

**ESSAYS ON FINANCIAL DEVELOPMENTS**

**By**

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**ABSTRACT****ESSAYS ON FINANCIAL DEVELOPMENT****By****Yin Yin Mon****Ph.D. in Economics****International University of Japan, 2019****Dr. Chun-Hung Kuo, Supervisor**

This study analyses financial sector development using an econometric model to understand various issues related to financial development through three essays. The first essay empirically investigates the non-linear effect of financial development on the shadow economy (SE) and how the development of the financial market and financial institution shape the size of the shadow economy. The estimation uses a two-stage least square method based on the data of 59 countries from 1991-2014 and uses the financial liberalization index as the instrumental variable. In general, the finding suggests that financial market development reduces the size of the shadow economy. Moreover, the influence is not monotonic, and it can be categorized by three stages. In the first stage, financial development might be insufficient; it has no clear influence on the shadow economy. When the development is higher than a certain level, it begins the second stage, in which the financial development starts to reduce the shadow economy. When financial development continues to rise, its influence diminishes in the third stage.

The second essay empirically explores how monetary policy (money growth) and fiscal policy (government expenditure) are related to financial development and how the economic environment influences these relationships. The estimation uses the fixed effects model constructed on the average 5-year period panel data of 59 countries from 1987 to 2011. The results show that both money growth rate and government expenditure are negatively related to financial development. Moreover, in a better economic environment (an index measured by six dimensions), a higher money growth rate comes with better financial development, while the relationship between government expenditure and financial development does not depend on the economic environment.

The third essay examines how the financial crisis influenced the speed of financial reform using the data of 91 countries from 1973 to 2005. The results indicate that the influences of the crisis on reform depend on the economic environment. After the financial crisis, small economies tended to speed up reform, while large economies tended to slow it down. The more connected an economy is to the world economy, the less likely it is to choose to reverse financial reform. These findings are basically in line with the 'crisis-begets-reform hypothesis', together with a condition.

**Keywords:** Financial development, Financial institutions, Financial markets, Shadow economy, Economic environment, Fiscal policy, Monetary policy, Financial reform, Financial crisis, Macroeconomic variables.

## **Dedication**

*I dedicate this to my mother, Daw Kyi Kyi Maw; father, U Thein Aung; and family members. They support, encouragement, and constant love have sustained me throughout my life.*

*This dissertation dedicate to all colleagues from Myanmar Foreign Trade Bank, Ministry of Planning and Finance.*

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## **CHAPTER 1**

### **Introduction**

Economists and policy-makers generally agree that financial development contributes to financial institutions and markets, such as commercial and investment banks, bond and stock markets, which in turn lead to a country's financial development. This study analyses financial development using an econometric model to understand several issues: the shadow economy, monetary and fiscal policy, liberalization of financial services and economic environments that are related to financial development through three essays.

The rest of this chapter delivers into four sections. Each section briefly discusses the objective of the research, contribution, and research methodology and chapter outline of this dissertation.

#### **1.1 Research objective**

This dissertation explores answers to questions that are of great interest in the literature. It points out that in most cases, empirical studies neglect the idea that the parts of financial development such as markets and institutions affect the size of the shadow economy and experience significant impacts from monetary and fiscal policies. Furthermore, the other issue is the financial crisis' influence on financial reform. Therefore, the objectives of this study are:

- to identify the impact of financial development on the shadow economy by exploring its non-linear relationship;
- to classify the impact of economic environment and monetary and fiscal policy on financial development; and
- to explore how the effects of the crisis on reform depend on a country's macroeconomic conditions.

This study empirically investigates financial development to find different results from the outcomes of existing literature. In the first essay, I specifically study financial development and the size of the shadow economy. I contribute to two dimensions of financial development, financial institutions and financial markets, which reduce the size of the shadow economy and the non-linear relationship between them. The second essay contributes to the identification of the impact of monetary and fiscal policies on financial development by using a two-panel data model. Furthermore, I address the issue of the effect of economic policy on financial development that was specified within the economic environment at a good or bad level. The country's monetary policy's and fiscal policy's influence on financial development depend on the economic environments in terms of legal and institutional quality. The last essay contributes to the literature by using panel data under a financial liberalization index and financial crisis. Additionally, I deliver details estimating the effect of the financial crisis on financial reform and expanding economic conditions such as trade openness and per capita income. The dissertation helps expand understanding of financial development, the informal sector, policies and economic environments and the financial liberalization process.

## **1.2 Research Methodology**

This study involves extensive literature reviews for each of the essays. In this study, I use an empirical model: a two-way fixed effects approach to assess methods of analysis and estimation and statistical findings in the field. There are three different essays in this study. Chapter 2 is based on the data of 69 countries over the period from 1991 to 2014. The estimation uses a two-stage least square approach and the financial liberalization index as the instrumental variable. Chapter 3 uses the fixed effects model constructed on the average 5-year period panel data of 59 countries from 1987 to 2011. Additionally, applying the two-way fixed effects approach to estimate the effect of financial reform on the financial crisis, I use panel data of 91 countries from 1973 to 2005 in Chapter 4. In this study, I use some statistical databases to analyze the econometric model from the World Bank, International Financial Statistics and World Development Indicators, International Country Risk Government and the specialized computer software STATA to manipulate the data.

## **1.3 Chapter Outline**

The paper is structured in four chapters. Chapter 1 describes the motivation, research objective, contribution, and methodology and structure of the paper. Chapter 2 deals with empirical evidence of the measures of financial development and its effects on the shadow economy. This essay empirically investigates how the development of financial markets and financial institutions may shape the size of the shadow economy. In this chapter, I use panel data from 69 countries from 1991 to 2005. The main variables are the share of the shadow economy, financial development and

control variables. To control for the endogeneity issue, I use the instrumental variable (IV) as the degree of financial liberalization. Moreover, I investigate the marginal effect of financial development on the shadow economy. Also, I check robustness by using average panel data and different measurements of financial development. Generally, the finding suggests that there exists a non-linear relationship between financial development and the shadow economy, particularly in financial market development. On the other hand, the influence of the development of financial institutions is not related to the shadow economy.

Chapter 3 focuses on the economic environment's and policy's effects on financial development. This paper examines the channels of financial development, including financial markets and financial institutions, and investigates the impact of monetary and fiscal policies on these channels using panel data of 59 economies. In this chapter, the main dependent variable is the aggregated index of financial development. The independent variables are money growth and government expenditure. Moreover, I construct the economic environment index by using the regression result. Additionally, this chapter investigates the average effect of money supply (monetary policy) on financial development. Generally, the finding suggests that the most critical components of monetary policy influence the progress of financial development. In countries with good economic environments, money supply is positively related to financial development; otherwise, the relationship is negative. However, fiscal policy's effect on financial development does not depend on the economic environment.

Finally, Chapter 4 investigates how the financial crisis affected financial reform and the conditional effects of the macroeconomic environment on financial reform. Specifically, this study explores how the effects of the crisis on the reform depend on a country's macroeconomic conditions. In this chapter, I also investigate the total effect of macroeconomic conditions on financial reform by calculating marginal effect. To determine if the baseline result is sensitive to outliers, I test three alternative model specifications as robustness checks. In summary, the findings suggest that the conditional effect of macroeconomic variables on financial reform depends on the countries' situation.

## CHAPTER 2

### **Financial Development and Shadow Economy: A Exploration of Its Nonlinear Relationship**

#### **2.1 Introduction**

Conventional wisdom and some empirical evidence suggest that financial development reduces the shadow economy. In an underdeveloped financial system, firms resort to loans to the informal financial sector. Because firms are forced to engage in the informal financing sector, they are more likely to engage in other non-traceable informal activities (Blackburn et al. (2012), Bose et al. (2012), Capasso and Jappelli (2013)). In this study, I re-examine this relationship by considering two additional elements that existing empirical investigations have neglected. First, different facets of financial development may bring about uneven influences. Second, the influences may be more complicated than a simple linear model can reveal. As I will discuss later in detail, the effects are diminishing as financial development.

There are two types of financial development: the development of (1) financial institutions and (2) financial markets. Financial institutions include the banking, insurance, and other financial sectors, while financial markets include stock, bond, and other financial derivatives. A larger scale of financial institution facilitates firms in the informal sector to gain access to credit, which not only helps these firms participate in the formal sector, but also helps reduce informal transactions. This is a direct force that reduces the shadow economy. In comparison, the development of financial markets influences the shadow economy through a different channel.

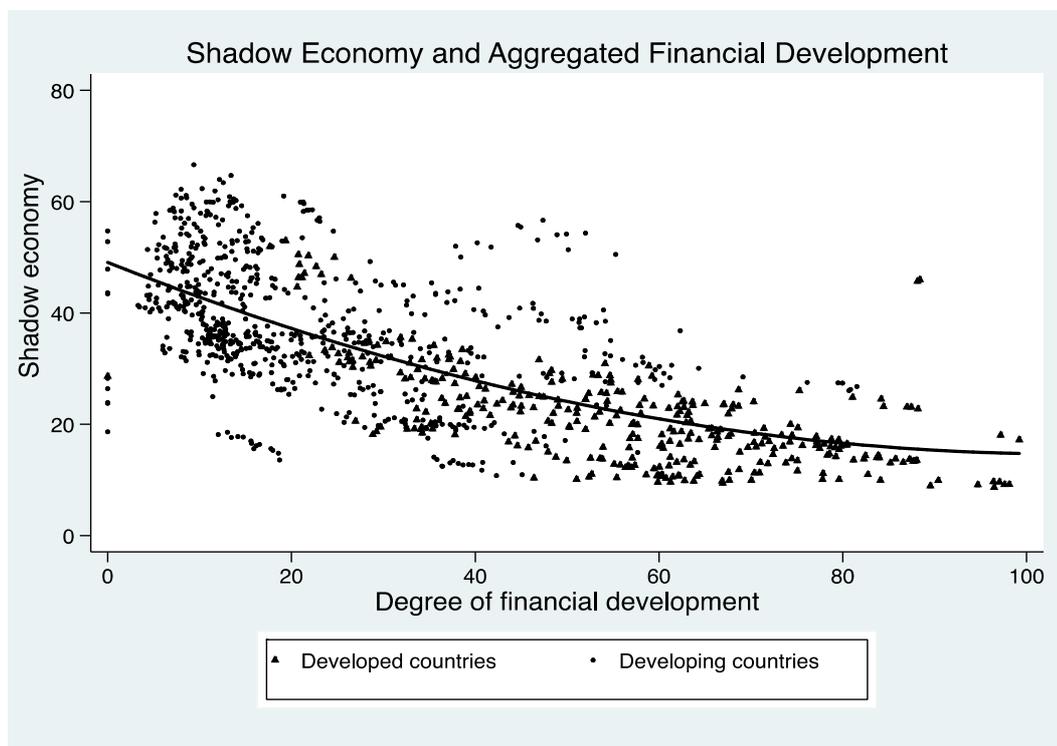
Because participants in the markets are more likely to be those firms already in the formal markets, a larger financial market may not directly reduce informal activities. However, a prosperous financial market facilitates activities in formal sectors, thus reducing the share of informal sectors (the shadow economy).

Although the development in both dimensions may reduce the share of the shadow economy, the influences are uneven. Moreover, they differ in terms of their relationship with policies and regulations. Specifically, the scales of financial institutions are more likely influenced by policies, for instance, the regulations on the types of business of commercial banks or the numbers of banks (or branches)<sup>1</sup>. In comparison, the size of financial markets is more likely determined by the entire economic environment. Therefore, identifying this difference is meaningful for policy-makers.

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<sup>1</sup> Barth, Caprio & Levine (2004) consider two theories of government regulation: the helping-hand approach, according to which governments regulate to correct market failures, and the grabbing-hand approach, according to which governments regulate to support political constituencies. They found a cautionary flag regarding reform strategies that place excessive reliance on country's adhering to an extensive checklist of regulatory and supervisory practices that involve direct government oversight of and restrictions on banks. See detail explaining of theories of government regulation in Shleifer and Vishny (1998) and Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2002).

United States these include banking and securities regulations as well as direct government involvement in lending activities. Indeed, throughout the 1980s about 25 percent of all loans were either originated by government agencies or carried government guarantees (see Schwarz 1992).



**Figure 2. 1 The relationship between the size of shadow economy and level of financial development**

The second focus is the non-linearity of the relationship. Figure 2.1 shows the relationship between the degree of financial development and the share of the shadow economy.<sup>2</sup> When the degree of financial development increases (the horizontal axis), the share of the shadow economy decreases; however, this relationship appears to be convex, which implies that the influence of financial development on the shadow economy is diminishing. This convex relationship has been discussed in Capasso and Jappelli (2013), but it has not yet been explored in empirical studies.<sup>3</sup> Their theoretical model suggests that the effect of financial

<sup>2</sup> The share of the shadow economy is taken from Medina & Schneider (2017). The financial development data have constructed aggregated into two sub-indices of financial institutions and financial markets, which is taken from Svirydzhenka, (2016).

<sup>3</sup> Habibullah, et. al, (2016) also identified a different nonlinear relationship between financial development and shadow economy based on one Malaysia data for the period 1971-2013. They show a non-linear long-run relationship and they suggest that financial development can play an important role in reducing shadow economy by improving the accessibility to finance and to the credit market.

development on reducing the size of the shadow economy is non-monotonic and is stronger at the lower level of financial development.<sup>4</sup> This study provides evidence of this relationship.

I use panel data covering 69 countries from 1991 to 2005. The main variables are the share of the shadow economy, financial development, and control variables. The share of the shadow economy is the last updated data from Medina and Schneider (2017). The measures of financial development are extracted from the dataset of Sviryzdenka (2016), which includes measures of two different dimensions: financial institutions and financial markets. Most empirical studies measure financial development by using the ratio of aggregate credit or the ratio of the stock market.<sup>5</sup> The former and latter represent different dimensions of financial development. This implies these studies do not distinguish between the effects of financial institutions and financial markets. For control variables, I include institutional quality, capital openness, trade openness, GDP growth and GDP per capita and both country and time fixed effects.

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<sup>4</sup> Capasso and Jappelli (2013) construct a theoretical model where entrepreneurs choose between “high-return technology” which involves access to credit from financial institutions and “low- return technology” which can be produced with internal capital. The model proposes that entrepreneurs can lower the cost of capital by supplying assets as collateral to financial institutions. Nevertheless, supplying assets as collateral suggests that entrepreneurs are revealing their activities to public agents, which, in turn, entails that they also experience higher tax fees. To the extent that public agents can utilize financial intermediaries to monitor activities, the financial system through reducing the barriers to acquiring credit inhibits the likelihood of tax evasion that then mitigates the spread of the shadow economy.

<sup>5</sup> For example: Henri (2018) measure of financial development by ‘domestic credit to private sector’ and ‘share of broad money’. Bose et.al (2012) measure the banking sector development by domestic credit provided by depository banks (percentage of GDP), and liquid liabilities (percentage of GDP). Berdiev and Saunoris (2016) also use the three measurement of financial development including M2, domestic credit to private sector and domestic credit to financial sector to the central government. Sirisankanan (2017) uses the financial development such as the ratio of M2 to GDP, the ratio of private domestic credit to GDP, the ratio of savings to GDP and the ratio of stock market capitalization to GDP.

Moreover, I control for endogeneity using the instrumental variable (IV) of the degree of financial liberalization. This variable, drawn from Abiad, Deteragiache, and Tressel (2008), is an aggregated index that measures the degree of financial liberalization in seven different dimensions: credit controls, interest rate controls, entry barriers, banking supervision, privatization, security markets, and international capital flows. The degree of financial liberalization, which describes how stringent the policies and regulations are that control the financial sectors, is supposed to directly influence financial development. It is, however, less likely related to activities in the shadow economy. This variable indeed is shown to be a suitable IV for the estimation.

The empirical result shows a non-linear relationship between the shadow economy and financial development. In general, financial development reduces the shadow economy. Specifically, this relationship includes three stages. In the first stage, financial development might be insufficient; it has no clear influence on the shadow economy. When the development is higher than a certain level, it begins the second stage, in which the financial development starts to reduce (the activities in) the shadow economy. When the financial development continues to rise, stage three begins. The influence is diminished because many other economic forces are at work.

In my results, in the case of the developing countries, the effects of financial development are either significant in the linear model or insignificant in all models. This is the case of stage 1 and stage 2. Since financial development is relatively low, it fits what I describe as 'insufficient'. On the other hand, for the developed countries, the effects are significant in both the linear and non-linear models. This is the case of stage 2 and 3. It follows that financial development is relatively high in developed

countries. In comparison, existing empirical studies (Bose et al. (2012), Njangang (2018), and Berdiev and Saunoris (2016)) only show the negative relationship between financial development and the shadow economy in the linear model.<sup>6</sup> This study depicts a picture of the entire relationship.

This paper proceeds as follows: Section 2 describes the methodology and data; Section 3 presents the empirical results and discussions; and Section 4 draws conclusions and discusses policy implications.

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<sup>6</sup> Bose et al. (2012), Henri (2018) and Berdiev and Saunoris (2016) study different measurement of financial development and shadow economy.

## 2.2 Methodology and Data

### 2.2.1 The empirical specification

The model is specified as follows:

$$SE_{it} = \beta_i + \gamma_1 FD_{it} + \gamma_2 (FD_{it}^2) + \delta X_{it} + v_{it}$$

where  $SE_{it}$  is a measure of the shadow economy of country  $i$  and year  $t$ ;  $FD_{it}$  is a measure of financial development;  $X_{it}$  is a vector of control variables;  $\beta_i$  is the country-specific intercept and  $v_{it}$  denotes the error term. As discussed in the introduction and shown in Figure 2.1, I assume there exists a non-linear relationship between the size of the shadow economy and the level of financial development. Therefore, the square term of financial development is incorporated.

The issue of endogeneity is always a concern for the empirical macro-analysis. In this estimation, the endogeneity problem may come from the omitted variables and inverse causality. In response to this, I use the instrument variables (IV). In the existing literature, several variables have been chosen to be the IV of financial development. For instance, Bose et al. (2012) use legal origins and regional dummies, and Capasso and Jappelli (2013) use characteristic of 1936 Italian banking law as instrumental variables for financial development. These variables, however, are not suitable in my estimation because they might be also related to the size of the shadow economy.<sup>7</sup>

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<sup>7</sup> Capasso and Jappelli (2013) choose the characteristics of the 1963 banking law as the instrumental variables. It is an adequate instrumental variable, but not suitable for this data.

I choose the financial liberalization index as the IV. This index describes the degree of financial liberalization in seven dimensions: credit controls, interest rate controls, entry barriers, banking supervision, privatization, security markets and international capital flows. The degree of financial liberalization, which describes how stringent the policies and regulations are that control the financial sectors, is supposed to directly influence financial development. It is, however, less likely related to the activities in the shadow economy.

I run the test for over-identification restrictions and weak IV test. The results suggest that the instruments explain the variation in financial development suitably. In all cases, the F-statistic of the excluded instruments exceeds the benchmark value of 10, and the value of the Sargan-Hansen test indicates its validity.<sup>8</sup> Accordingly, IV estimates pass the standard tests of the validity of instruments.

### **2.2.2 Data**

The data for shadow economy (SE) are taken from Medina and Schneider (2017) and the up-to-date measure of the shadow economy for 158 countries from 1991 to 2015. They estimate the shadow economy by using light intensity in place of GDP as an indicator variable with the macroeconomic multiple indicators multiple causes

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<sup>8</sup> In order for variables to valid instruments they need to explain a sufficient amount of the variation of the potentially endogeneous regressor. A simple test for whether that is actually the case suggests that the F-statistic of the first-stage regression exceed ten to rule out such weak instrument issues (For a detail discussion see e.g. Stock and Yogo (2002)). The result shows that the value of Chi2 of Anderson, LM test and Sargan test are statistically significant [Chi2 (1) P-value (0.0000)] and weak identification test (F statistic= 11.574).

(MIMIC) method.<sup>9</sup> The MIMIC model based estimations of the shadow economy are generally used in the literature.<sup>10</sup>

The data of financial development (FD) are drawn from Svirydzenka (2016), who builds an index of financial development that includes two main sub-indices: financial institution (FI) and financial market (FM). FI and FM are aggregated into the overall measure of financial development (for details, see Svirydzenka, 2016).<sup>11</sup> The index of FI measures the depth of the banking sector, access, and efficiency. The index of FM measures the stock market and the depth of debt markets, access, and efficiency. The details indicators of financial development are discussed in the **Appendix A 2.1**. All indexes range from 1 to 100, where higher values denote a greater degree of financial development.

For the measure of capital openness (KAOPEN), I use an updated version of the Chinn–Ito index (KAOPEN) developed by Chinn and Ito (2006)<sup>12</sup>. I use the International Country Risk Government (ICRG) index as the measure of the institutional quality. The ICRG has a special emphasis on aspects affecting private

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<sup>9</sup> Some issues that arise when estimating the MIMIC model for the shadow economy are the inclusion GDP as both a causal and an indicator variable, and for calibration of the relative estimates (see Breusch 2016 and Schneider 2016). Therefore, to overcome these issues as well as provide a more up-to-date measure of the shadow economy, Medina and Schneider (2017) estimate the shadow economy by using light intensity in place of GDP as an indicator variable and calibrate their model using predictive mean matching method to show the robustness of the MIMIC method results.

<sup>10</sup> See, for example, Biswas et al. (2012), Buehn et al. (2013).

<sup>11</sup> The financial development data have constructed using six sub-indices are called FID, FIA, FIE, FMD, FMA, and FME, where the letters M and I denote markets and institutions, and the letters D, A, and E denote depth, access, and efficiency. These sub-indices are aggregated into two higher-level sub-indices, FI and FM, which measure how, developed financial institutions and financial markets are overall.

<sup>12</sup> The Chinn-Ito index (*KAOPEN*) is updated version of Chin and Ito (2006) and an index measuring a country's degree of capital account openness. *KAOPEN* is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*.

foreign investment decisions. The rating comprises three subcategories of risk: political, financial, and economic. I will mainly focus on the political risk component that provided to assess the political stability on a comparable basis using 12 different measurements that cover both political and social attributes.<sup>13</sup> I will investigate the political risk rating, but also 8 key sub-components that measure governance and institutional quality. Among them, I will use five component including corruption, government stability, investment profile, bureaucracy quality, and democratic accountability. For each dimension, the score is ranged from 0 to a maximum number (risk point). Detail explanation of measurement shows in **Appendix A 2.2**. A higher number of points indicate a lower potential risk and the lower number (0) indicating the highest potential risk. Therefore higher scores are in line with a higher institutional and governance quality. The better institutional qualities expected to be negatively related to the shadow economy.

For other control variables, the model includes GDP growth (*GDPG*), GDP per capita (*GDPPC*), and trade (*Trade*), which are drawn from the World Data Indicator (WDI). GDP per capita is used to control for the size of an economy and income level. In general, its relationship with the shadow economy is expected to be negative, since the shadow economy is likely to be more prevailing in developing countries. However, existing empirical studies have not concluded this yet. Njangang (2018) determined that the logarithm of GDP per capita is negatively related to the shadow economy. Trade openness is measured by the average of export and import in a

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<sup>13</sup> See

[http://www.icrgonline.com/page.aspx?page=icrgmethods#Background\\_of\\_the\\_ICRG\\_Rating\\_System](http://www.icrgonline.com/page.aspx?page=icrgmethods#Background_of_the_ICRG_Rating_System)

country. More openness in an economy may be associated with more job opportunities and more formal business for foreign companies. In the existing literature, the effect of trade on the shadow economy is positive. Njangang (2018) and Bose et al. (2012) find trade and the shadow economy have a positive relationship. The detail explanation and data source are shows in **Appendix A 2.3**. The summary statistics of all variables in this chapter describes in Table 2.1.

**Table 2.1 Summary statistics**

Variable	Mean	Standard deviation	Minimum	Maximum
<i>SE</i>	32.726	13.345	8.6	66.61
<i>FD</i>	32.464	22.949	0	99.211
<i>FI</i>	39.189	24.328	0	98.288
<i>FM</i>	25.358	24.073	0	100
<i>FL</i>	14.165	4.457	1	21
<i>KAOPEN</i>	0.539	0.363	0	1
<i>GDPPC</i>	8.363	1.573	5.549	11.518
<i>GDPG</i>	3.886	7.156	-28.1	149.97
<i>Trade</i>	83.88 2	52.802	20.437	531.737
<i>Corr</i>	3.730	2.902	0	29
<i>GS</i>	8.696	7.620	1	80
<i>IP</i>	7.851	3.829	1	36
<i>BQ</i>	2.441	1.524	0	11
<i>DA</i>	4.628	3.436	0	2

Note: GDPPC is the logarithm of GDP per capita.

## 2.3 Empirical Result

### 2.3.1 Baseline result

Table 2.2 presents the regression results of the aggregated financial development (*FD*), financial institution development (*FI*) and financial market development (*FM*) in the whole sample. Each column shows the linear and non-linear relationships between the shadow economy and different measurements of financial development.

Column 2 presents the baseline result of financial development in the whole sample. I find that the coefficient of the *FD* is negative and its squared term is positive; both are significant at 1% level. This implies a non-linear relationship between the shadow economy and financial development. Because the magnitude of the squared coefficient (0.007) is comparatively small, the minimum occurs near the maximum value of the sample. Therefore, in the whole sample, the relationship is negative but diminishing.<sup>14</sup> In comparison, the regression results without a square term also show this negative effect. This finding is in line with the empirical evidence reported in Bose et al. (2012), Berdiev and Saunoris (2016), and Capasso and Jappelli (2013).<sup>15</sup>

On the other hand, these diminishing, negative effects of financial development cannot be found for financial institution development. Specifically,

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<sup>14</sup> The marginal effects depend on the level of financial development in each country's. I will discuss this in detail later.

<sup>15</sup> Bose et.al (2012) suggest that banking sector development influence reducing the size of the shadow economy by using 137 countries over the period from 1995 to 2007. Henri (2018) finds that the measurement of financial development as a broad money and credit to private sector reduces the size of informal economy for 41 Sub-Saharan African countries over the period 1991-2015. Berdiev and Saunoris (2016) also explore that the three measurement of financial development including M2, domestic credit to private sector and domestic credit to financial sector to the central government reduce the size of shadow economy using data for 161 countries over the period 1960–2009.

when the model includes the square term, both coefficients of *FI* and its square term are not significant. When the square term is removed from the model, the coefficient of *FI* is negative and significant. I interpret these results as follows: the effects start to diminish only when financial development is 'comprehensive enough', while this might not be the situation for the development of the financial institution. Thus, only the linear model shows the negative relationship, and the model with the square term cannot reveal such information.

Some studies also find a linear relationship between the shadow economy and financial institution development. Bose, Capasso, and Wurm (2012), Njangang (2018) and Berdiev and Saunoris (2016) study the different measurements of financial institutions and found significantly correlation with the development of financial institutions and the shadow economy.

For the effects of financial markets, the coefficient of FM (-0.652) and the squared term of FM (0.005) are negative and positive; both are statistically significant at the 1% level. This result implies a non-linear relationship similar to what I found in the aggregate index of financial development. Furthermore, as shown in Column 5, when the square term is omitted from the model, this negative effect can still be detected in the linear term.

**Table 2. 2 Baseline result (IV=financial liberalization)**

	Aggregated Financial Development (FD)		Financial Institution (FI)		Financial Market (FM)	
	(1)	(2)	(3)	(4)	(5)	(6)
Linear	-0.758*** (0.211)	-1.087*** (0.232)	-1.681** (0.706)	-2.389 (3.496)	-0.493*** (0.147)	-0.652*** (0.150)
Square term		0.007*** (0.002)		0.014 (0.063)		0.005*** (0.001)
KAOPEN	1.010*** (0.390)	0.523*** (0.186)	1.985** (0.963)	1.301 (2.904)	0.724** (0.347)	0.377** (0.179)
GDP per capita	4.832 (3.448)	-0.788 (1.525)	10.35 (7.413)	2.660 (33.17)	3.213 (3.236)	-1.561 (1.436)
GDP growth	-0.023 (0.037)	-0.052** (0.025)	-0.079 (0.059)	-0.084 (0.052)	-0.007 (0.040)	-0.016 (0.027)
Trade	-0.023** (0.009)	-0.025*** (0.006)	-0.009 (0.015)	-0.020 (0.052)	-0.027*** (0.009)	-0.027*** (0.007)
Corruption	-0.113 (0.129)	-0.097 (0.083)	-0.194 (0.201)	-0.164 (0.191)	-0.089 (0.138)	-0.063 (0.0922)
Government Stability	0.016 (0.033)	0.002 (0.021)	-0.003 (0.049)	-0.025 (0.107)	0.021 (0.035)	0.011 (0.023)
Investment Profile	0.011 (0.055)	0.002 (0.035)	-0.072 (0.083)	-0.036 (0.169)	0.035 (0.060)	0.007 (0.039)
Bureaucracy Quality	-0.113 (0.272)	0.110 (0.183)	0.079 (0.407)	0.343 (1.251)	-0.170 (0.293)	-0.044 (0.194)
Democratic Accountability	0.032 (0.120)	-0.017 (0.078)	0.214 (0.199)	0.0895 (0.559)	-0.0213 (0.129)	-0.028 (0.086)
Observations	897	897	897	897	897	897
R-squared	-1.569	-0.064	-4.822	-2.377	-1.937	-0.307
Number of country	69	69	69	69	69	69

Note. Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

As for the relationships of the shadow economy to the control variables, they are in general consistent with what I expected. The coefficient of *KAOPEN* is positive and significant at the 1% level. This means that capital openness is intended to raise the size of the shadow economy. The negative coefficient of *Trade* is significant at the 1% level, implying that removal of barriers to trade is likely to reduce the size of the shadow economy. (The possible reason is that openness (trade)

helps develop the formal sector.) Porta and Shelifer (2008) find that the firms in the shadow economy are too small and are not able to dominate the formal firms or to receive benefits from trade. The coefficient of GDP growth is negative and significant at the 5% level; this indicates that higher GDP growth may reduce the shadow economy. Schneider (2005) finds that the shadow economy is negatively related to economic growth. Since economic growth is a key factor of expectations in the development of sovereign debt markets, there could be a similar effect of the informal sector with respect to the stage of development.

Moreover, I report the institutional quality variables results in Table 2.2. The coefficients of institutional variables are insignificant, meaning that they have no influence on the size of the shadow economy. After removing the institution quality variables in the model, the result of financial development on the shadow economy is still negative and diminishing. The result without institutional quality shows in **Appendix A 2.4**.

Table 2.3 shows the results by country group. In the case of the developed countries, results show a similar negative, diminishing effect of financial development on the shadow economy. There is a non-linear relationship between financial development, financial market development and the shadow economy. Moreover, the result is still a negative relationship between different measures of financial development and the shadow economy.<sup>16</sup>

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<sup>16</sup> This result is consistent with Bayar and Aytemiz (2017) who find that financial development has a negative impact on the shadow economy in Turkey.

In the case of developing countries, the negative effects can only be found in the linear model of the aggregated index and financial market development. This finding is similar to the case of financial institutions in the whole sample, which is driven by the same reason: the financial development is not sufficient yet to show the diminishing effects. In fact, this is exactly the case for developing countries, in which the financial development level is low and no effects are detected.

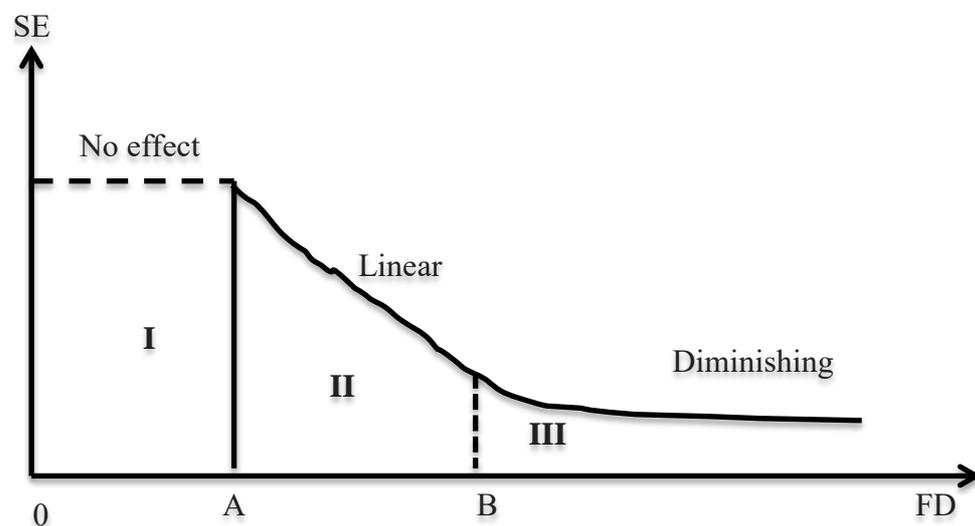
**Table 2.3 Shadow economy and financial development by country groups**

	Aggregated Financial Development (FD)				Financial Institution (FI)				Financial Market (FM)			
	Developed		Developing		Developed		Developing		Developed		Developing	
Linear	-0.501*** (0.151)	-1.994*** (0.545)	-0.567*** (0.219)	-3.096 (2.974)	-0.807*** (0.229)	7.970 (51.44)	-1.624 (1.312)	-3.943 (2.706)	-0.367*** (0.133)	-1.142*** (0.347)	-0.346** (0.137)	-3.714 (11.62)
Square term		0.017*** (0.005)		0.055 (0.061)		-0.091 (0.535)		0.035 (0.032)		0.012*** (0.003)		0.099 (0.337)
KAOPEN	2.285** (0.980)	1.601** (0.712)	0.192 (0.165)	0.034 (0.556)	2.259** (0.920)	6.261 (25.35)	1.027 (0.885)	1.046 (1.073)	2.296* (1.186)	1.625** (0.803)	0.014 (0.151)	0.665 (2.679)
GDP per capita	7.404** (3.215)	-5.261** (2.643)	-2.760 (2.848)	-15.54 (16.32)	7.615** (3.090)	60.25 (314.3)	3.656 (10.96)	0.982 (13.36)	7.309* (3.848)	-3.480 (2.362)	-4.127* (2.415)	-48.69 (150.0)
GDP growth	0.009 (0.056)	0.004 (0.048)	-0.092** (0.039)	-0.005 (0.155)	-0.059 (0.049)	-0.250 (1.163)	-0.113 (0.092)	-0.133 (0.114)	0.039 (0.072)	0.096 (0.069)	-0.088** (0.039)	0.481 (1.938)
Trade	-0.045*** (0.017)	-0.020 (0.015)	-0.028*** (0.007)	-0.009 (0.031)	-0.019 (0.016)	-0.097 (0.466)	-0.031** (0.015)	-0.025 (0.019)	-0.057** (0.023)	-0.037** (0.017)	-0.027*** (0.007)	0.007 (0.138)
Corruption	0.125 (0.227)	-0.108 (0.195)	-0.085 (0.111)	0.026 (0.380)	-0.129 (0.209)	1.710 (10.89)	-0.047 (0.230)	0.035 (0.288)	0.240 (0.287)	0.231 (0.234)	-0.093 (0.115)	0.219 (1.548)
Government Stability	-0.079 (0.073)	-0.021 (0.063)	0.017 (0.023)	-0.078 (0.131)	-0.080 (0.069)	-0.448 (2.227)	0.017 (0.049)	-0.059 (0.092)	-0.078 (0.088)	-0.061 (0.072)	0.017 (0.024)	-0.141 (0.589)
Investment Profile	0.088 (0.124)	0.074 (0.107)	-0.002 (0.053)	-0.193 (0.272)	-0.040 (0.111)	-0.134 (0.876)	-0.081 (0.113)	-0.095 (0.138)	0.146 (0.158)	0.042 (0.120)	0.015 (0.057)	-0.856 (2.978)
Bureaucracy Quality	-1.082 (0.797)	0.467 (0.697)	0.055 (0.191)	0.711 (0.960)	-0.138 (0.700)	-8.076 (47.01)	0.041 (0.400)	0.417 (0.592)	-1.511 (1.030)	-0.726 (0.765)	0.059 (0.196)	0.812 (3.227)
Democratic Accountability	0.357 (0.236)	-0.087 (0.208)	-0.055 (0.103)	0.252 (0.475)	0.344 (0.222)	2.149 (10.82)	0.041 (0.215)	0.065 (0.261)	0.362 (0.286)	0.045 (0.223)	-0.076 (0.107)	1.422 (5.148)
Observations	284	284	613	613	284	284	613	613	284	284	613	613
R-squared	-1.060	-0.567	-0.065	-10.207	-0.843	-67.822	-3.650	-5.825	-1.995	-1.017	-0.118	-112.496
No of country	22	22	47	47	22	22	47	47	22	22	47	47

Note. Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

### 2.3.2 Summary result and argument

Figure 2.2 describes the relationship between financial development and the shadow economy based on the findings. There exists a threshold level of financial development (point A). FD can reduce the shadow economy only when it is higher than this threshold (between point A to point B); there is no clear relationship in FD that is lower than this level. Most of the developing countries are in the neighbourhood of this threshold level. Thus, I can identify 'no significant' or a 'linear' effect of the FD. When the level of FD becomes higher, the effect is diminishing (to the right of point B). For developed countries, the level of FD is in general high enough (on the right side of point A). Either a constant effect or a diminishing effect can be detected.



**Figure 2.2 Relationship between shadow economy and financial development**

Moreover, I explore the average financial development and a different measure of each group in Table 2.5. In the whole sample, the square term and linear

model are significant in aggregated financial development (AGG) and FM. The average value of FM (25.36) is lower than the average value of FI (39.19), but FI is only significant in the linear model. Even when the average level of FM is higher than the AGG, there is not enough for the non-linear effect. For the developed countries, the significant result of AGG and FM is similar to the whole sample. Also, all the averages are higher than the whole sample. Therefore, the levels of AGG and FM are high enough to reduce the shadow economy. For developing countries, only a linear model is significant for AGG and FM. FI is not only significant in the non-linear model, but also in the linear model. Therefore, a different stage of the financial development level has a different effect on the shadow economy.

**Table 2. 4 Summary result and average for each groups**

	AGG		FM		FI	
	Result	$\overline{AGG}$	Result	$\overline{FM}$	Result	$\overline{FI}$
Whole sample	S/L	32.46	S/L	25.36	L	39.19
Developed countries	S/L	56.08	S/L	46.61	L	63.89
Developing countries	L	21.41	L	15.41	N	27.16

Note: AGG= Aggregated financial development. S= Square term are significant. L= Linear model is significant. N= none of the result significant.

### 2.3.3 Marginal effect of financial development on shadow economy

In this section, I confirm that the influence on the size of the shadow economy depends on the level of financial development. I calculate the average effect of financial development on shadow economy as

$$\text{Average effect} = \gamma_1 + 2\gamma_2(\overline{FD}) = -0.63$$

where  $(\overline{FD})$  is the average level of financial development measured by the mean of the whole sample. Financial development has a negative effect and the square term of financial development has a positive effect on the shadow economy. In general, the overall effect is negative. The results show that financial development has a negative effect on the shadow economy in countries with average financial development. Table 2.6 shows the mean values of financial development, financial institution development, financial market development and the marginal effect of financial development on the shadow economy in 22 developed countries. Table 2.7 shows the same values for 47 developing countries. The positive marginal effect is 68 countries, and the negative marginal effect is one country. The marginal effects depend on the level of financial development. If the financial development level is high, then its influence on the size of the shadow economy will be positive. If the financial development level is low, its influence on the size of the shadow economy will be negative.

**Table 2.5** The level of financial development by developed country

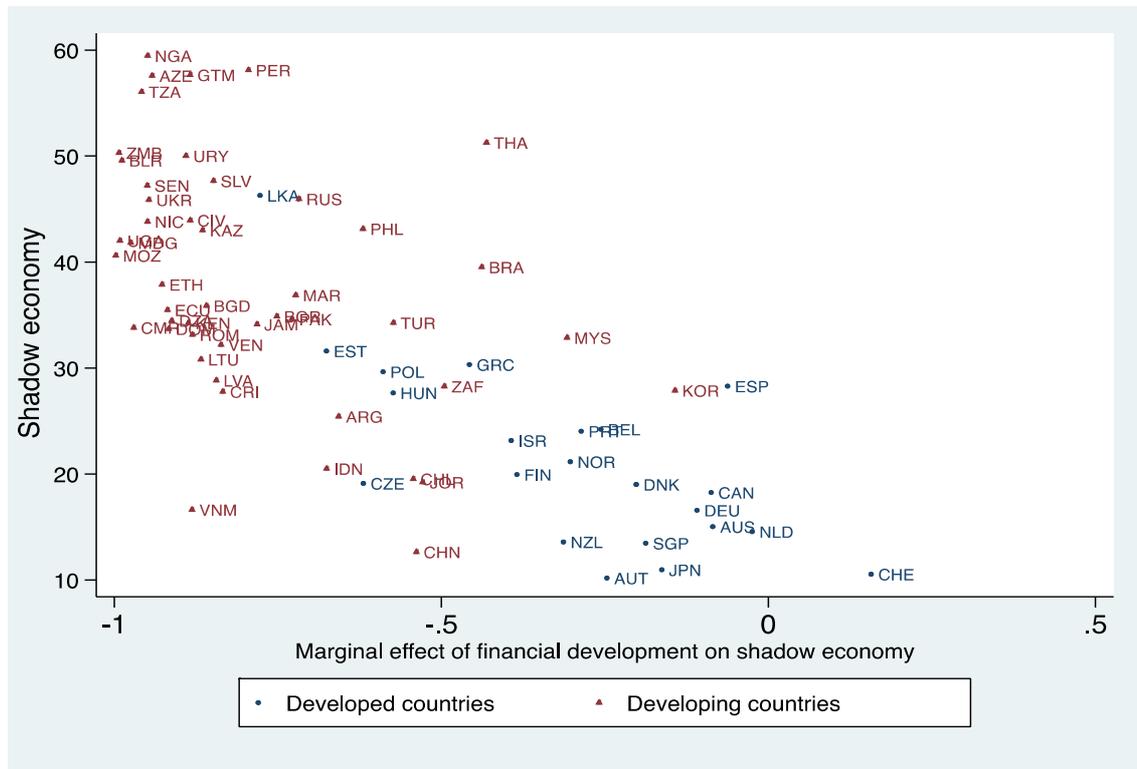
No	Country	$\overline{FD}$	$\overline{FI}$	$\overline{FM}$	$\overline{ME}$
1	Australia	71.56	80.96	61.33	-0.09
2	Austria	60.00	71.12	48.18	-0.25
3	Belgium	59.34	84.56	33.43	-0.26
4	Canada	71.39	84.46	57.48	-0.09
5	Czech Republic	33.41	44.35	22.08	-0.62
6	Denmark	63.21	83.85	41.82	-0.20
7	Estonia	29.37	33.17	25.23	-0.68
8	Finland	50.18	52.89	46.87	-0.38
9	Germany	69.84	76.74	62.12	-0.11
10	Greece	44.99	52.06	37.39	-0.46
11	Hungary	36.66	35.75	37.14	-0.57
12	Israel	49.55	60.81	37.71	-0.39
13	Japan	66.00	84.23	46.99	-0.16
14	Netherlands	75.86	88.05	62.78	-0.02
15	New Zealand	55.25	65.43	44.42	-0.31
16	Norway	56.00	51.07	60.27	-0.30
17	Poland	35.55	35.10	35.59	-0.59
18	Portugal	57.19	78.77	34.95	-0.29
19	Singapore	64.23	63.53	64.18	-0.19
20	Spain	73.18	84.35	61.16	-0.06
21	Sri Lanka	22.12	25.56	18.43	-0.78
22	Switzerland	88.85	90.72	85.93	0.16

Note: FD= Aggregated financial development, FI= Financial institutions development, FM= Financial markets development. ME=Marginal effects of financial development on shadow economy. *Source: Svirydzenka (2016).*

**Table 2. 6 Average level of financial development by developing country**

No	Country	<i>FD</i>	<i>FI</i>	<i>FM</i>	<i>ME</i>
1	Algeria	12.48	24.00	0.81	-0.91
2	Argentina	30.71	28.81	32.24	-0.66
3	Azerbaijan	10.34	17.96	2.59	-0.94
4	Bangladesh	16.26	21.63	10.71	-0.86
5	Belarus	7.04	13.41	0.58	-0.99
6	Brazil	46.33	59.48	32.64	-0.44
7	Bulgaria	23.96	42.26	5.37	-0.75
8	Code d'Ivoire	14.49	17.57	11.25	-0.88
9	Cameroon	8.33	16.46	0.10	-0.97
10	Chile	38.86	48.94	28.33	-0.54
11	China	39.20	37.15	40.79	-0.54
12	Costa Rica	18.05	30.68	5.21	-0.83
13	Dominican Republic	12.14	22.69	1.45	-0.92
14	Ecuador	12.01	20.17	3.71	-0.92
15	El Salvador	17.03	30.41	3.46	-0.85
16	Ethiopia	11.42	22.39	0.31	-0.93
17	Guatemala	14.48	26.33	2.46	-0.88
18	Indonesia	29.39	26.73	31.70	-0.68
19	Jamaica	21.80	32.63	10.71	-0.78
20	Jordan	39.89	45.11	34.20	-0.53
21	Kazakhstan	15.85	14.60	16.91	-0.87
22	Kenya	14.29	23.42	4.99	-0.89
23	Korea, Rep.	67.44	69.17	64.92	-0.14
24	Latvia	17.34	26.36	8.12	-0.84
25	Lithuania	15.67	24.27	6.88	-0.87
26	Madagascar	8.01	14.78	1.14	-0.97
27	Malaysia	55.65	61.40	49.25	-0.31
28	Morocco	26.02	35.93	15.80	-0.72
29	Mozambique	6.37	11.22	1.44	-1.00
30	Nicaragua	9.83	19.47	0.08	-0.95
31	Nigeria	9.85	16.44	3.14	-0.95
32	Pakistan	25.59	22.84	28.05	-0.73
33	Peru	20.86	17.24	24.23	-0.79
34	Philippines	33.36	27.93	38.40	-0.62
35	Romania	14.73	22.12	7.17	-0.88
36	Russian Federation	26.37	25.39	27.05	-0.72
37	Senegal	9.81	19.23	0.27	-0.95
38	South Africa	42.24	50.74	33.25	-0.50
39	Tanzania	9.19	15.01	3.26	-0.96
40	Thailand	46.85	41.65	51.50	-0.43
41	Turkey	36.68	23.22	49.72	-0.57
42	Uganda	6.82	12.90	0.66	-0.99
43	Ukraine	9.98	15.41	4.44	-0.95
44	Uruguay	14.03	24.14	3.75	-0.89
45	Venezuela, RB	17.85	25.39	10.11	-0.84
46	Vietnam	14.69	20.12	9.08	-0.88
47	Zambia	6.73	11.35	2.03	-0.99

Note: FD= Aggregated financial development, FI= Financial institutions development, FM= Financial markets development. ME=Marginal effects of financial development on shadow economy. *Source: Sviryzdenka (2016).*



**Figure 2.3 Marginal effect of financial development on shadow economy**

Moreover, Figure 2.3 depicts the average of the marginal effect of financial development on the shadow economy for 69 countries. I can observe that countries with larger shadow economies have a stronger marginal effect and lower financial development. The figure shows a convergence pattern. In conclusion, the result is clear for the aggregated index of financial development and financial markets, but I could not find a clear result for financial institutions.<sup>17</sup>

<sup>17</sup> Financial institutions such banking developments are not statistically significance with the size of the shadow economy, therefore the result not reports in Table 2.2. And also, I find that five institutional quality variables are not statistically significance with shadow economy.

## 2.4 The results of robustness tests

This paper finds that the effect of financial development on the shadow economy is non-linear. The development of financial markets negatively affects the size of the shadow economy in the whole sample. These results might be due to the use of a specific index, the aggregated index of financial development. Therefore, I test for the robustness of the result by employing alternative indicators of financial development and three 5-year periods of the panel data. Here, I examine whether the baseline results are sensitive to the data movement and the selection of indicators: first, (i) 5-year average panel data and (ii) the alternative measures of financial development: private credit by bank (PCB), stock market capitalization (SMT) and stock market total trade (STT). In both estimations, I use the same instrumental variable of financial development as the index of financial liberalization.

Table 2.8 presents the result of three 5-year period panels from 1991 to 2005. Column (1) and Column (3) report a similar result as the first panel outcome in Table 2.3. The coefficient of FD is negatively and the squared term of FD is positively correlated with the size of the shadow economy. Moreover, the coefficient of FM is negatively and the squared term of FM is positively correlated with the size of the shadow economy. The coefficient of FI is less significant. Trade openness still has an adverse effect on the shadow in the whole sample and developed countries. Capital openness is no longer significant at conventional levels in all samples. I report the five-year 3-period result by country group in **Appendix A 2.5**.

**Table 2. 7 Fiver-year average panel data**

	Aggregated Financial Development (FD)		Financial Institution (FI)		Financial Market (FM)	
	(1)	(2)	(3)	(4)	(5)	(6)
Linear	-1.198 (1.024)	-1.189*** (0.453)	-1.843 (1.738)	-2.128* (1.255)	-0.895 (0.918)	-0.832** (0.414)
Square term		0.006 (0.005)		0.014 (0.022)		0.004 (0.004)
KAOPEN	2.039 (2.068)	0.888 (0.618)	2.777 (2.940)	1.025 (2.163)	1.681 (2.147)	0.816 (0.672)
GDP per capita	11.60 (16.94)	1.064 (4.883)	10.47 (17.67)	-2.053 (15.45)	12.16 (20.89)	2.404 (5.607)
GDP growth	0.106 (0.276)	-0.073 (0.114)	0.025 (0.254)	-0.117 (0.211)	0.145 (0.362)	0.007 (0.135)
Trade	-0.047 (0.044)	-0.031* (0.018)	-0.032 (0.043)	-0.025 (0.025)	-0.055 (0.057)	-0.038 (0.025)
Corruption	-0.021 (1.167)	-0.403 (0.523)	-1.211 (1.410)	-1.239 (0.780)	0.557 (1.687)	0.072 (0.722)
Government Stability	0.167 (0.295)	0.035 (0.140)	0.202 (0.338)	0.007 (0.306)	0.150 (0.349)	0.012 (0.193)
Investment Profile	0.102 (0.506)	0.023 (0.208)	-1.050 (0.917)	-0.629 (0.570)	0.661 (1.035)	0.389 (0.367)
Bureaucracy Quality	-3.878 (3.441)	-1.525 (1.434)	-1.560 (2.592)	0.639 (3.415)	-5.005 (5.057)	-2.725 (1.773)
Democratic Accountability	0.927 (0.974)	0.657 (0.436)	2.686 (2.208)	1.542 (1.489)	0.073 (1.256)	0.191 (0.603)
Observations	187	187	187	187	187	187
R-squared	-6.282	-0.458	-7.867	-1.615	-9.490	-1.712
Number of country	66	66	66	66	66	66

Note. Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

**Table 2. 8 Shadow economy and alternative measurement of financial development**

Variables	Private credit by bank (PCB)		Stock market capitalization (SMC)		Stock market total trade (STT)	
	(1)	(2)	(3)	(4)	(5)	(6)
Linear	-3.087 (7.621)	-1.316** (0.627)	-0.172*** (0.064)	-0.233*** (0.079)	-0.166*** (0.060)	-0.379 (0.247)
Square term		0.006*** (0.00240)		0.001 (0.001)		0.003 (0.003)
KAOPEN	4.862 (12.60)	1.548* (0.925)	1.093** (0.516)	0.636** (0.315)	0.282 (0.262)	-0.150 (0.391)
GDP per capita	64.78 (177.0)	0.995 (6.940)	-4.118*** (1.321)	-2.334 (1.622)	-1.820 (1.657)	-1.729 (2.697)
GDP growth	-0.932 (2.246)	-0.177 (0.113)	-0.025 (0.039)	0.029 (0.046)	-0.027 (0.038)	-0.035 (0.060)
Trade	0.122 (0.362)	-0.019 (0.017)	-0.012 (0.009)	-0.006 (0.008)	-0.014 (0.009)	-0.012 (0.014)
Corruption	0.041 (1.169)	-0.211 (0.200)	-0.046 (0.147)	-0.108 (0.112)	-0.075 (0.139)	-0.123 (0.221)
Government Stability	-0.036 (0.305)	0.013 (0.049)	0.059 (0.039)	-0.0001 (0.039)	0.046 (0.035)	-0.013 (0.059)
Investment Profile	0.296 (0.918)	0.009 (0.086)	-0.029 (0.059)	-0.039 (0.044)	-0.104* (0.058)	0.011 (0.113)
Bureaucracy Quality	-0.319 (2.525)	0.446 (0.434)	-0.008 (0.314)	0.029 (0.233)	0.108 (0.294)	0.187 (0.470)
Democratic Accountability	-0.270 (1.262)	-0.029 (0.182)	-0.037 (0.127)	0.069 (0.112)	0.043 (0.117)	-0.076 (0.205)
Observations	881	881	686	686	691	691
Number of country	69	69	61	61	59	59

Note. Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

As a final check for robustness, this study tests whether the alternative measure of financial market development reduces the size of the shadow economy. Therefore, I use private credit to bank (% of GDP), stock market capitalization (% of GDP) and stock market total traded (% of GDP), taken from the World Development Indicator (WDI). Table 2.9 presents the results of an alternative measurement of the financial market and the size of the shadow economy. The result of each measurement of financial development is negatively related with the shadow economy in the whole sample. The financial institution as a private credit by bank

(PCB) is significant in the square term. Also, financial market developments as stock market capitalization (SMC) and stock market total trade (STT) are significant in linear and square terms. Thus, financial markets' development reduces the size of the shadow economy. I conclude that the financial market has adverse effects on the shadow economy, and the results are robust under the different specifications, although the non-linear relationship is not detected in financial market development. I report the alternative measurement of financial development and shadow economy by country group in **Appendix A 2.6**.

## 2.5 Conclusion

This paper explores which sectors of financial development reduce the size of the shadow economy, and there is a non-linear relationship between them. In general, financial development reduces the size of the shadow economy empirically. Specifically, the finding suggests that financial markets, stock and debt market development reduce the size of the shadow economy. Because the participants in the market are more likely to be those firms that are already in the formal market, a larger financial market may not directly reduce the informal activities. However, prosperous financial markets facilitate the activities of formal sectors, thus reducing the share of the shadow economy.

This study finds that the relationship between the shadow economy and financial development is non-linear. The majority of the financial development effect on shadow economy is negative on the full sample, and only a few countries have a positive effect. Therefore, the effect of financial development is diminishing. The result shows three stages of the effect of financial development on the shadow economy. If the level of financial development is not enough to reach a certain level, there is no effect. After reaching the threshold level, the effect is starting to decrease, and there is a linear relationship between financial development and the shadow economy. When the level of financial development is higher than the threshold level, there is a diminishing effect of financial development on the shadow economy.

Furthermore, the linear model shows negative effects of financial market development on the shadow economy. In contrast, financial institution development has a negative relationship only in the linear model, and the model with the square

term cannot reveal the relationship with the shadow economy. The finding is in contrast to some literature. Bose, Capasso, and Wurm (2012) suggest that financial institution improvement in the development of the banking sector reduces the size of the shadow economy. For the estimation by country group, I find that the influences of financial institutions on the shadow economy only occur in developed countries when the linear relationship between them.

Additionally, this study suggests that the influence on the size of the shadow economy depends on the level of financial development. I find the marginal effect of financial development on the size of the shadow economy with 67 positive effects countries and 2 negative effects countries. If the financial development level is high, then the influence of financial development on the size of the shadow economy will be positive. If the financial development level is low, the influence of financial development on the shadow economy will be negative.

Based on the findings from this empirical analysis and given the main objective of this study, I can draw the following policy implications. The policy-makers who are willing to reduce the size of the informal economy should implement some financial regulations with different views for financial institution and financial market development. Based on the finding from this analysis, the policy-makers can create some micro-prudential policy for a different channel of financial development to reduce the shadow economy. In addition, the governments of developed and developing countries must take other steps to control the degree of financial liberalization for financial development. If this is done, firms might move from the informal to the formal economy.

## CHAPTER 3

### Financial Development, Macroeconomic Conditions and Policies

#### 3.1 Introduction

The development of financial markets and institutions is an important issue for policy-makers concerned about their countries' economic development. Financial development is heavily dependent on economic policies within the economic environment. Moreover, incidences of financial instability in some countries have shown that poor economic policies and weak economic environments can have serious consequences. Therefore, it is now broadly accepted that the money function must be the tool of economic development and that the government must make efforts to foster the right facilitating environment and policies for private sector development.

Therefore, this paper reviews the relationship between financial sector development, macroeconomic environment, and policy. Monetary and fiscal policies are crucial for the good development of financial systems. Monetary policy helps balance the adverse consequences of financial inconsistency on the real sector of the economy. The central bank implements monetary policy and the government implements fiscal policy. Those policies are used to maintain balance in the economy. Since, the fiscal policy is based on legislation, it typically takes a lot more time to affect the economy compared to monetary policy. Therefore, this study points out the importance of macroeconomic policy to manage economies effectively. There are two objectives to this study. The first is to evaluate the impact of monetary and fiscal

policies on financial development. The second is to examine whether the effectiveness of economic monetary and fiscal policies depends on the countries' economic environments.

Some literature has documented the relationship between the financial sector and monetary policy. Mishra et al. (2010) state that monetary policy is likely to be dominated by the lending channel of the bank at lower levels of financial development. Ciccarelli et al. (2015) argue that the bank's lending channel is higher than the demand and balance-sheet channels for firms. Also, the credit channel significantly amplifies the effect of a monetary policy shock on GDP and inflation. Kashyap and Stein (2000) contend that monetary policy effects on lending performance are stronger for banks with less liquid balance sheets. The financial development system is deemed important in clarifying monetary policy's effectiveness because its efficacy crucially depends on the condition of financial development (Mishra et al., (2012), Carranza et al., (2010), Ma and Lin (2016)).

Studies of the relationship between financial development and fiscal policy also have been found. Hauner (2006) suggests that higher public sector borrowing causes financial problems financial to deepen and that banks are mainly lending to the public sector tend to be more profitable but less efficient. Cooray (2011) found that government expenditure and government ownership of banks has a negative effect on financial sector efficiency and a positive impact on financial sector size, particularly in low-income economies.

Other related elements can affect financial development. Most remarkably, institutional quality affects financial markets and monetary policy. Mishra et al.

(2010) confirm that institutional factors affect not only monetary policy, but also the effectiveness and dependability of monetary policy. Aysun et al. (2013) studied the role of institutions in monetary policy transmission by investigating the effects of legal origin, central bank independence and financial market development on the effectiveness of the monetary policy. The findings are not clear for the overall impact of institutional improvement on the effectiveness of monetary policy.

However, the connection between financial development and monetary and fiscal policies' effectiveness is complicated. The common finding is that well-functioning monetary and fiscal policies lead to development of the financial system. Nevertheless, differences in countries' monetary policy, management of government fiscal policy and economic environment can lead to substantial differences in the financial development system. Most importantly, this study addresses potential differences in awareness of policies and economic environment on financial development, since few studies have examined this issue.

This paper conducts a panel data analysis encompassing 59 countries from 1984-2011. It confirms a statistically significant relationship between the measure of financial development and monetary and fiscal policies. The fixed effect model indicates that money growth and government spending negatively affect the dependent variables. In addition, this article examines whether monetary and fiscal policies affect financial development through the economic environment using average 5-year period panel data from 1987-2011. Using the result of the first regression, I construct an economic environment index by combining the coefficients of six variables from the International Country Risk Guide (ICRG). The five average

panel data results show that the changes in independent variables significantly influence changes in money growth and the economic environment. The overall results show that it is crucial for the central monetary authorities to take into account both stages of financial development in forecasting money growth and government spending to design effective monetary and fiscal policies.

The remainder of the study is organized as follows. Section 2 examines the structure of the methodology to classify and the empirical approach to identify how monetary and fiscal policies are related to financial sector development indicators. Section 3 presents the empirical results. Section 4 concludes with a summary of the results.

## **3.2 Data and Methodology**

### **3.2.1 Data**

The study employs panel data from 59 countries, and both developed and developing, for the period 1984-2011. The data are collected from IMF sources and the World Bank's World Development Indicators (WDI). The dependent variable in the study is the financial development index that is a multifaceted measurement drawn from Svirydenka (2016) and IMF sources. Svirydenka (2016) created nine indices that measure how developed financial institutions and financial markets are and their depth, access and efficiency. Those indices are financial institution depth (FID), access (FIA) and efficiency (FIE) and financial market depth (FMD), access (FMA) and efficiency (FME). Financial institutions include banks, insurance companies, mutual funds, and pension funds. Banks and nonbank financial institutions play vital roles that usually involve the largest and most important, including investment banks, insurance companies, investment funds, pension funds, and venture capital companies.

Financial markets include stock and bond markets that allow individuals and corporations to diversify their savings and firms to raise money through stocks, bonds and currency markets. Therefore, financial development is a combination of the size and liquidity of markets, the ability of individuals and companies to access financial services, the ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets. Svirydenka (2016) developed a broad multi-dimensional approach to defining financial development that follows the matrix of financial system characteristics

established by Čihák et al. (2012). Details of the measurement of financial institutions and markets are in the Appendices.

Money growth rate and government spending are used as the main independent variables to identify the impact of monetary and fiscal policies in the regression. Broad money growth, government spending data, and other control variables are extracted from the World Bank's World Development Indicators (WDI). Broad money is the sum of currency outside banks; demand deposits other than those of the central government; time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper. Final consumption expenditure is the sum of household final consumption expenditure and general government final consumption expenditure. This estimate includes any statistical discrepancy in the use of resources relative to the supply of resources. Trade openness is the sum of exports and imports of goods and services measured as a share of the gross domestic product. An interest rate is a rate paid by commercial or similar banks for demand, time or savings deposits. Total external debt measures the sum of public, publicly guaranteed and private nonguaranteed long-term debt, use of IMF credit and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt.

**Table 3.1 Summary Statistics for 59 countries**

Variable	Observations	Mean	Std. Dev.	Min	Max
Financial development	295	0.318	0.261	0.044	0.998
Broad money growth	293	16.681	11.656	-6.535	94.855
Government consumption	293	78.860	13.372	43.135	116.427
Trade openness	293	69.667	31.587	16.917	202.980
External debt	212	56.177	46.715	3.956	314.247
Deposit interest rate	216	9.073	8.934	0.087	73.188
Corruption	295	3,483	1.992	0.750	16.000
Investment profile	295	7.657	2.372	1.791	20.291
Bureaucracy quality	295	2.306	1.276	0.000	7.500
Law and order	295	3.979	1.851	1.000	12.500
Democratic accountability	295	4.288	2.299	0.616	17.000
Government stability	295	8.795	4.023	3.208	40.000
Economic environment	295	0.187	0.128	-0.059	0.902
MP_ECE	293	2.790	2.645	-2.174	20.062
FS_ECE	293	14.296	9.990	-4.763	62.172

Average 5-year panel data of five periods. Note: MP\_ECE is the interaction term of broad money growth rate and economic environment. FS\_ECE is the interaction term of government consumption and economic environment.

In addition, this paper uses economic environment indicators such as institutional quality from the International Country Risk Guide (ICRG). The literature includes the effects of institutions on financial development. Law & Azman-Saini (2012) suggested that a high-quality institutional environment is important in explaining financial development, specifically for the banking sector using a dynamic GMM estimation. Huang and Wei (2006) found that a pegged exchange rate is typically not appropriate for countries with weak institutions and a low inflationary framework can induce governments to improve public institutions. The mean value of broad money growth is 16.68, and the average economic environment is 0.19 in this study. Table 3.1 reports the summary statistics of all variables for 59 countries from 1987 to 2011.

### 3.2.2 Methodology

The main purpose of the paper is to examine the policies' effect on the performance of financial development as the financial markets and financial institutions development. First, this article identifies the monetary and fiscal policies (money growth and government spending) and then evaluates how the financial development index relates to each policy. To that end, the effects of economic policy on financial development must be specified within the economic environment at a good or bad level. I use the following two-panel data models to demonstrate the impact of monetary and fiscal policies on financial development.

In this first equation, error terms are correlated with the explanatory variables that cause bias. Therefore, I select the fixed effect model by testing the Hausman test because a fixed effect model works to correct the bias.

$$FD_{it} = \alpha_i + \beta MP_{it} + \psi FS_{it} + \eta X_{it} + \delta Z_{it} + \epsilon_{it} \dots \dots (1)$$

Here  $FD_{it}$  is the financial development index.  $MP_{it}$  is the broad money growth.  $FS_{it}$  is the variable for government consumption.  $X_{it}$  is the set of environment variables that include corruption, investment profile, bureaucracy quality, law and order, democratic accountability and government stability.  $Z_{it}$  is the vector of control variable that includes external debt, deposit interest rate and trade openness. Here,  $i$  refers to the country,  $t$  refers to the time period and  $\epsilon_{it}$  is the error term.

Moreover, I examine the average five-year panel data of five periods from 1987-2011 to determine how economic environment and monetary policy affect financial development. From the average 5-year period data, I examine the second

regression to construct an institutional quality index ( $e_{it}$ ) to investigate the impact of policies on the growth of financial development through the economic environment index.

$$\Delta FD_{it} = \alpha_i + \vartheta FD_{it-1} + \gamma (FD_{it-1})^2 + \beta MP_{it} + \psi FS_{it} + \eta X_{it} + \delta T_{it} + \varepsilon_{it} \dots \dots (2)$$

where  $\Delta FD_{it}$  is the growth of financial development and  $T_{it}$  is the control variable as trade openness. The coefficients are  $\alpha_i, \vartheta, \gamma, \beta, \psi, \eta, \delta$ . The rate of financial development is:

$$\Delta FD_{it} = (FD_{it} - FD_{it-1}) / FD_{it-1}$$

The following equation constructs the economic environment index by combining the six legal and institutional quality variables from Eq. (2).

$$e_{it} = \mathbf{d} X_{it}$$

where  $\mathbf{d}$  is the fixed effect estimate of  $\eta$  in Eq. (2).

The third regression investigates the effect of each policy on financial development in the economic environment.

$$\Delta FD = \alpha_i + \vartheta FD_{it-1} + \gamma (FD_{it-1})^2 + \beta MP_{it} + \psi FS_{it} + \theta_e e_{it} + \theta_{MPe} MP_{it} e_{it} + \theta_{FSe} FS_{it} e_{it} + \delta T_{it} + \varepsilon_{it} \dots \dots (3)$$

where  $e_{it}$  is the economic environment index in country  $i$  in period  $t$ .  $MP_{it} e_{it}$  is the money growth rate interacting with the economic environment index.  $FS_{it} e_{it}$  is the

fiscal policies interacting with the economic environment index, and  $\theta_e, \theta_{MPe}, \theta_{FSe}$  are the coefficients.

### 3.3 Estimation results

This article investigates the impact of monetary and fiscal policy on financial development in both 28-year panel data and 5-year period panel regressions. The first panel analysis helps to identify the characteristics that explain how monetary policy and fiscal policy affect financial development. The second panel framework needed, however, to assess how policies and economic environment affect financial development in countries.

First panel shows the result for the full sample of countries during the period from 1984 to 2011. Table 3.2 presents the estimation results related to extreme movements of money growth and government consumption with aggregated financial development. The coefficient of broad money growth is negative and statistically significant with the dependent variable<sup>18</sup>. The result implies that increased broad monetary growth decreases the development of financial systems.

However, the coefficient of government consumption is positively correlated with financial development. This finding shows that higher government expenditure influences the degree of financial development. The other control variables are strongly correlated with financial development. External debt is negatively correlated with dependent variables at the 1% significance level. In addition, deposit interest rate is inversely related to financial development. The result indicates that an increasing deposit interest rate is correlated with 0.001 % decrease in financial development at the 1% significance level. The other variable, trade openness, has a

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<sup>18</sup> Although, there are sub-indices of financial development such as FII, FID, FIA, FIE, FMI, FMI, FMD, FMA and FMD, the results are not reported in Table 2 since the main independent variables are not significant with sub-indices.

significant positive impact on financial development at the 1% level. If trade openness is increased by 1%, financial development will increase by 0.001%, meaning that countries with higher trade openness obtain higher financial development by using financial services and other financial facilities. The other economic environment variables are not significant with the dependent variable.

In the second part, this study examines the 5-year 5 period panel data from 1987 to 2011. Dependent variable is growth of aggregated index of financial development, and the main independent variables are the last year of financial development, the square terms of financial development and policies. Table 3 shows the regression results. The results in Table 3 Column (1) demonstrate the effects of the last year financial development effects on the growth of financial development, and the sign of this variable is negative. This means that increasing the last year's financial development tends to decrease the growth of financial development. Interestingly, the variables of broad money growth and government consumption are negatively correlated with the growth of financial development.

**Table 3. 2 The result of financial development and policies (1984-2011)**

Variables	Aggregated index of financial developme
Money growth	-0.0003** (0.000)
Government consumption	0.0006* (0.000)
External debt	-0.0002*** (0.000)
Deposit interest rate	-0.0013*** (0.000)
Trade openness	0.0013*** (0.000)
Corruption	-0.0029** (0.001)
Investment profile	0.0003 (0.001)
Bureaucracy quality	0.0018 (0.003)
Law and order	0.0017 (0.002)
Democratic accountability	-0.0001 (0.001)
Government stability	0.0001 (0.000)
Number of observations	789
R-squared	0.270
Number of countries	41

Robust standard error is in parentheses. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1 (\*\*\*p<0.01 means 1% level of significance, \*\*p<0.05 means 5% level of significance and \*p<0.1 means 10% level of significance): Aggregated index of financial development is the dependent variable, and broad money growth and government consumption are the main independent variables.

Slowing down the level of monetary policy and fiscal policy decreases the growth of financial development. Therefore, government consumption has a positive effect on financial development in the first panel, but a negative effect on the growth of financial development in the second panel. Trade openness is still positively correlated and significant with the growth of financial development. As noted, this

paper combines the six political indicators from the second regression results to construct the economic environment index. The regression combines the economic variables to determine the important equation:

$$\begin{aligned}
 e_{it} = & 0.001 * (\textit{corruption}) - 0.008 * (\textit{investment Profile}) + 0.097 \\
 & * (\textit{buearacy quality}) - 0.002 * (\textit{loaw and order}) - 0.026 \\
 & * (\textit{democractic accountability}) + 0.007 \\
 & * (\textit{government stability})
 \end{aligned}$$

In Table 3.3, column (2) shows that the last year's financial development is negatively correlated, but the square term of financial development is positively correlated with the growth of financial development. The other independent variables—money growth and government consumption—are negatively correlated with financial development. Broad money growth has a significantly negative correlation at the 10% level, and government consumption has a 5% significance level on the growth of financial development. Trade openness result implies that a 1% increase in trade openness is associated with 0.006% in financial development at the 1% significance level. Moreover, this paper seeks to determine whether the effectiveness of policies depends on countries' economic environments. The result of the set of economic environment shows a significant positive effect on the growth of financial development, finding that a 5% increase in economic environment is associated with a 0.547% increase in the growth of financial development.

**Table 3.3 Estimation result for policies, economic environment and financial development (average 5-year periods from 1987-2011)**

Variables	$\Delta FD$ (1)	$\Delta FD$ (2)	$\Delta FD$ (3)
$FD_{t-1}$	-6.453*** (0.639)	-6.451*** (0.627)	-6.486*** (0.621)
$(FD_{t-1})^2$	3.286*** (0.526)	3.285*** (0.517)	3.391*** (0.514)
Money growth rate	-0.003* (0.002)	-0.003* (0.002)	-0.009*** (0.003)
Government consumption	-0.007* (0.004)	-0.007** (0.004)	-0.007 (0.005)
Trade openness	0.006*** (0.001)	0.006*** (0.001)	0.007*** (0.001)
Corruption	0.001 (0.031)		
Investment profile	-0.008 (0.011)		
Bureaucracy Quality	0.097 (0.062)		
Law and Order	0.002 (0.029)		
Democratic Accountability	-0.026 (0.025)		
Government Stability	0.007 (0.006)		
Economic environment index		1.001** (0.398)	-1.193 (2.192)
MP_ECE			0.067** (0.027)
FS_ECE			0.013 (0.025)
Number of observations	233	233	233
R-squared	0.616	0.616	0.630
Number of countries	59	59	59

Robust standard error is parentheses\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 (\*\*\*p<0.01 means 1% level of significant, \*\*p<0.05 means 5% level of significant and \*p<0.1 means 10% level of significant): Dependent variable is the average annual growth rate of financial development, broad money growth and government consumption are the main independent variables. MP\_ECE is the interaction term of money growth and economic environment and FS\_ECE is the interaction term of government consumption and economic environment index.

In the Eq. (3), this study investigates the effect of policies by using two interaction terms namely, monetary policy interacted with economic environment and fiscal policy interacted with the economic environment. The results in column 3 show that money growth is negatively related to the growth of financial development at 1% significance level, but government consumption and economic environment is not significant with dependent variables. The results imply that monetary policy has a negative effect on the growth of financial development. The interaction term of the monetary policy and economic environment has a significant positive effect on the growth of financial development. The result implies that increasing the interaction between monetary policy and economic environment by 1 percent is associated with 0.05 percent increase in the growth of financial development at 5% level. This means that monetary policy has a positive effect on the growth of financial development in countries with good economic environments. However, government consumption does not have an effect on the growth of financial development in countries with good economic environments, and fiscal policy does not depend on other factors for developing the financial system.

Additionally, this study computes the overall effect of monetary policy on financial development. The average effect of policy on financial development can be figured as;

$$\text{The total effect} = (\theta_e + \theta_{MPe} \overline{e_{it}})MP_{it} = - 0.004$$

Whether  $\overline{e_{it}}$  is the average level of economic environment, measured by the mean of the whole sample. Monetary policy itself leads to a negative effect, and the

interaction term leads to a positive effect. The result shows that monetary policy has a negative effect on financial development in the countries with average economic environments. However, if the economic environment is good enough, which is higher than a threshold, the overall effects can be positive. This cut-off point can be computed by:

$$\theta_e + \theta_{MPE} \bar{e}_{it} > 0, \bar{e}_{it} > 0.2$$

The result shows that the 20 countries over the 0.2 economic environment level have a positive effect on financial development. The rest of the 39 countries are under the cut-off value of the economic environment on financial development.

In Table 3.4, column (5) presents the positive effect countries with good economic conditions. Table 3.5 in column (5) presents the negative effect countries with unfavorable economic conditions. Column (1) reports the average financial development, and Columns (2) and (3) report average annual growth of broad money and average annual growth of government consumption. In column 6 describe the effects of monetary policy on financial development by analysing the average economic environment of sample countries.

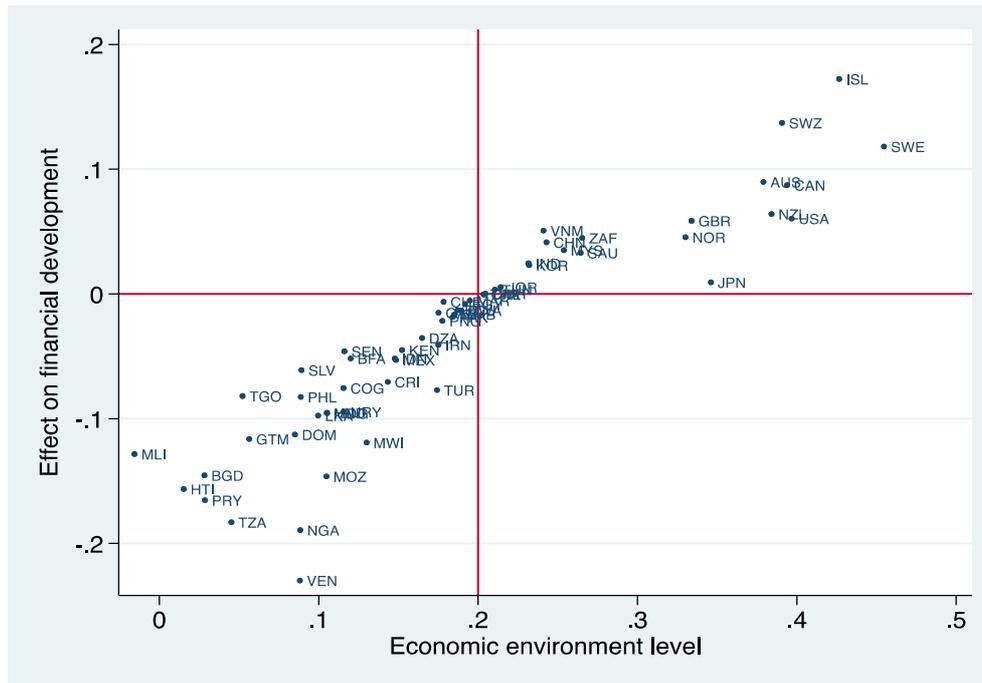
**Table 3. 4 Sample mean for 20 countries positive effect over 1987-2011**

<b>Code</b>	<b>Country</b>	<b>(1)</b> $\overline{FD}$	<b>(2)</b> $\overline{MP}$	<b>(3)</b> $\overline{FS}$	<b>(4)</b> $\overline{e_{it}}$	<b>(5)</b> <i>Effect</i>
ISL	Iceland	0.667	15.487	79.146	0.426	0.172
SWZ	Sweden	0.686	14.688	95.244	0.390	0.137
SWE	Switzerland	0.926	9.426	71.822	0.454	0.118
AUS	Australia	0.794	10.255	74.904	0.379	0.089
CAN	Canada	0.770	9.188	76.409	0.393	0.087
NZL	New Zealand	0.586	7.116	76.077	0.384	0.064
USA	United States	0.821	6.268	81.844	0.396	0.060
GBR	United Kingdom	0.840	9.027	83.981	0.333	0.058
VNM	Vietnam	0.203	27.437	76.450	0.241	0.050
NOR	Norway	0.641	7.218	64.635	0.330	0.045
ZAF	Spain	0.799	14.651	80.185	0.265	0.044
CHN	China	0.447	21.291	54.970	0.242	0.041
MYS	Malaysia	0.593	14.100	57.933	0.253	0.035
SAU	Saudi Arabia	0.376	10.935	59.548	0.264	0.033
IND	India	0.369	17.884	69.164	0.231	0.024
KOR	Korea, Rep.	0.732	16.516	64.660	0.232	0.023
JPN	Japan	0.735	1.310	72.303	0.346	0.009
JOR	Jordan	0.443	10.754	99.496	0.214	0.005
TUN	Tunisia	0.198	10.680	78.517	0.210	0.003
CMR	Cameroon	0.085	7.893	79.951	0.204	0.000

Note: *FD* is financial development, *MP* is broad money growth rate (%), *FS* is government consumption rate (%),  $e_{it}$  is economic environment index and *Effect* is the marginal effect of monetary policy on financial development.

Moreover, Figure 3.1 illustrates the clear differences in the correlations between monetary policy and financial development. Figure 1 indicates that 20 countries with good economic conditions are positively related to monetary policy, and the remaining 39 countries with bad economic conditions are negatively associated with financial development. For example, Sweden, the seventh-richest country in the world in terms of GDP, increases the effectiveness of monetary policy by 0.137% at the 0.391 economic environment level. The overall finding suggests

that monetary policy is more effective in countries with good economic environments than countries with humble economic environments.



**Figure 3. 1 The effect of monetary policy on financial development**

**Table 3. 5 Sample mean of 39 negative effect countries over 1987-2011**

Code	Country	(1) <i>FD</i>	(2) <i>MP</i>	(3) <i>FS</i>	(4) $\overline{e_{it}}$	(5) <i>Effect</i>
CHL	Chile	0.441	17.198	71.436	0.203	-0.000
THA	Thailand	0.502	10.214	67.637	0.203	-0.000
MAR	Morocco	0.324	11.408	76.873	0.194	-0.005
CHE	Syrian Arab. Republic	0.116	4.930	68.021	0.178	-0.006
EGY	Egypt, Arab. Rep.	0.269	13.268	85.390	0.191	-0.008
ECU	Ecuador	0.148	15.474	78.332	0.187	-0.013
BWA	Botswana	0.184	18.411	61.884	0.189	-0.013
GAB	Gabon	0.103	10.470	49.248	0.175	-0.015
GMB	Gambia, The	0.080	17.504	95.621	0.185	-0.016
PAK	Pakistan	0.274	18.480	86.149	0.183	-0.018
PNG	Papua New Guinea	0.147	16.282	69.730	0.177	-0.021
DZA	Algeria	0.124	18.016	56.716	0.164	-0.035
IRN	Iran, Islam Rep.	0.229	28.147	59.632	0.175	-0.040
KEN	Kenya	0.152	17.389	89.221	0.152	-0.045
SEN	Senegal	0.102	10.461	93.100	0.116	-0.046
BFA	Burkina Faso	0.082	12.308	91.069	0.120	-0.051
IDN	Indonesia	0.310	18.369	70.685	0.147	-0.051
MEX	Mexico	0.335	19.027	79.252	0.148	-0.052
SLV	El Salvador	0.192	10.640	100.513	0.089	-0.061
CRI	Costa Rica	0.198	23.230	82.935	0.143	-0.070
COG	Congo, Rep.	0.050	17.053	55.905	0.115	-0.075
TUR	Turkey	0.405	51.702	77.707	0.174	-0.077
TGO	Togo	0.098	10.782	97.979	0.052	-0.081
PHL	Philippines	0.337	14.321	83.851	0.088	-0.082
URY	Uruguay	0.166	21.348	83.129	0.115	-0.094
HND	Honduras	0.167	19.264	86.303	0.105	-0.095
MDG	Madagascar	0.084	19.348	93.700	0.105	-0.095
LKA	Suriname	0.134	18.670	82.956	0.099	-0.097
DOM	Dominican Republic	0.127	18.945	85.469	0.085	-0.112
GTM	Guatemala	0.168	15.751	93.798	0.056	-0.116
MWI	Malawi	0.083	32.182	95.662	0.130	-0.119
MLI	Mali	0.086	11.685	89.375	-0.015	-0.128
BGD	Bangladesh	0.197	16.547	82.027	0.028	-0.145
MOZ	Mozambique	0.081	29.485	100.254	0.104	-0.146
HTI	Haiti	0.073	16.568	100.177	0.015	-0.156
PRY	Paraguay	0.104	18.839	74.250	0.028	-0.165
TZA	Tanzania	0.095	23.048	88.111	0.045	-0.183
NGA	Nigeria	0.119	32.744	79.818	0.088	-0.189
VEN	Venezuela, RB	0.187	39.651	67.958	0.088	-0.229

Note: *FD* is financial development, *MP* is broad money growth rate (%), *FS* is government consumption rate (%),  $e_{it}$  is economic environment index and *Effect* is the marginal effect of monetary policy on financial development.

### 3.4 Conclusion

This paper examines the effect of money growth and government consumption as monetary and fiscal policy on financial development in 59 countries using two panel datasets. Monetary and fiscal policies are important factors that help improvement of the financial development and economic systems. However, effective policies are required for the legal system or institutional quality of countries. The first panel results show that the value of money growth coefficient negatively relates to financial development, but the effect of government spending on financial development is significantly and positively correlated. The result implies that strong monetary policy hinders a financial system's development, however, the effectiveness of fiscal policy improves the development of the financial system. Moreover, control variables are significantly correlated with financial development. The countries have higher external debt, higher interest rates and lower trade would less development of financial system.

The second panel result suggests that monetary policy and fiscal policy have a negative effect on financial development without considering the economic environment. In general, this paper suggests that monetary policy does work in countries with good economic environments, but it does not depend on fiscal policy on financial development. More importantly, this article finds clearly differences in the role of monetary policy that depend on the countries' economic environment. Among all sample, 20 countries have significant positive effect of monetary policy on financial development, while monetary policy leads to negative effects on all other countries. These findings are important in the design of monetary policies.

## CHAPTER 4

### **The Macroeconomic Conditions, Financial Crisis and the Financial Reform**

#### **4.1 Introduction**

Evidence suggests that policy reforms are usually triggered by shocks, the presence and consequences of which alert policy-makers to the flaws of the current system and thus motivate policy reform. Similarly, financial reforms, which are the liberalization of the financial sector, are also related to the occurrence of financial crises. Several studies have confirmed this (for example, Hall (2003), Barth et al. (2001), Williamson and Mahar (1998), Gokmen et al. (2017)). The influence of crisis, however, is more than just 'triggering a reform'. Specifically, sometimes a financial crisis triggers financial liberalization (reform), and sometimes it halts financial liberalization (reversal).<sup>19</sup> In this study, I argue this inconsistent influence is due to the difference of the macroeconomic conditions of a country. Specifically, whether the economy is big or small, closed or open, and to what degree that exposes it to financial risk would be crucial.

Each country liberalizes its financial sector/markets for different reasons. For instance, Rajan and Aingales (2003) argue that trade openness and the availability of foreign capital markets make the incumbents more willing to liberalize their financial sectors. In this case, when a financial crisis causes a shortage of domestic capital, to

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<sup>19</sup> For instance, Abiad and Mody (2005) finds that a significant adverse impact on financial reform coming from recessions and banking crises.

acquire international capital, the policy-makers would enact financial reform. On the other hand, some policy-makers choose to implement more stringent regulations (interest rate control and capital control) on the financial sectors to stabilize the impacts of a financial crisis. This is a form of reversal. These two examples show policy-makers' opposite views and actions in dealing with the aftermath of a crisis for a different objective. The objective is different because the macroeconomic conditions are different.

This study explores how the effects of a crisis on reform depend on a country's macroeconomic conditions. In comparison, the literature focuses more on how the effect depends on the origin (and the type) of crisis. For instance, Abiad and Mody (2005) study how the condition of balance of payment crisis and banking crisis affects financial reform through trade openness. Moreover, Waelti (2015) studies how the different crises affect different individual dimensions of financial reforms by using seven dimensions of financial reforms and sudden stops in financial flows. Hlaing and Kakinaka (2018) emphasize the role of a crisis' origins and the dimensions of the policy reform. Compared with these studies, I provide a new view on the crisis-begets-reform hypothesis: policy-makers' responses depend on the economy's condition. Given that a more liberalized financial system is the direction that international organizations such as the World Bank and the International Monetary Fund (IMF) expect, this study provides critical information on the types of economies that may choose a reversal after experiencing a financial crisis.

I use a two-way fixed effect model using panel data of 91 countries from 1973 to 2005. I include the interaction term of financial crisis and variables of macroeconomic conditions. These terms help me examine how the crisis affects the

reform conditional on the macroeconomic conditions. The measurement of financial reform is the change of the financial liberalization index, drawn from the dataset of Abiad et al. (2008).<sup>20</sup> This index includes seven components. In my empirical investigation, I use the aggregate index and all the components. The financial crisis dataset is from Laeven and Valencia (2013). I choose five variables to measure the macroeconomic conditions: GDP growth, GDP per capita, inflation rate and the external debt.

There are two key findings from the empirical investigation. First, after the financial crisis, small economies tend to speed up reform, while large economies tend to slow it down (a reversal). This finding is intuitive. Since larger economies rely less on foreign capital for economic revival after a financial crisis, they have less incentive to liberalize the financial sector even more. In comparison, they might impose stricter regulations on the financial sectors to rein in shadow banks or facilitate the stabilization of monetary policy. Second, economies with a higher degree of openness tend to increase the speed of reform more than economies with a lower degree of openness. Suppose the openness to some degree represents how tightly the economy connects to the world market. This finding suggests that the more connected an economy is to the world economy, the less likely the economy is to choose to reverse financial reform. Among the literature on the crisis-begets-reform hypothesis, few emphasize the role of a country's macroeconomic conditions.

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<sup>20</sup> Seven components of financial reform index are credit controls and excessively high reserve requirements; interest rate controls; entry barriers; prudential regulations and supervision of the banking sector; state ownership in the banking sector; capital account transactions; security market policy. Financial crisis consists banking crisis, currency crisis and debt crisis. Macroeconomic variables are GDP growth, GDP per capital, inflation, and external debt and trade openness.

Abiad and Mody (2005) consider the influences of 'high inflation' and 'recession'. They find that high inflation results in a reversal of reform, while recession has no influence. Given that the considered economic conditions are different, this study contributes to the literature by providing new evidence.

In the next section, I review financial reform after financial crisis. Section 3 describes the empirical model and data, and Section 4 analyses the empirical results. Section 5 presents the conclusion of the analysis.

## **4.2 Financial reform after the crisis**

A financial crisis leads to some serious consequences. In addition to the large decline of economic growth, there are other macroeconomic situations such as high inflation and highly devaluated exchange rates. Therefore, policy-makers change particular regulations to recover from the crisis. There have been two significant crises, the Asian financial crisis and the global financial crisis.

### **4.2.1 Asian financial crisis**

The Asian financial crisis started in 1997 and offered a chance for the creation of a sounder Asian economy (Bremner et al. (1997)). The most crisis-affected countries were Indonesia, South Korea and Thailand. In addition, Hong Kong, Laos, Malaysia and the Philippines were injured by the collapse of the economic sectors. Brunei, China, Singapore, Taiwan, and Vietnam were less affected, although they suffered from a loss of demand and confidence. At that time, regional governments took the opportunity to initiate and implement wide-ranging regulatory and institutional reforms (Magnusson (1997)). Soesastro (1998) stated that governments in ASEAN economies addressed reform, although responses have been varied at both a country and ASEAN-wide level. For instance, Singapore started a range of internal reforms and restructuring to bolster its own international competitiveness (Yue (1998)). Malaysia started some degree of banking system reform, but took a slightly less open approach than Singapore (Hill and Athukorala (1998)). Similarly, both Thailand and Indonesia have witnessed considerable political, institutional and regulatory reform since the onset of the crisis (Chowdhury (1999), Thompson and Poon (2000)).

GDP growth, GDP per capital and trade are the main macroeconomic variables for this paper. Therefore, I select those two economic variables to determine what happened during the crisis.<sup>21</sup> Figure 4.1 shows the nature of GDP per capita and trade during the crisis period in developing countries. I selected the data of the most crisis-affected countries from 1990 to 2013. The Philippines, Thailand, Malaysia, Indonesia, Singapore and South Korea suffered more from the Asian financial crisis than other developing countries.<sup>22</sup>

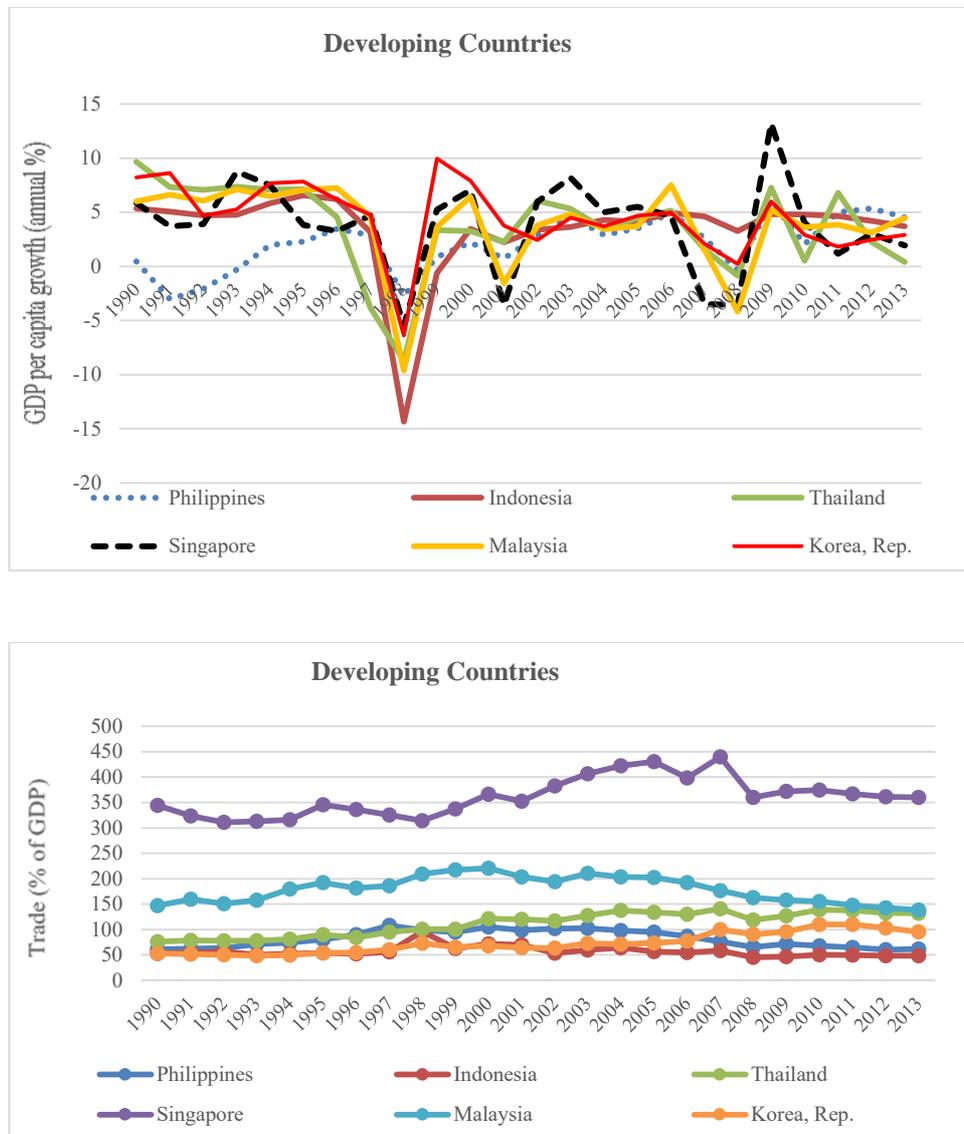
In 1998, all developing countries in the sample experienced a decline of GDP per capita growth to under zero. In particular, Indonesia's and Malaysia's GDP per capita dropped significantly (-14.351 and -9.638, respectively). Interestingly, during the crisis period, trade volume increased overall compared with other periods except from Singapore. After the 1997 Asian financial crisis, economies in the region regulated financial liberalization toward financial reform. Therefore, in 1999, many financial forecasters suggested that the economies of Asia were beginning to recover.

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<sup>21</sup> For the nature of GDP growth during the Asian crisis and Global crisis shows in Appendix Figure.

<sup>22</sup> According to the interaction terms, GDP per capita and trade are significant with financial reform during the crisis period. Therefore, we attempt to connect the real situation of crisis-affected countries and regression result.

## GDP per capita growth and Trade for developing countries



**Figure 4.1 GDP per capital and trade**

(Sources: World Development Indicator)

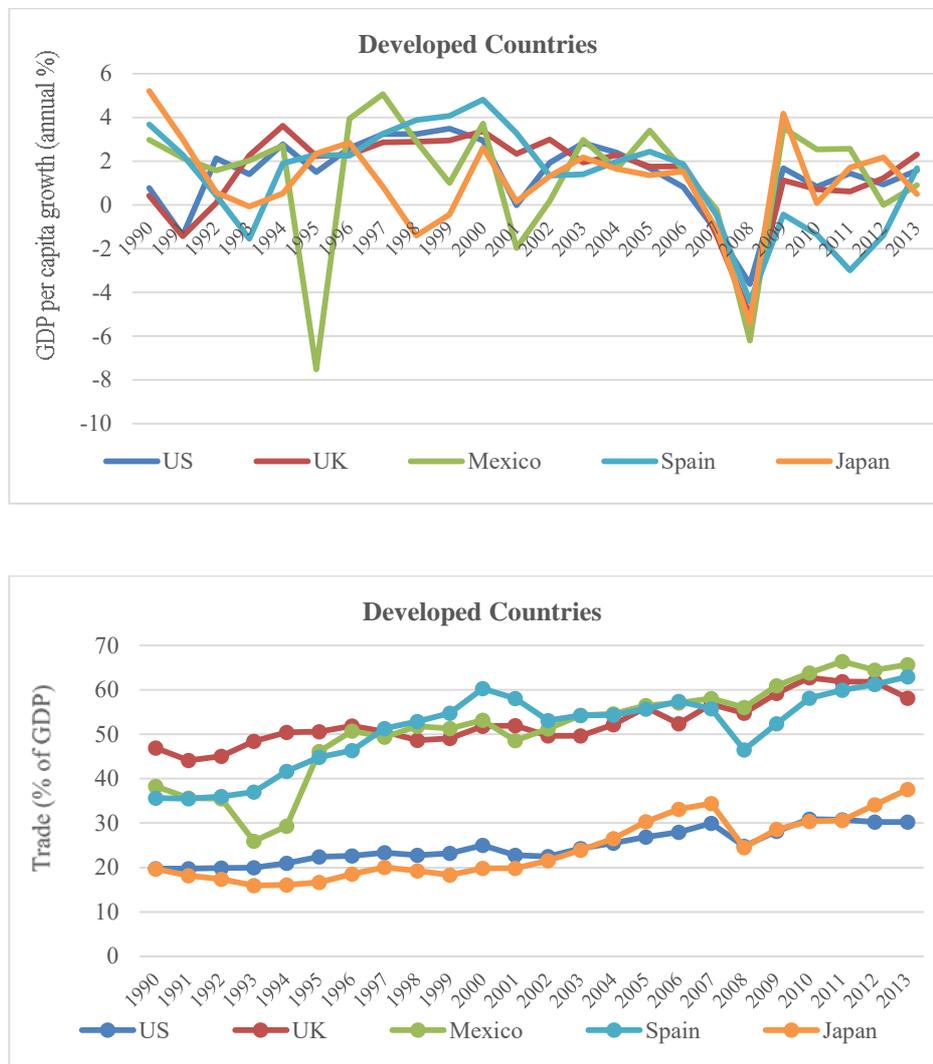
### 4.2.2 The Global financial crisis

The global financial crisis started in mid-2007 and grew in late 2008. It was the most severe financial crisis since the Great Depression. The Asian financial crisis

originated in developing countries, but the global crisis originated in advanced economies. It started with market failures in the US housing and financial markets. During the global financial crisis, all countries were not affected at the same time or in the same situations. The fast financial spill overs affected some economic situations through the subsequent collapse in international trade. Goldstein and Xie (2009) determine that the impact of the global financial crisis was less severe than that of the Asian crisis. This study selected some advanced economies that mostly were affected by the global financial crisis, such as US, UK, Mexico, Spain and Japan.

Figure 4.2 shows GDP per capita and trade in developed countries from 1990 to 2013. The selected emerging countries' GDP per capita significantly declined during the global financial crisis period in 2008. The trade ratio slightly declined in 2008. After the global crisis, trade and GDP per capita immediately rose in 2009. To recover from the global financial crisis, most attempted to formulate structural reforms in collaboration with each financial authority with support from the World Bank (WB), Asian Development Bank (ADB) and IMF programmes. Demirgüç-Kunt and Detragiache (1999) state that the financial reform process was stimulated by frail policy circles, inadequate structures of reform and lack of sufficient supervision.

## GDP per capita growth and Trade for developed countries



**Figure 4.2 GDP per capita growth and Trade for developed countries**

Sources: World Development Indicator (WDI)

### 4.3 Econometric Analysis

This section discusses the econometric method and data for this empirical study.

#### 4.3.1 Methodology

This empirical paper explores the effect of financial crisis on the speed of financial reforms using panel data. The basic specification is

$$\Delta FLI_{i,t} = FLI_{i,t} - FLI_{i,t-1} = \alpha + \beta_1 FLI_{i,t-1} + \beta_2 (FLI_{i,t-1})^2 + \gamma MAC_{i,t-1} + \delta FC_{t-1} + \phi (MAC_{i,t-1} \times FC_{t-1}) + \varepsilon_{it}, \dots\dots\dots(1)$$

where  $\Delta FLI$  is a measurement of financial reforms that is the change of financial liberalization index;  $FLI$  is an aggregated index of financial liberalization in countries ( $i$  at time  $t$ );  $\alpha$  is the country fixed effect;  $FC$  refers to a measure of the financial crisis dummy; and  $\varepsilon_{i,t}$  denotes the error term. Accordingly, the dependent variable, the financial liberalization process, will occur at a particular time in a particular country when it restructures by liberalizing its financial system. The distinctive histories of financial liberalization control for past financial liberalizing policies directly with lagged dependent variable. For most of the countries, their financial liberalization index is highly correlated from one year to the next, so that past financial liberalization is an excellent predictor of future financial reform. Therefore, I use one-year lagged dependent and independent variables.

Moreover, this study answers the question of whether the effect of financial crisis on financial reform depends on the macroeconomic conditions of the countries. To explore this issue, this study uses the interaction term of financial crisis dummy with each macroeconomic variable. A negative and significant coefficient of the

interactive variables would suggest that financial reform is less severely affected by financial crisis in countries. Those countries are more financially unstable during the crisis period. The dummy variables for financial crisis control for specific effects of crisis that might more regulate the level of the financial reform than in other periods. The coefficient of interest in Equation (1) is  $\phi$ . A positive sign on this interaction term can be interpreted as evidence in favour of my hypothesis. A negative or insignificant coefficient might signal the irrelevance of the financial crisis and macroeconomic variables for the level of financial reform. A significantly positive  $\phi$  provides evidence in favour of the fixed effect model that countries develop economic conditions and speed up financial reforms. Therefore, I use a set of macroeconomic variables (*MAC*).

$$\gamma \mathbf{MAC}_{i,t-} = [\gamma_1 \mathit{GDPGR}_{i,t-1}, \gamma_2 \mathit{LGDPPC}_{i,t-1}, \gamma_3 \mathit{TRADE}_{i,t-1}, \gamma_4 \mathit{EXTD}_{i,t-1}, \gamma_5 \mathit{INF}_{i,t-1}]$$

The vector of *MAC* includes GDP growth rate (*GDPGR*), the ratio of external debt stocks (*EXTD*), logarithm form of real GDP per capita (*LGDPPC*), the trade to GDP ratio (*TRADE*) and inflation rate (*INF*). The expected sign for GDP growth is negative. Financial reform through economic growth increased most of the time, but if policy-makers do not manage well, they may import instability or limit economic growth during the crisis. Hence, I cannot say that the better economic growth is associated with specific characteristics of financial reform. Log GDP per capita can be used to control for the level of development of the country. I can suggest that there may be trade-offs between valuable effects of growth on financial reform and stability of some financial structures. Then, the expected sign for GDP per capita is ambiguous, but in the study, the expected sign for GDP per capita is positive.

External debt is expected to have a positive effect on financial reform, since the countries receive loans and grants from international organizations, increase economic growth and develop financial systems as further financial reforms. Therefore, the expected sign of external debt will be positive. However, external debt will be adversely associated with financial reform because different economic situations affect different countries during financial crisis. Trade openness can open the trade integration that affects the financial reform process of each country. The expected sign between trade openness and financial reforms is therefore positive.

Inflation could be expected to directly affect financial reform and financial crises. Boyd et al. (2001) suggest that higher levels of inflation coincide with distortions in financial sector performance. Rousseau and Wachtel (2002) find that high inflation is associated with a reduction in financial depth. High inflation can also lead to increased price variability, more production and decreased demand. The effects of the crisis on inflation were largely temporary in the United States, but longer lasting in the United Kingdom. That is surprising because the United Kingdom had a formal inflation target during this period. Expectations may have been affected more because inflation stayed above the central bank's target for extended periods during the crisis in 2008-2009. Therefore, the expected sign of inflation is positive on financial reform and negative during the crisis period.

### **4.3.2 Data**

In this study, I use a panel dataset of 91 countries from 1973 to 2005. I explain the detailed measurements of variables in the next subsections.

#### **4.3.2.1 Financial Liberalization Index**

This empirical study uses a financial liberalization index that it extracted from the dataset of Abiad et al. (2008). Financial reform in this study refers to the change of degree of financial liberalization. The financial liberalization index is an aggregate of seven components. The measurement along the seven dimensions is combined to get an index of overall financial liberalization for each country in each year.

Some researchers have attempted to measure financial reforms differently. Williamson and Mahar (1998) construct the measure of financial reforms using six dimensions (credit controls, interest rate controls, entry barriers, regulations, privatization, and international capital flows) over 34 countries during the period from 1973 to 1996. Abiad and Mody (2005) also created a financial reform index with six different dimensions: directed credit/reserve requirements, interest rate controls, entry barriers and/or lack of pro-competition policies, restrictive operational regulations, the degree of privatization in the financial sector and controls on international financial transactions. Kaminsky and Schmukler (2008) use three components to analyze financial reforms—domestic financial sector liberalization, capital account liberalization and openness of the equity market to foreign investment—of 28 countries during the period 1973-1999. Bandiera et al. (2000) introduce six measurements of financial liberalization—interest rates, credit allocation, bank ownership, prudential regulation, security markets, and openness of the capital account—in 8 developing countries.

Laeven (2003) constructs six indicators for financial reforms (interest rates deregulation, reduction of entry barriers, reduction of reserve requirements, reduction

of credit controls, privatization of state banks and strengthening of prudential regulation) during the 10 years from 1988 to 1998. However, the country coverage in this work is relatively small, so the dataset may not be large enough to show the broad patterns of financial sector reforms in developing countries.

Abiad, Deteragiache, and Tressel (2008) construct a new financial reform index and a detailed explanation about multi-faceted measurement of financial liberalization. The data consist of seven components of financial sector policy: (1) credit controls and excessively high reserve requirements, (2) interest rate controls, (3) entry barriers, (4) banking supervision, (5) privatization of bank, (6) capital account transaction, and (7) security market policy. To measure the degree of financial reform, each dimension is coded on a four-point scale: 0 = Fully Repressed, 1 = Partially Repressed, 2 = Largely Liberalized and 3 = Fully Liberalized..<sup>23</sup> Since each of the seven liberalization policies can take on values between 0 and 3, the sum takes on values between 0 and 21. A list of the coding rules for each dimensions show in **Appendix A 4.1**.

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<sup>23</sup> For detail explanation, please see Abiad, Deteragiache, and Tressel (2008).

**Table 4.1 Correlations among components of financial liberalization index**

	Credit Controls	Interest Rate Controls	Entry Barriers	Banking Supervisi on	Privatiz ation	Internat ional Capital Market	Securitie s Market
Credit Contro	1.000						
Interest Rate Controls	0.651	1.000					
Entry Barriers	0.565	0.550	1.000				
Banking Supervision	0.608	0.590	0.565	1.000			
Privatization	0.494	0.437	0.435	0.481	1.000		
International Capital Market	0.587	0.606	0.513	0.578	0.517	1.000	
Securities Market	0.624	0.628	0.545	0.642	0.492	0.676	1.000

Table 4.1 reports the correlations among seven components of the financial liberalization index. Each component shows a higher correlation, indicating that the liberalizations along with these measurements tended to occur together. The measures of credit controls, interest rate controls, banking supervisions and security markets are all highly correlated with each other, with the correlations ranging from 0.676 to 0.624. The measures of entry barriers and international capital markets show fewer correlations around 0.55, and privatization has the lowest correlations with other components, indicating it does not coincide with other reforms. The measures along the seven magnitudes can be used to obtain an index of overall financial liberalization for each country in each year. The detail definition and have each dimension is shown in **Appendix A 4.2**.

#### 4.3.2.2 Financial Crisis Dummy (FC)

For the financial crisis dummy, this study uses a combination of three crises from Laeven and Valencia (2013). FC constructs the year of the financial crises, including systemic banking, currency and sovereign debt crises during the period 1970-2007.<sup>24</sup> Accordingly, the financial crisis dummy is equal to zero if there is no financial crisis, and it is equal to one if there is a crisis. The probability that a crisis will occur at a particular time in a particular country is assumed to be a function of a vector of macroeconomic variables. The definition of each crisis explains in **Appendix A 4.3**.

Laeven and Valencia (2013) specify three types of crisis: banking crisis, currency crisis and debt crisis. Some papers measure different crises such as sudden stops in financial flows, twin crisis, triple crisis, stock market crisis and particular crisis.<sup>25</sup> Claessens and Kose (2013) classify four type of financial crisis, and Waelti (2015) classify a sudden stops crisis. Some works have attempted to show currency crises and their timing. Frankel and Rose (1996) define a currency crisis as a large nominal depreciation. Sachs et al. (1996) and Kaminsky and Reinhart (1999) describe a currency crisis as a combination of a large depreciation of exchange rate and a large loss of foreign reserves, which is closely related to exchange market pressure (EMP) developed by Girton and Roper (1977).

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<sup>24</sup> See the detail explanation of financial crisis in IMF working paper, Valencia and Laeven (2008), (2012). The dataset expands from the Caprio et al. (2005) that the banking crisis database by including recent banking crises, information on currency and debt crises.

<sup>25</sup> For example: Glick and Hutchison (2005); Hutchison and Noy (2005), Falcetti and Tudela (2008), Laeven (2012).

#### 4.3.2.3 Macroeconomic variables

The macroeconomics variables for this study measure whether an increased or decreased level of financial liberalization occurs. The macroeconomic variables are real GDP growth rate, real GDP per capita, trade-GDP ratio, inflation rate and external debt. The data are drawn from the WDI and EWN. Demirgüç-Kunt and Detragiache (1997) use macroeconomic variables of the growth of real GDP, the external term of trade and the rate of inflation for analyzing banking crisis and financial liberalization.<sup>26</sup> A list of the macroeconomics variables and definition for all variables attaches in **Appendix A 4.4**.

Table 4.2 shows the interconnections between the variables' correlation matrices and descriptive statistics for each indicator. Financial liberalization has a pairwise correlation with GDP per capita by 0.545, which is the highest correlation. The financial liberalization index is positively correlated with GDP growth rate, GDP per capita, trade openness and external debt level, but negatively correlated with inflation and financial crisis dummy. Financial crisis dummy has a negative relationship with financial liberalization index and other macroeconomic variables except for inflation. GDP growth rate has a positive relationship with trade openness but is negatively correlated with GDP per capita, external debt and inflation.

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<sup>26</sup> For more detail on the relationship between the theory of banking crisis, financial liberalization and the choice of control variables, see Demirgüç-Kunt and Detragiache (1997).



## 4.4 Empirical Result

The results are reported in two parts: the baseline results for 89 countries and restricted results for 75 countries. A list of the sample countries expresses in the **Appendix A 4.5**. The different model specification restricted model calculates the percentage of financial liberalization level as reduced by 3%. A list of the countries of percentage change in level of financial reform expresses in the **Appendix A 4.6**.

### 4.4.1 Baseline results

Table 4.3 reports the empirical result for the model specified in Equation (1). This study focuses on the coefficient of FC and the interaction term between macroeconomic variables during the crisis period. Column 1 shows that the coefficient of financial crisis is positively significant with aggregated financial liberalization. Financial crisis influences the speeding up of financial liberalization. According to the result, the coefficient of financial crisis dummy variable is not significant with each liberalization policy. This implies that financial crisis affects the speeding up or slowing down of financial reform, depending on the specific financial liberalization policy.

The coefficient of GDP growth rate is negatively significant with financial reform. This means that high-growth countries are likely to slow down the pace of financial reforms. The coefficient of external debt is positively significant with  $\Delta FLI$ , suggesting that higher external debt tends to speed up financial reforms. The other variables are not significant with  $\Delta FLI$  as GDP per capita, trade and inflation. Furthermore, Columns (2) to (8) show that the coefficient of GDP growth rate is positively significant with privatization but negatively related with securities markets.

The coefficient of GDP per capita is positively significant with interest rate control, entry barrier, banking supervision, international capital market and security market. The coefficient of external debt is also positively significant with credit controls, entry barriers, banking supervision and privatization.

Subsequently, I examine the interaction between macroeconomic variables and financial crisis. The interactive effect between financial crisis and macroeconomics environment is also detected. The coefficient interactive terms of log GDP per capita (LGDPPC) and trade openness (TRADE) are significant. The coefficient of interaction term of GDP per capital is negative and significant at the 1% level with financial reforms during the financial crisis. This indicates that the country's initial level of income is low when the government is likely to speed up the pace of financial reforms. The result supports the conditional convergence hypothesis in which poor countries reform faster than richer countries (Solow (1956)).

The coefficient of interaction variable between trade openness and financial crisis dummy is positively significant at the 1% level. This result is interesting because it implies that trade openness in itself does not contribute to financial reform, but simultaneous opening during financial crisis significantly promotes financial reforms. Rajan and Zingales (2003) argue that it is the combination of trade openness that makes incumbents more willing to liberalize the financial sector.

This finding supports the view that a higher level of openness to the rest of the world will tend to impact positively on the performance of financial reforms. The coefficient of interaction term of GDP growth is positively related with entry barrier but negatively significant with privatization. This indicates higher GDP growth rate

more restricts the entry of new domestic or foreign financial institutions, but privatization policy less restricts credit allocation during the crisis. The coefficient of interaction term of GDP per capita is negatively significant with interest rate controls and entry barriers. The coefficient of trade openness is positively significant with most financial liberalization policies. In particular, credit control, interest rate control, banking supervision and privatization are strongly relative with trade. This means that higher trade integration is associated with encouraging financial reform. The coefficient of interaction term of external debt is positively significant with entry barrier and interest rate control, but negatively related with banking supervision.

In conclusion, financial crisis promotes the speeding up of financial reform. The result shows two interaction terms significantly influence financial reform during the crisis period. Small economies tend to speed up reforms, while large economies tend to slow down reforms (a reversal) after the financial crisis. Therefore, the effect of a financial crisis on financial reform depends on macroeconomic conditions.

Table 4.3 Baseline results

Variable	Aggregate index (1)	Credit control (2)	Interest rate control (3)	Entry barrier (4)	Banking supervision (5)	Privatization (6)	Int's capital market (7)	Security market (8)
<i>FLI</i>	0.099*** (0.015)	0.035 (0.029)	0.169*** (0.040)	0.025 (0.026)	0.016 (0.020)	-0.034 (0.029)	-0.120*** (0.034)	-0.022 (0.019)
$(FLI)^2$	-0.007*** (0.001)	-0.039*** (0.009)	-0.091*** (0.013)	-0.033*** (0.008)	-0.043*** (0.008)	-0.022** (0.010)	-0.010 (0.010)	-0.026*** (0.006)
GDP growth	-0.010* (0.006)	-0.001 (0.002)	-0.003 (0.003)	-0.001 (0.002)	-0.002 (0.002)	0.005*** (0.002)	-0.000 (0.002)	-0.004*** (0.001)
Log GDP per capita	0.022 (0.125)	0.044 (0.039)	0.123** (0.050)	0.115*** (0.035)	0.181*** (0.033)	-0.013 (0.035)	0.196*** (0.046)	0.098*** (0.031)
Trade	-0.002 (0.002)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.000)
External debt	0.185*** (0.044)	0.028** (0.014)	0.027 (0.018)	0.032*** (0.012)	0.048*** (0.012)	0.032** (0.013)	-0.000 (0.016)	0.011 (0.010)
Inflation	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Financial crisis	0.937* (0.551)	0.074 (0.178)	0.231 (0.234)	-0.193 (0.160)	-0.054 (0.146)	0.262 (0.172)	0.177 (0.210)	0.108 (0.135)
GDP growth × Financial crisis	0.004 (0.015)	0.005 (0.005)	-0.006 (0.006)	0.013*** (0.004)	0.001 (0.004)	-0.013*** (0.005)	-0.002 (0.006)	0.001 (0.004)
GDP per capita × Financial crisis	-0.188*** (0.066)	-0.021 (0.021)	-0.062** (0.028)	0.027 (0.019)	-0.002 (0.018)	-0.048** (0.021)	-0.039 (0.025)	-0.016 (0.016)
Trade × Financial crisis	0.008*** (0.003)	0.002* (0.001)	0.003** (0.001)	-0.001 (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.001 (0.001)	-0.000 (0.001)
External debt × Financial crisis	0.012 (0.077)	0.008 (0.025)	0.073** (0.032)	0.046** (0.022)	-0.048** (0.020)	-0.027 (0.024)	-0.010 (0.029)	-0.029 (0.019)
Inflation × Financial crisis	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Observations	2,387	2,387	2,387	2,387	2,387	2,387	2,387	2,387
R-squared	0.065	0.056	0.1	0.063	0.055	0.051	0.082	0.068
Number of Country	89	89	89	89	89	89	89	89
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. For each column, the 'FLI' is measured by aggregate index of different components. The dependent variables of first two rows of column (2) to (8) are each component of financial liberalization index. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

#### 4.4.2 Restricted results

Additionally, this study uses the alternative model specification, the restricted model that describes the countries' less experience with financial reforms. In particular, this model eliminated the countries that are not initiating financial reforms by 100%. I reduce the ratio of FLI by 3%, which assumes countries are not executing financial reforms. After reducing by an average of 3%, 75 countries are undertaking financial reforms system. A list of financial crisis year and countries are report in **Appendix A 4.7**. Table 4.4 shows the restricted result. Even with the removal of some countries, the result demonstrated the still-significant effect of financial crisis on financial reform since the coefficient of financial crisis dummy slightly changes with respect to the baseline specification. The impact of financial crisis on financial reforms is raised from 0.937 to 1.039. In particular, among the seven financial reform policies, privatization is also at a 5% level of significance with financial crisis dummy. The result shows that financial crisis encourages speeding up privatization of banks.

The coefficient of external debt is positively significant at the 1% level, which means higher external debt tends to speed up financial reforms. Likewise, Columns (2) to (8) show that the coefficient of GDP growth rate is negatively related with securities markets. The coefficient of GDP per capita is positively significant with credit control, interest rate controls, entry barriers, banking supervision, international capital markets and securities markets. The coefficient of external debt is also positively significant with six policies: credit control, interest rate control, and entry barrier, banking supervision, security market and privatization. All

liberalization policies are strong, with a 1% significance level with the coefficient of external debt.

The coefficient of GDP per capita is negatively significant with financial reform, meaning the countries faced high GDP per capita. The speed of financial reform would be slowed in a financial crisis period. Negative and significant coefficients for the interaction variables mean that a better macroeconomic situation tends to weaken the effect of a financial crisis on financial reforms. The interaction term of independent variable, the coefficient of external debt and financial crisis become significant with financial reform. This means that countries might see long-term effects of external debt on financial reforms. The coefficient of interaction term of GDP growth is positively correlated with entry barriers, but negatively significant with privatization. This indicates that the higher GDP growth rate is more restricted to the entry of new domestic or foreign financial institutions, but privatization policy is less restricted to credit allocation during the crisis.

Finally, interesting results are the coefficients of financial crisis that encourage financial reforms. One reason why financial crisis may lead to financial reform is the removal of credit controls and interest rate controls and regulation of entry barriers and banking supervision. The effect of macroeconomic variables and cross-term variables has a reverse relationship with financial reform. A possible explanation for this result is that countries would change their reform systems.

Table 4. 4 Restricted results

Variable	Aggregate index (1)	Credit control (2)	Interest rate control (3)	Entry barrier (4)	Banking supervision (5)	Privatization (6)	Int's capital market (7)	Security market (8)
<i>FLI</i>	0.107*** (0.017)	0.012 (0.032)	0.197*** (0.045)	0.020 (0.029)	0.019 (0.023)	-0.031 (0.032)	-0.131*** (0.037)	-0.022 (0.021)
$(FLI)^2$	-0.007*** (0.001)	-0.036*** (0.010)	-0.103*** (0.014)	-0.036*** (0.009)	-0.050*** (0.009)	-0.027** (0.011)	-0.009 (0.011)	-0.028*** (0.007)
GDP growth	-0.008 (0.007)	-0.001 (0.002)	-0.002 (0.003)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.003)	-0.004*** (0.002)
Log GDP per capita	0.078 (0.143)	0.074* (0.044)	0.166*** (0.056)	0.125*** (0.039)	0.190*** (0.035)	-0.022 (0.040)	0.249*** (0.054)	0.099*** (0.034)
Trade	-0.003 (0.003)	0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)
External debt	0.409*** (0.087)	0.084*** (0.027)	0.099*** (0.035)	0.089*** (0.025)	0.115*** (0.022)	0.130*** (0.026)	0.046 (0.031)	0.070*** (0.020)
Inflation	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Financial crisis	1.039* (0.605)	0.087 (0.194)	0.181 (0.253)	-0.112 (0.176)	0.007 (0.151)	0.383** (0.192)	0.094 (0.233)	0.135 (0.145)
GDP growth × Financial crisis	0.007 (0.016)	0.003 (0.005)	-0.001 (0.007)	0.013*** (0.005)	-0.001 (0.004)	-0.013** (0.005)	-0.001 (0.006)	0.001 (0.004)
GDP per capita × Financial crisis	-0.208*** (0.072)	-0.024 (0.023)	-0.059** (0.030)	0.020 (0.021)	-0.007 (0.018)	-0.056** (0.023)	-0.039 (0.028)	-0.018 (0.017)
Trade × Financial l crisis	0.012*** (0.003)	0.003** (0.001)	0.004*** (0.001)	-0.001 (0.001)	0.003*** (0.001)	0.003** (0.001)	0.004*** (0.001)	0.000 (0.001)
External debt × Financial crisis	-0.205* (0.105)	-0.044 (0.033)	-0.002 (0.043)	-0.008 (0.030)	-0.106*** (0.026)	-0.123*** (0.033)	-0.059 (0.039)	-0.083*** (0.025)
Inflation × Financial crisis	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Observations	1,974	1,974	1,974	1,974	1,974	1,974	1,974	1,974
R-squared	0.073	0.063	0.108	0.07	0.066	0.06	0.083	0.069
Number of Country	75	75	75	75	75	75	75	75
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. For each column, the 'FLI' is measured by aggregate index of different components. The dependent variables of first two rows of column (2) to (8) are each component of financial liberalization index. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

### 4.4.3 Sensitive analysis

This study explores the interactive effect of macroeconomics variables during the crisis period on financial reform. I estimate the total effect of interaction term and financial crisis on financial reform. Equation (2) shows the total effect financial crisis and interactions terms,

$$\text{Total Effect} = \delta + \phi_1 \bar{X} + \phi_2 \bar{Y}, \dots\dots\dots(2)$$

$$\text{Total Effect} = 0.937 - 0.188(\overline{LGDP\text{PPC}}) + 0.008(\overline{TRADE})$$

where  $\delta$  is the coefficient of the last year financial crisis. For example, when I examine the regression specifications for macroeconomic variables, I calculate the total effect of interactions for each country in Table 4.5. In the equation,  $\phi_1$  (-0.188) and  $\phi_2$  (0.008) are the coefficients of interaction terms, and  $\bar{X}$  and  $\bar{Y}$  are average GDP per capita and average trade openness. Therefore, I can calculate the total effect of GDP per capita and trade during the financial crisis by using significant interaction terms for analyzing the effect of each country's financial crisis on financial reforms. Table 4.5 shows the total effect, average GDP per capita and trade openness (mean value of X and Y) for all sample countries.

**Table 4.5 Total effect, average GDP per capita and trade**

No	Country	Total effect	$\overline{GDPPC}$	$\overline{TRADE}$	No	Country	Total effect	$\overline{GDPPC}$	$\overline{TRADE}$
1	Singapore	1.792	9.895	339.433	37	Hungary	-0.017	9.208	97.118
2	Hong Kong	1.010	9.647	235.871	38	Bangladesh	-0.017	6.026	22.316
3	Malaysia	0.519	8.408	145.284	39	Pakistan	-0.022	6.535	33.750
4	Belarus	0.482	7.886	128.437	40	Albania	-0.024	7.581	57.991
5	Vietnam	0.464	6.530	94.371	41	Morocco	-0.024	7.387	53.420
6	Jordan	0.403	7.971	120.593	42	Cameroon	-0.030	7.061	45.062
7	Kyrgyz Rep	0.383	6.520	83.994	43	Bolivia	-0.036	7.332	50.676
8	Mozambique	0.339	5.280	49.377	44	Nigeria	-0.037	7.304	49.934
9	Estonia	0.294	9.235	136.604	45	Dominican Rep	-0.037	7.963	65.403
10	Azerbaijan	0.273	7.486	92.895	46	Latvia	-0.038	8.876	86.736
11	Paraguay	0.258	7.782	97.984	47	Costa Rica	-0.053	8.492	75.844
12	Ukraine	0.208	7.708	90.019	48	El Salvador	-0.061	7.866	60.045
13	Georgia	0.189	7.294	77.951	49	Belgium	-0.082	10.365	116.238
14	Senegal	0.181	6.787	65.030	50	China	-0.099	6.902	32.740
15	Sri Lanka	0.174	7.111	71.780	51	India	-0.102	6.315	18.540
16	Uzbekistan	0.148	6.718	59.313	52	Algeria	-0.147	8.169	56.469
17	Tanzania	0.141	6.212	46.453	53	Czech Rep	-0.154	9.565	88.417
18	Nepal	0.139	5.880	38.425	54	Guatemala	-0.159	7.761	45.420
19	Kenya	0.138	6.758	58.970	55	Romania	-0.172	8.544	62.143
20	Cote d Ivoire	0.133	7.376	72.842	56	Netherlands	-0.188	10.466	105.382
21	Madagascar	0.128	6.199	44.562	57	Israel	-0.246	9.926	85.416
22	Burkina-Faso	0.124	5.858	36.099	58	Russia	-0.253	8.805	58.194
23	Tunisia	0.122	7.746	80.212	59	Korea	-0.257	8.924	60.428
24	Jamaica	0.108	8.388	93.546	60	Chile	-0.276	8.754	54.131
25	Philippines	0.101	7.349	68.176	61	Ecuador	-0.276	8.216	41.445
26	Thailand	0.086	7.694	74.431	62	South Africa	-0.304	8.764	50.766
27	Bulgaria	0.082	8.313	88.451	63	Poland	-0.308	8.911	53.772
28	Uganda	0.080	5.861	30.561	64	Peru	-0.347	8.119	30.293
29	Ghana	0.074	6.795	51.833	65	Colombia	-0.373	8.330	31.938
30	Kazakhstan	0.070	8.473	90.736	66	Uruguay	-0.411	8.890	40.364
31	Zimbabwe	0.069	7.051	57.149	67	Portugal	-0.419	9.645	57.205
32	Nicaragua	0.045	7.303	60.105	68	Turkey	-0.442	8.730	32.728
33	Lithuania	0.018	8.894	94.064	69	Venezuela	-0.444	9.454	49.559
34	Ireland	-0.005	10.068	118.852	70	Switzerland	-0.451	11.027	85.620
35	Egypt	-0.005	7.291	53.554	71	Austria	-0.453	10.386	70.248
36	Indonesia	-0.015	7.325	53.098	72	Mexico	-0.457	8.903	35.011

**Table 4.5 Total effects, average GDP per capita and trade (Continues)**

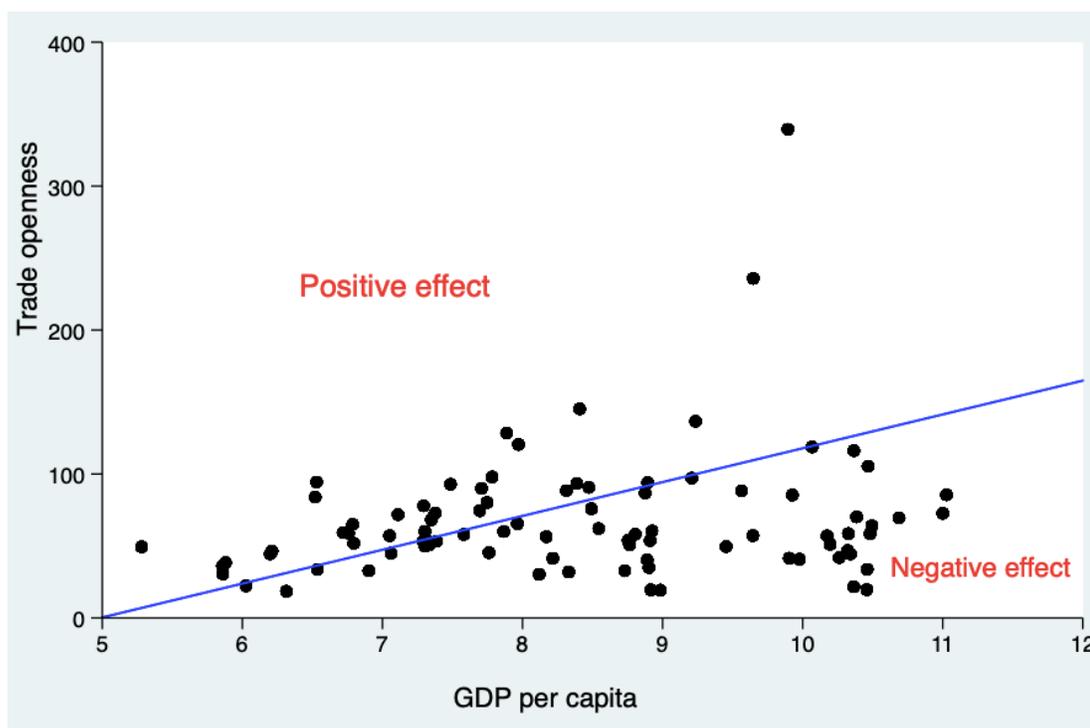
No	Country	Total effect	$\overline{GDPPC}$	$\overline{TRADE}$	No	Country	Total effect	$\overline{GDPPC}$	$\overline{TRADE}$
73	Denmark	-0.517	10.689	69.475	82	Brazil	-0.597	8.985	19.333
74	New Zealand	-0.519	10.174	57.043	83	Spain	-0.612	9.977	40.806
75	Sweden	-0.524	10.494	64.022	84	Germany	-0.629	10.322	46.881
76	Finland	-0.535	10.326	58.616	85	France	-0.652	10.341	44.456
77	Norway	-0.549	11.000	72.743	86	Italy	-0.657	10.261	41.899
78	Canada	-0.565	10.481	58.529	87	Australia	-0.760	10.461	33.773
79	Britain	-0.571	10.196	51.140	88	Japan	-0.838	10.366	21.706
80	Argentina	-0.583	8.916	19.539	89	United States	-0.872	10.459	19.707
81	Greece	-0.593	9.904	41.524					

According to the result, 56 countries are negative total effect and 33 countries are positive effect of financial crisis on financial reform. Among them, the emerging market country Japan is a negative total effect on financial reform by -0.838, but Hong Kong is a positive total effect on financial reform by 1.010. In developed countries such as the United States, Japan and Australia, GDP per capita is in negative relationship with total effect. Furthermore, I calculate the cut-off value from the significant interaction terms by Equation (3).

$$\delta + \phi_1(\overline{GDPPC}) + \phi_2(\overline{TRADE}) > 0, \dots\dots\dots(3)$$

After calculating the cut-off point, I can estimate the linear relationship between trade and GDP per capita of total effect. The main importance of this result is the nature of positive and negative effects of financial crisis on financial reform. The result clearly shows the effect depends on macroeconomic conditions. Although the countries' income levels are high, the speed of financial reform will decline. While some sample countries' openness level is low, financial reform will speed up. Figure 4.3 shows the relationship

between the marginal effects on financial reform. Y-axis shows the average trade, and X-axis shows average GDP per capita. The countries above the linear line have positive effects, and those below the linear line have negative effects. Most developing countries such as Vietnam, Malaysia, Nepal, and Philippines are positive total effect on financial reform. Generally, I can summaries that whether financial crisis leads to financial reform depends on macroeconomics. According to the result, economies with a higher degree of openness tend to increases the speed of reform more than economies with a lower degree of openness.



**Figure 4. 3 The marginal effect of financial crisis on financial reform**

#### 4.5 Robustness checks

To determine whether the baseline results are sensitive to outliers, I can check robustness by adding or dropping variables. There are important restrictions on which variables one may include or exclude when examining robustness. I begin by considering excluding interaction terms. I will explore the alternative model specification to find the conditional effect of selected macroeconomic variables on financial liberalization during the crisis period. Second, I explore the effect of financial crisis on financial reform by different groups (developed and developing countries). Third, I investigate how financial liberalization was affected during the financial crisis period. Therefore, I test the interaction term of FLI and financial crisis variables. Table 4.6 shows the effect of selected interaction terms on financial reform by country group.

The result shows that the coefficient of financial crisis is positively significant in developing countries. The result indicates that the effect of a financial crisis' impact on financial reform in developing countries. The coefficient of interaction terms of GDP per capita and trade are still significant at the 1% level in developing countries.

Second, I check the baseline model by different groups. A list of developed and developing countries are expresses in **Appendix A 4.8 and A 4.9**. The result in Table 4.7 shows that the coefficient of financial crisis is positively significant at the 1% level in developing countries. The coefficient of external debt is positively significant with financial reform. When external debt increases in developing countries, the financial liberalization level speeds up. In the developing countries, the results of the coefficient of interaction terms, GDP per capita and trade are similar with the baseline model.

**Table 4. 6** The result of selected interactions by country groups

Variables	Developed countries	Developing countries
	(1)	(2)
<i>FLI</i>	0.131*** (0.037)	0.133*** (0.019)
$(FLI)^2$	-0.009*** (0.002)	-0.009*** (0.001)
GDP growth	-0.018 (0.016)	-0.010 (0.006)
GDP per capita	1.911*** (0.413)	-0.158 (0.136)
TRADE	0.002 (0.005)	0.001 (0.002)
External debt	-0.141* (0.079)	0.219*** (0.041)
Inflation	-0.364* (0.203)	0.0003 (0.005)
Financial crisis	-3.495 (5.793)	2.095*** (0.687)
GDP per capita × financial crisis	0.344 (0.553)	-0.354*** (0.086)
Trade × financial crisis	0.003 (0.009)	0.009*** (0.003)
Observations	691	1,696
R-squared	0.104	0.086
Number of Country	22	67

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

In the analysis for developed countries, the coefficient of GDP per capita is positively and external debt and inflation are negatively significant with financial reform. When the developed countries' external debt and inflation decrease, the influence of financial reform slow downs.

**Table 4.7 The effect of financial crisis and macroeconomic variables on financial reform by country groups**

Variables	Developed countries (1)	Developing countries (2)
<i>FLI</i>	0.129*** (0.037)	0.134*** (0.019)
$(FLI)^2$	-0.009*** (0.002)	-0.009*** (0.001)
GDP growth	-0.023 (0.017)	-0.008 (0.007)
GDP per capita	1.877*** (0.415)	-0.162 (0.137)
TRADE	0.002 (0.005)	0.001 (0.002)
External debt	-0.139* (0.080)	0.251*** (0.059)
Inflation	-0.423* (0.226)	-0.0001 (0.005)
Financial crisis	-2.143 (6.514)	2.201*** (0.707)
GDP growth × financial crisis	0.140 (0.087)	-0.005 (0.016)
GDP per capita × financial crisis	0.196 (0.643)	-0.364*** (0.088)
Trade × financial crisis	-0.006 (0.013)	0.009*** (0.003)
External debt × financial crisis	0.696 (1.147)	-0.0681 (0.087)
Inflation × financial crisis	-0.019 (0.526)	0.005 (0.021)
Observations	691	1,696
R-squared	0.108	0.086
Number of Country	22	67

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

**Table 4. 8 The interaction term of FLI and financial crisis by country groups**

Variable	Aggregated FLI (1)	Developed countries (2)	Developing countries (3)
<i>FLI</i>	0.102*** (0.015)	0.130*** (0.037)	0.141*** (0.0120)
$(FLI)^2$	-0.007*** (0.001)	-0.009*** (0.002)	-0.010*** (0.001)
GDP growth	-0.010* (0.006)	-0.023 (0.017)	-0.009 (0.007)
GDP per capita	0.006 (0.126)	1.862*** (0.416)	-0.190 (0.137)
TRADE	-0.002 (0.002)	0.002 (0.005)	0.0006 (0.002)
External debt	0.183*** (0.044)	-0.137* (0.080)	0.247*** (0.059)
Inflation	0.003 (0.005)	-0.425* (0.226)	0.001 (0.005)
Financial crisis	0.735 (0.568)	-6.728 (10.37)	1.919*** (0.718)
FLI × financial crisis	-0.026 (0.017)	-0.064 (0.113)	-0.043** (0.020)
GDP growth × financial crisis	0.002 (0.015)	0.148* (0.089)	-0.006 (0.016)
GDP per capita × financial crisis	-0.146** (0.0718)	0.714 (1.115)	-0.304*** (0.092)
Trade × financial crisis	0.009*** (0.003)	-0.011 (0.016)	0.012*** (0.003)
External debt × financial crisis	0.0202 (0.079)	1.415 (1.708)	-0.059 (0.087)
Inflation × financial crisis	-0.00701 (0.0201)	-0.232 (0.646)	-0.001 (0.021)
Observations	2,387	691	1,696
R-squared	0.066	0.108	0.089
Number of Country	89	22	67

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

Table 4.8 shows the interaction term FLI and financial crisis by country groups. Interestingly, the coefficient of interaction term is negatively significant only in developing countries. The result of macroeconomic interaction terms is similar to the

baseline result. Therefore, a financial crisis affects financial reform during the crisis period. Additionally, I test how different crises affect financial reform. Among three crises, the coefficient of banking crisis is positively significant with the dependent variable. The coefficient of the interaction terms of per capital income and growth are negatively significant. This implies that the economic growth is slow down during the banking crisis period. Although, trade is more open and liberalize during the currency and debt crisis period. Table 4.9 shows the macroeconomic conditions affect on the financial reform by different crisis period

**Table 4. 9 Different crises on financial reform**

Variables	Banking (1)	Currency (2)	Debt (3)
<i>FLI</i>	0.099*** (0.015)	0.101*** (0.019)	0.098*** (0.015)
<i>(FLI)</i> <sup>2</sup>	-0.006*** (0.001)	-0.007*** (0.001)	-0.006*** (0.0007)
GDP growth	-0.006 (0.006)	-0.008 (0.006)	-0.009* (0.005)
GDP per capita	0.011 (0.131)	-0.111 (0.171)	-0.002 (0.133)
TRADE	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)
External debt	0.220*** (0.052)	0.381*** (0.086)	0.188*** (0.035)
Inflation	0.0023 (0.005)	-0.001 (0.006)	0.003 (0.005)
Crisis	2.099** (0.825)	0.343 (0.807)	0.486 (1.711)
GDP growth × crisis	-0.063** (0.024)	0.024 (0.019)	0.011 (0.044)
GDP per capita × crisis	-0.280*** (0.097)	-0.129 (0.096)	-0.200 (0.209)
Trade × crisis	0.003 (0.004)	0.0128*** (0.004)	0.018* (0.009)
External debt × crisis	-0.0001 (0.0002)	-0.0004 (0.0003)	0.004 (0.005)
Inflation × crisis	-0.036 (0.089)	-0.093 (0.125)	-0.189 (0.012)
Observations	2,179	1,730	2,355
R-squared	0.064	0.068	0.060
Number of Country	81	66	88

Note: The dependent variable is changing of the financial liberalization index ( $\Delta FLI$ ). All dependent and independent variables are lag variables. The values of parentheses (brackets) are the standard errors (p-value) of corresponding coefficient estimates. \*\*\*, \*\*, and \* indicate significant at 1%, 5% and 10% levels, respectively.

## 4.6 Conclusion

To enhance the efficiency of financial reform, most countries have adopted a series of financial reforms toward financial liberalization with prudential regulations as a crucial policy. It is often argued in the literature, such as Rodrik (1996) and Weller and Singleton (2004), that financial crises would encourage the monetary authority to adjust financial policy to stabilize domestic financial conditions. This study accounts for the interaction between financial reforms, financial crisis and macroeconomic environments to allow for unequal effects across countries with different economic situations.

There are two key findings from the empirical investigation. First, after a financial crisis, small economies tend to speed up reform, while large economies tend to slow it down (a reversal). This finding is intuitive. Since larger economies rely less on foreign capital for economic revival after a financial crisis, they have less incentive to liberalize the financial sector even more. In comparison, they might impose stricter regulations on the financial sectors to rein in shadow banks or facilitate conducting the stabilization monetary policy.

Second, economies with a higher degree of openness tend to increase the speed of reform more than economies with a lower degree of openness. Suppose the openness to some degree represents how tightly the economy is connected to the world market. This finding suggests that the more connected an economy is to the world economy, the less likely the economy is to choose a reversal on financial reform.

In a globalized world with financial integration, most developing countries have attempted to liberalize their financial systems with prudential regulations. At the same

time, international organizations such as the International Monetary Fund (IMF) and the Bank of International Settlements (BIS) have recommended the implementation of a series of financial reforms. However, it is often the case that financial liberalization is difficult to implement due to the conflicts of interests among various private and public agents and groups. Among the literature on crisis-begets-reform, few studies emphasize the role of a country's macroeconomic conditions. Abiad and Mody (2005) consider the influences of 'high inflation' and 'recession'. They find that high inflation makes the crisis to have a reversal on reform, while recession has no influence. Given that the economic conditions being considered are different, this study contributes to the literature by providing new evidence.

It should be noted that this study finds different empirical facts. The financial crisis affects financial reform depending on the macroeconomic conditions. I believe that these empirical results could provide a good intuition with appropriate guidance to understand a government's reaction to financial reform policy in a macroeconomics environment and financial crisis.

## APPENDIXES

### A2: Appendix to Chapter 2

#### A 2.1 Indicator and data sources of financial development

Category	Indicator	Data source
<b>Financial Institutions</b>		
Depth	Private-sector credit to GDP	FinStats 2015
	Pension fund assets to GDP	FinStats 2015
	Mutual fund assets to GDP	FinStats 2015
	Insurance premiums, life and non-life to GDP	FinStats 2015
Access	Bank branches per 100,000 adults	FinStats 2015
	ATMs per 100,000 adults	IMF Financial Access Survey
Efficiency	Net interest margin	FinStats 2015
	Lending-deposits spread	FinStats 2015
	Non-interest income to total income	FinStats 2015
	Overhead costs to total assets	FinStats 2015
	Return on assets	FinStats 2015
	Return on equity	FinStats 2015
<b>Financial Markets</b>		
Depth	Stock market capitalization to GDP	FinStats 2015
	Stocks traded to GDP	FinStats 2015
	International debt securities of government to GDP	BIS debt securities database
	Total debt securities of financial corporations to GDP	Dealogic corporate debt database
	Total debt securities of nonfinancial corporations to GDP	Dealogic corporate debt database
Access	Percent of market capitalization outside of top 10 largest companies	FinStats 2015
	Total number of issuers of debt (domestic and external, nonfinancial and financial corporations)	FinStats 2015
Efficiency	Stock market turnover ratio (stocks traded to capitalization)	FinStats 2015

**Source: Svirydzenka (2016)**

## **A 2. 2      Detail measurement of ICRG data**

### **1.      Corruption**

This is an assessment of corruption within the political system Lower scores indicate, "high government officials are likely to demand special payments" and that "illegal payments are generally expected throughout lower levels of government" in the form of "bribes connected with import and export licenses, exchange controls, tax assessment, police protection, or loans. "

### **2.      Government Stability**

This is an assessment of the government's ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk. The subcomponents are: Government Unity, Legislative Strength and, Popular Support.

### **3.      Investment Profile**

This is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk. The subcomponents are: Contract Viability/Expropriation, Profits Repatriation and, Payment Delays.

### **4.      Bureaucracy Quality**

The institutional strength and quality of the bureaucracy: "High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training. Countries that lack the cushioning effect of a strong bureaucracy receive low points".

### **5.      Democratic Accountability**

This is a measure of how responsive the government is with its people. In general, the highest number of risk points (lowest risk) is assigned to alternating democracies, while the lowest number of risk points (highest risk) is assigned to autarchies.

### A 2.3 Definition and data sources

Variable	Definition	Source
Shadow economy ( <i>SE</i> )	The size of the shadow economy in percentage of GDP calculated with MIMIC method.	Medina & Schneider (2017)
Financial development ( <i>FD</i> )	Financial development is the aggregation of normalized variables into the sub-indices representing a particular functional dimension.	Svirydzienka (2016)
Financial institution ( <i>FI</i> )	The depth, access and efficiency of banking sector.	Svirydzienka (2016)
Financial market ( <i>FM</i> )	The depth, access and efficiency of stock and debt markets	Svirydzienka (2016)
Financial liberalization ( <i>FL</i> )	Financial liberalization is the aggregated measurement of seven variables.	Abiad et al., (2008)
Capital openness ( <i>KAOPEN</i> )	Country's degree of capital account openness	Chinn, Ito, (2006)
GDP per capita ( <i>GDPPC</i> )	GDP per capita is gross domestic product divided by midyear population	WDI
GDP growth ( <i>GDP</i> )	GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	WDI
Trade ( <i>Trade</i> )	The sum of exports and imports of goods and services.	WDI
Corruption ( <i>Corr</i> )	Measures corruption in the political system as a threat to foreign investment based on the analysis of a worldwide network of experts.	ICRG
Government stability ( <i>GS</i> )	Measures of sum of three subcomponents, which are government unity, legislative strength and popular support.	ICRG
Investment profile ( <i>IP</i> )	Measures of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components.	ICRG
Bureaucracy Quality ( <i>BQ</i> )	Measurement of the institutional strength and quality of the bureaucracy.	ICRG
Democratic accountability ( <i>DA</i> )	A measure of how responsive government is to their people.	ICRG

Notes: WDI=World Bank national accounts data, and OECD National Accounts data files. ICRG=International Country Risk Guide.

**A 2.1 Baseline result without institutional quality data (IV=financial liberalization)**

	FD		FI		FM	
	(1)	(2)	(3)	(4)	(5)	(6)
Linear	-1.119*** (0.231)	-0.803*** (0.213)	6.944 (290.9)	-1.446*** (0.492)	-0.731*** (0.163)	-0.560*** (0.169)
Square term	0.007*** (0.003)		-0.162 (5.590)		0.005*** (0.002)	
KAOPEN	0.594*** (0.194)	1.098*** (0.395)	10.00 (286.0)	1.677** (0.683)	0.467** (0.193)	0.874** (0.394)
GDP per capita	0.033 (1.578)	5.239 (3.484)	92.20 (2,881)	8.422 (5.506)	-1.094 (1.515)	4.006 (3.621)
GDP growth	-0.031 (0.019)	-0.007 (0.028)	0.191 (7.414)	-0.0236 (0.0357)	-0.012 (0.021)	-0.001 (0.032)
Trade	-0.025*** (0.006)	-0.019** (0.009)	0.162 (5.800)	-0.00671 (0.012)	-0.027*** (0.007)	-0.025** (0.010)
Observations	941	941	941	941	941	941
R-squared	-0.139	-1.745	-268.85	-3.521	-0.488	-2.566
Number of country	69	69	69	69	69	69

Note: FD= aggregated financial development. FI= financial institution. FM= financial market. Standard errors are reported in parenthesis. \*\*\*,\*\*,\* significant at 1%, 5% and 10% levels respectively.

## A 2.2 Five years 3-period penal result by country groups

	Aggregated Financial development (FD)				Financial institution (FI)				Financial market (FM)			
	Developed		Developing		Developed		Developed		Developing		Developed	
Linear	-1.278 (2.048)	-3.895 (3.311)	-0.560* (0.308)	-2.618 (2.964)	-0.794* (0.406)	24.52 (918.5)	-1.252 (1.321)	-8.658 (27.12)	-3.383 (26.08)	-13.11 (91.04)	-0.363* (0.203)	-3.009 (8.867)
Square term		0.0302 (0.026)		0.041 (0.053)		-0.285 (10.34)		0.108 (0.389)		0.126 (0.874)		0.072 (0.223)
KAOPEN	7.945 (14.39)	5.816 (5.870)	0.138 (0.328)	0.154 (0.929)	2.696 (1.971)	27.08 (892.2)	0.799 (0.992)	0.273 (3.561)	30.31 (241.2)	23.81 (170.5)	-0.054 (0.338)	1.570 (5.640)
GDP per capita	19.88 (38.08)	-7.761 (8.695)	-3.453 (4.114)	-10.69 (13.90)	5.984 (5.622)	211.6 (7,484)	-1.516 (9.758)	-4.707 (31.83)	79.13 (635.5)	-36.67 (245.5)	-4.013 (3.902)	-32.65 (87.08)
GDP growth	0.520 (1.100)	-0.002 (0.253)	-0.173* (0.100)	-0.324 (0.356)	0.079 (0.159)	1.571 (54.59)	-0.219 (0.216)	-0.762 (2.073)	2.400 (19.55)	1.406 (10.62)	-0.159 (0.099)	0.043 (0.989)
Trade	-0.112 (0.167)	-0.062 (0.061)	-0.032* (0.018)	0.036 (0.103)	-0.034 (0.031)	-0.421 (14.07)	-0.043 (0.038)	0.092 (0.504)	-0.442 (3.224)	-0.075 (0.534)	-0.029 (0.018)	0.097 (0.421)
Corruption	1.092 (3.104)	0.349 (1.340)	-0.590 (0.536)	-1.107 (1.654)	-0.518 (0.784)	23.67 (878.5)	-0.920 (1.059)	-0.851 (3.240)	7.957 (63.55)	14.51 (102.0)	-0.495 (0.551)	-2.531 (7.630)
Government	-0.466 (1.000)	0.117 (0.629)	0.127 (0.113)	-0.503 (0.872)	-0.229 (0.310)	-12.86 (458.8)	0.183 (0.237)	-1.394 (5.743)	-1.476 (10.17)	-3.637 (23.51)	0.111 (0.112)	-1.389 (4.724)
Investment	0.991 (2.232)	2.161 (2.041)	-0.226 (0.235)	-0.565 (0.816)	-0.330 (0.476)	-0.109 (14.61)	-1.257 (1.282)	-1.630 (4.151)	6.624 (52.12)	9.447 (66.12)	0.074 (0.254)	-1.563 (5.282)
Bureaucracy	-11.75 (15.09)	-2.135 (4.366)	-0.588 (1.027)	2.563 (4.937)	-4.094* (2.282)	-100.7 (3,511)	-0.043 (1.892)	4.534 (17.53)	-44.40 (317.7)	-4.943 (33.65)	-0.747 (1.071)	7.791 (27.21)
Quality	4.034 (4.870)	-0.325 (2.447)	0.517 (0.423)	1.958 (2.258)	2.821** (1.134)	35.65 (1,194)	1.987 (1.847)	4.052 (9.395)	9.202 (60.04)	-14.72 (115.3)	0.090 (0.462)	5.730 (17.58)
Observations	59	59	128	128	59	59	128	128	59	59	128	128
R-squared	-13.247	-2.980	0.125	-6.030	-0.453	-990.176	-2.216	-28.952	-329.026	-262.763	0.097	-60.665
Number of country	21	21	45	45	21	21	45	45	21	21	45	45

Note: Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

### A 2.3 Alternative measurement of financial development result by country groups

	Private credit to bank (PCB)				Stock market capitalization (SMC)				Stock market total trade (STT)			
	Developed		Developing		Developed		Developing		Developed		Developing	
Linear	-1.559 (3.155)	-1.17* (0.642)	-0.212** (0.083)	-1.544 (1.388)	-0.431 (0.367)	-0.609** (0.304)	-0.011 (0.046)	0.027 (0.112)	-0.424 (0.379)	-1.039 (1.785)	-0.006 (0.060)	0.133 (0.514)
Square term		0.004* (0.003)		0.009 (0.010)		0.002 (0.002)		-0.001 (0.001)		0.008 (0.014)		-0.002 (0.009)
KAOPEN	0.881 (4.121)	0.666 (1.027)	0.462** (0.232)	1.806 (1.460)	4.043 (4.134)	3.530* (2.015)	0.174 (0.304)	0.338 (0.400)	3.092 (3.558)	0.532 (3.499)	0.088 (0.164)	0.160 (0.339)
GDP per capita	86.87 (179.0)	17.97 (14.31)	-9.643*** (0.966)	-3.142 (7.381)	4.658 (7.140)	4.437 (3.814)	-8.182*** (1.253)	-9.728*** (3.669)	6.344 (8.706)	7.044 (17.43)	-7.768*** (2.008)	-6.703 (5.068)
GDP growth	-1.326 (2.590)	-0.323 (0.218)	-0.031 (0.032)	-0.238 (0.237)	0.319 (0.348)	0.250 (0.161)	-0.026 (0.055)	-0.071 (0.100)	0.157 (0.244)	0.034 (0.339)	-0.032 (0.052)	-0.103 (0.282)
Trade	0.175 (0.432)	0.052 (0.057)	-0.045*** (0.010)	-0.037 (0.029)	-0.043 (0.047)	-0.040 (0.025)	-0.011 (0.008)	-0.015 (0.012)	-0.101 (0.080)	-0.059 (0.110)	-0.010 (0.009)	0.002 (0.045)
Corruption	1.695 (3.838)	-0.074 (0.467)	-0.083 (0.111)	-0.161 (0.303)	-0.101 (0.594)	-0.091 (0.324)	-0.085 (0.145)	-0.069 (0.155)	0.219 (0.693)	0.335 (1.399)	-0.125 (0.139)	-0.160 (0.224)
Government Stability	-0.483 (1.046)	-0.121 (0.149)	0.021 (0.023)	0.037 (0.065)	0.190 (0.262)	-0.039 (0.156)	0.015 (0.026)	0.031 (0.042)	0.202 (0.287)	-0.268 (0.650)	0.009 (0.024)	0.014 (0.037)
Investment Profile	0.751 (1.791)	0.035 (0.240)	-0.035 (0.052)	0.049 (0.163)	-0.415 (0.446)	-0.121 (0.227)	-0.03 (0.064)	-0.016 (0.072)	-0.141 (0.352)	0.155 (0.756)	-0.048 (0.058)	-0.029 (0.105)
Bureaucracy Quality	-6.496 (13.87)	-0.229 (1.587)	0.091 (0.191)	0.317 (0.560)	0.197 (2.005)	0.399 (1.116)	0.249 (0.226)	0.280 (0.247)	-1.124 (2.353)	-0.964 (4.360)	0.280 (0.220)	0.296 (0.287)
Democratic Accountability	1.389 (3.045)	0.336 (0.451)	-0.033 (0.101)	-0.141 (0.290)	-0.136 (0.623)	0.052 (0.336)	-0.064 (0.120)	-0.120 (0.173)	0.262 (0.662)	0.0451 (1.226)	-0.013 (0.111)	-0.029 (0.155)
Observations	278	278	603	603	275	275	411	411	282	282	409	409
Number of country	22	22	47	47	22	22	39	39	22	22	37	37

Note: Standard errors are reported in parenthesis. \*\*\*, \*\*, \* significant at 1%, 5% and 10% levels respectively.

## **A 4 Appendix to Chapter 4**

### **A 4.1 Detail Measurement of Financial Liberalization Index**

According to the coding rules for financial liberalization Index, Abiad, Detragiache, and Tressle (2008,2010) assigned raw score scale from 0 to 3 and they classify basis normalization as fully liberalized is 3, partially liberalized is 2, partially repressed is 1 and fully repressed is 0. This paper used multi-faceted measures of financial reform index by seven dimensions as (credit control and excessively high reserve requirements, interest rate controls, entry barriers, banking supervision, privatization of bank, capital account transaction and security market policy.

#### **1. Credit Controls and Reserve Requirements**

To construct an index of credit control and reserve requirement, using the three questions as Are reserve requirement restrictive? Are there minimum amounts of credit that must be channeled to certain sectors? Are they any credits supplied to certain sectors at subsidized rates? For these three questions, the index coded as fully liberalized is 4, largely liberalized is 3, and partially repressed is 1,2 and fully repressed is 0.

#### **2. Interest rate controls**

In order to code interest rate control, government set to a binding ceiling, fluctuating within a band, freely floating rates by separately measured deposit rates and lending rates. If both rates are determined at market rates, they measure fully liberalized. Then measuring largely liberalized when one of these two rates are freed but only a part of interest rates are determined at market rates. When one of the two rates are freed but other interests are set by government or subject to ceiling or floor rates are partially liberalized. Fully repressed when both deposited rates and lending rates are set by the government or subject to ceiling/floor.

#### **3. Entry Barriers**

Entry barriers coded to examine whether a country allows the entry of foreign banks into a domestic market; whether branching restrictions of foreign banks are eased; to what degree the equity ownership of domestic banks by nonresidents is allowed. When no entry of foreign banks is allowed; or tight restrictions on the opening of new foreign banks are in place its coded as 0 and when foreign bank entry is allowed, but nonresidents must hold less than 50 percent equity share, its coded as 1. Coded as 2 when the majority of share of equity ownership of domestic banks by nonresidents is allowed; or equal treatment is ensured for both foreign banks and domestic banks; or an unlimited number of branching is allowed for foreign banks.

For looking at the policies to compete in domestic banking market, they use three following survey and there coded is 0 and 1. The dimension of entry barriers is coded by

the result is 4 or 5, there is fully liberalized, largely liberalized is 3, partially repressed is 1 or 2 and fully repressed is 0.

1. Does the government allow the entry of new domestic banks?
2. Are there restriction on branching?
3. Does the government allow banks to engage in a wide rage of activities?

#### **4. Capital account transaction**

Coding the capital account transaction also use the three questions and result is defined by ranks; fully liberalized is equal to 3, largely liberalized is equal to 2, partially repressed is 1 and fully repressed is 0.

1. The exchanged rate system is unified or a special exchange rate regime for capital or current account transactions exists.
2. A country sets restrictions on capital inflow.
3. A country sets restrictions on capital outflow.

#### **5. Privatizations**

Bank privatizations coded as

1. The percentage of public bank assets is less than 10 percent, not include state bank, is defined fully liberalized.
2. The percentage of public bank assets is from 10 to 25 and many banks are privately owned, is defined largely liberalized.
3. The percentage of public bank assets is from 25 to 50 and main bank are stated-owned banks, is defined partially repressed.
4. The percentage of public bank assets is from 50 to 100 and main bank are stated-owned banks, is defined fully repressed.

#### **6. Securities markets**

Defining the securities markets are coded by two questioners as 1) Has a country taken measures to development securities markets? 2) Is a country's equity market open to foreign investors? According to the questions, there are four different coded while described fully liberalized is 4 or 5, largely liberalized is 3, partially repressed is 1 or 2 and fully repressed is 0.

## **7. Banking Supervisions**

For the banking supervision measure by following four main dimensions and coded by 0,1,2 and defined degree are highly regulated is 6, largely regulated is 4-5, less regulated is 2-3 and not regulated is 0-1.

1. Has a country adopted a capital adequacy ration based on the Basel standard?
2. Is the banking supervisory agency independent from executives' influence?
3. Does a banking supervisory agency conduct effective supervisions through on-site and off-site examinations?
4. Does a country's banking supervisory agency cover all financial institutions without exception?

#### A 4.2 Definitions of seven dimensions of financial liberalization

Variable	Definition
<i>Financial liberalization index (FLI)</i>	FLI is seven dimensions of financial liberalization policies.
Credit controls and excessively high reserve requirements	Monetary authorities often set ceiling on credit provided by banks, or on credit to some specific sectors. In this case, reserve requirements may be excessively high beyond their appropriate level expected for prudential purposes.
Interest rate controls	A most common banking policy during financial repression. The monetary authority restricts financial activities by imposing the ceiling and/or floor rate for deposits and credits.
Entry barriers	To restrict the entry of new domestic or foreign financial institutions for the purpose of appropriate credit allocation.
Prudential regulations and supervision in the banking sector	Which is built on the several dimensions, such as capital adequacy ratios based on Basel capital accord, the independence of the banking supervisory agency, and the effectiveness of on-site and off-site bank examinations
State ownership in the banking sector (or) Privatization of bank.	State ownership is the most direct policy to control credit allocation
International capital markets	The government often restricts financial flows to and from its economy by imposing multiple exchange rates, transaction taxes, and other restrictions on inflows and outflows related to financial credits
Securities market regulations	The auctioning of governments bonds, establishment of securities markets and settlement systems, which attempts to restrict or promote the development of securities markets

### A 4.3 Detail definitions of three types of crises

Variable	Definition
<i>Financial Crisis (FC)</i>	FC includes banking crisis, currency crisis and debt crisis.
Banking Crisis	A banking crisis is defined as a situation where a country's corporate and financial sectors face significant difficulties in repaying contracts on time. This causes a sharp increase in non-performing loans with exhausted bank capital, which is often accompanied with the depression of asset prices, such as equity and real estate prices, Laeven and Valencia (2008).
Currency Crisis	A currency crisis is regarded as at least a 30 percent nominal depreciation of the currency with at least a 10 percent increase in the rate of the depreciation compared to the previous year, following the approach in Frankel and Rose (1996)
Debt Crisis	A sovereign debt crisis is defined as the failure to repay public debt, and it typically happens when a country reaches critical high debt levels and suffers from the low economic growth. Recently, in several European countries, financial crisis has caused sovereign debt crisis, which have been recurrent phenomenon, Reinhart and Rogoff (2013). The data includes the year of sovereign defaults to private loaning and the year of debt rescheduling.

#### A 4.4 Data variables, definition and sources

Variable	Definition	Sources
FLI	Financial liberalization index	Abiad et al., (2008)
FC	Financial Crisis dummy (1= crisis, 0= no crisis)	Laeven and Valencia (2008)
GDPGR	Annual percentage growth rate of GDP at market prices based on constant local currency. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	WDI
GDPPC	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	WDI
TRADE	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI
Inflation	Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency	WDI
External Debt	External debt is Total Liability divided to GDP.	EWN

Notes: WDI: World Development Indicators; EWN: The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004.

#### A 4.2 A list of countries

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Albania	Colombia	Hungary	Morocco	South Africa
Algeria	Costa Rica	India	Mozambique	Spain
Argentina	Cote d Ivoire	Indonesia	Nepal	Sri Lanka
Australia	Czech Rep	Ireland	Netherlands	Sweden
Austria	Denmark	Israel	New Zealand	Switzerland
Azerbaijan	Dominican Rep	Italy	Nicaragua	Thailand
Bangladesh	Ecuador	Jamaica	Nigeria	Thailand
Belarus	Egypt	Japan	Norway	Tunisia
Belgium	El Salvador	Jordan	Pakistan	Turkey
Bolivia	Estonia	Kazakhstan	Paraguay	Uganda
Brazil	Finland	Kenya	Peru	Ukraine
Britain	France	Korea	Philippines	United States
Bulgaria	Georgia	Kyrgyz Rep	Poland	Uruguay
Burkina-Faso	Germany	Latvia	Portugal	Uzbekistan
Cameroon	Ghana	Lithuania	Romania	Venezuela
Canada	Greece	Madagascar	Russia	Vietnam
Chile	Guatemala	Malaysia	Senegal	Zimbabwe
China	Hong Kong	Mexico	Singapore	

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Note: The sample comprises 89 countries; those countries are doing financial reform (Taiwan and Ethiopia are not reported since those countries has not reformed)

### **A 4.3 A list of percentage change in level of financial reform countries**

Albania	Colombia	Hungary	Morocco	South Africa
Algeria	Costa Rica	India	Mozambique	Spain
Argentina	Czech Rep	Indonesia	Nepal	Sri Lanka
Australia	Denmark	Israel	New Zealand	Sweden
Austria	Dominican Rep	Italy	Nicaragua	Thailand
Azerbaijan	Ecuador	Jamaica	Nigeria	Thailand
Bangladesh	Egypt	Japan	Norway	Tunisia
Belarus	El Salvador	Kazakhstan	Pakistan	Turkey
Bolivia	Estonia	Kenya	Peru	Uganda
Brazil	Finland	Korea	Philippines	Ukraine
Bulgaria	France	Kyrgyz Rep	Poland	Uruguay
Burkina-Faso	Georgia	Latvia	Portugal	Uzbekistan
Cameroon	Ghana	Lithuania	Romania	Venezuela
Chile	Greece	Madagascar	Russia	Vietnam
China	Guatemala	Mexico	Senegal	Zimbabwe

Note: The sample comprises 75 countries, 3 percentage change those countries are doing financial reform. (Belgium, Britain, Canada, Cote d Ivoire, Germany, Hong Kong, Ireland, Jordan, Malaysia, Netherlands, Paraguay, Singapore, Switzerland, United States are not reported since those countries has not reformed after reducing 3 percentage of reform level.)

**A 4.7 Impact of macroeconomic conditions on financial reform and financial crisis year**

<b>Country</b>	<b>Full sample (<i>t-value</i>)</b>	<b>Percentage change in financial reform (3%)(<i>t-value</i>)</b>	<b>Financial Crisis year</b>
Algeria	0.027	0.021	1990, 1988, 1994
Brazil		0.044	1990, 1994, 1976, 1982, 1987, 1992, 1999
Bangladesh	0.021		1987, 1976
Burkina-Faso	0.042		1990, 1994
Cameroon	0.021	0.037	1987, 1995, 1994
China	0.037		1998
Costa Rica	0.046	0.023	1987, 1994, 1981, 1991
Cote d Ivoire	0.018		1988, 1994
Dominican Rep	0.047	0.042	2003, 1985, 1990, 2003
Ecuador	0.049	0.035	1982, 1998, 1982, 1999
Egypt	0.046		1980, 1979, 1990, 1984
Ghana	0.025		1982, 1978, 1983, 1993, 2000
India	0.024		1993
Jamaica	0.033	0.013	1996, 1978, 1983, 1991
Morocco		0.035	1980, 1981
Nicaragua	0.007	0.004	1990, 2000, 1979, 1985, 1990, 1980
Nigeria	0.038	0.042	1991, 1983, 1989, 1997, 1980
Nepal		0.036	1988, 1984, 1992
Pakistan		0.032	1972
Senegal	0.026	0.045	1988, 1994
Tunisia	0.038		1991
Zimbabwe	0.030	0.051	1995, 1983, 1991, 1998, 2003

Note: Those countries are more likely to do financial reform as macroeconomics effect on reform during financial crisis.

**A 4.8 List of developing countries**

<b>No</b>	<b>Country</b>	<b>Code</b>	<b>No</b>	<b>Country</b>	<b>Code</b>
1	Albania	ALB	35	Kyrgyz Rep	KGZ
2	Algeria	DZA	36	Latvia	LVA
3	Argentina	ARG	37	Lithuania	LTU
4	Azerbaijan	AZE	38	Madagascar	MDG
5	Bangladesh	BGD	39	Malaysia	MYS
6	Belarus	BLR	40	Mexico	MEX
7	Bolivia	BOL	41	Morocco	MAR
8	Brazil	BRA	42	Mozambique	MOZ
9	Bulgaria	BGR	43	Nepal	NPL
10	Burkina-Faso	BFA	44	Nicaragua	NIC
11	Cameroon	CMR	45	Nigeria	NGA
12	Chile	CHL	46	Pakistan	PAK
13	China	CHN	47	Paraguay	PRY
14	Colombia	COL	48	Peru	PER
15	Costa Rica	CRI	49	Philippines	PHL
16	Cote d Ivoire	CIV	50	Poland	POL
17	Czech Rep	CZE	51	Romania	ROM
18	Dominican Rep	DOM	52	Russia	RUS
19	Ecuador	ECU	53	Senegal	SEN
20	Egypt	EGY	54	Singapore	SGP
21	El Salvador	SLV	55	South Africa	ZAF
22	Estonia	EST	56	Sri Lanka	LKA
23	Georgia	GEO	57	Tanzania	TZA
24	Ghana	GHA	58	Thailand	THA
25	Guatemala	GTM	59	Tunisia	TUN
26	Hong Kong	HKG	60	Turkey	TUR
27	Hungary	HUN	61	Uganda	UGA
28	India	IND	62	Ukraine	UKR
29	Indonesia	IDN	63	Uruguay	URY
30	Jamaica	JAM	64	Uzbekistan	UZB
31	Jordan	JOR	65	Venezuela	VEN
32	Kazakhstan	KAZ	66	Vietnam	VNM
33	Kenya	KEN	67	Zimbabwe	ZWE
34	Korea	KOR			

**A 4.9 List of developed countries**

<b>No</b>	<b>Country</b>	<b>Code</b>
1	Australia	AUS
2	Austria	AUT
3	Belgium	BEL
4	Britain	GBR
5	Canada	CAN
6	Denmark	DNK
7	Finland	FIN
8	France	FRA
9	Germany	DEU
10	Greece	GRC
11	Ireland	IRL
12	Israel	ISR
13	Italy	ITA
14	Japan	JPN
15	Netherlands	NLD
16	New Zealand	NZL
17	Norway	NOR
18	Portugal	PRT
19	Spain	ESP
20	Sweden	SWE
21	Switzerland	CHE
22	United States	USA

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