Financial inclusion and the effectiveness of monetary policy in Vietnam: An empirical analysis

Bui Duy Hung, PhD
Division of Economics
Banking Academy, 12 Chua Boc Str, Dong Da, Hanoi
Tel: +84 4 38526416; Mobile: +84 911056397
Email: hungbui@hvnh.edu.vn

Abstract

This paper presents a simple model analyzing the relationship between financial inclusion and monetary policy in Vietnam from 2004 to 2015. Instead of using financial inclusion indicators individually, this paper has propose a financial inclusion index that captures information of financial access. The results of the study indicate that an increase of financial inclusion index would lower inflation, which is used as a proxy for the effectiveness of monetary policy. In addition, the lending interest rate of banks is in negative relation with the inflation in Vietnam. The negative coefficient between inflation and interest rate shows that if interest rate increases it will help to reduce inflation and vice versa. Lastly, this study investigated that, the ER, the price of one country's currency expressed in terms of another and inflation positively related mean that if ER increases it leads to inflation increases.

Key words: ATMs, Financial inclusion, monetary policy, banks services

1. Introduction

Studies have shown that in conjunction with financial depth, which measures the overall volume of financial services, financial inclusion (FI) is seen by most policymakers as a way to make financial development work for society. Many definitions of financial inclusion have been suggested, the most widely accepted ones is that "*FI is a process that ensures the ease of access, availability, and usage of the formal financial system for all members of an economy*" (Sarma, 2016). In more detail, FI refers to a state where individuals, including low-income people, and companies, including the smallest ones, have access to and make use of a full range of formal quality financial services (payments, transfers, savings, credit, and insurance) offered in a responsible and

sustainable way by a variety of providers operating in a suitable legal and regulatory environment.

To measure FI, in the literature, there are several approaches, the most commonly used indicators are number of bank accounts (per 1000 adults), number of bank branches (per million people), number of automated teller machines (ATMs) (permillion people), amount of bank credit, amount of bank deposits, and volume of bank credit and deposit as ratios of GDP etc. However, Sarma (2015) argued these indicators when used individually, they may provide incomplete information on the extent of FI in an economy, though they do provide useful information on various aspects of FI.

The financial sector in Vietnam has achieved remarkable progress since the establishment of two-tier banking system. Although, Vietnam is a low-middle income country, its financial sector is large, with total assets of 200% of GDP in 2011 (World Bank, 2014). After more than 25 years of reform, the financial sector now includes 99 banks and 30 non-banking financial institutions. The banking sector is domination with total assets is about 183 percent of GDP and 92 percent of financial institutions' assets. Non-banking financial institutions (including cooperatives) account for only 17 percent of GDP and 8 percent of financial institution assets.

Policies to promote financial inclusion have relied heavily on the interventions of policy banks, including the Vietnam Bank for Social Policies (VBSP), the Vietnam Development Bank (VDB) and the Vietnam Bank for Agriculture and Rural Development (VBARD), and a few SOCBs (World Bank, 2014). According to the World Bank Findex survey data, Vietnam has a higher level of credit account penetration for SMEs and individual account holders than comparators. However, in a research by Park and Mercado (2015), Vietnam has low financial inclusion and ranks 112th out of 176 countries. To promote financial inclusion, it is necessary to strengthen financial infrastructure, reform financial institutions and develop product market.

It is well-known that financial market plays an important role in the process of monetary policy transmission. The impact of monetary policy on the economy, to begin with, takes place *via* financial markets. However, the effectiveness of transmission process depends very much on the development of financial market, the degree of FI. The growing of FI would improve the effectiveness of monetary policy (Mbutor & Uba, 2013). According to Khan (2011) FI has positive impact on monetary policy transmission, the greater FI the more effective of transmission process.

The State bank of Vietnam (SBV), as a central bank of Vietnam, has managed monetary policy successfully keeping inflation at reasonable level and contributing to the economic development. The management of monetary policy has positive affected the growth of financial system whereby capital is effectively mobilized and allocated. However, monetary policy transmission process in Vietnam is weak and the best channels are credit and exchange rate (Bhattacharya, 2014; Le & Pfau, 2009). The weak monetary policy transmission can be improve through the implementation of financial sector, these reforms will probably help to trengthen the interest rate and bank credit channels of the monetary transmission mechanism (Camen, 2006).

In this paper, after the introduction, section II presents literature survey on links between financial inclusion, economic growth, financial stability and the goals of monetary policy. Section III discusses the methodology of analysis and data. In section IV, the results of econometric estimations are presented. Section V summarizes the paper with recommendations.

2. Literature review

In developed countries, financial inclusion is well-known topic, but there is an acute shortage of literature on this topic for developing countries. Moreover, the most of literature has focused on the effect of financial inclusion on growth, income inequality, and poverty reduction.

There are a number of studies on financial inclusion in developing countries. The most recent is study by Park and Mercado (2015), they find there are several factors have impact on financial inclusion including per capita income, rule of law, and demographic characteristics. These factors broaden financial inclusion, thereby contributing to poverty reduction and lower income inequality. Hannig and Jansen (2010) argue that greater financial inclusion presents opportunities to enhance financial stability, financial inclusion also has been shown to reduce income inequality. Financial inclusion is also found to have impact on the economy through modernization of agricultural sector in India by Kelkar (2010). Kelkar also found that the farmers' indebtedness were considerably lower by enhanced financial inclusion.

Individual and enterprises in an economy are also found benefited from financial inclusion as the improvement of access to financial services should help both consumers and producers to raise their welfare, productivity as well as reducing non-performing loans. Effective participation in financial markets and other factor markets is a precondition for effective participation in the economy. Access of disadvantaged groups to financial markets is therefore of strategic importance for social and economic development and social inclusion (Adenuga & Omotosho, 2013; Morgan & Pontines, 2014).

There is limited literature investigating the specific relationships between financial inclusion and monetary policy transmission. A number of studies focus on the role of financial inclusion in monetary policy transmission through interest rate channel. Mehrotra and Nadhanael (2016) analysed the links between financial inclusion and monetary policy, focusing on the interest rate sensitivity of output and prices, and the targets of monetary policy, in emerging Asian economies. Their findings indicate that the interest rate sensitivity of output is stronger in economies with a higher degree of financial inclusion.

A long-run relationship between financial inclusion and monetary policy is found in a study by Evans (2016). The positive interest rate has a positive and statistically significant permanent effect on the level of monetary policy effectiveness. Moreover, there exists a one-way causality from monetary policy effectiveness to financial inclusion, this means that monetary policy effectiveness is the driver of financial inclusion. Mehrotra and Yetman (2015) emphasized the effect of growing financial inclusion on monetary transmission through interest rate as a greater share of economic activity comes under the sway of interest rates.

In addition, impact of financial inclusion on the final target of monetary policy is inflation was also analyzed. A study on the impact of financial inclusion on monetary policy of South Asian Association for Regional Cooperation countries from 2004–2013, Lenka and Bairwa (2016) found that the impact of financial inclusion on monetary policy is highly significant, an increase of financial inclusion may reduce the inflation rate in an economy, which causes the stability of the price level. Financial inclusion was also found to have positive effect on financial stability in a study by Mehrotra and Yetman (2015).

In Vietnam, there is no specific study on the relationship between financial inclusion and monetary policy except for a research by Vo (2013) on regulations in financial market, restructuring of financial market and the effectiveness of monetary policy in Vietnam. In this paper, Vo analyzed the impacts of regulations in financial market and restructuring financial market on the effectiveness of monetary policy. He found that a greater involvement of private and foreign investor would increase the effectiveness of monetary policy.

3. Methodology and data

3.1. Model specification

Empirical studies on the impact of financial inclusion on either monetary policy or on economic growth mostly used financial inclusion indicators individually. However, as Sarma (2015) indicates, when these indicators used individually, they may provide incomplete information on the extent of FI in an economy. Therefore, instead of using each FI indicators as independent variables, this study uses a composite single value index to measure financial inclusion.

As we all know that, the main objective of monetary policy is to control inflation contributing to economic growth. Therefore, to measure the effectiveness of monetary policy, inflation is taken as a proxy variable. Thus the operating model is:

$$INF_{i,t} = \alpha + \beta_0 + \beta_1 FII_{i,t} + \beta_2 Ctrl_{i,t} + \mu_{i,t} \quad (1)$$

where: INF is inflation rate; FII is Financial Inclusion Index, which includes several financial accessibility variables like geographic penetration (commercial bank branches per 1,000 km^2, number of ATMs per 1,000 km^2), demographic penetration (commercial bank branches per 100,000 adults, number of ATMs per 100,000 adults), and banking penetration (Outstanding loans from commercial banks (% of GDP) and outstanding deposits with commercial banks (% of GDP)). The "Ctrl" are control variables which include commercial bank lending interest rate (IR) and exchange rate (ER). The study covers the data from 2004–2015. So the above model is extended to:

$$INF_{i,t} = \alpha + \beta_0 + \beta_1 FII_{i,t} + \beta_2 ER_{i,t} + \beta_3 IR_{i,t} + \mu_{i,t} \quad (2)$$

3.2 Data sources

The study used data for the period of 2004 to 2015. The scale of per 100,000 adults and per 1,000 Km^2 has been used for measuring the respective density of commercial bank branches and number of ATMs. Alongside, the data have also been taken about the volume of outstanding credits and deposits to the private sector as a proportion of country's GDP. The required data have been collected from the World Bank, Financial Access Survey from the International Monetary Fund. The data for Inflation, ER, and Lending Interest Rate were collected from the State Bank of Vietnam.

Regarding to FII, as there is no available data for this variable so the Principal Component Analysis method (PCA)[1] is employed to calculate Financial Inclusion Index. Here, the composite financial inclusion index has been formed by three dimensions where each dimension consist two factors. Therefore, in brief, our Financial Inclusion Index comprises three dimensions and six factors. The three dimensions are: *(i)* geographic penetration, which is measured by the number of commercial bank branches and the number of ATMs per 1,000 km^2; *(ii)* demographic penetration, which is measured by the number of commercial bank branches and number of ATMs per 100,000 adults; and *(iii)* banking penetration, which is measured by volume of outstanding credits and deposits of the private sector as a proportion of the total GDP of the nation. Through PCA method a composite single value Index was generated and showed in Table 1. In this table, one can notice from 2004 to 2008 IFI is negative, which means extreme condition of financial exclusion.

Table 1 Financial Inclusion Index

Time	Financial Inclusion index	Time	Financial Inclusion index
2004	-3.5492	2010	0.87280
2005	-2.7892	2011	1.35520
2006	-2.4270	2012	0.19486
2007	-1.4831	2013	2.19715
2008	-1.2405	2014	3.14184
2009	0.04511	2015	3.68166

Sources: Author's calculation using PCA method

4. Regression and discussion

4.1 Data properties

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[1] Please see Lenka, S. K. (2015). Measuring financial development in India: A PCA approach. *Theoretical and Applied Economics*, *22*(1 (602), Spring), 205-216 for more detail on PCA.

Table 2 presents the results of the Augmented Dicley-Fuller test (ADF) and Phillips-Perron test (PP) unit root test conducted on the included variables with the lag structure automatically determined based on the Schwarz criterion. The results revealed that all the variables are non-stationary at level but integrated of order one, implying the need to difference them once.

Table 2 Unit roots test

Variables	Augmented Dickey-Fuller test		Phillips-Perron test	
	Level	1st difference	Level	1st difference
INF	-2.228538	-5.242859*	-2.382023	-4.263020*
	(0.1973)	(0.0000)	(0.1486)	(0.0007)
Index	-0.583070	-12.31427*	-0.583070	-12.31427*
	(0.8545)	(0.0000)	(0.8696)	(0.0000)
IR	-2.337504	-6.386599*	-2.048046	-6.470581*
	(0.1618)	(0.0000)	(0.2662)	(0.0000)
ER	-1.754265	-9.928907*	-5.801640	-116.4895*
	(0.4019)	(0.0000)	(0.0000)	(0.0001)

*Note: P-value in ( ); * denote significant at 5%*

Given all variables are I(I), It is able to analyse the co-integrating relationships between variables. Johansen co-integration test is used to examine cointegrating relationships. The results of Trace and Maximum Eigenvalue test are summarized in Table 3, indicating that at the significance level of 5%, there is a co-integrating relationship between inflation and FII, exchange rate and interest rate.

Table 3 Johansen Co-integration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.196110	55.06524	47.85613	0.0091

At most 1	0.109138	24.28596	29.79707	0.1886
At most 2	0.052975	7.991175	15.49471	0.4664
At most 3	0.002242	0.316548	3.841466	0.5737

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.196110	30.77928	27.58434	0.0188
At most 1	0.109138	16.29478	21.13162	0.2081
At most 2	0.052975	7.674627	14.26460	0.4127
At most 3	0.002242	0.316548	3.841466	0.5737

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The co-integration equation is obtained from the Trace and Max-eigen test as follows (standard error in parentheses):

$$INF = -2.98Index + 0.00378ER - 2.18IR$$

$$(0.71) \quad (0.00067) \quad (0.3)$$

The results show that the estimated coefficients of FII, exchange rate and interest rate all have expected signs and is consistent with the theory. An increase of FII and lending interest rate would reduce inflation in Vietnam. Meanwhile, a depreciation of exchange rate would lead to a higher inflation rate. The presence of cointegration between variables suggests a long term

relationship among the variables under consideration. Then, the VEC model can be applied. The long run relationship between inflation, financial inclusion index, exchange rate, and interest rate for one cointegrating vector is displayed below in Table 4 (standard errors in ( ).

Table 4 Vector Error Correction model

Error Correction:	D(INF)	D(INDEX)	D(ER)	D(IR)
EC_t	-0.031690	0.003162	-146.2846	0.007826
	(0.01428)	(0.00486)	(32.3111)	(0.00945)
D(INF(-1))	0.657396	-0.019287	-116.0948	0.205653
	(0.09070)	(0.03085)	(205.150)	(0.05998)
D(INF(-2))	0.087856	0.065827	279.1647	-0.059425
	(0.09192)	(0.03127)	(207.928)	(0.06080)
D(INDEX(-1))	-0.231054	-0.057014	-66.31419	-0.097202
	(0.24877)	(0.08462)	(562.698)	(0.16453)
D(INDEX(-2))	0.157926	-0.045766	-25.42952	0.209534
	(0.24720)	(0.08409)	(559.158)	(0.16349)
D(ER(-1))	7.31E-05	-8.11E-06	-0.285044	-1.88E-05
	(5.0E-05)	(1.7E-05)	(0.11267)	(3.3E-05)
D(ER(-2))	3.13E-05	-5.08E-06	-0.142058	-6.50E-07

	(3.9E-05)	(1.3E-05)	(0.08736)	(2.6E-05)
D(IR(-1))	0.105610	-0.026369	-192.8662	0.346367
	(0.13971)	(0.04752)	(316.017)	(0.09240)
D(IR(-2))	-0.035170	-0.120703	-380.6961	0.074128
	(0.14095)	(0.04795)	(318.824)	(0.09322)
C	-0.016005	0.057051	66.06140	-0.006361
	(0.06927)	(0.02356)	(156.692)	(0.04582)
R-squared	0.620858	0.083439	0.421050	0.388593
Adj. R-squared	0.594810	0.020470	0.381275	0.346587
Sum sq. resids	82.35448	9.529353	4.21E+08	36.02314
S.E. equation	0.792881	0.269709	1793.467	0.524391
F-statistic	23.83525	1.325070	10.58574	9.251084
Log likelihood	-162.1606	-10.11633	-1251.243	-103.8661

To identify the effect of exogenous variables on inflation, only the first column in Table 4 is considered. It can be seen that the coefficient of the error correction terms (EC_t) is negative and statistically significant at 5 per cent level of significance. The significance of the error correction term suggests a long-term causality from financial inclusion index, exchange rate, and interest rate towards the inflation. The value of the coefficient of the error correction term (-0.031) shows that 3% of the adjustment towards the long-run equilibrium takes place per month.

In order to analyse the response of inflation to exogenous variables, an impulse response function is used. Figure 1 presents the results of impulse response function of inflation to a 1% of FII, ER, and IR. It can be seen that The responses of inflation to FII, ER, and IR are consistent with theory suggestions,

reacting positively to exchange rate and negatively to financial inclusion index and lending interest rate.

Figure 1 Impulse response function of inflation to a 1 standard deviation shock to index, exchange rate, and interest rate.

Response of INF to Cholesky
One S.D. INDEX Innovation

Response of INF to Cholesky
One S.D. ER Innovation

Response of INF to Cholesky
One S.D. IR Innovation
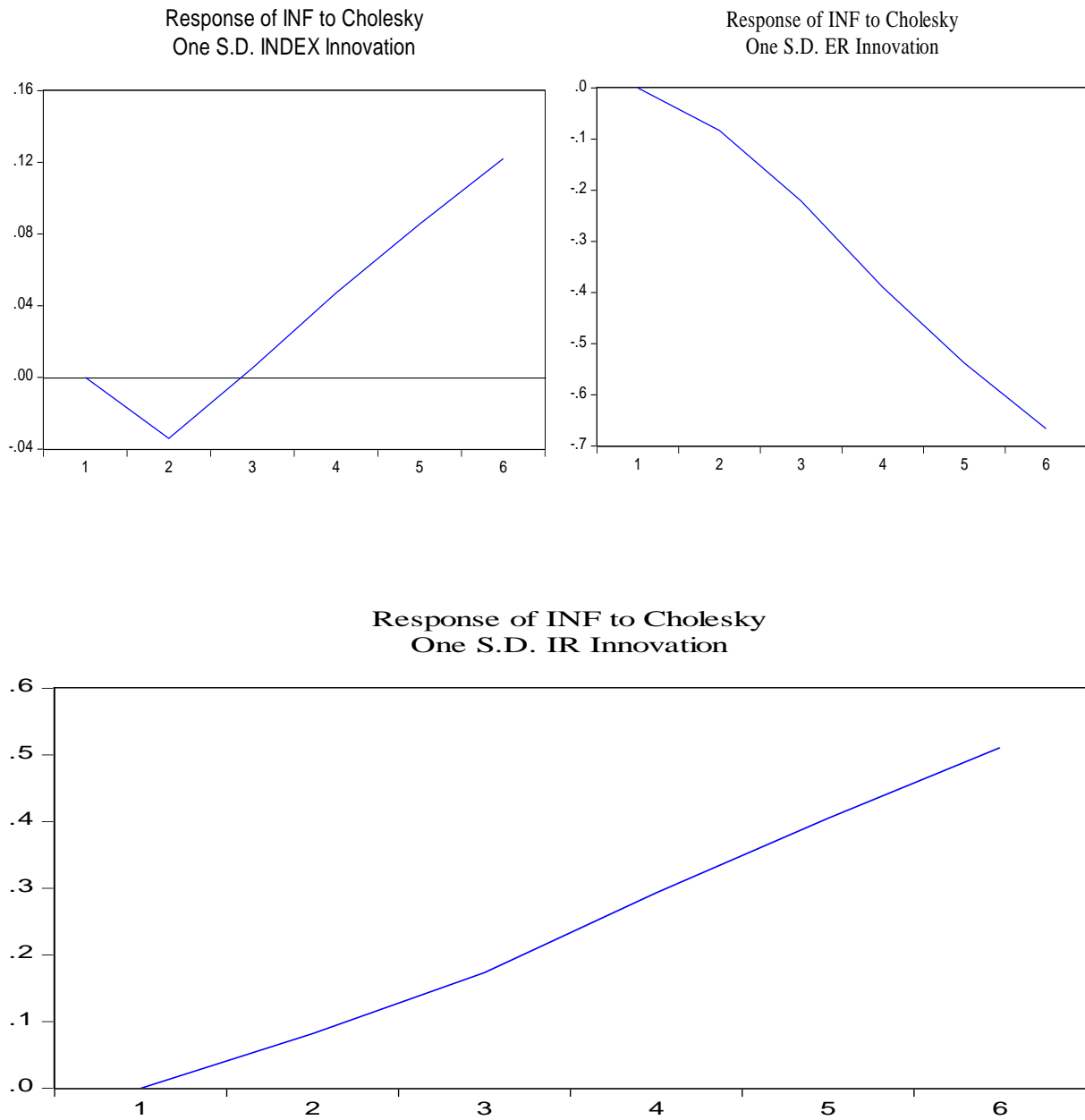
5. Conclusion and policy implication

The aim and objective of this paper is to examine whether financial inclusion can play a role in monetary policy implementation in Vietnam. In addition, the paper have proposed an FII, a multidimensional measure of financial inclusion index that captures information of financial access.

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The empirical analysis of this study finds that the impact of financial inclusion on monetary policy is significant. The relationship between financial inclusion and inflation, which was used for measuring effectiveness of monetary policy, is highly negative and statistically significant. It indicates that, if the financial inclusion increases then it may reduce the inflation rate in Vietnam. In addition, interest rate, which is proxied by the lending interest rate of banks, is in negative relation with the inflation of countries showing that if interest rate increases it will help to reduce inflation and vice versa. Lastly, the ER, the price of one country's currency expressed in terms of another and inflation positively related. It means that if ER increases it lead to increase the inflation. This result is consistent with the results of other studies on exchange rate pass—through.

Based on these research outcomes, the following implications can be drawn: It is important to improve efficiency of the domestic financial sector and the financial inclusion drive at the grass-root level, as financial inclusion helps to stabilize the price level and controls the inflation which is essential for sustainable economic growth.

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