Financial Development and Armed Conflict
A Cross-country Analysis

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Disclaimer:

This document represents part of the author's study programme while at the Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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List of Acronyms

UCDP	Uppsala Conflict Data Program
WDI	World Development Indicator
IMF	International Monetary Fund
IFS	International Financial Statistics

Acknowledgement

Abstract

In this paper we have examined how armed conflict and financial development is associated using a panel of 66 developing countries for the period 1985-2010. Financial development has been measured by two proxy indicators: M2 as a share of GDP and credit allocated to private sector by banks as a share of GDP. Our findings suggest that armed conflict has significant adverse effect on financial development. In addition, quality of governance is found highly significant and conducive to the financial development. In one hand, governance quality appears with greater impact towards credit allocated to private sector as the effect of armed conflict seems insignificant. On the other hand, effect of armed conflict towards M2 as a percentage of GDP gets smaller; however, significant in the presence of governance quality. This paper also explores that the negative effect of armed conflict increases as armed conflict intensifies. However, governance performances seem trading off with low and medium intensity of armed conflict. That implies governance quality does matter but cannot offset entirely the effect of high intensity armed conflict and its effect by retarding M2 as a share of GDP.

Relevance to Development Studies

To eradicate poverty and achieving a considerable economic affluence is always being one of the major concerns for development studies. Development in financial sector and its substantial role for economic growth has been well accepted among the academics. On the other hand, armed conflict and its destructive nature which creates immense human suffering are always undesirable from the humanitarian perspectives. In one hand we aimed to achieve financial development, on the other hand, armed conflict might retard financial development. Our finding suggests armed conflict reduces financial development at a considerable extent. Based on our finding, it is worth to conclude that reduction of armed conflict not only desirable for humanitarian perspective but also can be seen as important conditions for achieving development in financial sector.

Keywords

Armed conflict, financial development, governance quality

Chapter 1
Introduction

The contribution of well-functioning financial system towards economic growth has been discussed extensively since the evolution of development macroeconomics. The importance of financial development can be traced back to the middle of the nineteenth century when Bagehot (1878) explained how capital market efficiently allocated resources to productive investments for England. Furthermore, seminal works by King and Levine (1993a, 1993b) and Levine el al. (2000) showed that the level of financial development can be considered as a predictor of economic growth for a large number of economies. It has been well accepted regarding the positive relationship between financial development and per-capita income across countries. There will be a little disagreement if one considers development in financial sector as one of the key components that operates a substantial role for economic growth for a large number of economies.

On the other hand, armed conflicts, which are destructive in nature, have also gained increasing attention from the academics and policy makers in recent times in both economic and political perspectives. According to Uppsala Conflict Data Program, armed conflict is defined as a *"contested incompatibility that concerns government or territory or both where the use of armed force between two parties (at least one is the government of a state) results in at least 25 battle-related deaths"* (Gleditsch et al. 2002: 618). On-going violent conflicts have been recorded by the UCDP since the 1970s. A steady increase in the occurrence of armed conflicts has been noticed since World War II and a high peak is observed in 1991 (52 armed conflicts in 38 countries) (fig. 1-1). Since then, a decreasing pattern is noticeable in armed conflict occurrences, although the duration of armed conflict might not be declining (Murshed 2010:11). The recent updates for 2012 recorded the number of armed conflicts is 32 in 26 different locations around the world and also estimated battle-related death ranging from 37175 to 60260 (Themnér and Wallensteen 2013). Though a reduction is seen in terms of number of active armed conflicts, high level of armed conflicts are still continued for the fourth consecutive years (ibid). Moreover, the consequences of armed conflicts might be perceived as the source of immense human sufferings, including death, displacement of people, damage to public property and long-term burden of diseases and disabilities. Due to the destruction of armed conflict, a steady loss of the capital stock would directly reduce production and a decline in the per capita GDP is evident (Collier 1999: 181).

If we incorporate both the financial development and armed conflict phenomenon in one basket, the impression would be complex and will take us in two opposite directions. It is because, in one aspect, financial development is based on a well-functioning financial system along with continuous financial innovation, progress of institutional and organizational quality, increasing competitiveness of markets with reduced transaction costs and sufficient use of physical and human capital (Hartmann et al. 2007). On the other hand, armed conflicts would obviously result immense destruction of resources, a sudden change in consumption pattern, vulnerable investment situation and unbearable human sufferings. In this regard, one may expect an unavoidable effect of

armed conflict on financial performance as it is directly related to physical and human capital and indirectly related with political, demographic and institutional structures. Moreover, several relevant questions may arise regarding the relationship between armed conflict and financial development. In one aspect, one can intend to evaluate how armed conflict is associated with the overall financial development. In another aspect, one can assume to explore how the nature of financial development would have varied considering the level of intensity of armed conflict[1]. Thirdly, it could also be a concern to see how intensity level of armed conflict is associated with financial development while incorporating country's financial, economic and political situations. Fourthly, depending on different forms of armed conflict (intra-state or inter-state), the effect on financial development would be different. It is because, the level of destructions due to intra-state and inter-state armed conflict would be different and it is argued that intra-state armed conflict would be less destructive in terms of physical capital (Collier 1999). A thorough study on how armed conflict and financial development is associated would help us to shed light on these questions.

Figure 1-1: Armed conflict by region
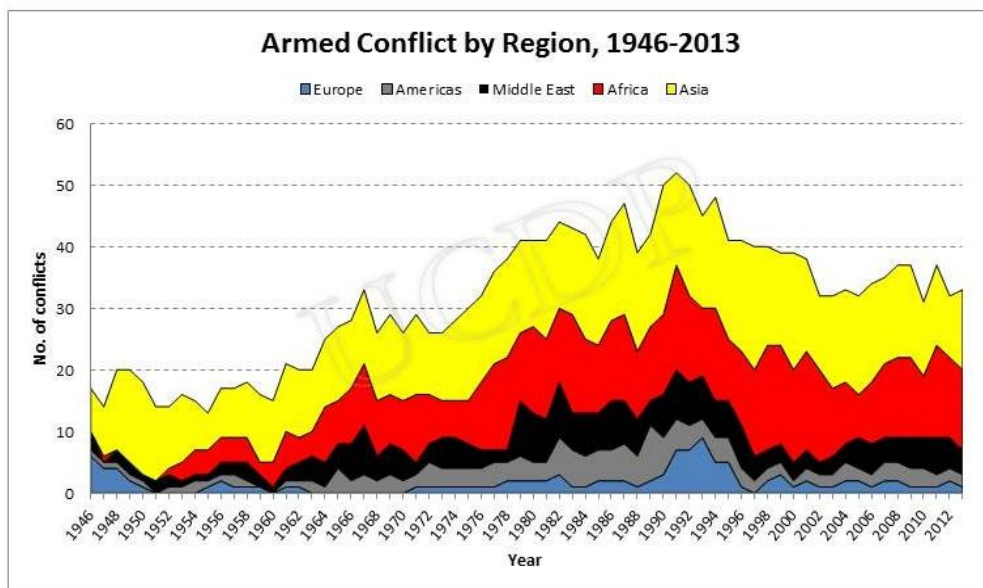
Source:http://www.pcr.uu.se/digitalAssets/66/66314_1armed-conflict-by-region-jpg.jpg

A large number of studies that carried out focusing on armed conflict can be categorized broadly into two aspects. In one aspect, a majority of work con-

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[1] Intensity level of armed conflict refers to the three categories in ordinal scale defined by UCDP which is based on the number of battle related deaths. Minor armed conflict is the one if there are at least 25 battle-related deaths per year but does not cross 1000 deaths during the course of conflict. Intermediate armed conflict is defined if there are at least 25 battle related deaths per year and accumulated deaths is more than or equal to 1000 but does not cross 1000 deaths in any given year. Third category is defined as war which implies at least 1000 deaths per year (Gleditsch et al. 2002).

centrated on the causes and consequences of armed conflict (Fearon and Laitin 2003, Hegre 2001, Sandler and Hegre 2002). In another aspect, a growing interest can be seen to investigate the association between economic growth and armed conflicts (Koubi 2005, Murdoch and Sandler 2002, Collier 1999). On the other hand, studies that focus on financial development have mainly dealt with whether the level of financial development contributes to economic growth. Moreover, studies also investigated to explore different channels through which financial development might be associated with economic growth. It has been argued that financial development has different aspects; development in one aspect behaves differently towards economic growth compare to development in other aspect (Kar et al. 2011: 687). Such as, liberalizing financial market and market determined interest rate are argued to be increased saving and investment and can positively associated towards economic growth (Shaw 1973). However, a little attention is being paid to study how armed conflict occurrences affect financial development or how they interact. Whereas, the importance of financial development is worth mentioning for comparative economic growth in several studies (Kar et al. 2011, Levine 1997, Shaw 1973, Schumpeter 1912, Patrick 1966). In this regard, need of studying the nature of relationship between financial development and armed conflict can be stated broadly in two perspectives:

Firstly, economic growth is a broad concept which might be related with a numerous factors. Dealing with financial development we would narrow down our area of concentration. In addition, it can be assumed that a well-functioning financial system is positively associated with higher economic performances. Figure 1-2 shows a positive relationship between income groups of countries and development in financial sector.

Figure 1-2: Financial development across income group
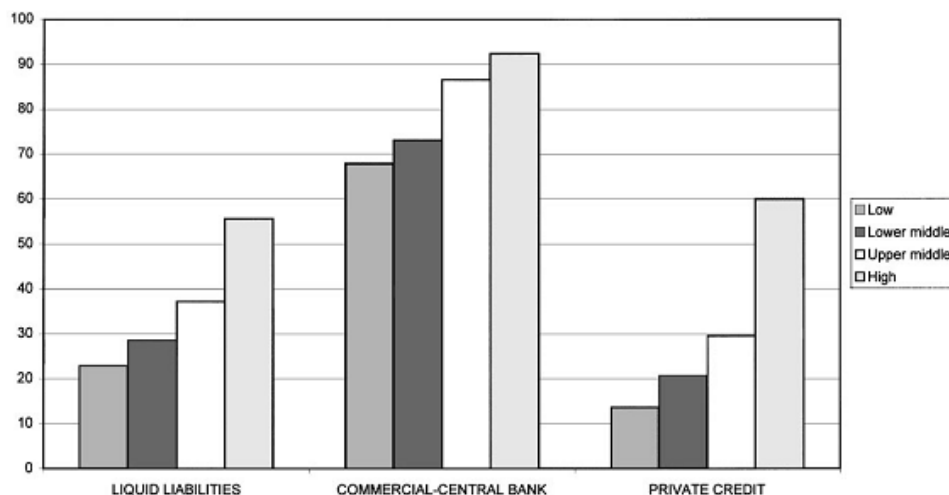
Fig. 1. Financial development across income groups, 1960–1995.

Cited from (Levine et al. 2000: 40)

A significant increasing pattern of financial development[2] is noticeable when it moves from low income group countries to high income group countries.

Secondly, existing literature does not adequately address whether armed conflict affects financial development and what would be the effect of armed conflict if we incorporate a countries political and economic institution performances. For instance, Addison et al. (2002) analysed how conflict and governance indicators are associated with financial development for developing countries using a cross-sectional data in one point of time. However, cross-sectional data unable to tackle the additional overtime variation of financial development and also variation in conflicts characteristics. In addition, their study didn't account country and time fixed effect. Moreover, the political and governance index they have used, unable to track the variation of the quality of institutions over time and how it affects financial development. In addition, their work didn't adequately handle the joint endogeniety issue and might suffer with biasness. Pooled cross-country time series data, in a panel setting, would enable us to obtain more precise estimate by exploiting the additional variation over time. Moreover, if there is any association between armed conflict and financial development, a consistent and efficient estimate would help us better understanding of under what condition conflicts might affect financial development.

This study is aimed to examine how armed conflict is associated with financial development and to what extent armed conflict occurrences able to explain the variations in the financial sector in cross-country perspective. The intension is to check whether there exists any systematically different financial development outcome among developing countries due to having occurrences of armed conflict. In order to address the question, the study exploits a panel data covering 66 developing countries for the period 1985-2010 and concentrated on the following major objectives:

- To examine whether variation in the intensity of armed conflict has an impact on the level of financial development
- To examine the extent to which armed conflict affects financial development in the presence of different institutions and varying institutional quality
- To examine whether intra-state and inter-state armed conflict is associated with financial development

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[2] Financial development has been measured by three proxy indicators in the article (Levine et al. 2000). Liquid liabilities refer to demand and interest bearing liabilities of banks and nonbank financial institutions plus currency which was measured as a percentage of GDP. Commercial-central bank measures commercial bank assets divided by commercial bank plus central bank assets. Private credit refers to the value of credit allocated to private sector by financial institutions.

Definition and Measure of Armed Conflict

As mentioned earlier, armed conflict is a contested incompatibility involving at least two parties, of which one is government of a state, that concerns government or territory or both and by using armed forces, the battle results at least 25 deaths in a year (Gleditsch et al. 2002: 618). The Uppsala Conflict Data Program (UCDP) has been recording on-going violent conflicts (intra-state, inter-states, intra-state internationalized and extra-state) and battle-related deaths since 1970s. Increase in number of deaths can be considered as a measure of severity of armed conflict. In order to explore how severity, in terms of number of battle-related deaths, of armed conflict and financial development is associated, we may categorize the severity of armed conflict. To label intensity of armed conflict, this study relies on the definition proposed by UCDP. According to UCDP, an armed conflict is defined as a low intensity level if the resulted battle-related death is at least 25 per year for every year in the period but beyond 1000 deaths in the entire course of armed conflict. A medium level intensity of armed conflict is said if there is occurrences of at least 25 battle-related deaths per year and accumulated deaths are more than or equal to 1000 but beyond 1000 deaths in any given year. High intensity level of armed conflict is defined if the battle related deaths is more than 1000 per year. In addition, a zero level intensity of armed conflict is defined if there is less than 25 battle related deaths in any given year. Moreover, in a cross-country setting, countries that have never experienced armed conflict would be considered zero intensity level of armed conflict for the need of analysis.

It may be noted that the categorization of different level of armed conflict intensity does not take into consideration the relative size of a country's population. For instance, 25 battle-related deaths in a country with small number of population and in a country with large number of population and its subsequent severity would not be the same. Moreover, the ordinal category has been done not based on crude measurement of battle-related death, rather based on estimated range of death in each year by UCDP. Nevertheless, this study relies on the armed conflict intensity data reported by UCDP to carry out the investigation though having limitations as data on armed conflict by UCDP has been extensively used in literature.

Definition and Measure of Financial Development

Financial development can be seen as a web of financial system where one can see continuous financial innovation, progress of institutional and organizational quality, increasing competitiveness of markets with reduced transaction costs (Hartmann et al. 2007). In order to measure financial development, one has to rely on proxy measures as there is no direct measure of financial development and different indicators can proxy different aspect of financial development (Kar et al. 2011: 687).

The most widely used proxy measure of financial development is the ratio of money and quasi money (M2) to the level of income (GDP) which is popular among academics for its availability and simplicity (Odhiambo 2009, King and Levine 1993a, King and Levine 1993b). This indicator is expected to measure the size of the financial sector (Levine 1993a). If the financial sector develops faster than the real sector, one can expect M2/GDP will be increasing over time. This indicator is designed to capture the degree of monetization

in the economy and also expected to track the size of expanding financial sector in which money is considered to be a valuable instrument for payment and savings. Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.

Liquid liabilities which is known as M3 is comprised of M2 plus traveller checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents. However, this indicator has a problem of double counting as it includes deposits by one financial institution to another (Levine et al. 2000).

The value of total credit provided to the private sector by bank as a percentage of GDP is another important measures of financial development. Private sector could play a crucial part to improve the overall economic condition of any country. This indicator does not consider central bank as a depository corporation and an increasing value of the indicator[3] indicates higher level of financial services (Levine et al. 2000:38). Though this indicator does not show overall financial development of a country, however, can be served to track growing private sector and subsequently as a reflection of overall financial development.

Though the above mentioned three commonly used financial development proxy measures is not free of criticism and shortcomings, can be served as to track whether a country's financial sector is developing or not. In addition, development in equity market is also considered as a proxy measure of financial development; however, it can only capture the size of the stock market (Chinn and Ito 2006). From the definition of the proxy indicators one can easily assume that development in financial sector might be directly or indirectly associated with economic and non-economic aspects. For instance, economic and political institutions are playing important role in the process of development in various ways. Economic institution is engaged in to ensure property rights and the rule of law in one hand; whereas, political institution involve ensuring the rule of the game. The change in non-economic factors and its impact towards financial growth needs proper attention as well. It creates the demand as the World is observing an increasing number of armed conflicts in different part of the world which is the most noticeable since 1970 and onwards (fig. 1-1).

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[3] Definition of M2, M3 and PRIVATE CREDIT has been taken from www.worldbank.org

Chapter 2 Review of Literature

2.1 Theoretical Framework

2.1.1 Financial Development and Economic Growth

The role of well-functioning financial system for economic growth has been measured very notably for both developed and developing economies. Since the early last century, a number of empirical studies has been noticed which intended to investigate the association between financial development and economic growth. Among those early economists, Schumpeter (1912) is the one who emphasized the role of financial development towards economic achievement. The argument of the author mainly focused on to highlight how financial institutions able to stimulate economic growth through funding in productive investment and encouraging innovation. On the other hand, Robinson (1952) argued that the development in financial sector is the result of an increase in output, as increasing output creates demand for the financial services (as cited in (Kar et al. 2011). According to the author, growth precedes financial development and not the opposite.

Patrick (1966) contributed further theoretical argument with the existing literature by presenting two phenomenon: "demand-following" and 'supply-leading". Demand-following concept indicates that the creation of financial institutions and financial instruments are nothing but the demand for these services in the economy by the investors and savers. It implies that an expansion of the financial system is just as a consequence of real economic growth. On the other hand, supply-leading means the creation of financial institutions and financial instruments in advance of demand for them. Supply-leading mechanism is expected to transfer resources from traditional (non-growth) sectors to modern sectors and also to stimulate an entrepreneurial response in these modern sectors.

Apart from the debate of the direction of causality mentioned above between demand driven or supply leading financial development, the existence of well-functioning financial system and its positive association with sustained economic growth is widely accepted for both developed and developing countries (Kar et al. 2011). Furthermore, seminal work of Levine (1997:689) also presented how financial institutions and its different instruments and services are not only able to reduce the information and transaction cost but a well-functioning financial system is also able to increase long-run growth through more saving, investment and innovation.

2.1.2 Financial Development and Armed Conflict

Theoretical framework that can be seen as a basis of this present study is based on Tobin's (1969) portfolio-balance model that have discussed and further analysed by Addison et al. (2002). The model considers broadly two types of store of value; one is the domestic currency and another belongs to alternative store of value such as; gold, foreign currency, real assets. During the armed conflict, the agent has the choice for holing either domestic currencies or another form of store of value. It has been argued that during the occurrence of

armed conflict financial condition of a country would be unstable as government would have financed the war on one hand and on the other hand, effectiveness of fiscal and monetary policies would be weaker because of massive physical and human capital destruction as a result of armed conflict. Expectation of high inflation rate and anticipation for more destruction on assets would lessen the faith of people on holding domestic currencies and subsequently a reduction of demand for it would be evident. In such situation, demand for domestic currency falls and demand for other form of store of value rises. In the presence of severe conflict, equilibrium condition of bank deposit market falls, whereas, equilibrium condition of other store of value rises.

Figure 2-1: Bank deposit market and Gold market equilibrium in response to armed conflict
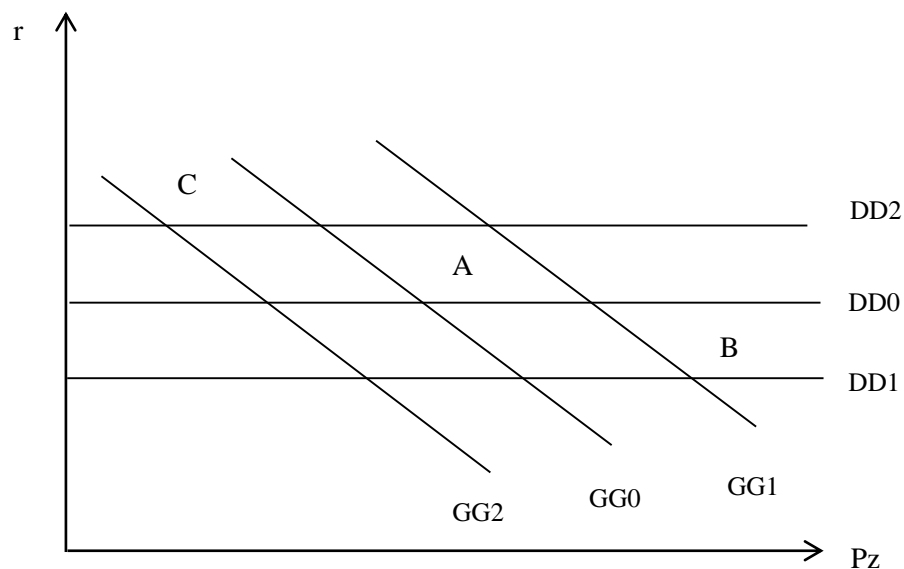
Cited from Addison et al. (2002)

In the figure 2-1, y-axis indicates interest rate (r) that clears the market for bank loans. In x-axis, Pz represents market price of gold or other store of value. Horizontal DD schedule shows equilibrium in the bank deposit market for different interest rate. GG schedule are represents equilibrium in the gold or other store of value market. GG schedules are downward sloping to indicate if there is less conflict or no conflict, if the price of gold increases, the demand for gold decreases. The initial equilibrium point is A where both the money market and gold market is in equilibrium. However, an increase in the intensity level of armed conflict would have increased the relative return on gold (or other store of value) and decreased the return on domestic currency. GG schedule will shift upwards and DD schedule will shift downwards. The new equilibrium point would be B indicating now lower level of r and higher level of Pz. A lower level of interest rate, r can be seen as a fall in the demand for bank deposit as well as a decline in the demand for loan by firms due to armed conflict.

Though the main focus of this study is to investigate the relationship between financial development and armed conflict, it is also useful to consider the theoretical basis of how armed conflict affects economic growth of a country. Collier (1999) exploits Cobb-Douglas production function to discuss how armed conflict might have negatively associated with economic growth focusing only on intra-state conflict or civil war. The model depicted that civil war steadily reduce the capital stock and lowers the GDP growth rate. It is because of the fact, during the war, the rate of return from capital stock gets lower compare to the rate of return from the foreign asset. Here capital stock is considered endogenous in the model and might implies land, unskilled labour or supplies of buildings. The author also mentioned less investment would be result of weakening property rights and increasing dissaving during war. A sudden change would also be noticed in the labour force as a result of battle related death in the conflicts which would lower productive activity in the economy. Resources such as, bridges and infrastructure would be damaged which would eventually make an interruption in the flow of business.

2.2 Empirical Findings

2.2.1 Armed Conflict and Financial Development

As mentioned earlier, this study has come across a very few number of literature that dealt with financial development and armed conflict. The work by Addison et al. (2002) investigated how armed conflict is associated with financial development in a cross-country setting. Their empirical findings show that armed conflict is negatively associated with financial development. They also argued that medium and high intensity level of armed conflict have more adverse effect on financial development compare to low intensity level of armed conflict. They have used cross-section OLS approach to identify how conflict is associated with financial development. However, their study did not account for the country heterogeneity and did not control for the time fixed effect. In addition, as financial development and armed conflict situation are expected to change over time, not considering the overtime variation will lead the estimates to be inefficient and biased.

2.2.2 Armed Conflict and Economic Growth

Though the study objective is mainly focused on how armed conflict is associated with financial development, empirical finding on armed conflict and economic development is also carefully accounted. There are a number of studies that attempted to analyse how different types of conflict or conflict characteristics are related with economic performances. Among several works, a seminal work by Collier (1999) mainly concentrated on studying how civil war or intra-state armed conflict and economic growth are associated. The study findings showed that during civil war, GDP per capita declines at an annual rate of 2.2%. In addition, the study also shows that if a country had experienced prolonged war, a rapid economic growth would be seen in the post war period.

In line with Collier (1999), Murdoch and Sandler (2002) also found evidence that war negatively affects economic growth both in the short and long

run. In addition, they have showed that neighbouring countries also get affected negatively in their growth process due to war affected countries. Their findings suggest the negative effect of war on income per capita persist in the long run steady state level.

Koubi (2005) tested the relationship between armed conflict and economic growth incorporating all types of armed conflict and filled up the gap of the work by Collier (1999). The author considers inter-state war along with intra-state war and tried to see how economic growth varies for different characteristics of armed conflict; such as, severity of armed conflict. The findings also go in line with the previously found results by Collier and Murdoch & Sandler. However, not addressing the issue of endogeneity leads the direction of causality unclear. Does armed conflict lead to lower economic growth or lower economic growth lead to armed conflict?

Chapter 3 Methodological Framework

3.1 Financial Development and Armed Conflict: A Panel Procedure

This paper has attempted to explore the link between financial development and armed conflict using panel data covering developing countries for the period 1985-2010. An attempt has been made to empirically address whether armed conflict able to explain the variation of financial development among developing countries. In line with the theoretical framework mentioned in section 2.1, this paper has considered two important proxy indicators of financial development: M2 as a percentage of GDP (DEPTH) and credit allocated to private sector by bank as a percentage of GDP (PRIVATE)[4]. As the theoretical framework suggests armed conflict would lower the bank deposit and lower the use of domestic currency, we may expect the above mentioned two indicators would have captured the picture of financial development. Nevertheless, there are several proxy measures of financial development which may reflect different aspects of financial system; such as capital market, however, not incorporated in this study.

As far as econometric specification is concern, annual data on financial development raises the need to control for partial adjustment by introducing lagged dependent variable as one of the explanatory variable in the model (Chinn and Ito 2006, Baltagi et al. 2009). Along with priority variable, armed conflict, econometric specification is going to consider a set of control variables that have suggested by the related literatures for determining financial development in terms of DEPTH and PRIVATE.

Estimation technique using panel data has opened several advantages compare to cross-sectional estimation. It will enable us to take into account how intensity level of armed conflict or armed conflict occurrences over time within a country may have an effect on a country's financial development. Moreover, in panel setting one can separate unobserved country-specific effect and time fixed effect from the error term and subsequently able to reduce bias form the estimated coefficient (Wooldridge 2012:484, Gujarati 2003: 636). Both fixed effect and random effect model are commonly used as estimation applied to panel data. However, in this present setting we intend to control for unobserved country and time fixed effect, fixed effect estimation technique would be best fit. The model is specified as:

$$FD_{it} = \beta_o + \beta_1 FD_{i,t-1} + \beta_2 \log GDP\ pc_{i,t} + \beta_3 Inflation_{i,t} + \beta_4 \log population\ size_{i,t} + \beta_5 \log TOT_{i,t} + \beta_6 Institute_{i,t} + \beta_7\ armed\ conflict_{i,t} + \gamma_t + v_i + \epsilon_{it} \dots \dots \dots (1)$$

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[4] The name DEPTH and PRIVATE refer to M2 as percentage of GDP and Credit to private sector by bank as percentage of GDP respectively and the shorter names have introduced just for simplicity and will be frequently used in this paper.

where FD is a proxy measure of financial development which will consider both DEPTH and PRIVATE separately. Lagged dependent variable has been introduced for the partial adjustment. Armed conflict is the priority variable and going to consider different measures of armed conflict situation, such as; level of intensity of armed conflict, occurrence of armed conflict and inter-state and intra-state armed conflict. Institute refers to the quality of institution or development of legal system which are argued to be an important factor for financial development (Baltagi et al. 2009, Chinn and Ito 2006). Institute includes a measure of those legal systems which are expected to be related with financial transaction suggested by the literatures. More description and the source of data have been discussed in the next chapter. Real GDP per capita, inflation and terms of trade have been introduced in the model as macroeconomic control variables. GDP per capita has been controlled for as richer nations are likely to have better financial institution and so as more financial development (Addison et al. 2002: 7). Inflation variability could distort decision making and discourage saving and has been controlled by inflation rate in the model (Chinn and Ito 2006: 166). Terms of trade has been taken in the model to measure the competitiveness in the international trading system. Total population of each country is also used as a control variable in the model. Log has been taken for scaling the observations. Time fixed effect and country fixed effect are also included in the model by γ_t and v_i respectively. Time fixed effect has been introduced to capture if there is any variation in financial development between years which might not be covered by the explanatory variables in the model. Idiosyncratic error term has been noted by ϵ_{it}.

This study is not incorporating real interest rate and real exchange rate in the model basically for three reasons. Firstly, real interest rate, inflation and real exchange rate are highly correlated which generates multicollinearity in the model. Secondly, positive or negative natures of real interest rate sometimes depend on the political decision (Law and Habibullah 2009: 5). Thirdly, this study encountered with a number of missing values while incorporating with real interest rate and exchange rate.

3.2 Endogeneity and System GMM

The model specification in equation (1) might be suffering from two types of econometric problems. Firstly, by introducing lagged dependent variable in the right hand side will create bias as it would be correlated with the error term (Nickell 1981). Secondly, one could raise a question about the hidden dynamics between financial development and conflict occurrences and the direction of causality, which indicate the possible endogeneity problem in the proposed model. It is because, if we believe that more income inequality is a potential component of conflict occurrences, then higher financial development might be a cause of increasing conflicts through increasing income inequality. Moreover, the model contains several control variables such as GDP per capita, inflation and terms of trade that might also be considered as endogenous. If there are endogenous regressors in the explanatory variables, they might be correlated with the error term and violates OLS assumption. In order to address the problem to reduce biasness, one of the popular statistical procedures is to use two stage instrumental variable approaches. However, finding time-varying instruments which would be correlated with armed conflict intensity

and not correlated with the financial development is somewhat difficult. For example, ethnolinguistic composition might be a potential instrument, however, not changing over time (Carbonnier and Wagner 2013: 10). In addition, as the model contains more than one endogenous variable, it would be very challenging to get several instruments to comply with the instrumental variable approach.

One possible solution is to apply first differenced equation to control for the time invariant unobservable. However, the correlation between the differenced lagged dependent variable and the disturbance process would not be removed and it will follow first order moving average process. Arellano and Bond (1991) proposed to use lagged levels of the endogeneous variables as instruments for its differenced equation. The assumption is that the disturbance term would be uncorrelated with the lagged instruments. This estimation is known as first differenced GMM. Later on Arellano and Bover (1995) and Blundell and Bond (1998) have discovered the weakness of the differenced GMM estimator as lagged levels are often poor instruments for first differenced variables. Arellano and Bover (1995) proposed a system GMM[5] model in which, in addition to the moment condition of the first differenced equation, a moment condition in levels also will be employed. Thus, in system GMM, lagged levels are used as instruments for first differenced equation and lagged differences are also used as instruments for level equations (ibid). So, in system GMM, the following two moment conditions have been imposed:

$$E[y_{i,t-s}\Delta\epsilon_{it}] = 0 \; for \; s \geq 2; t = 3 \ldots\ldots T$$
$$E[X_{i,t-s}\Delta\epsilon_{it}] = 0 \; for \; s \geq 2; t = 3 \ldots\ldots T$$

.... (i)

$$E[\Delta y_{i,t-1}(v_i + \epsilon_{it})] = 0 \; for \; i = 1,2,\ldots\ldots N$$
$$E[\Delta X_{i,t-1}(v_i + \epsilon_{it})] = 0 \; for \; i = 1,2,\ldots\ldots N$$

.... (ii)

First moment condition indicates that, for s=2, lagged level of $y_{i,t-2}$, for example, is uncorrelated with $\Delta\epsilon_{it}$ and serves as instrument. Second moment condition states that for i=1, 2,…. N and t= 3, 4,….T, lagged differences are uncorrelated with the error term and country specific effect. Which implies lagged differenced can be used as instrument for the level equation as lagged differenced is assumed uncorrelated with the error term and country specific effect. By employing these moment conditions, system GMM procedure will generate consistent and efficient estimates. System GMM approach is widely used to address the endogeneity in dynamic panel setting and seem popular among the academics in recent times (Carbonnier and Wagner 2013, Heid et al. 2012, Levine et al. 2000).

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[5] System GMM is efficient for relatively small time periods (T) compare to number of panel units (N). Our study also concerns covering 66 countries and having maximum T=26 observations.

3.3 Econometric Strategy

Econometric procedures for analysing how armed conflict and financial development is associated would start with the conventional ordinary least square estimation technique. In the next step, fixed effect specification will be employed with time and country fixed effect to take the advantage of panel data for cross-country setting. We would deal with different specification and characteristics of armed conflict in fixed effect model. And finally, an attempt would be made to apply system GMM to check the consistency of the parameter estimates after controlling for the endogeneity issue. Throughout the process of analysis robust standard error will be calculated and subsequently used for testing the significance of the parameter estimates in order to take into account heteroscedasticity of the error term.

Chapter 4 Data and Its Description

4.1 Sources of Data and Description of Variables

This paper considers financial development and armed conflict data across 72 developing countries for the period of 1985 to 2010. The study restricted the sample from developing countries as it aims to investigate whether there exists any systematically different outcome in terms of financial development among these countries due to having occurrences of armed conflict or different characteristics of armed conflict. Developing countries refers to the countries with low income, lower middle income and upper middle income according to the World Banks' WDI database. According to World Bank' WDI database, number of developing countries is 139. However, the study only covers 72 countries due to the unavailability of information for most of the variables in concern[6]. Basically, an attempt has been made to gather information on economic, political and armed conflict situation of developing countries from the available sources of data. The coverage of the study period from 1985 to 2010 has been chosen arbitrarily. In addition, it also might be noted that before this period we have very little information for most of the variables and for some cases we did not find any data before 1985 (for instance, institutional data from ICRG). A full list of 72 countries highlighting available number of observations and armed conflict occurrence have been presented at the appendix A. In the next section a detailed description of the variables and the sources of data collection will be discussed.

<u>Dependent Variable</u>

Money and quasi money (M2): DEPTH

Different types of proxies have been noticed in the literature to measure the degree of financial development. The most widely used measure is the ratio of broad measure of money stock (M2) to the level of income (GDP) which is popular among the academics for its availability and simplicity (Odhiambo 2009, King and Levine 1993a, King and Levine 1993b). If the financial sector develops faster than the real sector, one can expect M2/GDP ratio will be increasing over time. This indicator is designed to capture the degree of monetization in the economy and also expected to track the size of expanding financial sector in which money is considered to be a valuable instrument for payment and savings. Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS). The annual data on M2 as a percentage of GDP is obtained from the WDI database and the unit has

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[6] When we applied full model incorporating all the variables (some with log specification), number of countries covered only 66.

been measured on 2005 constant US price. M2 as a percentage of GDP will be considered as one of the dependent variables in this study as a proxy measure of financial development.

Credit to private sector as percentage of GDP: PRIVATE

Credit to private sector implies the total value of credits provided to private sector and has been seen as one of the important measures of financial development (Levine et al. 2000:38). Annual data has been collected from the World Bank's WDI and is measured in terms of credit allocated to private sector by banks as a percentage of GDP. It should be noted that this variable does not include credit issued to any government body and also excludes credit issued by central bank. Credit allocated to private sector as a percentage of GDP will be second proxy measure of financial development in this study.

Financial development will be measured using these two proxies; DEPTH and PRIVATE. Nevertheless, there are several proxy measures and none of them free of criticism and being discussed in the introduction section. This study believes DEPTH and PRIVATE would be potential indicator to capture the financial development where money is considered to be a valuable store of value.

<u>**Priority variables**</u>

Armed conflict:

Armed conflict refers to the use of armed forces between two parties, of which at least one is the government of a state, resulting in at least 25 battle-related deaths. Intensity of armed conflict (zero, low, medium and high) has been coded depending on the number of deaths recorded annually. Zero intensity armed conflict refers to the situation where the battle related death accounts for less than 25 per year. However, zero (0) as a value of the armed conflict intensity level, also refers to those countries for which there were no record of armed conflict during the entire period of 1985-2010 according to Uppsala Conflict Data Project database. It should be noted that history of armed conflict occurrences prior to 1985 has not been considered in this study. Low intensity armed conflict is categorized if there were a record of at least 25 battle-related deaths per year and accumulated death were less than 1000. A medium intensity armed conflict is said if there were more than 25 battle-related deaths occurred per year for every year in the conflict period accumulated more than 1000 deaths in the entire conflict, but less than 1000 per annum. High intensity armed conflict is the one if there were more than 1000 battle-related deaths in each year[7]. Annually recorded data on armed conflict has been incorporated in this study and one can access the datasets from this web address- http://www.pcr.uu.se/research/ucdp/datasets/. Armed conflict and its intensity level are going to be considered as priority variable of concern in this study. In addition, the dataset also recorded information regarding types of armed conflict; such as intra-state or inter-state. Intra-state also known as civil war refers to armed conflict between government of a state and internal

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[7] An elaborated definition of armed conflict and its intensity can be accessed in the appendix 2 of the article by Wallensteen and Sollenberg (2001: 643)

opposition group without any foreign intervention. Inter-state armed conflict occurs between two or more states (Gleditsch et al. 2002: 619).

<u>Control variables</u>

Institutional quality:

Role of well-functioning institutions towards comparative economic affluence among countries have been immensely investigated more recently. It has been argued that in the absence of well-functioning institution, a country might not be able to accelerate its economy though having in favourable condition in terms of geography or natural resources (Acemoglu et al. 2001, Rodrik et al. 2004, Glaeser et al. 2004). A country might have experienced less financial development because of having poor functioning institutions. However, measuring institutional quality of a country is not an easy and straight forward task to carry out. One can segregate institutions to economic, political and social institutes. In this study an attempt has been made to incorporate institutional quality as one of the important explanatory variables. The intension here is to investigate how institutions and armed conflict are interacting towards financial development. As far as measuring the institutional quality is concern, this study relies on the data from International Country Risk Guide (ICRG). ICRG prepares political risk rating (PRR), among others, on annual basis for 140 countries covering 12 separate indicators incorporating both political and social attributes as a proxy measure of the overall political risk of a country. From those 12 indicators, five indicators have been selected; namely: i) Government stability, ii) Bureaucracy quality, iii) Corruption, iv) Law and order and v) Risk of expropriation. It is believed that the mentioned five indicators can be tracked the overall governance environment of a country which are expected to favour financial development and has been used comprehensively in academic journal (Law and Habibullah 2009, Knack and Keefer 1995, Baltagi et al. 2009, Chinn and Ito 2006). The first three can be seen as a measure of governance quality and the last two can be considered as a measure of legal system and property rights. By summing over those five indicators, this study defines a new index based upon the idea that all those five indicators might jointly reflect the overall governance quality that might favour financial development[8] (Law and Habibullah 2009). The First and last indicators have been scaled from 0 to 12; second indicator has been scaled 0 to 4; third and fourth indicators have been scaled 0 to 6. Higher the value of each indicator means very low risk whereas; lower the value indicates higher the risk. It should be noted that ICRG has recorded data on the mentioned indicators since 1985. A detailed description of each indicator has been discussed in the appendix.

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[8] In order to make all the indicators comparable, third and fourth indicators have been multiplied by 2 and second indicator has been multiplied by 3. By summing these five indicator and used it as a single indicator has been used by Law and Habibullah (2009). In addition, it may be remarked that the resultant sum of the five indicators would reflect more variability over time.

Real GDP per capita

Real GDP per capita has been introduced in the analysis as a control variable. GDP per capita is considered to be one of the measures to capture the overall economic affluence of an economy. The reason why GDP per capita is considered as control variable as one might expect that a country with higher economic affluence is associated with a developed financial sector. Annual data on GDP per capita has been collected from the World Bank's WDI database and it is measured at constant 2005 US $.

Inflation, consumer prices (annual %)

According to the Quantity Theory of Money, inflation is seen as a monetary phenomenon. If the growth rate of money supply is greater than the growth rate of the economy, then there might be inflation (Gokal and Hanif 2004). In order to control for the effect of inflation on M2/GDP ratio, the analysis collected data on inflation (consume price index) from World Bank's WDI database. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

Net Batter Terms of Trade (2000=100)

The terms of trade index which is also known as commodity terms of trade index measures the relative prices of a country's exports and imports. It is the ratio of the export price index to the import price index. When a country's export become more expensive or import becomes cheaper, the terms of trade index will be increase. Terms of trade has been calculated using 2000 as base year and is going to be incorporated as control variable in the analysis. Data and definition have been collected from the World Bank's WDI database.

Total population

Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are midyear estimates. Data and definition have been collected from the World Bank's WDI database.

Based on the above mentioned variables an unbalanced panel data set has been organized that covers 72 countries for the period 1985 to 2010. Basically, there are three sources from which we have collected information on the above mentioned variables: World Bank's WDI, Uppsala Conflict Data Project and ICRG.

4.2 Summary Statistics

A summary statistics has been presented in the table 4-1 showing mean, standard deviation (overall, between and within countries), minimum and max-

imum values of the variables. Between standard deviation is based on the summary statistics of 72 countries ignoring the time while, within standard deviation is based on the summary statistics of 26 time points ignoring the countries. In sum, dataset contains 1122 country-year observations for most of the variables (exception is the case of inflation and terms of trade). For each country on average we have 16 observations with minimum 2 and maximum 26. Among the 72 countries, 48 countries have experienced armed conflict at least once during the study period.

M2 as percentage of GDP is exhibiting huge variation with average value 39% and standard deviation 25. Credit allocated to private sector as a percentage of GDP is also showing considerable variations (19) with mean 24%. Considerable variations in terms of within and between standard deviation have indicated that financial development varies across countries and time periods. A considerable variation is also seen for the variable armed conflict intensity level with mean value 0.8 and standard deviation 1.1. Institutional quality index is also exhibited variations with mean 30 and having minimum 4 and maximum 53; which indicates there exists huge variations in terms of institutional quality among the countries. Conflict year dummy variable which indicates whether there were armed conflict occurrences of any particular year implies that 39% of total country-years observations have had armed conflict during the period 1985-2010 for this sample data.

Table 4-1: Summary statistics

Variables	N	Mean	Std. Dev	Between Std.	Within Std.	Min	Max
M2/GDP (%)	1122	38.85	25.32	28.18	11.07	1.62	193.73
Private credit as % GDP	1117	24.01	19.45	18.20	10.88	0.15	133.08
GDP PC	1122	2083.90	2087.51	1938.75	484.72	111.79	11533.82
Inflation (%)	1052	58.33	487.91	124.70	467.68	-33.21	11749.64
Terms of trade	998	109.33	31.33	20.66	24.66	39.2	315.63
Population size†	1122	55.1	162	172	2040	0.3869	1210
Institute quality	1122	30.05	7.80	6.45	5.08	4.33	53.25
Armed conflict intensity*	1122	0.81	1.11	0.90	0.54	0	3
Conflict-year dummy[1]	1122	0.39	0.49	0.41	0.23	0	1

Table 4-2: Correlation matrix

	M2/GDP	Private	GDP pc	Inflation	Conflict	Institute	TOT	Pop
M2/GDP	1							
Private	0.8139	1						
GDP per capita	0.1401	0.2235	1					
Inflation	-0.0375	0.008	-0.0065	1				
Conflict Intensity*	-0.0979	-0.1656	-0.154	0.0357	1			
Institution quality	0.3623	0.3597	0.3704	-0.1171	-0.2484	1		
Terms of trade	-0.1731	-0.1671	0.0123	0.0368	0.0121	-0.1418	1	
Population size	0.1631	0.1437	-0.1236	-0.0087	0.2829	0.0999	-0.0644	1

Notes: * Intensity level has been coded 0, 1, 2 and 3, where 0=no conflict, 1=low level armed conflict, 2=medium level armed conflict and 3=high level armed conflict. However, intensity level "0" can be shared by both armed conflict and non-armed conflict occurred countries. [1] conflict year dummy = 1 if that year there were at least 25 battle related death. † Figures are in millions.

Similarly, we can see average dispersion from mean value are considerably high for the variables, GDP per capita, inflation, terms of trade and population size. The variability is noticeable across countries and also across time periods as indicated from between and within standard deviation. Between and within variability of each of the variables are justifying the need of using panel estimation techniques.

Table 4-2 shows correlation matrix of the variables. From the correlation results, it can be noted that intensity level of armed conflict is negatively correlated with financial development (M2/GDP and Private Credit). On the other hand, institutional quality and real GDP per capita are positively correlated with both the proxy of financial development. Inflation is negatively correlated with M2/GDP and very weakly positively correlated with Private Credit. Correlation between financial development and terms of trade indicates negative relationship and there might be several channels by which this negative relationship can be encountered. One possible way could be increasing M2 likely to lead depreciation of domestic currency and in turn worsen terms of trade.

Before starting with econometric modelling, an attempt has been made to have an overview whether there is any significant differences in the mean value of financial development between armed conflict occurred countries and non-armed conflict occurred countries. A country has been considered as armed conflict country if it had history of having at least 25 battle-related deaths at least once during the entire period of 1985-2010.

Table 4-3: Financial development and institutional quality between conflict and non-conflict countries

	Armed conflict countries[*]		Non-conflict countries		T-test (p-value)
	Mean	Std. Dev	Mean	Srd. Dev	
M2/GDP	36.40	23.53	41.71	27.0	3.52 (0.00)
Private credit	20.54	16.57	28.01	21.66	6.52 (0.00)
Institute quality	27.71	7.78	32.78	6.87	11.47 (0.00)
Total no. of countries		48	24		-
Total no. of observations		604[1]	518		-

Notes: * If there was any occurrences of armed conflict which result at least 25 battle-related deaths per year during 1985-2010, has been considered as an armed conflict country. [1]Number of observations were 599 while calculating Private credit.

t-test results give us an impression that there exits significant difference in financial development in terms of M2/GDP and private credit for the armed conflict occurrence and non-armed conflict occurrence. However, differences in financial development between these countries might depend on a number of factors. As mentioned earlier, armed conflict situation varies over time and being categorized as armed conflict country does not imply the country had faced battle- related death every year from 1985 to 2010. In addition, mean of the institutional quality index also significantly differs between these two groups. In order to explore how armed conflict is affecting financial development, we need to exploit advance econometric techniques to account for other factors as well as overtime variations.

Chapter 5 Result and Discussion

In this chapter a series of statistical analysis will be performed to investigate how armed conflict and financial development is interacting. While incorporating with control and priority variables in the model, the number of countries reduces from 72 countries to 66 counties due to unavailability of information. Using a lagged dependent variable also cost for losing information and in sum, the model considers an unbalanced panel data of 66 countries, having total number of observations is 894.

5.1 Cross-sectional OLS

At the very first step, a cross-sectional OLS has been employed without consideration of country and time fixed effect on financial development. Table 5-1 shows cross-section regression on DEPTH variable for different specifications. DEPTH refers to M2 as a percentage of GDP. Three dummy variables are created as we have four categories of the level of armed conflict intensity. No armed conflict or zero intensity of armed conflict has been chosen as reference group. As mean difference indicates financial development might be higher in the non-conflict countries, considering it as reference group would make interpretation simple and understandable. OLS results in Column (1) presents that intensity of armed conflict is statistically significant and negatively associated with DEPTH. On average, low intensity level of armed conflict might reduce the DEPTH by 2.2 percentage point compare to zero intensity level or no armed conflict and it is significant at 1% level. In addition, medium intensity level of armed conflict might reduce the DEPTH by 1.1 percentage point compare to the reference group of no armed conflict or zero intensity level of armed conflict on average. If the intensity level is high, it might reduce the DEPTH by 1.7 percentage point compare to no armed conflict or zero intensity level of armed conflict on average. In the second specification (column 2), in addition to dummy intensity level of armed conflict, we have controlled for institutional quality. After controlling for institutional quality, high and medium intensity level of armed conflict become statistically insignificant and low intensity level of armed conflict remains with statistical significant. Inclusion of institutional quality might have change the significance level and coefficient estimates of the dummy intensity level of armed conflict. Coefficient estimates of institutional quality imply that one additional point in institutional quality might increase the DEPTH by 0.1 percentage point on average. In column 3 and 4, we have introduced conflict year dummy instead of armed conflict intensity dummy. Dummy conflict year variable takes the value "1" for any specific year for which there was an occurrence of armed conflict which had resulted at least 25 battle-related deaths. Conflict-dummy year specification has been done to explore how armed conflict as a whole affects financial development by ignoring the severity. In other words, in conflict year dummy, we make the severity into two observations. The dummy variable with value 1 indicates low or medium or high intensity of armed conflict and the value with 0 indicates no armed conflict or zero intensity level of armed conflict. Conflict year dummy would tell us whether in a particular year, there was any armed conflict occurrence or not. Result indicates that having occurrences of armed

conflict might reduce the DEPTH by 1.6 percentage point compare to not having armed conflict experiences on average (column 3). In column (4) institutional quality has been introduced as a control variable in the presence of conflict year dummy. Parameter estimates of institutional quality shows highly statistically significant at 1% level and the magnitude of conflict year dummy gets smaller. That might indicate, institutional quality is outraging the effect of armed conflict towards DEPTH.

Table 5-1: Cross-sectional OLS on DEPTH

	DEPTH			
VARIABLES	(1)	(2)	(3)	(4)
DEPTH (lag)	0.975***	0.970***	0.974***	0.969***
	(0.016)	(0.017)	(0.016)	(0.017)
Per capita GDP[1]	0.328	0.202	0.334*	0.196
	(0.200)	(0.199)	(0.199)	(0.199)
Inflation	-0.002	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Population size[1]	0.455*	0.411	0.473*	0.419
	(0.263)	(0.263)	(0.263)	(0.263)
Terms of trade[1]	-0.334	-0.233	-0.319	-0.219
	(0.837)	(0.828)	(0.819)	(0.809)
Intensity dummy, Reference group= No conflict or zero intensity of armed conflict				
High intensity	-1.670*	-1.333		
	(0.892)	(0.895)		
Medium intensity	-1.146*	-0.998		
	(0.651)	(0.652)		
Low intensity	-2.218***	-1.750**		
	(0.736)	(0.783)		
Institutional quality		0.066**		0.071***
		(0.028)		(0.027)
Conflict dummy-year			-1.552**	-1.249*
			(0.685)	(0.690)
Constant	-5.815	-6.601	-6.209	-6.910
	(5.331)	(5.258)	(5.352)	(5.286)
Observations	894	894	894	894
R-squared	0.936	0.936	0.936	0.936
Number of countries				

Notes: Values in the parenthesis reports robust standard errors clustered by country. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. [1] Variables that are in log specification. DEPTH= M2 as percentage of GDP.

Lagged dependent variable, log GDP per capita and log population size also show statistically significant with positive sign (column 3). It can be interpreted as one per cent increase in real GDP per capita might increase the DEPTH by 0.33 percentage point on average. For the case of population size, we can say that one per cent increase in total population might increase the DEPTH by 0.47 percentage point on average. Significant lagged dependent variable reflects that DEPTH in a particular year strongly associated with the past year realization.

Table 5-2: Cross-sectional OLS on PRIVATE

	PRIVATE			
VARIABLES	(1)	(2)	(3)	(4)
DEPTH (lag)	0.942***	0.935***	0.942***	0.935***
	(0.034)	(0.034)	(0.033)	(0.034)
Per capita GDP[1]	0.581**	0.373	0.586**	0.365
	(0.253)	(0.248)	(0.250)	(0.247)
Inflation	-0.002	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Population size[1]	0.580*	0.515*	0.602**	0.523*
	(0.300)	(0.300)	(0.299)	(0.299)
Terms of trade[1]	-0.239	-0.029	-0.187	0.015
	(0.918)	(0.902)	(0.890)	(0.875)
Intensity dummy, Reference group= No conflict or zero intensity of armed conflict				
High intensity	-2.123**	-1.596*		
	(0.910)	(0.925)		
Medium intensity	-1.329*	-1.123		
	(0.763)	(0.764)		
Low intensity	-2.395**	-1.647		
	(1.111)	(1.119)		
Institutional quality		0.109***		0.114***
		(0.029)		(0.028)
Conflict dummy-year			-1.831**	-1.378*
			(0.788)	(0.791)
Constant	-9.789	-11.504*	-10.404*	-11.912**
	(6.112)	(6.000)	(6.141)	(6.042)
Observations	887	887	887	887
R-squared	0.890	0.891	0.890	0.891
Number of countries				

Notes: Values in the parenthesis reports robust standard errors clustered by country. *** p<0.01, ** p<0.05, * p<0.1. [1] Variables that are in log specification. PRIVATE= Credit to private sector as percentage of GDP.

Cross-sectional OLS has been estimated for another proxy measure of financial development, credit to private sector by bank as a percentage of GDP (PRIVATE) and presented in table 5-2. From column 1, we can see that coefficient estimates for low intensity and high intensity of armed conflict is almost same with negative sign. Compare to no armed conflict, both low and high intensity level of armed conflict affect the financial development with similar magnitude. If there is high intensity level of armed conflict, it might reduce the PRIVATE by 2.1 percentage point compare to no armed conflict or zero intensity level of armed conflict on average. However, controlling for institutional quality made the low and medium intensity level of armed conflict insignificant; only high intensity level of armed conflict remains statistically significant to explain the variation in PRIVATE. When we introduce conflict year dummy in column 3 & 4, the results indicate that both armed conflict occurrence and institutional quality is statistically significant. Armed conflict occurrences negatively affects PRIVATE, whereas, institutional quality affects positively. Armed conflict might reduce the PRIVATE by 1.4 percentage point and one additional point of institutional quality will increase the PRIVATE by 0.11 percentage point on average. Real GDP per capita, lagged dependent variable and population size are also found as statistically significant with positive sign.

In sum, cross-sectional OLS has depicted that armed conflict occurrences are negatively associated and statistically significant to explain the variation on financial development. In addition, institutional quality which is mainly focused on governance performance and development in legal system and property rights are strongly associated with financial development and may outrage the effect of armed conflict.

5.2 Fixed Effect Estimates

However, the results generated using cross-sectional OLS might be suffering from biased and inconsistent estimates as unobservable time-invariant country specific characteristics might be correlated with explanatory variables. In order to overcome the limitation, we re-estimate the effect of armed conflict on financial development applying fixed effect model. In the new specification, we able to control for unobserved heterogeneity across countries which are time invariant and also would controlled for time fixed effect. Time fixed effect has been introduced to capture if there is any variation in financial development between years which might not be covered by the explanatory variables in the model. Fixed effect results have been presented in table 5-3 for the similar specification that we did in cross-sectional OLS.

If we compare the results from table 5-1 and 5-3 (for column 1), we can notice that the absolute magnitude and significance level of dummy intensity of armed conflict somewhat reversed. For instance, in the cross-sectional OLS, the magnitude of low intensity armed conflict was larger compare to fixed effect estimates. On the other hand, coefficient of high intensity dummy become larger in fixed effect compare to cross-sectional OLS. That indicates, previous estimates might have suffered with bias as we did not controlled for country heterogeneity effect and time fixed effect. In other words, disturbance term in

cross-sectional OLS might be correlated with unobserved country fixed effect and time fixed effect.

Table 5-3: Fixed effect model on DEPTH

	DEPTH			
VARIABLES	(1)	(2)	(3)	(4)
DEPTH (lag)	0.717***	0.706***	0.718***	0.708***
	(0.086)	(0.088)	(0.085)	(0.087)
Per capita GDP[1]	4.978**	3.827*	5.034**	3.833*
	(2.261)	(2.034)	(2.266)	(2.032)
Inflation	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Population size[1]	-6.985	-9.946	-6.655	-9.726
	(5.461)	(6.245)	(5.287)	(6.055)
Terms of trade[1]	-0.168	-0.220	-0.093	-0.176
	(0.984)	(0.957)	(0.976)	(0.947)
Intensity dummy, Reference group= No conflict or zero intensity of armed conflict				
Low intensity	-1.271*	-0.905		
	(0.686)	(0.769)		
Medium intensity	-1.693*	-1.434		
	(1.012)	(0.924)		
High intensity	-2.034**	-1.491*		
	(0.905)	(0.858)		
Institutional quality		0.153*		0.154*
		(0.087)		(0.085)
Conflict year dummy			-1.622**	-1.275*
			(0.786)	(0.750)
Constant	88.484	141.448	82.297	137.572
	(93.701)	(105.549)	(91.14)	(102.69)
Observations	894	894	894	894
R-squared	0.709	0.711	0.709	0.711
Number of countries	66	66	66	66

Notes: Robust standard errors reported by the parenthesis. Fixed effect specifications included time dummies which are not presented in the table. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. [1] Variables that are in log specification. DEPTH= M2 as percentage of GDP.

From fixed effect estimation, we can interpret that if there is high intensity of armed conflict, it might reduce the DEPTH by 2 percentage point compare to the zero intensity level of armed conflict or no armed conflict on average. Moreover, if there is medium intensity of armed conflict, it might reduce the DEPTH by 1.7 percentage point compare to no armed conflict or zero intensi-

ty level of armed conflict on average. Low intensity level of armed conflict might reduce the DEPTH by 1.3 percentage point compare to the reference group of no armed conflict. It can also be noticed that from low intensity to high intensity dummy, the coefficient estimates possessing an increasing pattern in terms of absolute magnitude. That might indicates, as intensity level increases, the corresponding negative effect on DEPTH also increases. However, low and medium intensity level of armed conflict lost its statistical significance when we controlled for institutional quality. Result indicates only high intensity level of armed conflict able to explain the variation in DEPTH with statistical significance at 10%. The magnitude of high intensity become lower as well (compare from column 1 & 2). On average, if there is high intensity level of armed conflict, it might lower the DEPTH by 1.5 percentage point compare to zero intensity level or no armed conflict while we controlled for institutional quality. The coefficient value decreases by 0.5 compare to the previous specification (column 1 and 2). Moreover, to interpret institutional quality, we can say that a one point increase in institutional quality might increase the DEPTH by 0.15 percentage point on average. Furthermore, in column 3 and 4, conflict year dummy has been introduced instead of dummy intensity variable. The magnitude of the coefficient estimate for conflict year dummy gets larger in fixed effect estimation compare to cross-sectional OLS (column 3). It can be interpreted that having armed conflict occurrences might reduce the DEPTH by 1.6 percentage point on average. However, while controlled for institutional quality, the magnitude of armed conflict gets smaller (from 1.6 to 1.2). That might indicates both armed conflict and institutional quality are operating such a way that one outrages another's effect.

Fixed effect results on private credit as percentage of GDP (PRIVATE) has been presented in the table 5-4. Interestingly none of the dummy intensity level of armed conflict shows statistically significant while the model controlled for both country fixed effect and time fixed effect (column 1 & 2), however, these were statistically significant in cross-sectional OLS (in table 5-2, column 1). Introducing institutional quality as a control variable shows positive association with PRIVATE and statistically significant at 5% level (column 2); however, dummy intensity level of armed conflict remains insignificant. One can interpret that one additional point in institutional quality might increase PRIVATE by 0.3 percentage point on average. Conflict year dummy specification shows whether controlled for institutional quality or not, armed conflict occurrences do not provide statistical evidence that it has an impact on PRIVATE (column 3 & 4). Moreover, quality of institution shows positively and statistically significant at 5% level and coefficient estimate is somewhat similar with the estimates in column 2 where we dealt with dummy intensity of armed conflict.

Table 5-4: Fixed effect model on PRIVATE

	PRIVATE			
VARIABLES	(1)	(2)	(3)	(4)
PRIVATE (lag)	0.747***	0.723***	0.746***	0.721***
	(0.092)	(0.098)	(0.091)	(0.097)
Per capita GDP[1]	7.109**	5.043**	7.190**	5.035**
	(3.082)	(2.396)	(3.111)	(2.398)
Inflation	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Population size[1]	-1.873	-7.723	-2.283	-8.291
	(5.296)	(5.520)	(5.461)	(5.566)
Terms of trade[1]	-1.167	-1.269	-1.173	-1.346
	(1.213)	(1.074)	(1.204)	(1.059)
Intensity dummy, Reference group= No conflict or zero intensity of armed conflict				
Low intensity	-1.671	-0.974		
	(1.128)	(1.063)		
Medium intensity	0.099	0.501		
	(0.704)	(0.619)		
High intensity	-0.589	0.419		
	(0.784)	(0.777)		
Institutional quality		0.313**		0.314**
		(0.137)		(0.135)
Conflict year dummy			-0.658	-0.029
			(0.568)	(0.487)
Constant	-9.280	93.512	-3.227	103.147
	(94.908)	(92.590)	(97.940)	(93.757)
Observations	887	887	887	887
R-squared	0.670	0.680	0.670	0.679
Number of countries	66	66	66	66

Notes: Values in the parenthesis reports robust standard errors. All specifications include time dummies which are not presented in the table. *** p<0.01, ** p<0.05, * p<0.1. [1] Variables that are in log specification. PRIVATE= Credit to private sector as percentage of GDP.

So far, we have attempted to explore how armed conflict might have associated with financial development after controlling for time fixed effect and country fixed effect. In the specification, we also considered a number of financial variables as control variable and also controlled for institutional quality. Two separate fixed effect model has been exploited for two proxy measures of financial development; namely, DEPTH and PRIVATE credit. The regression results indicate that armed conflict intensity level or armed conflict occurrences are negatively affecting a country's DEPTH and found statistically significant.

On the other hand, PRIVATE credit seem less sensitivity to the armed conflict; it shows statistically insignificant.

Institutional quality is found to be a key predictor and positively associated for explaining the variation in financial development across-countries. After controlling for institutional quality, the magnitude of armed conflict get smaller in absolute term but continues to show significant to determine DEPTH. On the other hand, result shows no evidence that armed conflict is affecting credit allocation to private sector (PRIVATE) on the basis of this sample for developing countries. Moreover, institutional quality shows strongly statistical significant for explaining the variation in PRIVATE credit while we controlled for. It might indicate that institution plays a dominant role for determining countries PRIVATE credit.

For both the proxy indicator of financial development, institutions are playing a crucial role for explaining the variations in DEPTH and PRIVATE credit. One may suspect that there would be a complex interaction between armed conflict and institutional quality towards financial development. In one hand conflict shows negative effect on financial development and on the other hand, institutional quality shows positive effect on financial development. The interaction is expected not to be very straight forward as armed conflict and institutional quality can be interacted through different channels. For example, a country with low per capita GDP having extreme poverty can be translated financially and bureaucratically weak state and in turn can initiate forming conflict (Fearon and Laitin 2003). In this case, poor economic condition might worsen different institutions which in turn could have formed conflict. On the other hand, a country running by coherent democracy or extremely autocracy regime is less prone to have armed conflict; such as, civil war (Hegre 2001). In this case, political regime play important role for the formation of conflict. Nevertheless, this study did not investigate how institutional quality and armed conflict phenomenon are interacting other than incorporating them in the model. Moreover, it might be noted that parameter estimates and significance might not be driven by the multicollinearity as the correlation between institutional quality and armed conflict intensity is -0.24. Based on the fixed effect estimation, it would not be wrong to conclude that institutional quality might outrage negative effect of armed conflict towards financial development to some extent.

Moreover, in addition to the armed conflict occurrences, we have used dummy intensity level of armed conflict to explore which intensity level of armed conflict might have affect the most by retarding financial development. Findings suggest that the absolute magnitude of armed conflict intensity is highest for the high intensity level of armed conflict compare to the reference group as zero intensity level for DEPTH. For example, if the intensity level is in high category, on average 2 percentage point reduction on DEPTH would be evident. For medium and low level of intensity, the coefficient estimates are smaller in absolute term compare to medium and high intensity level. For each case, zero intensity or no armed conflict has been used as reference group. In addition, coefficient estimates for high intensity level of armed conflict is statistically significant at 5% level, whereas, low and medium level intensity of armed conflict are significant at 10% level (column 1). However, controlled for institutional quality, keeps only high intensity level with statistically significant. That can imply, having quality institutions can trade-off between low and me-

dium intensity level of armed conflict and its effect towards DEPTH. It might be possible that during low and medium intensity level of armed conflict, people's perception regarding conflict would be optimistic at the beginning. Whereas, if the armed conflict situation getting worst, institutional quality still matters but cannot offset entirely the effect of high intensity level of armed conflict on DEPTH.

On the other hand, armed conflict occurrences do not provide statistical evidence regarding the negative effect on PRIVATE. However, institutional quality shows significant at 5% level to explain the variation in PRIVATE for this sample data. Intuitional quality is positively associated with PRIVATE credit though having armed conflict occurrences and the effect of armed conflict can be seen very weak on PRIVATE credit. The inherent mechanism of private credit might give us three possible explanations regarding unresponsiveness behaviour of PRIVATE credit to armed conflict characteristics. Firstly, according to the definition, PRIVATE credit measures the amount of credit that has been allocated to the private sector by banks as a percentage of GDP. Average value of PRIVATE credit is almost half of the average value of DEPTH (table 4-1). That might let us assume when a country has got occurrence of armed conflict, it would directly affect DEPTH as it comprises more shares of the economy compare to the PRIVATE credit. Secondly, in developing countries context, small and medium entrepreneurs and small business contribute to a large share of the overall economy that might know as informal sector. These small level firms and business entities unable to ask credit due to collateral limits or banks do not want to lend them to minimize risk (Ray 1998: ch 14). On the other hand, big companies or enterprises are the prime borrowers from banking sector and shares the majority of credits. These large companies or enterprises usually few in numbers and operate through different nature of business, some directly oriented with domestic need and a major portion operates through export. Multiple nature of business or having insurance to minimize future risk might have less effect on PRIVATE during armed conflict. Thirdly, state might facilitate the private sector during armed conflict by arranging protection to carry on production. In such cases, it can be assumed that armed conflict and its intensity might affect very weakly towards credit allocated to private sector by bank compare to how it affects to M2/GDP.

The analysis also intended to see how intra-state and inter-state armed conflict have effect on financial development, however, encountered with very limited observation for inter-state conflict. More specifically, the sample contains only 11 records for the inter-state armed conflict and 392 records for intra-state armed conflict. In addition, there were 38 observations categorized as intra-state with foreign support. However, a fixed effect model cannot be performed with dummy variable approach as the categories do not changing over time. Moreover, separate fixed effect model cannot be executed due to lack of information in inter-state conflict type (when we control for other variables, number of observations dropped from 11 to 3). To check the influence of those observation of inter-state conflict, we ran fixed effect model by dropping those 3 observations and the result seem not affected. Moreover, fixed effect model without intra-state conflict is fruitless as it takes away all the conflict information. However, to get an overview whether financial development var-

ies between intra-state and inter-state armed conflict, we have performed mean difference test.

Table 5-5: Financial development by intra-state and inter-state conflict

	Intra-state armed conflict		Inter-state armed conflict		T-test (p-value)
	Mean	Std. Dev	Mean	Srd. Dev	
DEPTH	36.26	19.75	46.39	23.20	-1.67 (0.09)
PRIVATE credit	20.87	16.41	34.77	26.34	-2.72 (0.01)
Institutional quality	27.32	8.01	28.36	4.90	-0.43(0.66)
Total no. of observations		392		11	-

Notes: DEPTH= M2 as percentage of GDP, PRIVATE= Credit allocated to private sector

Table 5-6 presents, the average value of financial outcome for intra-state and inter-state armed conflict. Results from t-test indicate that the mean might differ in terms of DEPTH between two groups which is statistically significant at border line (10%). Statistically significant difference also noticed for PRIVATE credit between two groups. On the other hand, based on this un-balanced sample observations, we cannot say that institutional quality significantly differ between inter-states and intra-state armed conflict groups. Moreover, as discussed earlier, to be more precise whether financial development varies depending upon the types of armed conflict (inter-state and intra-state), it is important to control for other factors what we failed to incorporate due to limited information on inter-state conflict. In sum, this study cannot infer whether the differences in financial development are happened to be by the cost of inter-states and intra-state armed conflict.

5.3 System GMM

In the previous section, we have applied fixed effect model and analysed how different characteristics of armed conflict are associated with financial development and interpreted the coefficient estimates. However, as discussed in the methodological framework in chapter 3 that coefficient estimates from fixed effect model might be associated with bias. Firstly, it has been modelled in dynamic panel setting, which implies that lagged dependent variable used as an explanatory variable could lead bias. Secondly, the model contains several endogenous and predetermined explanatory variables which could lead inefficient estimates as those regressors might be correlated with the error term and violates the OLS assumptions. In this section, we are going to employ system GMM approach as an attempt to address those limitations and come with more credible estimates of the parameters.

System GMM approach is an updated version of the difference GMM technique as it has been argued that lagged level of the regressors sometimes worked as poor instrument for the differenced regressors (Arellano and Bover 1995, Blundell and Bond 1998). Thus, in system GMM, in addition to the previous process, level equations are also instrumented by their own first differences. The resultant estimates would be more efficient and credible (ibid). In order to apply system GMM, we need to specify endogenous regressors or

weakly exogenous regressors, strongly exogenous regressors and number of lags that the system GMM is going to use. Roodman (2009) provides a comprehensive stata package along with some additional features to deal with system GMM; namely xtabond2.

For the endogenous and weakly exogenous or predetermined variables, system GMM uses all the available lags, unless specified, of the level variables as instruments for the differenced equations. In addition, it also uses contemporaneous first differences as instruments for the level equations. For our model, we have specified financial development and all other financial variables as endogenous; such as, lagged financial development, GDP per capita, inflation and terms of trade. In addition, the model considers armed conflict as a truly endogenous variable as armed conflict can be seen as a result of poor performing financial system or oppositely, armed conflict can weaken the financial development. In order to compare the results with cross-sectional OLS and fixed effect model and to check the efficiency and consistency of the parameter estimates after addressing endogeneity issue, we categorize the low, medium and high intensity of armed conflict into one category. That implies, dummy conflict year refers to whether there was any armed conflict or not; it will take value "1" if there was armed conflict which might be low, medium or high intensity of armed conflict and that makes us to do a simple comparison across three methods.

Table 5-7 shows one step system GMM results for the dependent variable DEPTH and also presents the estimates we got before for the same specification using cross-sectional OLS and fixed effect method for comparison purpose. After addressing endogeneity and subsequent bias raised for the use of lagged dependent variable in the model, system GMM would deliver efficient and consistent estimates of the parameters. As far as the consistency of the estimates and diagnostic test of the model is concern, no second order serial correlation exists as indicated by AR (2). Instrument validity has been checked by Hansen J test and reported in the table. The specification considers lag limit from 2 to 4 years. That indicates, the analysis used 2nd, 3rd and 4th lags for incorporating instruments for both level equation and differenced equation. In addition, lags of armed conflict, institutional quality and population size have been used as instrument only for the first differenced equations. Year dummies have been considered as fully exogenous. Moreover, the study reveals that changing the lags limit weakens the instrument validity and also changes the parameter estimates.

GMM estimates provide strong evidence that armed conflict might reduce the DEPTH by 2.1 percentage point on average; this estimates is larger compare to cross-sectional OLS and fixed effect estimates and highly significant. Lagged dependent DEPTH, GDP per capita and population size are positively associated; however, GDP per capita shows statistically insignificant (column 5). Institutional quality is statistically significant and positively associated. After controlling for institutional quality, the estimates of armed conflict become 1.6, it was 2.1 in column 5. The magnitude of the coefficient of armed conflict is deceased by almost 30 per cent while controlled for institution. That leads us to conclude that institution might able to decrease the adverse effect of armed conflict towards DEPTH to some extent. Moreover, we can interpret that an additional point of institutional quality might increase the DEPTH by 0.13

percentage point on average. Significant positive sign of population size indicates that one per cent increase in population size might increase the DEPTH by 0.5 percentage point on average.

Table 5-6: System GMM estimation on DEPTH

	Cross-sectional OLS		Fixed effect		System GMM	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
DEPTH (lag)	0.974***	0.969***	0.718***	0.721***	0.964***	0.955***
	(0.016)	(0.017)	(0.085)	(0.097)	(0.036)	(0.037)
GDP per capita[1]	0.334*	0.196	5.034**	5.035**	0.204	0.064
	(0.199)	(0.199)	(2.266)	(2.398)	(0.353)	(0.275)
Inflation	-0.002	-0.002	-0.001	-0.001	-0.002	-0.002
	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)
Population size[1]	0.473*	0.419	-6.655	-8.291	0.554*	0.511*
	(0.263)	(0.263)	(5.287)	(5.566)	(0.288)	(0.264)
Terms of trade[1]	-0.319	-0.219	-0.093	-1.346	-0.361	-0.564
	(0.819)	(0.809)	(0.976)	(1.059)	(1.015)	(0.967)
Conflict-year dummy	-1.552**	-1.249*	-1.622**	-1.275*	-2.107***	-1.650***
	(0.685)	(0.690)	(0.786)	(0.750)	(0.599)	(0.541)
Institutional quality		0.071***		0.154*		0.126*
		(0.027)		(0.085)		(0.063)
Constant	-6.209	-6.910	82.297	137.572	-5.491	-7.398
	(5.352)	(5.286)	(91.14)	(102.69)	(5.466)	(5.334)
Observations	894	894	894	894	893	893
Number of countries	66	66	66	66	65	65
Country fixed effect	No	No	Yes	Yes	Yes	Yes
Time fixed effect	No	No	Yes	Yes	Yes	Yes
AR(1) test in 1st Δ (p-value)					[0.004]	[0.004]
AR(2) test in 1st Δ (p-value)					[0.524]	[0.528]
Hansen J-test					[1.00]	[1.00]

Notes: Robust standard errors are presented in the parenthesis. All specifications include time dummies that are not presented in the table. System GMM shows one step output and use lag limits from 2 to 4. Hansen J-test reports the p-values for the null hypothesis of instrument validity. AR(1) and AR(2) report the p-values for first and second order autocorrelated disturbances in the first differences equations. *** p<0.01, ** p<0.05, * p<0.1. [1] Variables that are in log specification. DEPTH= M2 as percentage of GDP.

Table 5-8 presents one step system GMM result for PRIVATE that is, credit allocated to private sector by bank as a percentage of GDP. Specification of variables and lag limits remains the same as we had specified earlier. Form column 5, we can see that armed conflict is negatively associated and statistically significant to explain the variation in PRIVATE. From the fixed effect estimation, the effect of armed conflict occurrence towards PRIVATE was insignificant; however, system GMM reports significant at 5% level (column 3 & 5). The change indicates that the previous estimation might be suffered with endogeneity. Occurrences of armed conflict might reduce the PRIVATE by 2.2 percentage point on average according to system GMM results. On the other

hand, controlled for institutional quality shows that armed conflict is no more statistically significant; however, having negative sign. Institutional quality is highly significant to explain the variation in PRIVATE among the developing countries for this sample data.

Table 5-7: System GMM estimation on PRIVATE

	Cross-sectional OLS		Fixed effect		System GMM	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
PRIVATE (lag)	0.942***	0.935***	0.746***	0.746***	0.917***	0.903***
	(0.033)	(0.034)	(0.091)	(0.091)	(0.069)	(0.069)
GDP per capita[1]	0.586**	0.365	7.190**	7.190**	0.474	0.171
	(0.250)	(0.247)	(3.111)	(3.111)	(0.493)	(0.413)
Inflation	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Population size[1]	0.602**	0.523*	-2.283	-2.283	0.604	0.445
	(0.299)	(0.299)	(5.461)	(5.461)	(0.383)	(0.359)
Terms of trade[1]	-0.187	0.015	-1.173	-1.173	-1.275	-1.474
	(0.890)	(0.875)	(1.204)	(1.204)	(1.489)	(1.348)
Conflict-year dummy	-1.831**	-1.378*	-0.658	-0.029	-2.272**	-1.367
	(0.788)	(0.791)	(0.568)	(0.487)	(1.022)	(0.825)
Institutional quality		0.114***		0.314**		0.221***
		(0.028)		(0.135)		(0.078)
Constant	-10.404*	-11.912**	-3.227	103.147	-5.976	-5.849
	(6.141)	(6.042)	(97.940)	(93.757)	(6.481)	(6.995)
Observations	887	887	887	887	886	886
Number of countries	66	66	66	66	65	65
Country fixed effect	No	No	Yes	Yes	Yes	Yes
Time fixed effect	No	No	Yes	Yes	Yes	Yes
AR(1) test in 1st Δ (p-value)					[0.015]	[0.015]
AR(2) test in 1st Δ (p-value)					[0.270]	[0.273]
Hansen J-test					[1.00]	[1.00]

Notes: Robust standard errors are presented in the parenthesis. All specifications include time dummies that are not presented in the table. System GMM shows one step output and use lag limits from 2 to 4. Hansen J-test reports the p-values for the null hypothesis of instrument validity. AR(1) and AR(2) report the p-values for first and second order autocorrelated disturbances in the first differences equations. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. [1] Variables that are in log specification. PRIVATE= Credit to private sector as percentage of GDP

In this section, we have attempted to address the issue of endogeneity and potential problem associated with lagged dependent variable by exploiting system GMM approach. The parameter estimates from system GMM techniques reflected fully consistent based on the diagnostic tests. Firstly, Hansen J test of the overall validity of the instruments that is over-identifying restrictions. Secondly, the test whether error term is serially correlated and found no second orders serial correlation as indicated by AR (2).

Comparison among cross-sectional OLS, fixed effect and system GMM show that the magnitude of armed conflict dummy gets larger and become highly significant for DEPTH. Statistical significance previously was at 10% now become at 1% level. After controlling for endogeneity, institutional quality

is still persisted with statistical significance and shows greater share to explain the DEPTH. On the other hand, no statistical evidence favours that armed conflict might be a significant factor to explain the variation in PRIVATE credit among developing countries for this sample data. In system GMM, statistical significance of institutional quality gets larger and the sign of the coefficient of armed conflict intensity shows negative sign as expected.

Chapter 6 Conclusions

In this paper we have examined how armed conflict affects financial development in a dynamic panel setting for 66 developing countries for the period of 1985 to 2010. Financial development has been measured by two proxy indicators: M2 as a percentage of GDP (DEPTH) and credit to the private sector by bank as a percentage of GDP (PRIVATE).

As far as econometric technique is concern, we have employed cross-sectional OLS as a baseline at the beginning. Furthermore, we have exploited fixed effect method to account for the country fixed effect along with time fixed effect and take advantage of panel data. Finally, we have attempted to address the issue of endogeneity and potential problem associated with lagged dependent variable by exploiting system GMM approach.

Our findings suggest that armed conflict is an important phenomenon for explaining the variations in financial development among developing countries. Results from system GMM approach indicate that armed conflict has a significantly negative impact on financial development; proxies by DEPTH and PRIVATE.

Furthermore, this study also explored how institutional quality, proxies by quality of governance and legal system and property rights, might have influenced financial development and what would be the effect of armed conflict if one controlled for governance quality. In order to incorporate overall governance quality of a country, this study employs Political Risk Rating (PRR) data prepared by ICRG. PRR presents 12 separate indicators, from which, five indicators have been selected; namely: i) Government stability, ii) Bureaucracy quality, iii) Corruption, iv) Law and order and v) Risk of expropriation. By summing over those five indicators, this study defines a new index based upon the idea that all of those five indicators might jointly reflect the overall governance quality which in turn favours financial development (Law and Habibullah 2009).

Empirical results indicate that governance quality is highly statistically significant and positively associated with both the financial development proxies-DEPTH and PRIVATE, even after controlling for the level of income per capita. Moreover, the magnitude of armed conflict gets lower in absolute term while we controlled for overall governance quality. That leads us to conclude, governance performances and its influence towards financial development is inevitable; even if in the presence of armed conflict, overall performances of governance by ensuring property rights and improvement in legal system might play an important role for continuing the process of the financial system. The importance and significance of overall institutional performances for determining financial development in cross-country panel can be followed by the work of Levine et al. (2000: 60) and Law and Habibullah (2009) as well.

Although, controlling of governance quality lowers the magnitude of armed conflict on DEPTH, armed conflict has persisted with statistical significance and negative sign. On the other hand, coefficient of armed conflict though having negative sign lost its statistical significance to explain the variation in PRIVATE credit across-countries after controlling for governance qual-

ity. One might assume that governance environment appears with greater impact toward financial development in terms of credit allocated to private sector by banks. Nevertheless, why PRIVATE credit seems less sensitive to armed conflict is not the main focus of this study; it might be possible that major borrowers who ask credit from banks are usually prepared for future risk. Government protection during armed conflict and the nature of business might also be related with the less impact of armed conflict on PRIVATE credit. In addition, bank's operation usually spread over the whole country; whereas, armed conflict might be concentrated on a few specific locations.

Furthermore, the study also attempted to reveal which intensity level of armed conflict affects the most in terms of retarding the DEPTH. Our findings suggest that even if low, medium and high intensity level of armed conflict has significant negative impact for retarding DEPTH compare to the reference group o fno armed conflict or zero intensity; the highest intensity level of armed conflict affects the most. In other words it can be concluded that if the intensity of armed conflict increases from low to medium and then high level, corresponding effect by retarding DEPTH would also be increased subsequently in comparison to the zero level of armed conflict or no armed conflict. However, after controlling for governance quality, only the high intensity level of armed conflict remains with statistically significance, medium and low intensity level become insignificant. That can imply, governance performances are trading-off with low and medium level of armed conflict intensity. It might also possible that during low and medium intensity level of armed conflict, people's perception regarding conflict would be optimistic. Agents might think that the situation would be under control; however, when the armed conflict situation getting worst, governance quality still matters but cannot offset entirely the effect of high level of intensity on DEPTH.

Finally, an attempt has also been made to check whether financial development varies between intra-state and inter-state armed conflict. Our results indicate that financial development differs between intra-state and inter-state armed conflict, on the other hand, no evidences found regarding the differences in governance quality. Due to lack of data on inter-state conflict, this study could not carry out advance econometric technique to infer how interstate and inter-state have impact on financial development. In sum, this study could not conclude whether the difference in financial development is happened to be by the cost of inter-states and intra-state conflict.

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Appendices

Appendix A: List of countries and available observations

Country	Obs	Country	Obs	Country	Obs
Albania	17	Mali©	10	Guinea-Bissau©	2
Algeria©	20	Mexico©	3	Guyana	26
Angola©	15	Moldova©	12	Haiti©	11
Argentina©	8	Mongolia	20	Honduras	26
Armenia	12	Morocco©	22	Hungary	26
Azerbaijan©	11	Mozambique©	7	India©	26
Bangladesh©	11	Namibia	21	Indonesia©	23
Belarus	13	Nicaragua©	6	Iran, Islamic Rep.(c)	22
Bolivia	26	Niger©	12	Iraq©	7
Botswana	26	Nigeria©	3	Jordan	26
Brazil	26	Pakistan©	10	Kazakhstan	12
Bulgaria	20	Papua New Guinea©	14	Lebanon©	3
Burkina Faso©	3	Peru©	19	Liberia©	12
Cameroon©	6	Philippines©	26	Libya	12
China©	3	Senegal©	20	Madagascar	26
Colombia©	24	Sierra Leone©	12	Malawi	26
Congo, Dem. Rep.(c)	10	South Africa©	10		
Congo, Rep.(c)	12	Sri Lanka©	26		
Costa Rica	26	Sudan©	26		
Cote d'Ivoire©	7	Suriname©	6		
Dominican Republic	26	Tanzania	23		
Ecuador©	5	Thailand©	8		
Egypt, Arab Rep.(c)	6	Turkey©	26		
El Salvador©	11	Uganda©	26		
Ethiopia©	24	Ukraine	13		
Gabon	26	Vietnam	18		
Guatemala©	12	Yemen, Rep. (c)	3		
Guinea©	3	Zambia	25		

Notes: (c) indicates armed conflict countries which refers to those countries that have had experienced at least 25 battle related death per year (at least once during 1985-2010) according to Uppsala conflict data project yearly data.

Appendix B: Description of proxies for Institutional quality

As far as measuring the institutional quality is concern, this study relies on the data from International Country Risk Guide (ICRG). ICRG prepares political risk rating (PRR), among others, on annual basis for 140 countries covering 12 separate indicators incorporating both political and social attributes as a proxy measure of the overall political risk of a country. Institutional quality has been measured using ICRG risk rating variables. From the 12 political risk components, this study selects the following 5 components as those five components are expected to be related with overall financial development of any country (Law and Habibullah 2009, Knack and Keefer 1995, Baltagi et al. 2009, Chinn and Ito 2006).

Government stability: Based on three subcomponent; government unity, legislative strength and popular support, this component is devised to asses government's ability to carry out programs and ability to stay in office. This indicator can have minimum value of 0 and maximum of 12. Higher value indicates better government stability and lower value indicates very high risk as having unstable government.

Investment profile: This indicator reflects the risk of investment and captured by contract viability or expropriation, profits repatriation and payment delays. The score of this indicator ranges from 0 to 12. Higher value indicates low risk to carry out investment that means there will be low risk of expropriation and profit repatriation. Low value of the indicator indicates higher the risk which might associated with low investment.

Corruption: Corruption reduces the efficiency of government and business and creates unequal access to the resources and facilities. Corruption could retard financial development through various means. Special payment and bribes can be seen to have favour in export and import licenses, under value tax assessment etc. This indicator is designed to capture the degree of corruption a country might be associated with. This indicator can takes value between 0 and 6. Higher value indicates less corruption and lower value indicates higher corruption.

Law and order: Law has been captured by assessing the strength and neutrality of the legal system. Order has been assessed by the general compliance of law. It is expected to capture the independency of judicial system and how effectively the law is being practiced. The indicator can take values from 0 to 6. For instance, value 6 will indicate the judiciary system is operating independently and the country is having very low crime rate.

Bureaucracy quality: Bureaucracy quality measures the strength and expertise to govern the services autonomous from political pressure. The value of this indicator can be ranged from 0 to 4. Higher value indicates that the country is in low risk as the bureaucracy strength is sufficient enough to govern the country without drastic changes in the policies and can work autonomously without the influence of the political pressure.

The rest seven indicators which are not being incorporated in this study, namely; socio-economic condition, internal conflict, external conflict, Military in politics, religious tensions, ethnic tensions and democratic accountability.