

# The Relationship between Net Foreign Assets Positions and Financial Development – Cases from Developing Countries in Asia

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**Abstract:** This research examines the relationship between the net foreign asset position (NFA) and financial development of ten developing countries in Asia over the period 1973–2013. Using the Pooled Mean Group (PMG) method, the research results provide empirical evidence that financial development (measured through private credit/GDP ratio and bank credit to bank deposit ratio) contributes to the reduction in the net foreign asset position in the long run of a country, thus reducing the current global imbalance.

**Keywords:** Net foreign assets, financial development, PMG estimation method.

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## 1. Introduction

Net foreign asset position is the difference between the value of overseas assets of a country and its value of domestic assets owned by foreign countries. In other words, NFA is the difference between the assets owned by a country and its debt. Thus, NFA can be used as a measure of debt level of a country.

Bernanke (2005) explains that the current account deficit of the US and the current account surplus of developing countries is a global saving glut that causes imbalance in the global economy. This situation has occurred since the 1997-1998 financial crisis in Asia when some developing countries began to accumulate foreign reserves, leading to the current account surplus. According to Caballero, Farhi & Gourinchas (2008), manufacturers and emerging markets need safe and liquidised financial instruments to save their new asset values and the US financial market is an ideal place for them. This resulted in an influx of capital from emerging countries to the US financial market, mainly into the US governmental bond market, creating cash flows from poor countries to rich countries (Alfaro, Kalemli-Ozcan & Volosovych, 2008). According to Bernanke (2005), to improve this situation, emerging markets need to develop a healthy and stable financial market to reverse capital flows from the US. The global saving glut is one of the explanations for the global financial crisis 2008-2009. However, this argument is not completely convincing because many scholars suspect that if there were not high savings in developing countries, would the world avoid the financial crisis or are there other reasons. This suggests that the argument about the reasons of the crisis will keep going on.

However, it is undeniable that a robust financial system helps a country to diversify risks, effectively allocate capital, boosting its economic growth. Therefore, the relationship between financial development and NFA calls for in-depth studies. To date, not many studies have provided empirical evidence on the relationship between NFA and financial development, especially the long-term relationship between NFA and financial development.

Studies on this topic in developing countries including Vietnam are still limited. Most of the studies about NFA in Vietnam focused on the impact of monetary policies, which include NFA, on the economy of Vietnam in general, however, they did not analyse the relationship between NFA and financial development. Therefore, this research was conducted in an attempt to examine the relationship between NFA and financial development of developing countries in Asia.

## 2. Literature Review

### 2.1. Net Foreign Asset Position

World Bank defines “net foreign assets” of a country as the total foreign assets held by the central bank and banks minus foreign debt of that country (World Bank, 2016). Another definition of a country’s NFA is changes in the accumulative current account balance (Investopedia, 2016). NFA indicates whether a country is a net creditor or debtor in comparison with the rest of the world. Positive NFA indicates the net creditor while negative NFA means the net debtor. Lane & Milesi-Ferretti (2000, 2007) provide a detailed discussion on the measurement/calculation of net foreign assets. According to these authors, the prosperity of a nation is reflected in its net foreign assets. NFA at any given time can be measured by the previous position plus the balance of capital accounts and cumulative current accounts. The accumulation of net foreign accounts in developing countries, especially East Asia, has recently attracted attentions of politicians, scholars and the media because of the scope and the persistent deficit in the current account of the US.

In this study, NFA is understood as the difference between the foreign asset value of a country and its domestic asset value owned by foreign countries. In other words, NFA is the difference between the assets owned by a country and its debt. This is a measure of debt level of a country.

### 2.2. Financial Development

King & Levine (1993) always stressed the importance of financial sectors to the economic growth of a country. Accordingly, financial development can be understood as policies, factors and institutions that help intermediary financial institutions and financial markets operate effectively. A strong financial system enables risk diversification and effective capital allocation. Developed financial markets have a higher ability to attract saving resources and allocate capital to highly profitable projects. A developed financial system also opens up the opportunity for economic development, thus entailing credit allocation, opportunities for reducing personal savings, and a stronger focus on social values of the projects. Therefore, recent quantitative studies used the ratio of private credit to GDP to represent the FD index of a country (Binici, Hutchison & Schindler, 2010; Lane & ctg, 2007).

### 2.3. Empirical Studies on Net Foreign Asset Position and Financial Development

There are not many studies on the relationship between NFA position and

financial development and more importantly the results of these studies are inconsistent.

First of all, one pioneering work is of Lane & ctg (2000) which examines the relationship between NFA and financial development based on a sample of 132 countries. The authors show that the relationship between NFA and financial development does not exist. Lane (2000) used an observation sample of 19 OECD countries and found that trade openness and financial development has a positive correlation with the total asset and foreign debt of a country. Taking a different approach, Chinn & Ito (2007) estimated the model with the control of financial depth and interactions with other variables such as institutional development and financial openness of Asian Pacific countries during the period 1971-2004. The authors found that financial development has non-linear impacts on current accounts, and the non-linear impacts of the financial openness on current balances depend on national characteristics of capital account openness and legal system.

Mendoza, Quadrini & Rios-Rull (2009) argues that investors from developed countries are willing to accept risks when investing in emerging countries if the financial development in these countries can offset the risks. As a result, developed countries will be in a positive net foreign asset position (creditors) while developing countries will be in a positive net debt position (borrowers). In other words, the net debt position and the net asset position of a country slow its financial development. A study of Binici & ctg (2010) found that financial development represented by the ratio of private credit to GDP has strong influence on the stock capital and debt inflows into the countries, but it does not influence capital outflows.

Vermeulen & De Haan (2014) investigate the relationship between financial development and the net foreign asset of 50 countries during the period 1970-2007 using the PMG method. Their results indicate that financial development reduces NFA in the long term. In addition, financial development increases the owner's net equity. The results of this paper are consistent with the estimation theory of Mendoza et al. (2009).

### **3. Methodology and Data**

#### **3.1. Methodology**

This research is based on the model of Vermeulen & ctg (2014) to investigate the relationship between NFA and financial development as given below:

$$NFA_{i,t} = \alpha + \beta_{1,i,t} * FD_{i,t} + u_{i,t} \tag{1}$$

in which: *i* – country (*i* = 1,2,3,...10); *t* is the year (*t* = 1,2,...*T*);  $\alpha$  – root coefficient of a country;  $u_{i,t}$  is the surplus of all *i* countries;  $NFA_{i,t}$  –  $NFA/GDP$  of the country *i* during the *t* period.

Erauskin (2015) provided two ways for NFA calculating as follows:

The first way, NFA1: the ratio of external stock capital minus debt of the domestic economy to internal assets. Assets and debt include direct stocks together with capital investment portfolio, debt investment portfolio, other investment assets (the government, banks, and other organisations), derivative finance and reserve assets (except gold). This is a complete method suggested by the models.

The second way, NFA2: the ratio of stocks of debt investment portfolios, other investment assets (the government, banks and other organisations), derivative financial assets, and reserve assets (except gold) minus debt from debt investment portfolio stocks, other investment debt (of the government, banks and other parties), and derivative financial debt to the domestic assets.

We adopted the second way of calculating NFA of regressions.

$FD_{i,t}$  is the financial development index of *i* country, which is represented by the ratio of private credit to GDP from the financial structure data set of World Bank. In the supplemental test, we used the ratio of bank credit to bank deposits to access the sensitiveness of the results to the alternatively financial development indexes.

To solve internal problems of the model, we used control variables ( $Z_{i,t}$ ) to catch short-term shocks of NFA. Control variables include net export/GDP, growth rates of the actual GDP, exchange rate decreasing level, openness of the capital account, and trade openness.

With two ways of measuring FD variable, we have (1) equation which is developed into two models as below:

$$\text{Model 1: } NFA/GDP_{i,t} = \alpha + \beta_{1,i,t} * PCGDP_{i,t} + \beta_{2,i,t} * NEGDP_{i,t} + \beta_{3,i,t} * RGDPG_{i,t} + \beta_{4,i,t} * EXRD_{i,t} + \beta_{5,i,t} * KAOPEN_{i,t} + \beta_{6,i,t} * TOPEN_{i,t} + u_{i,t} \tag{2}$$

$$\text{Model 2: } NFA/GDP_{i,t} = \alpha + \beta_{1,i,t} * BCBD_{i,t} + \beta_{2,i,t} * NEGDP_{i,t} + \beta_{3,i,t} * RGDPG_{i,t} + \beta_{4,i,t} * EXRD_{i,t} + \beta_{5,i,t} * KAOPEN_{i,t} + \beta_{6,i,t} * TOPEN_{i,t} + u_{i,t} \tag{3}$$

This research adopted the PMG estimation method which allows: (i) the estimation of long-term elasticity index; (ii) the determination of correction speed to return the equilibrium in the long term. PMG is conducted in the following steps:

**Table 1.** A description of how variables and data sources are measured

Variable	Code	Source
<b><i>The net foreign asset position</i></b>		
NFA by the GDP based method	NFAG	IMF (IFS), Lane & ctg (2000, 2007)
<b><i>Financial development</i></b>		
Private credit per GDP	PCGDP	World Bank (WDI)
The ratio of bank credit to bank deposit	BCBD	
<b><i>Control variables</i></b>		
Net export per GDP	NEGDP	World Bank (WDI)
Growth rate of actual GDP	RGDPG	
Decreasing level in the exchange rate	EXRD	
Openness of the capital account	KAOPEN	Data of Chinn & ctg
Trade openness	TOPEN	World Bank (WDI)

Step 1: Check the correlation coefficient of the variables in the model. To avoid collinearity or multicollinearity between them and possible fake regression, this research eliminated variables with high correlation coefficient and statistical significance.

Step 2: Test the stationarity of all variables through the unit root test with the Fisher panel developed by Maddala & Wu (1999). If all of the variables in the model stabilised at the root variable, meaning the zero  $I(0)$  integration, it is not necessary to test the cointegration because all of the variables are cointegrated. If some variables stabilised at the difference, meaning 1  $I(1)$  integration, it is necessary to test panel cointegration.

Step 3: This model requires that variables analysed in the long term must be cohesive. To test panel cointegration of the variables in the model, the test of Westerlund & Edgerton (2007) should be used.

Step 4: After testing dependent and independent variables which are cointegrated, the next step is to perform the PMG estimation according to Pesaran, Shin & Smith (1999).

### 3.2. Data

This research used annual data during the period 1974-2013 of ten developing countries in Asia including Turkey, Thailand, Philippines, Pakistan, Malaysia, Indonesia, India, Cyprus, China and Vietnam.

## 4. Empirical Results

### 4.1. Descriptive Statistics of the Variables

Table 2 shows that the ratio of foreign assets to GDP are different from GDP from -1.64 to 1.33 times. The ratio of private credit to GDP is larger than GDP from 0.09 to 2.5 times. Banking credit/bank deposit has large differences with the group average of 1.4, the highest figure being 8.98 and most high values being of Vietnam. Explanatory variables such as net export/GDP, the growth rate of actual GDP based on the average statistics of the country group are relatively low, - 0.02 and -0.03 respectively. Foreign exchange rate decreasing level from -0.2748 to 0.95. Capital liberalisation and the average trade openness of the group are respectively 0.34 and 0.57.

**Table 2.** A descriptive statistics of variables

No.	Variable	Sample size	Average	Standard deviation	Lowest value	Highest value
1	NFAG	385	-0.2769	0.3160	-1.6454	1.3375
2	PCGDP	382	0.5983	0.4962	0.0899	2.5356
3	BCBD	376	1.4095	1.3233	0.3589	8.9801
4	NEGDP	378	-0.0162	0.0708	-0.2649	0.2505
5	RGDPG	389	-0.0292	0.1098	-0.5378	0.1580
6	EXRD	388	0.0626	0.1457	-0.2748	0.95595
7	KAOPEN	400	0.3429	0.2596	0.1639	1.0000
8	TOPEN	377	0.5701	0.4073	0.0820	1.9212

### 4.2. Test Results of the Relationship between the Net Foreign Asset Position and Financial Development Index.

#### 4.2.1. Pearson Correlation Matrix

The correlation matrix in Table 3 show that the correlation between independent variables and explanatory variables in comparison with dependent variables is relatively low and therefore proposed variables included in the PMG model will remain unchanged.

#### 4.2.2. Testing the Stationarity through Individualised Unit Tests of Fisher Panel

To test the stationarity of data, we adopted Fisher tests based on Augmented Dickey Fuller (ADF) and Philip Poon (PP). The results in Table 4 shows that the variables of net foreign asset/GDP, private credit/GDP, banking credit/bank deposit, trade openness

**Table 3.** Pearson correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) NFAG	1.0000							
(2) PCGDP	0.3500	1.0000						
(3) BCBD	0.0600	0.1500	1.0000					
(4) NEGDP	-0.0100	0.2700	0.0200	1.0000				
(5) RGDPG	0.2200	0.3200	0.2100	0.0900	1.0000			
(6) EXRD	-0.1900	-0.3200	-0.0800	-0.0800	-0.5400	1.0000		
(7) KAOPEN	-0.1400	0.2000	-0.1800	0.2500	0.0600	-0.1400	1.0000	
(8) TOPEN	-0.0400	0.4400	0.1700	0.3600	0.2500	-0.2300	0.2500	1.0000

**Table 4.** Data stationarity test

Variable	ADF test		PP test	
	Prob>chi2		Prob>chi2	
	No trend	Trend	No trend	Trend
(1) NFAG	0.0000***	0.0000***	0.0000***	0.0000***
(2) PCGDP	0.0000***	0.0000***	0.0000***	0.0000***
(3) BCBD	0.0000***	0.0000***	0.0000***	0.0000***
(4) NEGDP	0.3904	0.3694	0.0362**	0.0708*
(5) RGDPG	0.0000***	0.0060***	0.0000***	0.0000***
(6) EXRD	0.0000***	0.0008***	0.0000***	0.0000***
(7) KAOPEN	0.0458*	0.4872	0.0004***	0.0069***
(8) TOPEN	0.0000***	0.0000***	0.0000***	0.0000***

\*, \*\*, \*\*\* represent for the significant degrees of 10%, 5%, 1%.

are at 1 order difference. The variables of net export/GDP, the growth rate of actual GDP, exchange rate decreasing level, capital account openness stabilised at I(0) order.

#### 4.2.3. Westerlund Panel Correlation Test

Westerlund test shows that all variables of private credit/GDP, banking credit/bank deposit, net export/GDP (%GDP), the growth rate of actual GDP, exchange rate decreasing level, capital account openness, and trade openness have a correlation with the net foreign asset/GDP variable. According to Anshasy & Bradley (2012), if three out of the four tests reject the H0 hypothesis, the corresponding pairs of variables will be correlated. Table 5 shows that independent and explanatory variables are correlated with dependent variable, thus providing the condition for applying the PMG method.



**Table 5.** Correlation test

Dependent variable: NFAG				
Independent variable	G <sub>t</sub>	G <sub>α</sub>	P <sub>t</sub>	P <sub>α</sub>
(1) NFAG	-2.690* (-1.314)	-18.953*** (-3.354)	-9.403*** (-3.170)	-18.570*** (-5.091)
(2) PCGDP	-2.689* (-1.313)	-18.969*** (-3.362)	-7.348 (-0.777)	-17.137*** (-4.332)
(3) BCBD	-2.613 (-1.012)	-18.788*** (-3.276)	-9.040*** (-2.748)	-20.976*** (-6.365)
(4) NEGDP	-3.135*** (-3.067)	-19.029*** (-3.390)	-8.753*** (-2.413)	-17.353*** (-4.447)
(5) RGDPG	-3.582*** (-4.827)	-18.310*** (-3.048)	-9.136*** (-2.859)	-18.139*** (-4.863)
(6) EXRD	-3.031*** (-2.657)	-25.704*** (-6.563)	-10.282*** (-4.194)	-24.195*** (-8.069)
(7) KAOPEN	-3.429*** (-4.225)	-18.165*** (-2.979)	-8.330** (-1.921)	-18.646*** (-5.131)

\*, \*\*, \*\*\* respectively represent for significance degrees of 10%, 5%, 1%.

**4.2.4. PMG Regression Result.**

PMG regression results acknowledge the long-term correlation between NFA and FD. This correlation is - 0.16 and is statistically significant, indicating that financial development of a country has significantly reversed impacts on the total net foreign asset of that country. This result is consistent with the research results of Mendoza et al. (2009), Vermeulen & ctg (2014).

Error adjustment of -11.8% also represents the correlation between NFA and FD. The error adjustment degree is not too high: on average, the gap of NFA at present time and in the long run will be 11,8% closer each year. This result also confirms the argument of Mendoza et al. (2009), Vermeulen & ctg (2014) that the progress toward the long-term balance is relatively slow.

**Table 6: PMP regression results of (2) equation:**  $NFA/GDP_{i,t} = \alpha + \beta_{1,i,t} * PCGDP_{i,t} + \beta_{2,i,t} * NEGDP_{i,t} + \beta_{3,i,t} * RGDPG_{i,t} + \beta_{4,i,t} * EXRD_{i,t} + \beta_{5,i,t} * KAOPEN_{i,t} + \beta_{6,i,t} * TOPEN_{i,t} + u_{i,t}$

Variable		
<b>Long-term coefficient</b>		
	PCGDP	-0,1620* (0,083)
	Error adjustment	-0,1187*** (0,037)
<b>Short-term coefficient</b>		
	$\Delta$ PCGDP	-0,2004 (0,168)
	NEGDP	-0,6848* (0,400)
	RGDPG	0,2836* (0,166)
	EXRD	-0,2433 (0,328)
	KAOPEN	0,1967 (0,147)
	TOPEN	-0,1747 (0,117)
Sample size		364
Log-likelihood		448,5499

*Standard error in the parenthesis. \*has a statistical significance of 10%, \*\*has a statistical significance of 5%, \*\*\* has a statistical significance of 1%.*

The examination of short-term impacts of financial development on the net foreign asset of the countries indicates that the theory of short-term impacts of financial development is still limited. The PMG method is conducted on the average of all of the countries in the research group, while each country has its own short-term coefficient. Therefore, the result of the PMG model indicates that the short-term relationship between FD and the net foreign asset is not statistically significant and this result is consistent with Vermeulen & Ctg (2014).

#### 4.2.5. Robustness Test

The use of banking credit/bank deposit variable representing for only the FD value (Vermeulen & Ctg, 2014) to test the sustainability of the model also creates similar results. The correlation between NFA and FD is also shown in the long run. However, adjustment figure in this model is relatively small, merely 9%. In the short

run, only variables of exchange rate decrease, and GDP growth are statistically significant. The two variables have opposite effects on NFA in the short run.

**Table 7: PMG regression results of the equation (3):**  $NFA/GDP_{i,t} = \alpha + \beta_{1,i,t} * BCBD_{i,t} + \beta_{2,i,t} * NEGDP_{i,t} + \beta_{3,i,t} * RGDPG_{i,t} + \beta_{4,i,t} * EXRD_{i,t} + \beta_{5,i,t} * KAOPEN_{i,t} + \beta_{6,i,t} * TOPEN_{i,t} + u_{i,t}$

Variable		
<b>Long-term coefficient</b>		
	PCGDP	-0,3751*** (0,052)
	Error adjustment	-0,0933*** (0,033)
<b>Short-term coefficient</b>		
	$\Delta$ PCGDP	-0,3325 (0,300)
	NEGDP	0,1632 (0,108)
	RGDPG	-0,1278** (0,0565)
	EXRD	-0,1155* (0,063)
	KAOPEN	-0,0356 (0,033)
	TOPEN	-0,0140 (0,032)
Sample size		361
Log-likelihood		788,0586

*Standard errors are represented in parenthesis.*

*\* has a statistical significance of 10%, \*\* has a statistical significance of 5%, \*\*\* has a statistical significance of 1%.*

## 5. Conclusion

This research provides empirical evidence on the relationship between financial development and NFA of a country. Using the PMG estimation method, the results of this research show that a country's financial development have significantly opposite impacts on its NFA. Also, financial development in the long run contributes to reducing the global imbalance. However, it will require a long

period for financial development to create a significant economic impact and this is reflected in the fact that the adjustment speed is not too high – an average of approximately 12% of the distance between current and long-term gaps is reduced.

For policymakers, financial development plays an important role in the development of economic policies that regulate international investment flows and foreign debt position, especially in developing countries. A strong financial system helps diversify risks and effectively allocate capital to the economy, thus boosting economic growth of a country. Asymmetric information is the cause that restrains the development of a financial system. A developed financial system provides diversified financial services and its effective operation reduces asymmetric information on the market. Investors can rely on forecasts of well-experienced financial intermediaries in the developed financial system. In this way, value and reliability of information will be increased, therefore attract more investors.

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