

# Credit Market Depth and Income Inequality in Vietnam: A Panel-Data Analysis

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Received: 15 September 2015 | Revised: 08 January 2016 | Accepted: 18 February 2016

## **Abstract**

*Financial development could exert various effects on income distribution of a country. By employing Generalized Method of Moment, this paper aims at examining the impacts of credit market depth, one of most used financial development barometers, on income inequality in Vietnam. The empirical findings show that expanding credit market in the country could lead to higher income inequality. We have not found evidence that supports the hypothesis of an inverted U-shaped relation ever introduced by Greenwood and Jovanovich, although this hypothesis may still hold in a sense that Vietnam has not reached to the inflection point to generate such a curve alike.*

**Keywords:** Financial development; inequality; Vietnam.

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## 1. Introduction

Vietnam kicked off its economic reform since 1986 and has made a number of remarked achievements until present. Opening and liberalizing domestic markets and gradual integration into the world economy transformed a poor country with majority of population working in agricultural sector to a lower middle income country in around two decades. In period 1990-2010 particularly, the economy experienced annual economic growth rate of 7.3% on average, only below that of China globally (according to database of IMF, 2011). Successively high economic growth rate has resulted in the poverty rate of the country dropping dramatically to around 13% (percentage of population earning less than 2USD/day) from over 85% during 1993-2013 (World Development Indicators). At present, poverty rate by national standard is around 7.2% only.

In another corner of the economy, one aspect of social development could be treated as a big challenge confronting Vietnam in the long-run that the income gap is widening, manifested in rising trend of Gini coefficient. This common measure of overall inequality of the country was 0.34 in 1993, went up to 0.422 in 2012. High inequality does harms to economic growth and sustainable development in the long-term (Alesina and Perotti, 1994; Alesina and Rodrik, 1994; Persson and Tabellini, 1994). High social disparity would require a huge resource to take over its repercussions once perception and awareness of social groups about it move upward. Social discontent in Egypt in 2011 was justified due to the fact that gap between the rich and the poor had bulged to a level that its people could not stand more (World Bank,

2014a). Also according to World Bank (2014a), 76% of urban population and 53% of their rural counterpart in Vietnam expressed concerns the uptrend of inequality. More strikingly, the expression of adolescent and young population is more intensified than that of other groups, which means the perception at least in one next generation will increase. And inequality is one of major determinants that influence a developing country like Vietnam to be able to escape from middle income trap (Ohno, 2010).

The positive role of financial market development, especially the banking system, has been demonstrated some research works, such as those by Tran (2008), Nguyen and Anwar (2009), Nguyen (2011). Chu and Le (2013, 2015) try to inspect the effects of financial development on income inequality in Vietnam and come across some conflicting findings depending on alternative proxies of financial development and analysis approaches. Nevertheless, none of the above works has made an effort to examine the impact of credit market depth, one of the most used measures of financial development in economics literature. Thus by analyzing panel provincial level data this paper targets to fill the existing gap in literature of finance-inequality nexus prevailing in Vietnam.

The rest of the paper is organized as follows: Section 2 presents a brief literature review; Section 3 provides some overview of credit market development and income inequality in Vietnam; model specification and methodology are outlined in Section 4; and finally Section 5 displays empirical findings and concluding remarks.

## 2. Literature review

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There are two main strands of theory about financial development-inequality nexus until today. Out of the two, the one developed by Greenwood and Jovanovic (1990) states that financial development leads to higher inequality in early stage of economic development, only has narrowing effects after it matures, also known as non-linear or inverted U-shaped hypothesis. The other one proposed by Galor and Zeira (1993) and Banerjee and Newman (1993) predicts that higher level of financial development could result in lowering income gap, known as linear hypothesis. Aghion and Bolton (1997) provides a trickle-down theory which implies that when capital accumulation is high enough, a governmental policy could still make income distribution more equal if it redistributes more wealth of the richer lenders to poorer borrowers, which could be done through credit allocation mechanism.

Based on those theoretical frameworks, a variety of empirical studies have been done in various scopes of geography. The empirical evidences that support linear hypothesis could be found in works by Liang (2006a, 2006b), Jalil and Feridun (2011) for case of China, or Ang (2010) for India. Falling in this category are studies by Muhammad et al. (2012), Baligh and Pirace (2013) in Iran, Shahbaz and Islam (2011) in Pakistan, or Bittencourt (2010) in Brazil. As for cross-country studies, research works by Clarke et al. (2003), Jauch and Watzka (2012), Batuo et al. (2010), Kai and Hamori (2009), or Kappel (2010) are typical ones that conclude financial development could help alleviate income inequality.

However, a number of other works recently conducted have shown the opposite outcomes.

Law and Tan (2009) find no evidence to support linear hypothesis in the case of Malaysia. Also in Malaysia, financial development could only reduce inequality after institutional quality has reached a certain threshold (Law et al., 2014). One study in China by Zhang and Chen (2015) observes financial development enlarge urban-rural income gap. Cruz and Imperial (2014) even witness a U-shaped relation, rather than inverted version, in the case of the Philippine. Dhrifi (2013) concludes that financial development could only reduce inequality in developed country; the effects are reverse in less developed ones. Among African countries, it is uncertain that financial development would promote equality (Fowowe and Abidoye, 2013).

In Vietnam, Nguyen et al. (2007) find that access to micro-credit provided by Vietnam Bank for Social Policies could not only alleviate poverty but reduce slightly income inequality as well. Studying at provincial level over 2002-2008 and using some indicators of financial companies as proxies for financial development, Chu and Le (2013) find that broader financial access is correlated with lower Gini coefficient. On the contrary, employing method of generating proxies for financial development from data of Vietnam Enterprises Surveys to regress with Gini coefficient, Chu and Le (2015) show evidence to conclude that financial development would widen income gap. Apart from these studies, to the best of our knowledge, there is no other research work implemented to verify the potential impact of credit market depth on income inequality in Vietnam. This is the main motivation for the current paper to be conducted.

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### **3. Overall credit market development and income inequality in Vietnam**

#### ***3.1. Credit market development***

Financial and banking system of Vietnam existed since the 1950, but had not been really active until early 1990s when the economy began to transit from central planned regime to a more market based one. And although stock market officially came into operation since second half of 2000, banks are the main players in Vietnam financial market. At the end of 2011, total assets of Vietnam financial system is around 198% GDP, and share of banks system accounts for 86% out of this figure (World Bank, 2014b). The number of banks in the country had increased dramatically from only 9 banks in 1991 to 56 banks within half a decade. The number of banks hit a plateau of around 50 for in another half decade with declining trend in recent years due to government pushing up re-structuring the system of credit organizations. At the end of 2015, Vietnam has around 30 active commercial banks.

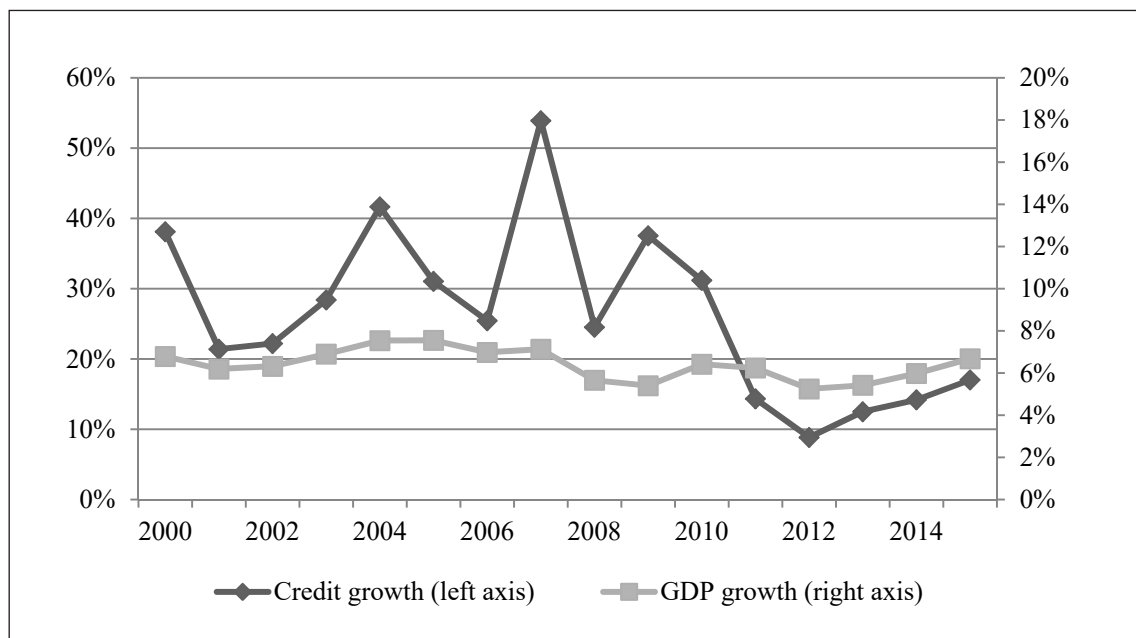
Since 2000 to 2010, credit grew rapidly at average rate 30% year-on-year, peaking at nearly 54% in 2007 (Figure 1). Successively high growth rate of credit contributed in rising financial depth of credit market. According to ADB (2015), outstanding domestic credit claimed by private sector (as percentage of GDP) in 1999 was only equivalent to 22%, rose to 61% in 2005, almost doubled in 2010 at 115%, then dropped to 100% in 2014.

On reviewing the history of credit market development in parallel with economic growth, we have been gleaned one argument that Vietnam for a long period had pursued a model financial market development taking credit ex-

pansion as driving factor of economic growth, but a major part of credit in the economy had not been translated into real productive activities, such as agriculture, manufacturing. Instead, credit had been diverted into speculative investment like construction, and other business areas of trading and services. For example, at quarter 3 of 2015, data released by State Bank of Vietnam shows that only less than 10% and 25% of total credit was poured into agricultural and industrial production respectively, while the rest was allocated to construction and other services. Results of Vietnam Household Living Standard surveys during 2002-2012 also revealed that around 55-59% of communes in the whole country grasp difficulties in accessing formal credit market. Additionally, approximately 97% of domestic private enterprises in the country are of small and medium size but 70% out of these enterprises face challenges or are be able to capture a credit line from formal financial institutions (according to an unpublished report of Ministry of Planning and Investment). These facts explain why GDP growth is not substantially correlated with credit growth in Vietnam as depicted in Figure 1.

Linking to income distribution issue, the facts about credit boom in Vietnam mean that credit market has been mainly serving elite groups for ages, either business or political-relating groups. Thus this kind of credit market should hurt marginalized groups rather than richer groups. Until the end of 2014, almost 46% the country population still live in rural area and take farming activities as the main livelihoods (GSO, 2015). Furthermore, because credit growth does not promote material

**Figure 1: Credit growth and GDP growth 2000-2015**



Source: State Bank of Vietnam

production sector, it does not exert spill-over effects on job creation and equal income opportunities for a low-skilled laborers who account for a large proportion of population in the country. Only a minority of people who have a certain degree of financial knowledge could benefit from credit market expansion. For instance, some of those could borrow and invest in stock market, or those living in urban areas that could access to financial services much easier.

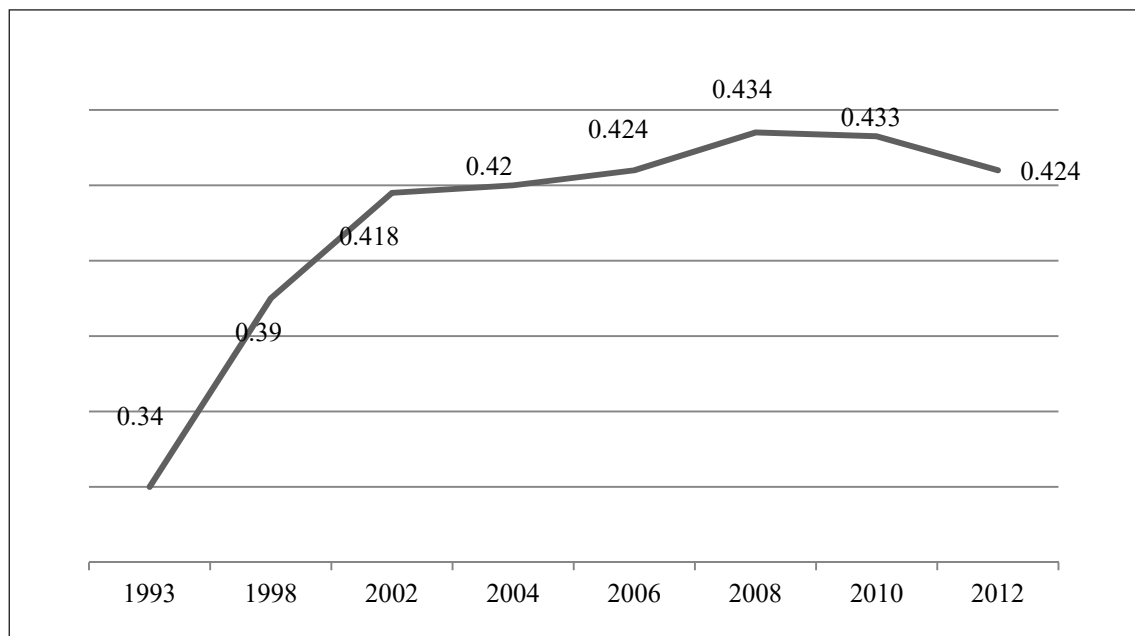
Trickle-down theory of Aghion and Bolton (1997) may fit under circumstances in Vietnam. Accordingly, most of poor or low-income household does not own wealth and properties that are worthy enough to encourage themselves to pursue a venture with high return rates. Instead, they lend money (savings) in

credit market where banks will allocate this money to richer borrowers. The richest households may lend money (redundant money after investing in a business) due to profit-maximization behavior. Given that banks center mainly in urban area and poor households live in rural area, it implies that credit market is relative a channel to transfer financial resource of less well-off population to more well-off population, so it may be intensifying income disparity. Nevertheless, this argument should be empirically tested.

### 3.2. Income inequality in Vietnam

In general, income inequality in Vietnam has a rising trend with Gini coefficient consecutively increases from 0.34 in 1993 to 0.433 in 2010 (Figure 2), slightly in 2012. But this pattern of inequality implies a new downtrend afterwards

**Figure 2: Evolution of overall Gini coefficient in Vietnam (1993-2012)**



Source: Results of VHLSS 2012

if we put a glance at other measures of overall inequality. As shown in Table 1, income share of 40% poorest population has continuously decreased over a decade, transforming the country from a relative equality to medium inequality. This trend is strengthened by increase in the income gap between the richest quintile and the poorest quintile.

A variety of studies has been conducted in Vietnam to investigate the determinants of in-

come inequality, both qualitatively and quantitatively. For instance, works by Le (2010), Nguyen and Pham (2012) emphasize differences in income may be derived from differences in social-economic conditions, education attainment, culture, lifestyle. These factors influence capacity and accessibility of individuals or social groups to various resources, and the way they choose livelihood strategies, leading to income disparity. From a macroeconom-

**Table 1: Indicators of income inequality in Vietnam (2002-2012)**

Year	2002	2004	2006	2008	2010	2012
“40%” standard of World Bank	17.98%	17.4%	17.4%	16.4%	15%	14.9%
Income gap (5 <sup>th</sup> Quintile/1 <sup>st</sup> Quintile)	8.1	8.34	8.37	8.93	9.23	9.35

Source: Results from VHLSS 2012

ic viewpoint, income inequality in Vietnam largely roots from its growth model (Le, 2010). More specifically, some macroeconomic variables such as trade openness, inflation, public investment has been found to be determining components of inequality (Chu and Dong, 2015). And as primarily suggested from trick-down theory, credit market development may also a candidate that exacerbates the state of income distribution of the country.

#### 4. Model specification, data and methodology

##### 4.1. Model specification

As we use a panel-data approach at provincial level, model specification is as follows:

$$Gini_{i,t} = \beta_0 + \beta_1 Gini_{i,t-1} + \beta_2 CRED_{i,t} + \beta_j X_{i,t} + \mu_i + \varepsilon_{i,t}, \text{ where } j > 3 \quad (1)$$

In this equation, Gini is Gini coefficient; taking value from 0 to 1 with bigger value resembles higher inequality. CRED is abbreviation for credit market dept, computed by taking domestic credit claimed by private sector as percentage of GDP. X is a set of other control variables including:

GDPPC - be GDP per capita in real term at comparable 1994 price). EDU- a proxy for educational attainment. In this study, we use number of schooling years of household head. Other measures, such as literacy rate or ratio of secondary school enrollment could also be used as proxy for educational level. TRADEOP - a proxy for openness of the economy, calculated by sum of import and export revenue as percentage of GDP. INF is abbreviation of inflation, represented by consumer price index (CPI).

Testing if impact of CRED on Gini would

be changed under various contexts of government intervening into redistribution is made through fiscal policy. Rationale for including these variables is that government size (GEX) in Vietnam am (measured by expenditure size over GDP) is said to be high, and public investment is of low efficiency. Indeed, RGX (recurrent expenditure as percentage of GDP) of the whole country is much higher than DGX (government expenditure for socio-economic development as percentage of GDP). Also, we include FDI (foreign-owned sector investment as percentage of GDP) and to see if presence of FDI company would help promote some equality. PINV (proxy for private sector investment) and SINV (proxy for state sector investment) are added, too.

Finally, we add squared term of CRED (sq-CRED) into the model so as to test the non-linear relationship suggested by Greenwood and Jovanovic (1990).

##### 4.2. Data

Data used in this paper for empirical analysis is collected from following sources: Gini coefficient is calculated by author from VHLSS (Vietnam Household Living Standard Survey). Since 2002, General Statistics Office of Vietnam (GSO) conducts VHLSS every two years. The survey is designed to cover the whole country to represent the socio-economic changes of the country at national and provincial level. Data of education in the model is also computed from these surveys in corresponding years. Of these surveys, VHLSS 2002 contains information of 29,530 households, other VHLSS from 2004-2012 contains information of over 9,100 households.

Data for generating other variables in the



model is collected from GSO, which includes: GDP, import and export revenue, public expenditure (recurrent and development), total social investment by ownership, inflation. One note is that Vietnam today has 63 cities/provinces but there happened some events of splitting and/or merging some provinces (for example, Can Tho was separated into Can Tho city and Hau Giang province in 2004, Dak Lak was divided into provinces Dak Lak and Dak Nong, or in 2008 Hanoi city and Ha Tay province were merged into Hanoi today) during 2002-2012, so in order to have a balanced panel data without reducing observations, we combine data of pair of respectively separated/merged provinces for the whole studying period. Thus primary data set contains a panel of 60 provincial observations (N) in 6 years (T).

There is no official or unofficial source to collect data of credit market size at provincial level. Indeed, we only have data of credit market size as a whole of the country released by State Bank of Vietnam. In some other cases, we found the sum of credit claimed by grouped provinces known as an administrative region. Fortunately, data about GDP generated by financial sector in each province/city could be traced in provincial agencies of General Statistics of Vietnam. Given that, we refer to a method employed by Bittencourt (2010) to construct the value of credit market depth at provincial level in Vietnam as follows:

$$CRED_{i,t} = \frac{GDPF_{i,t}}{\sum_{i=1}^n GDPF_{i,t}} \frac{\sum_{i=1}^n CRED_{i,t}}{GDP_{i,t}} 100\%$$

Where  $GDPF_{i,t}$  represents GDP by financial sector of province  $i$  in year  $t$ . Summation mark in  $\sum CRED$  implies the sum of grouped prov-

inces which is already known.

After the above process, we find that Hanoi city has a much higher value of CRED than all other provinces/cities, which makes it potentially an outlier. Therefore, we intend to remove Hanoi out of dataset before regressing. The final dataset is a balanced panel with T=6 and N=59.

### 4.3. Methodology

#### 4.3.1. Generalized Method of Moments

Theoretically, there could be some technical problems in equation (1) when exploiting panel data, which if unsolved would lead to inefficient estimates. These may consist the followings:

(i) Some variables may be endogenous. For instance, advancement in information technology in some previous years could result in an expansion of credit market in current years for it makes banking transaction faster and consolidated. Or, this variable could also be a pre-determined one in a sense that it is affected by shocks in the past, for example or policy that contracted or loosened money supply and interest rates in one or two year ago which would certainly exert considerable effects on credit market operation in current or coming years.

(ii) Fixed effects within the data may prevail; and the effects may correlate with other explanatory variables in the model;

(iii) Income inequality is of dynamic process, which means that level of inequality in current period is influenced by the past ones;

(iv) And last, but not the least, panel data with short T and large N.

With those mentioned problems, OLS estimates would be biased, the regression findings



could be unreliable to refer in real context. To address problem (i) (and maybe problem (ii)) methodology of instrument variable could be employed. However, if the instruments are weak, the estimates could still be biased and inefficient. According to La Porta et al. (1997), a factor which has effects on credit market depth without being affected in reverse order should be a good instrument, such as legal origin or rules of laws for financial sector, or the rights of the lenders. However, in the case of our study, law system or rights of lenders are the same among provinces, and that these factors do not really change over the investigating period. Thus it is difficult to find a strong instrument.

Together with problem (iii) and (iv), following suggestion from other research works conducted internationally, such as those by Liang (2006a, 2006b), Batuo et al. (2010) or Chu and Le (2015), we utilize Generalized Method of Moment (GMM) to analysis the dataset for the case of Vietnam. In practice, Difference GMM (DGMM) could be used to generate empirical results by taking first-difference and regress the following transformed equation:

$$\Delta Gini_{i,t} = \beta_1 \Delta Gini_{i,t-1} + \beta_2 \Delta FD_{i,t} + \beta_3 \Delta X_{i,t} + \Delta \varepsilon_{i,t} \quad (2)$$

Such transforming process removes fixed effects  $\mu_i$  because these componets do not vary over time. However, estimating equation (2) still requires good instruments to address endogeneity problem of variable FD as well as auto-correlation between new error term ( $\Delta \varepsilon_{i,t}$ ) and lagged first-difference dependent variable ( $\Delta INEQ_{i,t-1}$ ). While seeking for exogenous instrument is not feasible, constructing instruments through using lagged variables that already exist in the model is highly possible. Supposing  $E(\varepsilon_{i,t} | X_{i,s}) = 0$  given that  $t > s$ , then

second or higher order lag of variables in the right hand side of the model could be treated as instruments. This condition holds if serial correlation in  $\varepsilon_{i,t}$  does not exist in the model. Nevertheless, DGMM may still contain limits because taking first order differentiation would make cross-province and within-province long-term information disappear. Furthermore, lagged variables could be weak instrument for its differenced variable. To solve this, we could use an alternative technique which uses both lagged differenced dependent and independent variables as instruments. Specifically, if  $\varepsilon_{i,t}$  is not serial correlated, then first order differenced variables in the model could be suitable instruments. Arellano and Bond (1991) reckon a more efficient System GMM (SGMM) could be established by combining characteristics of first differenced equation and that of equation (1). To compare different estimating techniques and methodologies, Soto (2009) implements simulations with panel data of short T and large N, and finds that estimates produced by SGMM is better than most of other regression techniques, including DGMM. This reinforces our choice of using SGMM to test empirically the impacts of credit market depth on income inequality in Vietnam.

#### 4.3.2. Test of auto-correlation

As mentioned, when using SGMM, second or higher order lagged variables could be suitable instruments providing that there is no auto-correlation in equation (1). However, if there exists first order serial correlation in  $\varepsilon_{i,t}$ , then  $Gini_{i,t-2}$  will be endogenously related to  $\varepsilon_{i,t}$  because  $\varepsilon_{i,t-1}$  is a component in  $\Delta \varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$ . Thus  $Gini_{i,t-2}$  could not serve as an appropriate instrument, higher order lagged variables are

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required. To test phenomenon of auto-correlation, Arellano-Bond is applied with error term in differenced equation. Because both  $\Delta\varepsilon_{i,t}$  and  $\Delta\varepsilon_{i,t-1}$  contain the component  $\varepsilon_{i,t-1}$ , error term in differenced equation is expected to be negatively related to each other. Therefore, to test for first order auto-correlation in equation (1), we examine second order correlation in differenced equation, which equals testing auto-correlation between  $\varepsilon_{i,t-1}$  (present in  $\Delta\varepsilon_{i,t}$ ) and  $\varepsilon_{i,t-2}$  (present in  $\Delta\varepsilon_{i,t-2}$ ). Generally, to test for k-order auto-correlation - AR(k) in level equation, we inspect AR(k+1) in differenced equation.

Null hypothesis, H0, in this test is that: “No second order auto-correlation in differenced equation”

By default, test results tend to accept AR(1) in differenced equation, but we expect to a rejection of AR(2) to be able to use second or higher order lagged variables as instruments. If AR (2) holds, we have to restart testing process for higher order auto-correlation

#### 4.3.3. Test of over-identification

Using SGMM, a model is said to be under-identified, exactly identified or over-identified if number of instrument is less than, equal, or greater than number of parameter to be estimated. Sargen/Hanses test will indicate the overall validity of set of instruments. However, there is no instruction of how much instrument is too many (Roodman, 2006). Moreover, when executing robust regression to correct problem of heteroskedasticity, Hansen test of over-identification could be unreliable. We therefore, suggested by Roodman (2006), apply rule of thumb that number of instruments does not exceed that of observation groups, which is 60 in this research paper. Null hypothesis in Sargan/

Hansen is: “*the instruments are exogenous*”. In this test, the greater p-value the better the instruments.

## 5. Empirical results

We bear in mind an argument that Vietnam has been following a financial market development model that triggers speculative investment. So coefficient of variable CRED is initially slated to be positive. The results seem to satisfy our expectation. Accordingly, we run six different regressions, and all these regressions deliver similar results. Specifically, the coefficient of CRED falls in range of 0.0022 to 0.0024, which could be briefly interpreted that on average, a province whose credit market depth (or size) is one percentage point higher than that of another province, its Gini coefficient would be roughly 0.23% higher.

In addition to the findings for targeted variable CRED, our empirical results strongly emphasize the importance of raising educational level as a tool to alleviate inequality, whereas higher volatile economic environment, manifested CPI, obviously does not favor the poor. The taking on a positive sign, though not statistically significant in all regression, of coefficient of real GDP per capital (RGDPPC) implies that economic growth in the country may have an inequality-widening effect (at least over period 2002-2012). We do expect fiscal policy, reflected in government size as a whole or in recurrent public expenditure and/or public expenditure for socio-economic development would hinder equality, but we are unable to answer within this study. Similar situation is applied regarding the role of state sector investment and domestic sector investment. Lastly, there is a little obvious evidence that the

**Table 2: Regression results for the impact credit market depth on income inequality  
{dependent variable: ln(Gini)}**

Explanatory variables	I	II	III	IV	V	VI
L.Ln(Gini)	0.1418 (1.57)	0.1232 (1.42)	0.1225 (1.27)	0.1354 (1.57)	0.1643* (1.82)	0.1974** (2.05)
CRED	0.0023*** (4.14)	0.0022*** (3.88)	0.0023*** (4.02)	0.0022*** (3.75)	0.0022*** (3.28)	0.0024*** (2.72)
RGDPPC	0.0016 (1.17)	0.0021* (1.97)	0.0019 (1.62)	0.0020* (1.86)	0.0015 (1.20)	0.0012 (0.70)
EDU	-0.0334*** (-3.70)	-0.0323*** (-3.57)	-0.0328*** (-3.60)	-0.0309*** (-3.33)	-0.0305*** (-3.32)	-0.0302*** (-3.21)
INF	0.0038*** (3.51)	0.0039*** (3.52)	0.0040*** (3.31)	0.0039*** (3.62)	0.0038*** (3.54)	0.0034*** (2.83)
TRADEOP	-0.0001 (-0.68)	-0.0001 (-0.57)	-0.0001 (-0.66)	-0.0001 (-0.07)	-0.0000 (-0.06)	0.0003 (1.17)
GEX		0.0007 (1.11)		0.0007 (1.05)		
RGX			0.0003 (0.20)			
DGX			0.0008 (0.27)			
SINV					0.0004 (0.48)	
PINV					-0.0004 (-0.34)	
FINV				-0.0019* (-1.71)	-0.0020 (-1.60)	
L.SINV						-0.0003 (-0.21)
L.PINV						-0.0020 (-0.96)
L.FINV						-0.0077* (-1.91)
No. of Obs.	295	295	295	295	295	295
No. of instrument	21	22	23	23	24	24
AR(1) test	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) test	0.780	0.842	0.832	0.873	0.833	0.897
Hansen test	0.305	0.287	0.256	0.291	0.290	0.480

Notes: numbers in bracket (.) indicate t-statistics, and asterisk marks with (\*), (\*\*) and (\*\*\*) indicate the estimated coefficients are statistically significant at level of 10%, 5% and 1% respectively. We report Hansen test of over-identification because of using robust regression to correct heteroskedasticity.

presence of FDI sector helps to deplete some inequality. This could be true given that FDI companies in Vietnam mostly focus on taking advantage of cheap and low-skilled labor,

which results in lowering income gap between low skilled laborers and high-skilled ones.

As for testing the existence of an inverted U-shaped relation, we in turn add squared term

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of CRED into the model and adopt the same regression techniques. As the results, none of sqCREDIT coefficients is found to be statistically significant at least at 10% level. Therefore the analysis does not provide adequate evidence to support the hypothesis of Greenwood and Jovanovic (1990). However, the inverted U-shaped hypothesis may still hold in the case of Vietnam. The justification is that Vietnam is now at early stage of its development path, and maybe it has not yet reached the critical point that after this point inequality would tend to reduce.

## 6. Conclusion and policy implications

Theories about finance-inequality nexus vary, and empirical results all over the world vary, too. A number of empirical works have supported the linear hypothesis forwarded by Galor and Zeira (1993) or Banerjee and Newman (1993), whereas recently more and more studies does not exhibit the same story. In this paper, on dissecting a panel data 59 provinces/cities in Vietnam over the period 2002-2012 to examine the potential impact of credit market depth on income inequality. The empirical results half-support the non-linear hypothesis that expanding credit market in the country

would lead to higher level of inequality. The results also confirm the important role of education in fighting against inequality, while macro-economic volatility intensifies disparity.

Credit market is essential to drive economic growth, and inequality during the booming era of credit market is inevitable in Vietnam. It is due to the fact that a majority of population lives in rural area while banking system is mainly based in urban area, and large proportion of labor force is low-skilled and has got less income and properties, which lower the chance those people could pursue economic opportunities posed by credit market expansion. Therefore and in the current circumstances of Vietnam, it could be able to draw some policy implications from the above findings. Firstly, government should direct flows of credit to real economic activities rather than speculative investment. Secondly, more bank credit should be allocated to rural area and agriculture. Thirdly, government should also seek to design favorable credit program that promote education of overall population, especially of those living rural a poor economic conditioned areas and ethnic minority. And fourthly, State Bank of Vietnam should be solely entitled to implement policy that takes price level control as a primary goal.

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