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**Financial Inclusion and Armed Conflict:
Can Innovation play a role in Post-Conflict Reconstruction?**

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List of Acronyms

ATMs	Automated teller machines
ASEAN	Association of Southeast Asian Nations
FAS	Financial Access Survey
FIA index	Financial Institutions Access index
FII	Index for Financial Inclusion
fsQCA	fuzzy-set Qualitative Comparative Analysis
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
ILO	International Labour Organization
IMF	International Monetary Fund
MENA	Middle East & North Africa
OECD	Organization for Economic Co-operation and Development
OIC	Organization of Islamic Cooperation
OLS	Ordinary Least Squares
SDG	Sustainable Development Goals
UCDP	Uppsala Conflict Data Program
VAR	Vector Autoregression
V-Dem	Varieties of Democracy
WDI	World Development Indicators

Abstract

The objective of the present research is to analyze the relationship between financial inclusion and armed conflict. This has been done in order to gain a better understanding of the link between financial inclusion and conflict as well as the role of financial inclusion in post-conflict reconstruction. The research was conducted applying a panel data fixed effects regression model to assess the impact of armed conflict on different measures of financial inclusion. Four indicators are used to proxy financial inclusion. Since its peak in 1992, civil conflict has seen a steady decline, therefore the analysis must account for the time period starting in 1990. Given the lack of data on most financial inclusion indicators prior to 2004, this analysis makes use of the IMF Financial Institutions Access Index (FIA) to examine the impact of conflict on financial inclusion for the period between 1990 and 2017, based on imputed data. In addition, fixed effect regression models are also conducted for the time period of 2004-2018. Indicators proxying financial inclusion are – Bank Branches per 100,000 adults, ATM per 100,000 adults and Deposit Accounts per 1000 adults. Results indicate that financial conflict is significantly and adversely affected by conflict, however significance differs between the different indicators of financial inclusion. Bank Branches per 100,000 adults show significant results which are robust to controlling for socio-economic and institutional factors. Including a lag in the model finds no significant evidence for an impact. Against the background of the current rise in literature on innovation and financial inclusion, a small discussion evaluates the role of digital financial innovations in the context of conflict.

Relevance to Development Studies

Identifying factors which can promote and sustain post-conflict recovery is a key challenge of peacebuilding strategies. Designing policies which ensure the efficiency of post-conflict reconstruction can decrease the occurrence of civil conflict and enable conflict-affected countries to escape the vicious cycle of conflict, poverty and underdevelopment. This paper contributes to the development literature by examining the role of financial inclusion in post-conflict reconstruction. As part of the current discourse on the role of innovation for development, (financial) technologies are sought to promote financial inclusion and thus reduce poverty and generate growth. In light of this, the research contributes to a better understanding on the potential benefits of applied technologies in conflict-affected countries, through their impact on financial inclusion.

Keywords

Financial Inclusion, Post-Conflict Reconstruction, Peacebuilding, Economic Development, Innovation

Chapter 1 Introduction

The importance of technology and innovation for economic development has received increasing attention throughout the last decades and a growing body of literature explores their importance for responding to today's global challenges (Perez 2015). Based on the notion that innovation is in fact a crucial determinant for economic development (Leger and Swaminathan 2007), it is commonly understood that both technology and innovation are drivers of growth (Perez 2015).

Perez (2015) defines innovation as an economic process which creates the ability to facilitate new growth patterns. However, leveraging this potential lies in the hands of the society, policy makers and businesses (Perez 2015: 193). Although this implies a great relevance for poor countries, factors like technological innovation are still considered to be a topic of the global north (Fagerberg et al. 2010: 1). Nevertheless, based on the notion promoted by Carlotta Perez (2015), innovation should rather be understood as a tool which enables the development of new processes and strategies to tackle to world most pressing challenges. While Perez (2015) applies this idea to global environmental issues, there are various other fields in which innovation has the potential to leverage new solutions for long-standing problems. As innovation and technology can act as stimuli for many economic processes, they are closely linked to the concept of financial inclusion. In fact, innovation is sought to significantly increase and enable efforts to create inclusive access to financial systems (Demirguc-Kunt et al. 2018: xi).

The World Bank has set financial inclusion as one of its main goals which is targeted by 7 of the 17 Sustainable Development Goals (SDGs). This is due to the broad consensus on the positive impact of financial inclusion on poverty reduction and economic development (World Bank 2019). While the number of people without access to financial systems has been declining over the years, as of today 1.7 billion people worldwide remain unbanked (Demirguc-Kunt et al. 2018: 4). Most importantly, the vast majority of those who lack access come from developing countries. Thus, tackling this issue by promoting universal inclusive access is one of the main targets of the development strategies (World Bank 2019).

While linking innovation and financial inclusion follows a logical flow, other factors are also closely connected to this debate but somehow less intuitive. One development field for which new strategies for poverty reduction and growth are of crucial relevance refers to peacebuilding and more specifically post-conflict reconstruction approaches. A broad body of literature promotes the idea that economic recovery in post-conflict society is of great importance (Castillo 2008). More so, addressing development issues in the aftermath of conflict can help to reduce the risk of a renewed outbreak of violence and therefore presents a crucial task for development efforts (Hegre et al. 2019).

Therefore, this research paper explores this link of innovation, financial inclusion and peacebuilding by taking a closer look at the role of financial inclusion for post-conflict reconstruction.

1.1 Research Objective

Against this background, the objective of this research is to gain a better understanding of the relation between conflict and financial inclusion and draw a conclusion for future post-conflict reconstruction efforts. In line with the objective, this research examines the impact of armed conflict on financial inclusion.

The main research question of this paper is:

“How does conflict affect financial inclusion?”

In order to analyse and answer this, several sub-questions are being explored. These are as follows:

“Does armed-conflict have a negative impact on financial inclusion?”

“Which financial indicators are most affected by conflict?”

“Does (mobile) technology affect the impact of conflict on financial inclusion?”

1.2 Methodology

Research questions are examined by conducting a panel data analysis. A fixed effects panel regression model is applied to assess the impact of armed conflict on financial inclusion. The model is estimated based on data collected from several sources, covering the period of 1990 until 2018 for 103 countries.

1.3 Chapter Overview

This research paper is structured as follows: Chapter 1 presents the introduction as well as the research objective and methodology. Chapter 2 provides a conceptualization of the two main concepts which aims to illustrate the broader conceptual framework in which the current research is located. Chapter 3 builds on that by presenting a theoretical framework which discusses the links of each financial inclusion and conflict with development and concludes by discussing the theoretical links connecting the two. The aim is to give a comprehensive understanding on the main underlying theories and provide evidence for the relevance of this study. Chapter 4 then gives a brief literature review which includes an overview of research on determinants of financial inclusion, the impact of financial inclusion on the development and literature on the link of finance and post-conflict reconstruction. In Chapter 5, the empirical strategy is presented which is followed by Chapter 6 which discusses the results and potential limitations. Chapter 7 draws on the findings of the analysis by presenting a brief discussion on digital innovation and its role for financial inclusion and peace. Finally, Chapter 8 concludes by outlining some final remarks.

Chapter 2 Conceptualization

This chapter presents a conceptual framework which introduces the main concepts in terms of their broader topics of peacebuilding and financial development. Thus, the first part of this chapter gives a brief introduction of the peacebuilding concept and establishes its link to post-conflict reconstruction. The second part introduces the concept of financial development and illustrates the role of financial inclusion within this framework. The goal of this chapter is thus to give a brief overview of the context in which this analysis takes place, and to illustrate the conceptual point of view which is adopted for this research.

2.1 Peacebuilding

The field of peacebuilding is very complex and its definition much debated. As such, the term can be used to describe a broad variety of processes. This research paper follows the framework of strategic peacebuilding proposed by Schirch (2004) which, in its simplest form, describes peacebuilding as a response to violence (Schirch 2004: 8). As a more detailed definition, Schirch (2004) states:

“Peacebuilding seeks to prevent, reduce, transform, and help people recover from violence in all forms, even structural violence that has not yet led to massive civil unrest. Peacebuilding supports the development of relationships at all levels of society: between individuals and within families; communities; organizations; businesses; governments; and cultural, religious, economic, and political institutions and movements” (Schirch 2004: 9).

This illustrates the notion of peacebuilding as a broad, superior concept which encompasses various processes involved in approaching conflict. More importantly, peacebuilding here is understood as the nexus of various approaches, each of unique relevance but closely intertwined with each other (Schirch 2004: 11). The main four dimensions of the peacebuilding process entail *waging conflict violently*, *reducing direct violence*, *transforming relationships* and *building capacity* (Schirch 2004: 25-26). The last dimension of *building capacity* is central to the current research as it includes the process of development which can be further distinguished between economic, political or social development (Schirch 2004: 59). Collectively, these different types of development form the process of *reconstruction* which presents the main emphasis of this research (Schirch 2004: 59).

This conceptualization aims to give an idea on the wide-ranging and complex nature of peacebuilding. This has been done in order to emphasize the fact that the analysis conducted in this paper can only address a small fraction of this concept. However, presenting their roles within the peacebuilding framework also underline the relevance of development and reconstruction efforts, the latter of which is subject to a more detailed examination in the following.

2.1.1 Post-Conflict Reconstruction

Following the framework by Schirch (2004), *reconstruction* is defined as “a form of economic, political, and social development geared for societies in a post-war context.” (Schirch 2004: 60). It is thus referred to in the following as *post-conflict* reconstruction and describes efforts targeting the recovery of post-conflict economies by repairing or replacing the infrastructure (Schirch 2004: 60). This analysis defines ‘post-conflict’ as the situation after reaching a peace-agreement. This is done in consideration of the fact that the term ‘post-conflict’ has been subject to a critical debate (Addison et al. 2001a: 6). Since even in post-conflict settings, there is no clear distinction between peace and war (Addison et al. 2005: 704), reconstruction efforts might still be affected or impeded by remaining violence (Addison et al. 2001a: 6).

In its most general, theoretical form, conflict refers to the incompatibility of goals (Schmidt and Kochan 1972). As such, the occurrence of conflict is part of everyday life (Schirch 2004: 18) and only problematic if not met with an adequate response. Lacking the necessary tools to manage conflict, however, can result in its violent outbreak (Bowd and Chikwanha 2010: xi). Given the decline of interstate conflicts since the cold war, this analysis focuses on internal conflicts which experienced their peak in 1990 (Blattman and Miguel 2010: 4). This analysis follows the Uppsala Conflict Data Program (UCDP)¹ which defines (civil) conflict as a contested incompatibility which results in a minimum of 25 battle-related deaths per year (Pettersson 2019 and Blattman and Miguel 2010: 3).

Although post-conflict reconstruction is a broad and complex topic, this section focuses on aspects of the strategies that are of relevance in regard to its link with finance. Therefore, there are several important points worth mentioning. First of all, post-conflict reconstruction strategies must take into consideration that institutional and development structures prior to the conflict can be partially responsible for its onset (Addison et al. 2001a: 6). Reconstruction efforts are therefore required to address existing shortcomings and socio-economic inequalities to successfully achieve its goals (Addison et al. 2001a: 7). This is of particular importance as the lack of efficient policies or the failure of reconstruction efforts can have devastating consequences in fragile states (Addison et al. 2001a: 7). Given that conflict is considered as one of the main reasons for underdevelopment (Hasan and Murshed 2017: 190), conducting research on post-conflict reconstruction is of particular importance.

2.2 Financial Development

In order to outline the concept of financial inclusion, it is important to first elaborate the broader concept of financial development. The goal of this is to provide a comprehensive understanding of finance in the development context and to demonstrate why the concept of financial inclusion was chosen for this analysis.

Financial development is generally understood as the set-up of efficient financial systems entailing financial markets, intermediaries, financial products as well as regulatory frameworks (Cihak et al. 2012: 4). They emerge as a response to market imperfections such as information and transaction costs that prevent the efficient allocation of financial resources and thus impede the improvement of welfare and development (Cihak et al. 2012:

¹ See <https://www.pcr.uu.se/research/ucdp/definitions/>

4). Thus, financial development basically describes the process of creating a financial system and its efforts to alleviate such market imperfections (Cihak et al. 2012: 4).

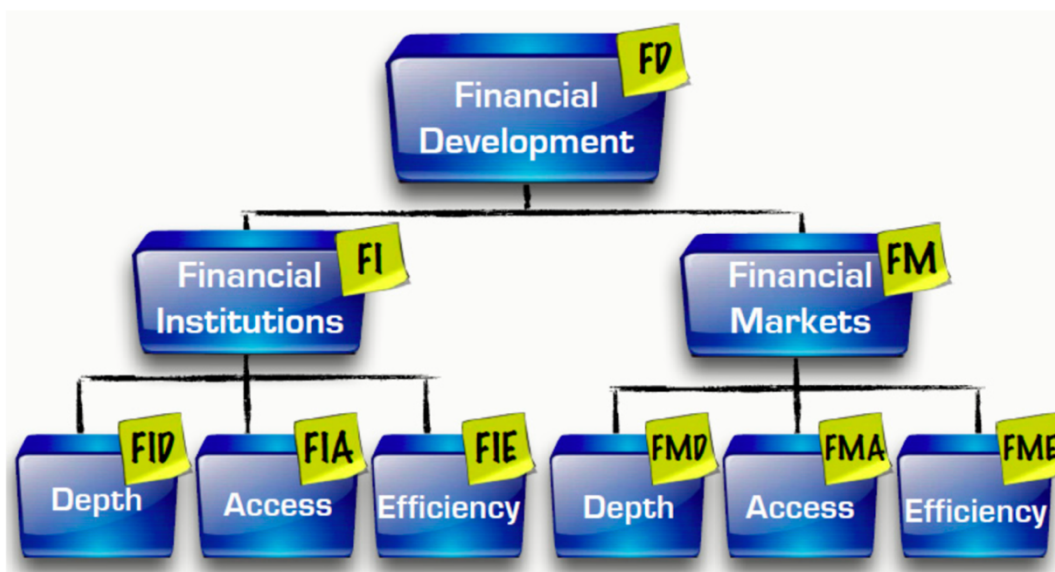
Given this relatively narrow definition, financial development has long been assessed by making use of two main indicators – ratio of private credit to GDP and stock market capitalization as a ratio to GDP (Svirydzenka 2016: 4), measuring financial development exclusively in terms of its size (Cihak et al 2012: 2). Since the 1970s, these indicators were commonly and primarily used to analyze the relevance of financial systems for economic development (Svirydzenka 2016: 4). However, this notion changed as Cihak et al (2012) introduced their matrix of financial system characteristics which defines financial development as a broad and multidimensional process (Svirydzenka 2016: 4 and Cihak et al 2012: 2). In their paper Cihak, Demirguc-Kunt, Feyen and Levine (2012) argue that in addition to the size of the banking sector which illustrates financial depth, financial development depends on factors like stability, quality and efficiency (Cihak et al. 2012: 2).

Therefore, Cihak et al. (2012) propose a multidimensional approach based on a 4x2 matrix which distinguishes measures of financial development in terms of financial institutions and financial markets. This understanding is further broken down into four dimensions, defined as:

“(a) the size of financial institutions and markets (financial depth), (b) the degree to which individuals can and do use financial institutions and markets (access), (c) the efficiency of financial institutions and markets in providing financial services (efficiency), and (d) the stability of financial institutions and markets (stability)” (Cihak et al. 2012: 3).

This more comprehensive understanding of the financial development concept was introduced in order to provide a new, more complex measurement tool which is now commonly adopted for research (Svirydzenka 2016: 20). Figure 1 illustrates the structure of the new multidimensional measurement of financial development.

Figure 1. Financial Development Index Pyramid



Source: Svirydzenka 2016: 5, based on Cihak et al. (2012)

As shown in figure 1, one aspect of financial development relates to the dimension of *access* which refers to the concept of financial inclusion. Despite being one of its components, financial inclusion does not necessarily result from financial development (Sarma 2008: 1). Furthermore, as the mere size of financial systems does not guarantee widespread access, the benefits of large financial systems can be limited² (Svirydzenka 2016: 4). This emphasizes the need to contribute to the research on financial systems by taking a closer look at the access dimension of financial development. The following section thus introduces the concept of financial inclusion in more detail.

2.2.1 Financial Inclusion

Throughout the last years, the concept of financial inclusion gained widespread recognition and has become a top priority of the World Bank's development efforts (Demircuguc-Kunt et al. 2018: 1). While the struggle to provide inclusive financial system not only concerns low income countries (Sarma 2008: 1), financial inclusion is primarily assessed in terms of its relevance for developing countries and is currently at the core of development efforts (Kabakova and Plaksenkov 2018: 199 and World Bank 2008).

Given that literature on financial inclusion is still in its infancy, there is no standard definition (Kabakova and Plaksenkov 2018: 199 and Park and Mercado 2015: 1). However, there are three main dimensions that are commonly associated with financial inclusion – access and usage as well as quality of financial services (Kabakova and Plaksenkov 2018: 199). This paper follows the definition by Sarma (2008), defining financial inclusion as “a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy.” (Sarma 2008: 3)

Since the concept of financial inclusion has gained in significance throughout the last decades, a growing body of literature examines its theoretical and empirical links to economic development (Sarma 2008: 1 and World Bank 2008: 21). As such, research on the role of financial inclusion suggests a positive impact on economic growth and the reduction of poverty as well as income inequalities (World Bank 2008: 21).

Chapter 3 elaborates on this literature by presenting the main theoretical findings on the role of financial inclusion for development.

² See also Cihak et al. (2012)

Chapter 3 Theoretical Framework

This chapter will introduce the theoretical framework on which the following analysis is built upon. For this, the previous chapter has laid the grounds by elaborating the conceptualization of the main concepts. This chapter now proceeds by examining the theoretical links of each underlying concept and economic development. Finally, the last section establishes the theoretical links between financial inclusion and post-conflict reconstruction to illustrate how they are connected and why it is important to analyse their relationship. This section is thus structured as follows. The first part presents an overview of the theory linking conflict and development, as presented in the development literature. The second part follows by doing the same for the link between financial inclusion and development. Finally, the third part brings together these findings and presents the theory linking finance, and financial inclusion in particular to conflict and post-conflict reconstruction.

3.1 The Conflict-Development Link

Due to the importance of conflict for development failures (Hasan and Murshed 2017: 190), in the past two decades the relationship between conflict and development has gained increasing attention and been put in the focus of economic research (Blattman and Miguel 2010: 5). Given the complexity of the topic, providing a thorough understanding of the link requires a comprehensive analysis, yet a full review of the literature is beyond the scope of this paper. Therefore, the following section provides a brief discussion of those theoretical findings which are most relevant for this analysis.

Although the absolute number of intrastate conflicts has been steadily decreasing since its peak in 1992 (Blattman and Miguel 2010: 4), a disproportionate amount of conflict still occurs in the poorest countries of the world (Hegre 2013: 4 and Blattman and Miguel 2010: 4). Not only does conflict mainly occur in the poorest and least-developed regions, countries that experience conflict also struggle to escape violence and return to peace (Blattman and Miguel 2010: 4). In fact, a significant link between the occurrence of conflict and the state of development has been found (Hegre 2013: 4). Yet, this link describes a reciprocal relationship (Hegre 2013). On the one hand, development, or rather the lack thereof, is also seen as a cause of conflict (Hasan and Murshed 2017: 188). Fearon and Latin (2003) for example find that growth, measured by GDP per capita, is significantly linked to the likelihood of conflict onset. On the other hand, as a consequence of violence, conflict results in what is called ‘development in reverse’ thus impeding and reversing development efforts (Hegre 2013). To demonstrate this in more detail the following section provides a brief discussion which links development as a cause for conflict with the impact of conflict on development.

Although the causes of conflict are much debated³, several factors are commonly understood to trigger the outbreak of violence. For one, low per capita income is considered a crucial determinant of civil conflict as it is significantly linked to an increase in the likelihood of conflict onset (Blattman and Miguel 2010: 4). Poverty is sought to trigger conflict as it decreases incentives to avoid violence and implies that people have less to lose (Blattman

³ For a discussion on this see Blattman and Miguel (2010)

and Miguel 2010: 10 and Murshed 2007: 1). Moreover, the existence of income inequalities and unequal distribution of wealth present major incentives to engage in conflict (Dal Bo and Dal Bo 2011 as cited in Blattman and Miguel 2010: 10). Therefore, an increase in economic inequalities is considered to trigger the onset of conflict (Blattman and Miguel 2010: 18). In addition to that, factors such as weak state capacity and the lack of efficient institutions have been found to be correlated to conflict (Blattman and Miguel 2010: 22).

At the same time, conflict adversely affects development. As part of its devastating consequences, conflict causes unimaginable human suffering, the destruction of physical and human capital and forces large populations to flee⁴ (Hegre 2013: 1 and Blattman and Miguel 2010: 4). This directly affects the economic development of countries (Blattman and Miguel 2010: 4). In addition to the direct impact, conflict affects the development by impeding the ability of economies to grow and by increasing poverty (Hasan and Murshed 2017: 189 and Addison et al. 2005: 704 and Murshed 2007 and Blattman and Miguel 2010: 4). Poverty is exacerbated as violence deteriorates living and health conditions, causing famines and death (Blattman and Miguel 2010: 4), while a decline in international trade enforces the negative effect on growth (Hegre 2013: 6). Furthermore, Addison et al. (2005) point towards the destructive impact of conflict on institutions and governance (Addison et al. 2005: 704)

Empirical evidence supports the assumptions that conflict deteriorates economic growth. Gates et al. (2012) show, that as a result of conflict, GDP growth decreases by more than 2% in each year of the conflict. Furthermore, Koubi (2005) found that the negative impact of conflict on growth is aggravated as conflict intensifies and prolongs (Hegre 2013: 5). On the contrary, a lack of economic growth is sought to increase the risk of experiencing conflict (Murshed 2007: 1). As poor growth tends to worsen poverty and inequalities, it exacerbates the triggers of conflict and thus increases the risk of violence (Murshed 2007: 1).

Therefore, the risk of an outbreak of conflict is increased by the very factors which conflict directly affects and deteriorates. This has several important implications for the following analysis. Given the role as both a cause and consequence of conflict, development and economic growth play an important role in the recovery from conflict after violence has ended (Hegre 2013: 7). This is of crucial importance for post-conflict reconstruction efforts since Collier et al. (2003) find that the probability of conflict reoccurrence in the aftermath of conflict is significantly higher than compared to the probability faced by non-conflict countries. The authors find that for the first five years after a conflict has ended, countries face a 44% likelihood of experiencing a renewed outbreak (Collier et al. 2003: 83). In fact, three times as many new conflicts occur in post-conflict countries than compared to those that are not affected by conflict and highly developed (Collier et al. 2003: 83). Similarly, Bigombe et al (2000) find that 31% of conflict affected countries experience a renewed outbreak of violence within 10 years. Although this could be explained by various factors, one major reason refers to the persistence of underlying root causes of conflict (Collier et al. 2003: 83).

Keeping in mind that conflict occurs mainly in the least developed and poorest countries (Hegre 2013: 4 and Blattman and Miguel 2010: 4), this has further implication for development efforts. Targeting this cycle of underdevelopment and conflict is therefore a

⁴ For a more detailed explanations on the consequences of conflict see Blattman and Miguel (2010)

main priority of post-conflict reconstruction efforts (Hegre et al. 2019). One possible way of addressing this dilemma is to promote growth and development in post-conflict situations. As economic growth supports the reduction of poverty and leads to a decrease in inequality, it is sought to decrease the likelihood of conflict (Murshed 2007: 1). This implies that promoting growth as part of post-conflict reconstruction efforts can decrease the risk of a renewed conflict outbreak. However, it is crucial that resulting economic benefits are allocated fairly. Therefore, in order to reduce the risk of conflict, growth in post-conflict economies has to be equitable and pro-poor (Murshed 2007: 1).

3.2 Linking Finance and Development

Given that the concept of financial inclusion rose to popularity only recently, existing literature linking finance and development focuses to a great extent on the role of financial development. However, as illustrated above financial inclusion depicts one dimension of the financial development concept and it is therefore useful to examine the general links of the broader concept, before taking a closer look on the specific mechanism linking financial inclusion and economic development. This is not to imply that there is a clear distinction between the two concepts but done in order to provide a broad overview of theory.

3.2.1 The Effects of Financial Development

The importance of financial institutions and markets is based on the notion that well-functioning financial systems are crucial determinants for poverty reduction and economic prosperity (Levine 2005 as cited in Cihak et al. 2012: 2). Hence, as a result of its positive impact on growth and poverty, financial development is sought to promote economic development (Cihak et al. 2012: 5). Nevertheless, the validity of this link has been much discussed in the literature and some studies, such as the one conducted by Acand, Berkes and Panizza (2012) which indicates a non-linear nature of the relation between finance and growth⁵. Despite these claims, there is broad scholarly consensus on a positive impact of finance on economic development (Cihak et al. 2012: 5). More importantly, it has been argued that the lack of financial development can result in the destabilization of the economy and thus impede development by excluding poor and marginalized groups, curtailing their economic opportunities (Cihak et al. 2012: 2).

Several mechanisms can be found which explain the positive impact of development of financial systems on the economy. These can be distinguished between the impact of financial development on growth as well as poverty. On the one hand, growth is positively affected as stronger regulatory frameworks improve the efficient allocation of limited resources while risk management allows for higher returns, and the pooling of savings enables to exploitation of economies of scale (Cihak et al. 2012: 5 and Svirydzenka 2016: 4). As savings and investment behavior improves, funds are allocated more efficiently which in turn affects the accumulation of physical and human capital, increasing countries productivity (Svirydzenka 2016: 4).

⁵ The authors find that positive the impact of financial development is restricted by thresholds. More so, finance can have adverse effect when reaching a certain point. Authors defined threshold as moment when credit to private sector reaches 100% of GDP. (Acand, Berkes and Panizza 2012).

3.2.2 The Role of Financial Inclusion

In addition to the impact that is generally assumed to result from financial development, an increasing body of research focuses on the specific role of financial inclusion. As stated above, this is of great relevance since financial development, usually measured in terms of financial depth, does not imply that financial systems are inclusive. Since that considerably limits the economic benefits of a growing financial system (Svirydzenka 2016: 4), it is important to understand the mechanisms which link financial inclusion to development.

Although mainly seen as a problem of the developing world, even countries which do not suffer from poverty or underdevelopment struggle to provide financial systems which are entirely inclusive (Sarma 2008: 1). However, according to the most recent 2017 Global Findex Report, developing countries still display the lowest levels of financial inclusion as compared to the rest of the world (Demircguc-Kunt et al. 2018: 4). Establishing inclusive financial systems is thus of particular importance for poor countries, not only in regard to their development but also because the lack of inclusive financial systems has considerable negative effects on the economy (Kabakova and Plaksenkov 2018: 199). This is the case since lacking access to financial services reinforces inequalities and carries the risk for individuals and firms lack to fall into the poverty trap (Kabakova and Plaksenkov 2018: 199).

On the contrary, in line with the findings for financial development, research on the role of financial inclusion suggests a positive impact on economic growth as well as poverty reduction and claims that providing equal access to financial services can reduce income inequalities and thus tackle the gap between rich and poor (World Bank 2008: 21 and Demircguc-Kunt and Levine 2009 as cited in Cihak et al. 2012: 6). As a result, there is broad scholarly consensus that deepening financial inclusion evidently promotes economic development (Kabakova and Plaksenkov 2018: 199 and Demircguc-Kunt et al. 2018: 1-4).

The positive impact on growth can be explained by referring to the macroeconomic implications of financial inclusion such as the positive impact on economic stability as well as an increase of consumption and output (Kabakova and Plaksenkov 2018: 199). The link between financial inclusion and development can be explained in more detail by considering several microeconomic mechanisms.

Sarma (2008) for example argues that increasing the access to financial systems diminishes the costs of capital by promoting the efficient allocation of resources and states that accessing financial services allows for a better management of finances (Sarma 2008: 1). This in turn improves the saving behaviour of companies and households and boosts the returns on investments by making them more efficient (Kabakova and Plaksenkov 2018: 199). This ultimately leads to higher consumption resulting in the improvement of overall welfare (Kabakova and Plaksenkov 2018: 199 and Sarma 2008: 1). In addition to that, efficient and inclusive systems eliminate the need for informal alternatives and thus protect individuals from exploitation (Sarma 2008: 1).

Research has also linked financial inclusion to the empowerment of marginalized groups (Kabakova and Plaksenkov 2018: 199). For one, Cihak et al. (2012) argue that as a result of an increase in economic opportunities and the demand for labor, poor and marginalized groups are usually the main beneficiaries of positive growth effects (Cihak et al. 2012: 7). Furthermore, Klapper et al. (2019) state that financial inclusion promotes the situation of

women, leading to female empowerment in developing countries (Klapper et al. 2019 and Swamy 2014).

In regard to this research, it is also important to note that besides generating economic growth, financial inclusion is also sought to make it more equitable (Park and Mercado 2015). As financial systems become more inclusive and access to services improves, individuals are capable of making long-term financial decisions and obtain the ability to respond to sudden economic shocks (Park and Mercado 2015), such as health emergencies or environmental disasters.

Although the phenomenon of financial inclusion is not restricted to developing countries, poor regions struggle the most with providing inclusive financial systems (Kabakova and Plaksenkov 2018: 199). Most importantly, fragile and conflict affected countries are the most affected, displaying considerably lower levels of financial inclusion than compared to the rest of developing countries (Demirguc-Kunt et al. 2013a). Given that financial inclusion is closely linked to economic prosperity and lower poverty rates, this is of great relevance for conflict affected regions (World Bank 2008: 21). A more detailed discussion of this is presented in the following sections.

In summary, this section illustrated that financial inclusion is able to reduce poverty, tackle income inequalities and generate equitable economic growth. These findings are of particular importance for the following analysis. A further discussion of their relevance for post-conflict reconstruction efforts follows below in section 3.3.

3.3 The Role of Finance in Post-conflict Reconstruction

Although there is broad consensus on the importance of financial inclusion (Sarma 2008: ii), little research has been conducted in regard to a link with conflict. Analyzing the theoretical link between financial inclusion and armed conflict is hampered given the limited amount of literature on this topic. This section therefore draws on theoretical findings compiled by reviewing the literature on the general link between finance and conflict. Furthermore, the role of finance is not restricted to the time after conflict, instead it plays a role before, during and after (Addison et al. 2001a: 1). However, since the main emphasis of this research is on post-conflict reconstruction, this section focuses on the role of finance and financial inclusion in post-war situations. Therefore, the following section briefly discusses effects of conflict on the financial system before explaining why financial inclusion plays an important role in post-conflict reconstruction.

The 2017 Global Findex Report shows that 1.7 billion people are still lacking access to a formal financial system (Demirguc-Kunt et al. 2018: 4). The majority of the unbanked lives in developing countries (Demirguc-Kunt et al. 2018: 4) and most importantly, conflict-affected countries show the lowest levels of financial inclusion (Demirguc-Kunt et al. 2013a: 1). Based on the Global Findex database of 2011, just 15% of adults in fragile and conflict affected states report the ownership of an official bank account (Demirguc-Kunt et al. 2013a: 1). This trend can be explained with a variety of factors, the most important of which are presented in the following section.

3.3.1 The Impact of Conflict on Financial Systems

As discussed above, conflict adversely affects the economy by reducing growth and exacerbating poverty. As part of this, conflict leads to the destruction of the financial sector which can include the destruction and looting of financial institutions or the shutdown of central banks (Addison et al. 2005: 704). In addition to that, violent outbreaks directly affect financial systems by changing asset preferences which might lead to a decrease in the demand of deposit accounts (Addison et al. 2005). In conflict situations however the financial sector plays a crucial role for households as financial services and money transfers, although often informal, help to avoid falling into poverty (Addison et al. 2005: 709). Information asymmetries as well as the lack of insurance and credit markets prevent financial systems from functioning and bare a high risk of bank's experiencing a substantial increase in debt as well as the risk of collapse (Addison et al. 2005: 710-714). Paradoxically, those living in conflict-affected areas are in particular need of secure saving and payment methods (Demirguc-Kunt et al. 2013a: 1). Furthermore, in times of conflict many depend on money which they receive in form of remittances (Demirguc-Kunt et al. 2013a: 1), thus being able to send and receive money is crucial. Furthermore, access to credit is of considerable higher relevance in conflict-affected countries as opposed to the rest of the developing countries (Demirguc-Kunt et al. 2013a: 5). Loans are commonly taken up as a response to emergencies, health shocks or funerals (Demirguc-Kunt et al. 2013a: 5). However, people living in fragile or conflict affected states are much more likely to borrow from informal sources (Demirguc-Kunt et al. 2013a: 5).

3.3.2 The Importance of Financial Inclusion for Reconstruction

The previous sections of this chapter have analysed the relation of both conflict and financial inclusion and economic development. On the basis of these findings, it is possible to illustrate the role and importance of financial inclusion for post-conflict reconstruction efforts.

It has been established above, that development is both a cause and a consequence of conflict (Hegre 2013). This being said, empirical evidence shows that as a result of conflict, growth in conflict-affected countries reduces significantly (Gates et al. (2012). At the same time, low levels of economic growth increase the risk of conflict (Fearon and Latin 2003). Furthermore, post-conflict societies face a considerably higher risk of experiencing a renewed outbreak of conflict (Collier et al. 2003) – a risk which can be reduced by promoting equitable, pro-poor growth (Murshed 2007:1). The evidence presented above also illustrates that financial inclusion has a positive impact on economic development and promotes an increase of equitable growth by increasing access to financial services (Park and Mercado 2015 and Kabakova and Plaksenkov 2018: 199). In addition to that, inequalities which have proven to trigger conflict (Blattman and Miguel 2010: 18) can be reduced by promoting inclusive access to financial services (Cihak et al. 2012: 6 and World Bank 2008: 21). More so, as the lack of access tends to exacerbate existing inequalities (Kabakova and Plaksenkov 2018: 199), reconstruction policies which do not target financial inclusion might fail to prevent renewed conflict. This supports the conclusion that promoting financial inclusion has the potential to prevent the reoccurrence of conflict, ensure economic development and increase the chances of countries to sustain long-term peace. Therefore, it is assumed here that post-conflict reconstruction strategies should pay particular emphasis on targeting and deepening financial inclusion.

3.3.3 Concluding Remarks

Although the literature covers the link between finance and conflict, the relation between financial inclusion and conflict has not received much attention. Previous studies on the link between finance and conflict have found that financial conditions are negatively affected by conflict (Hasan and Murshed 2017: 191) and empirical analyses conducted by Hasan and Murshed (2017) and Addison et al. (2002) found a significant negative impact of armed conflict on financial development. Yet, as stated above, financial development proves no direct evidence for the existence of inclusive financial systems. Therefore, this research aims to contribute to the existing literature by examining the link between financial inclusion and armed conflict.

The theory presented in this chapter suggests financial development plays an important role for the success of post-conflict reconstruction efforts. To examine this assumption, the following empirical analysis explores the impact of financial inclusion and armed conflict. The objective of this analysis is to gain a better understanding of the link between financial inclusion and conflict. It is based on the notion that an adverse impact of conflict on financial inclusion supports the assumption that post-conflict reconstruction efforts should target widespread and inclusive access to financial services.

Chapter 4 Literature Review

The following section provides an overview of literature and research findings on the main underlying concepts of this analysis. Given its relatively recent rise in popularity, research on financial inclusion is still infant and often intertwined with findings on financial development (Kim, Yu and Hassan 2018: 3). Moreover, there is little literature focusing on the relationship between post-conflict reconstruction and financial inclusion in particular. This is why the following sections give a brief and general overview of existing literature that involves the main topics of this research paper. The first section presents the main findings on literature examining the determinants of financial inclusion. This is followed by the second part demonstrating an overview of research linking financial development or financial inclusion to development. The third part then presents literature focusing on the relation between finance and post-conflict reconstruction.

4.1 Financial Inclusion

The focus of literature on financial inclusion has shifted throughout the last decades. While the concept of financial inclusion gained popularity in the late 1990s, research then focused mainly on the concept in terms of exclusion as well as its definition⁶ (Kim, Yu and Hassan 2018: 2). Since then, existing literature focused mainly on the determinants of financial inclusion, its measures, progress⁷, and link to economic development (Kim, Yu and Hassan 2018: 2 and Kabakova and Plaksenkov 2018: 199). The latter, however, examines the impact of both financial development and financial inclusion, and given the connection of the two concepts it is not always possible to make a clear distinction between their effects on development (Kim, Yu and Hassan 2018: 2). Lastly, literature on financial inclusion also encompasses several case studies which attracted attention in recent years. This niche of research evaluates the experience of projects, policies and business cases in the field of financial inclusion and attracted most attention for publications on mobile money such as Kenya's M-Pesa⁸ (Kabakova and Plaksenkov 2018: 199).

It is important to note that as a relatively new phenomenon, only a small body of empirical research on financial inclusion exists due to the limited availability of data (Kabakova and Plaksenkov 2018: 204). Given this restriction, the literature review includes papers with differing research emphases. However, the following section focuses on the two aspects of literature which are most relevant for this analysis – determinants of financial inclusion and impact on economic development.

⁶ See Dev (2006)

⁷ See also Bayero (2015).

4.1.1 Determinants of Financial Inclusion

Focusing on the Middle East and North Africa (MENA) region, Pearce (2011) analyses the regions financial systems and examines factors restricting the access to financial services. The main findings of the author suggest enhancing supervisory frameworks which contain strategies for both the public and the private sector. According to the author, this is necessary in order to be able to enhance inclusiveness of financial systems in the area.

Allen, Demirguc-Kunt, Klapper and Peria (2012) identify factors which decrease barriers impeding the access to financial services. Focusing on the use of bank accounts, the authors conduct a study based on a big data set containing information for 123 countries. Their findings suggest that increasing financial inclusion requires to reduce costs for financial services as well as simplifying documentation requirements.

In addition to the presented literature, several studies also examine the influence of socio-economic factors on financial inclusion. Although focusing their research on OECD countries, Van der Werff, Horath and Peach (2013) find interesting results which create valuable implications for research on developing countries. The authors investigate the relation of financial inclusion and social factors by using the World Bank's Global Findex Database on 31 countries. Their findings suggest that income inequality negatively affects efforts to build inclusive financial systems. Furthermore, low levels of trust in formal systems and the government adversely affect financial inclusion in OECD countries.

Kabakova and Plaksenkov (2018) conduct related research by analyzing the determinants of financial inclusion from an ecosystem perspective, focusing on developing countries. As a part of that, the authors apply a fsQCA for 43 countries to identify ecosystem factors which enhance or impede financial inclusion. The study reveals three configurations with a significant influence on financial inclusion. These refer to the combination of high political and socio-economic factors while missing economic development, as well as the combination of high economical, technological and social factors in the absence of political development and lastly the combination of economic and political factors, missing technological and social development. The applied framework allows to analyze the specific environmental characteristics, responsible for inclusive financial systems or the lack thereof. Findings suggest that policies must consider country-specific characteristics and involve multiple dimensions – social, political, economic and digital, as introduced by the authors. Furthermore, results of the study are in line with previous research suggesting that financial inclusion depends heavily on social welfare, economic performance and efficient legislative frameworks.

4.1.2 Impact on Development

There is an extensive body of literature analyzing the importance of financial development for growth. Due to the limited research on financial inclusion, this section presents a brief overview on findings, presented by studies focusing on the relation of financial development and economic development. The second part of this section continues by introducing several studies with a focus on the link between development and financial inclusion in particular.

Financial Development

In their paper on the causal relationship between financial development and economic growth in Pakistan, Malik, Hayee and Adeel (2018) conduct a time series analysis and find evidence for an impact of financial development on growth but not vice versa. For their analysis the authors use several measures of financial development such as domestic credit to private sector by banks as a share of GDP, bank deposits as share of GDP, Stock Market Capitalization to GDP as well as private sector credit by deposit money banks and other financial institutions to GDP, while growth is measured by GDP. Although not considering a cross-country analysis, this paper is of interest for this literature review as it conducts its research on financial development in the country of Pakistan which has experienced conflict and violent turmoil repeatedly throughout the last decades.

Similarly, Hassan, Sanchez and Yu (2011) conduct a panel data analysis in order to assess the impact of financial development on economic growth in low and middle-income countries. In addition to their analysis the authors examine the different measures of financial development. This is done to detect which factors play the most important role in regard to the impact on growth. Although the authors find evidence for a positive link between financial development and growth, their results also suggest the importance of institutional factors, in order for developing countries to achieve growth.

Although consistent in their results, findings from this field of research have to be assessed critically as Adu, Marbuah and Mensah (2013) indicate in their paper on the measurement of financial development when assessing its impact on growth. Conducting a cross-country analysis with eight different proxies for financial development, the authors find that results are sensitive to the respective measures. While they find positive results on growth for financial development measures such as credit to the private sector as share of GDP or the total domestic credit, other measures such as the ratio of broad money stock to GDP lack significance.

Financial Inclusion

Sarma and Pais (2011), conduct research to identify factors influencing financial inclusion by making use of the Index for Financial Inclusion (FII) and applying a cross-country study. The authors focus their research on the link between financial inclusion and human development and find evidence for a strong positive correlation. In addition to that, the results of their analysis identify literacy, inequality, income and urbanization as influential factors of financial inclusion. Interestingly, the authors also find that infrastructure in terms of phones and internet play a crucial role for the development of financially inclusive systems (Sarma and Pais 2011).

Pradhan, Arvin, Norman, Nair and Hall (2016) test the link between financial inclusion and growth, using insurance market penetration as a proxy for financial inclusion. The authors examine the granger causality of the relationship on stock-market capitalization and broad money with economic growth. Using panel data for ASEAN Regional Forum countries covering the period of 1988 until 2012 and a multivariate framework, they find evidence for cointegration and causal links between variables thus supporting the hypothesis that financial inclusion and economic growth are related.

Kim, Dai-Won and Yu (2018) make use of a panel data set covering 55 OIC countries to test the link between financial inclusion and growth by conducting a panel VAR and Granger Causality tests in addition to their dynamic panel estimation. The authors find significant evidence for a positive impact of financial inclusion on growth. However, results also indicate a reciprocal relationship between the two concepts.

Dabla-Norris, Ji, Townsend and Unsal (2015) develop a general equilibrium model with heterogeneous agents to identify barriers to financial inclusion. The authors therefore contribute to the literature by establishing a theoretical model, testing the impact of financial inclusion on inequality and GDP. Distinguishing financial inclusion aspects between access, efficiency and depth, the authors are able to show that GDP and inequality are directly affected by financial inclusion, yet the impact differs depending on country-specifics and in regard to the different dimension of financial inclusion. As a result, the authors conclude that policies targeting the deepening of financial inclusion must account not only for specific country characteristics but also for the different dimensions.

4.2 Finance and Post-Conflict Reconstruction

Besides the broad consensus on a significant relation of financial development and inclusion with economic development as established above, this presented field of research is met by a growing body of literature looking into the specific relationship of finance and growth in post-conflict economies. However, since research on this topic is still limited the following section presents findings on financial development, based on the notion that findings on the relation between financial development and conflict provide a valuable insight for the following analysis.

Addison, Chowdhury and Murshed (2002) develop a theoretical model to test the impact of conflict on financial development. The authors argue that effects of conflict such as poor quality of governance or reduced demand for domestic currency, adversely affect the efficiency of financial sector reforms and thus impedes financial development. Applying the model to a data set consisting of 79 countries and conducting a cross section OLS approach, the authors find significant negative results for the impact of conflict on financial development.

Hasan and Murshed (2017) present evidence from a cross-country analysis on the harmful impact of armed conflict on financial development. The authors build on the previous study by Addison, Chowdhury and Murshed (2002) and aim to account for several of its limitations by accounting for country heterogeneity or controlling for fixed effects. In addition to the fixed effects panel regression, the authors also conduct a GMM model to account for potential endogeneity problems of growth and conflict. Measuring financial development in terms of financial depth, they find a significant negative effect of high-intensity conflict on financial development. This paper thus supports the assumption that conflict and finance are related and more importantly provides robust significant evidence for a hampering effect of conflict on financial depth. The findings presented by the authors suggest that financial development is a crucial determinant for tackling poverty and decreasing inequality in post-conflict economies.

Reviewing the literature on financial development and conflict, there appears to be a lack of research on the specific link between inclusive financial systems and conflict. This research aims to contribute to this field of research by examining the impact of armed conflict on financial inclusion.

Chapter 5 Empirical Strategy

In recent years, the understanding and measurement of financial inclusion as well as the broader concept of financial development have considerably changed. Prior to the introduction of a multi-dimensional framework by Cihak et al. (2012), financial inclusion was assessed by making use of measures that would rather test financial development in general, than addressing the specific determinants of inclusion (Toxopeus and Lesinki 2007: 49). This analysis thus aims to account for the multidimensional nature of the concept by using different indicators to measure financial inclusion. This allows to cover at least two of the three pillars of the financial inclusion concept. The following analysis aims to assess the link between financial inclusion and armed conflict. More specifically, a panel data regression model is applied to examine the impact of armed conflict intensity on different indicators proxying financial inclusion. This is done to create a better understanding of the link between conflict and financial inclusion which is sought to allow for more effective development policies in fragile and conflict-affected areas and thus support peacebuilding efforts.

5.1 Data

The main data set used for this analysis comprises 110 economies covering 28 years (1990 – 2018) and was built by using various data sources. Indicators for financial inclusion have been obtained from the IMF's Financial Access survey and the IMF's Financial Development Index Database. Indicators for conflict stem from the Uppsala Conflict Data Program (UCDP) and remaining control variables have been taken from the World Bank Development Indicators, as well as the Varieties of Democracy Database.

Four indicators are used to proxy financial inclusion. Bank branches at commercial banks per 100,000 adults (BRANCHES) and ATM's per 100,000 adults (ATMs) are used as indicators for financial access while the number of deposit accounts with commercial banks per 1,000 adults (ACCOUNTS) is used to measure financial usage. In addition to that, a sub-index of the IMF's financial development index – the financial institutions access index (FIA), is used to proxy financial inclusion prior to 2004 (Sviridzenka 2016). This index is computed on the basis of the two indicators of financial access – BRANCHES and ATMs. In due consideration of the many indicators which are of theoretical relevance for research on financial inclusion, the choices made for this analysis were based on the availability of data and coverage in terms of years and countries. All indicators of financial inclusion are assumed to be negatively affected by armed conflict.

Countries included in the data set were selected based on their characteristics as developing countries and their availability of data for the dependent variable. Countries are categorized as *developing* based on the Atlas Classification by the World Bank as of 2017⁹. Developing countries included in the dataset display the classifications of low income, lower middle income and upper middle income. It is important to note that the choice of variables based on data availability demonstrates an important limitation to this analysis. This is the case, as the lack of financial data for certain developing countries might be indicative for their poor financial systems in the first place (Toxopeus and Lesinki 2007: 11). As a result, the sample

⁹ See World Bank (2019b)

could be biased, possibly favoring richer developing countries with better institutional and governmental infrastructure (Toxopeus and Lesinki 2007: 11).

The following analysis consists of two parts, covering a shorter and longer time period. Therefore, two panel datasets were created. This has been done as a response to the limited availability of data on financial inclusion for years prior to 2004. Both panels are based on the main dataset, covering the period from 1990 to 2018, containing 110 countries.

Panel I covers the period of 1990 until 2017 for 100 countries. The number of countries decreases as countries without data for the main dependent variable of this analysis are excluded. Equally, as data for the dependent variable is not available for 2018, the panel only covers the years of 1990 until 2017. Of the 100 countries included in this panel, 66 have been affected by conflict, while the remaining 34 did not experienced conflict in the years between 1990 and 2017. Panel II covers a shorter period of 15 years. Due to the lack of data for indicators of financial inclusion until 2003, this panel covers the period of 2004 until 2018. Countries without data on the dependent variables were excluded, resulting in a panel of 103 countries. Out of the 103 remaining countries in panel II, 52 are considered conflict-affected, thus experienced conflict in the years between 2004 and 2018.

5.2 Summary Statistics

This section gives an overview of the descriptive statistics for the following analysis. It first presents summary statistics for both panels and continues with describing the tables presenting each correlation matrix as well as the results of the t-test.

Summary statistics presented in this section have been conducted for the two underlying panels respectively. The panels cover different time periods, a longer one of 28 years (1990-2017) and a shorter one of 15 year (2004 – 2018). Both panels are unbalanced and contain data on 100 (panel I) and 103 developing countries (panel II).

Summary statistics for panel I are presented in table 1. The main indicator for financial inclusion which is used on the analysis based on panel I is the FIA index. Table 1 shows that with an overall standard deviation of 0.17 and an average value of 0.15, FIA displays considerable variation. Equally, the indicator for armed conflict – conflict intensity, also shows large variation with a mean of 0.30 and overall standard deviation of 0.58. Similarly, other explanatory variables show considerable variation as do the two indicators on mobile phone subscriptions and internet use. The summary statistics for inflation indicate that observations include outliers as the minimum score of -18.10% faces a maximum value of 23773.13%, while the median of the variable lies at 7.57% which is a common value for inflation in developing countries. Summary statistics for panel II are presented in table 2 which can be found in the appendix. For the analysis based on this panel the main indicators are bank branches, ATMs and financial accounts. All three of these financial inclusion measures show large variation. Bank branches per 100.000 adults displays a mean of 11.49 with an overall standard deviation of 12.96 while the mean of ATMs per 100,000 lies at 23.38 and its overall standard deviation at 27.65. Table 2 also shows that with a standard deviation of 706.92 deposit accounts per 1000 adults show an equally large average dispersion around its mean of 721.45. Similarly, the priority variable measuring armed conflict in this panel

shows large variation as well, with a mean value of 0.30 and an overall standard deviation of 0.57. As in panel I, all other explanatory variables also show a considerably high variation.

Table 1: Summary Statistics (Panel I)

Variables	N	Mean	SD	Between SD	Within SD	Min	Max
Financial Institutions Access Index	2800	0.152	0.174	0.148	0.092	0	0.939
Commercial Bank Branches per 100 000 adults	1296	11.183	12.938	12.294	3.312	0.135	92.173
ATMs per 100 000 adults	1157	22.672	27.135	22.917	13.233	0	185.324
Deposit accounts with commercial banks per 1000 adults	842	686.579	702.011	644.004	253.925	1.277	4688.703
GDP pc (log)	2800	7.455	1.034	0.984	0.329	5.101	9.928
Inflation (%)	2800	52.753	518.019	136.687	499.841	-18.108	23773.13
Egalitarian Component Index	2800	0.525	0.167	0.157	0.057	0.064	0.91
Primary School Enrolment	2800	98.059	19.191	14.509	12.641	21.708	165.645
Total Unemployment	2700	8.247	6.607	6.255	2.214	0.285	37.94
Internet Use (%)	2366	11.700	17.344	8.715	15.111	0	80.140
Mobile Cellular Subscriptions	2758	35.207	44.841	16.397	41.955	0	180.493
Armed Conflict Intensity'	2800	0.307	0.583	0.410	0.417	0	2
Conflict-country dummy"	2800	0.67	0.470	0.472	0	0	1

Note: Minimum and maximum refer to overall values.

' Intensity levels have been coded 0, 1 and 2, where 0 = no conflict, 1 = minor armed conflict, and 2 = high level armed conflict/war.

" Conflict country dummy = 1 if country experienced conflict (min. 25 battle-related deaths per year) at least once in the period between 1990 and 2018.

The correlation matrix for each panel is presented in table 3 and 4. Table 3 shows the correlations between variables in panel I. Results presented here support the main assumptions on conflict and financial inclusion which have been elaborated in the previous chapters. The correlation between the FIA index and conflict intensity is negative, yet very small. As expected, control variables like primary school enrolment, GDP per capita, the egalitarian component index are all positively correlated to financial inclusion. Whereas inflation shows a small yet negative correlation with financial inclusion. In contrary to the theory presented above, there seems to be a positive link of unemployment and financial inclusion, while the strong and positive relation between internet use and mobile subscription is supporting the assumptions made above.

Table 3: Correlation Matrix (Panel I)

Variables	FIA-Index	Conflict Intensity	GDPpc	Inflation	EC-Index	School Enrolment	Un-employment	Internet Use	Mobile Subscription
Financial Institutions Access Index	1								
Armed Conflict Intensity'	-0.0994	1							
GDP pc (log)	0.6262	-0.1064	1						
Inflation (%)	-0.0095	0.0280	0.0189	1					
Egalitarian Component Index	0.3179	-0.2083	0.1592	0.0203	1				
Primary School Enrolment	0.1685	-0.0837	0.2037	-0.0092	0.0864	1			
Total Unemployment (%)	0.1435	-0.0632	0.3652	0.0105	0.1115	0.0441	1		
Internet Use (%)	0.6494	-0.0413	0.4922	-0.0710	0.1863	0.1386	0.0481	1	
Mobile Cellular Subscriptions	0.5414	-0.0700	0.4181	-0.0960	0.1460	0.2030	0.0371	0.7951	1

' Intensity levels have been coded 0, 1 and 2, where 0 = no conflict, 1 = minor armed conflict, and 2 = high level armed conflict/war.

The correlation matrix for panel II is presented in table 4 and can be found in the appendix. It shows similar findings which are presented in table 4. Results presented here show that armed conflict is negatively correlated to the two indicators of financial access. However, table 4 shows a positive correlation of conflict and financial accounts. Equally surprising, the control variable primary school enrolment seems to be negatively linked to the indicators of financial inclusion and financial inclusion seems to vary according to the respective indicator. Other explanatory variables like GDP per capita and the egalitarian component index show a positive correlation with the three measures of financial inclusion, while the correlation of financial inclusion with inflation is negative.

Finally, results of the t-test conducted for each panel are presented in table 5 and 6 which can both be found in the appendix. For this, each panel has been collapsed to the country level and individual t-test have been conducted to examine potential differences of financial inclusion indicators when comparing affected and non-conflict affected countries. Results for the test on each test vary and lead to different findings. As illustrated in table 6 the only significant difference in means can be found for the number of ATMs per 100,000, thus one of the financial access measures. The t-test on panel II however, presented in table 5 finds a significant difference for several variables, comparing the means of countries with and without conflict. Here, the null-hypothesis that the difference in means equals zero can be rejected for the FIA-index, the number of bank branches, the number of ATMs and both indicators for technological infrastructure, mobile subscriptions and internet use. The test, however, finds no significant difference between countries for financial accounts. This test aims to give a first impression examination of the hypothesis that financial inclusion in fragile and conflict affected states differs considerably from other non-affected developing countries. As results from both panels hint towards the negative impact of conflict on financial inclusion but are inconclusive, the next chapter now presents the results of the fixed effects panel data regression which was conducted to test this hypothesis.

5.3 Econometric Model

A fixed effects panel data regression model is applied to examine the impact of armed conflict on financial inclusion. This decision was based on several factors and a review of related literature. A similar econometric specification has been used by Hasan and Murshed (2017) who tested the impact of armed conflict on measures of financial development. The model applies a fixed effects regression to account for unobserved effects and heterogeneity which would result in biased estimates (Wooldridge 2001: 251). Before applying the model, a Hausman was conducted in order to decide between a random and fixed effects model, testing which model has the better fit (Wooldridge 2001: 288-290). Results of the test were inconclusive, thus the null hypothesis of no difference between the models could not be rejected. However, random effects regressions show no considerable difference compared to results of a fixed effects model. Therefore, a fixed effect model was chosen, considering the need to account for specific and unobservable country characteristics. As a popular tool for panel data, fixed effects models allow to control for country specific characteristics which are unobservable (Wooldridge 2001: 251). Equally, the model enables to account for time fixed effects. Both allow to exclude unobserved effects from the error term and therefore make it possible to reduce the bias (Hasan and Murshed 2017: 191 and Wooldridge 2001: 251).

The econometric specification of this fixed effects model consists of an indicator measuring financial inclusion, the main independent variable of interest, armed conflict and a set of control variables which were selected based on a literature survey of research on financial inclusion and financial development. In addition to that, a lagged version of the dependent indicator has been included in the model. Including the lag bears the risk of a potential endogeneity issues and could generate a negative bias of coefficient estimates (Wilkins 2018: 393). However, the lag has been included to generate more robust results and control for partial adjustments, hence the development of financial inclusion prior to conflict (Hasan and Murshed 2017: 191 and Wilkins 2018: 393).

The model is specified as follows:

$$\begin{aligned} \text{FINC}_{it} = & \beta_0 + \beta_1 \text{ConflictIntensity}_{i,t} + \beta_2 \log \text{GDPpc}_{i,t} + \beta_3 \text{Inflation}_{i,t} \\ & + \beta_4 \text{EgalitarianComponentIndex}_{i,t} + \beta_5 \text{SchoolEnrolment}_{i,t} + \beta_6 \text{Unemployment}_{i,t} \\ & + \beta_7 \text{FD}_{i,t-1} + \gamma_t + \nu_i + \epsilon_{it} \end{aligned}$$

In this economic specification, FINC denotes the measures of financial inclusion - FIA, BRANCHES, ATM or ACCOUNTS which are discussed in detail in the following section. Armed conflict is the key variable of interest in this analysis and is proxied by a categorical variable indicating the level of conflict intensity. Additionally, several other explanatory variables are included in order to control for their impact on financial inclusion. First, the model controls for wealth and income effects by including real GDP per capita (Toxopeus and Lesinki 2007: 13). The underlying assumption suggests that financial systems of poorer countries are less developed and thus higher income or economic growth generates greater financial development (Hasan and Murshed 2017: 192). Higher GDP per capita is also understood to improve access to financial services (Toxopeus and Lesinki 2007: 13). This is the case, as financial institutions in richer countries usually have more efficient institutions (Addison, Chowdhury and Murshed 2002: 7). In addition to having a positive impact on financial development in general, Park and Mercado (2015) argue that GDP per capita

directly affects financial inclusion as it reduces barriers excluding low-income households from the financial sector by enabling their utilization of financial services (Park and Mercado 2015: 9 and Le et al. 2019: 1107).

As another macroeconomic control variable, inflation is also included since it is commonly used to control for macroeconomic stability (Ardic et al. 2011: 8). However, findings on the link of inflation and financial inclusion are mixed. Hasan and Murshed (2017) point towards the negative impact of inflation on saving behavior, as lower returns decrease the appeal of investing and saving money. This in turn translates to a negative effect on financial development (Hasan and Murshed 2017: 192 and Almarzoqi, Naceur and Akshav 2015: 10). Testing this in respect to financial inclusion, Ardic, Heimann and Mylenko (2011) find that inflation only reduces the actual amount of deposits, yet they find no evidence for a negative impact of inflation on the uptake of financial accounts (Ardic et al. 2011: 8). This suggests that while inflation adversely affects the amount of money stored in accounts, it might not influence the actual decision to open an account (Ardic et al. 2011: 8). Nonetheless, there is broad scholarly consensus that macroeconomic stability is a crucial factor for well-functioning financial systems and their sustainable development as well an essential prerequisite for ensuring inclusive access (Almarzoqi, Naceur and Akshav 2015: 10 and Ardic et al. 2011: 9). Therefore, inflation is included in this analysis to control for potential negative impacts on financial inclusion.

The model includes a control variable for the level of egalitarian democracy proxied by the egalitarian component index. This builds on the notion that systems of egalitarian democracy must ensure the protection of rights as well as equal distribution of resources for all social groups (Sigman and Lindberg 2015: 1). As such, the index is included in the model to account for inequality and institutional mechanism which could adversely affect financial inclusion (Sigman and Lindberg 2015: 9). Additionally, the model controls for socio-economic factors by including primary school enrolment and unemployment. Primary school enrolment is included as a proxy for literacy which is sought to have a positive influence on financial inclusion by increasing the access to financial services (Park and Mercado 2015: 9). As greater literacy enables to examine potential risks and benefits of financial services it increases engagement with the financial sector (Le et al. 2019: 1107). Given the lack of data on literacy rates, primary school enrolment is included in the model as a proxy.

Given the significant findings for a negative relation, a control variable for unemployment is included in the model and assumed to have a negative impact in measures of financial inclusion (Le et al. 2019: 1107). Finally, the last model specification also contains the one-year lag of the respective dependent variable in order to control the model for partial adjustments (Hasan and Murshed 2017: 192). As mentioned above, the model includes country and time fixed effects which are shown here as ν_i and γ_t as well as the error term ϵ_{it} . Furthermore, real GDP per capita is included as a log, which allows for observations to be scaled (Hasan and Murshed 2017: 192).

5.4 Description of Variables

Analysis on financial inclusion faces serious limitations in regard to data availability. Given the more recent increase in popularity of the concept, for most of the indicators which are used to measure the multidimensional nature of financial inclusion, data is only available from the early 2000s. For even more recent concepts such as mobile payment, the collection of broad cross-country data has only started in 2011. Thus, data on the various relevant indicators of financial inclusion is limited and prohibits a truly comprehensive examination. The most commonly used indicators on financial inclusion measure the geographical outreach of financial services. For those, good data coverage for a broad range of countries is available from 2004 onwards. However, when analyzing the impact of armed conflict, the time period from 1990 until 2011 is of particular importance, considering the peak of civil war around 1992 (Blattman and Miguel 2010: 4). In order to examine the impact of armed conflict on financial inclusion, it is therefore crucial to cover both time periods. This analysis addresses the data constraints and resulting problems by using multiple indicators for financial inclusion and two separate panel data sets. In order to account for the lack of data on the main indicators before 2004, the analysis makes use of the IMF index on financial institutions access (FIA) which contains imputed data for the time period of 1990 until 2004. This index is computed on the basis of the two main indicators used in the second part of the analysis, whose original data is then used to conduct the same test for the time period from 2004 until 2018. In order to account for the different pillars of financial inclusion, a third indicator on financial accounts has been included in the second analysis, although data on this indicator is considerably limited. In addition to that, several development countries could not be considered in the analysis as there was little or no data available for the dependent variables.

In order to avoid further reduction of the panel size, missing values of the control variables were treated and replaced with the yearly means of the indicator, resulting in a decrease of the variance. In the following analysis, replacement dummies were included indicating where missing values have been replaced. As a result of this treatment in panel I, 4% of GDP per capita, 2% of the egalitarian component index, 6% of unemployment, 18% of primary school enrolment and 14% of inflation values were replaced. In panel II, 2.5% of GDP per capita, 8% of inflation, 0.5% of the egalitarian component index, 2% of unemployment and 20% of primary school enrolment were replaced.

5.4.1 Dependent Variables

Financial Institutions Access Index (FIA)

The Financial Institutions Access (FIA) index is part of the IMF's financial development index and one of nine sub-indices which aim to provide a more comprehensive measurement of financial development (Svirydzenka 2016: 4). First introduced in 2016, the FIA index measures the accessibility of financial institutions and covers the time period of 1980 until

2018¹⁰ (Svirydzenka 2016). FIA is based on two indicator proxies for financial access - bank branches per 100,000 adults and ATMs per 100,000 adults (Svirydzenka 2016: 7). Due to the lack of data for other relevant indicators, FIA does not take into account any other proxies for financial access (Svirydzenka 2016: 7). However, the data coverage for the two indicators used still faces limitations as broad data coverage is only available from 2004 onwards. To account for the lack of data prior to 2004, the index is calculated based on imputed data which was generated by applying the splicing method (Svirydzenka 2016: 11). To omit the impact of outliers, indicators have been normalized between 0 and 1 as part of a minimum-maximum procedure and then aggregated in a weighted linear average (Svirydzenka 2016: 14-15). Data for this indicator was derived from the IMF's Financial Development Index Database as of 2019.

Number of Commercial Bank Branches per 100,000 adults

Commercial Banks are defined as financial institutions which offer basic financial products and carry out financial services (IMF 2019: 2). The indicator is denoted in terms of population and thus measures the demographic outreach of bank branches (Amidzic et al. 2014: 9). This dependent variable is included as a proxy for financial access and its annual data has been derived from the IMF's Financial Access Survey (FAS) in its version of October 2019.

Number of ATMs per 100,000 adults

Automated teller machines (ATMs) are defined as electromechanically devices which belong to financial institutions and allow clients to conduct financial transactions by making use of an electronic card (IMF 2019: 4). The indicator used in this model describes the access to physical points of financial services and defines the total number of ATMs in terms of population (Amidzic et al. 2014: 9). The dependent variable thus proxies the access to financial services and measures the demographic outreach of financial systems (Amidzic et al. 2014: 9). Data for this indicator stems from the IMF's Financial Access Survey (FAS) in the version of its latest update as of October 2019.

Number of Deposit Accounts per 1000 adults

In addition to the previous dependent variables, the number of accounts measures the actual use of financial systems and is therefore included as a proxy for the usage dimension of financial inclusion (Amidzic et al. 2014: 9). The number of deposit accounts entails savings, demand, checking and time-deposit accounts and is included to proxy the use of financial services (IMF 2019: 8). Data for this indicator has been derived from the IMF's Financial Access Survey (FAS) in its latest version as of October 2019.

¹⁰ The index was developed by Sahay et al. (2015) and prepared for the IMF Staff Discussion Note "Rethinking Financial Deepening: Stability and Growth in Emerging Markets" (Sahay et al. 2015)

5.4.2 Main Explanatory Variable

Armed Conflict Intensity

Throughout this analysis armed conflict is used as the priority variable, testing its impact on various indicators of financial inclusion over time. Data for this indicator was derived from the Uppsala Conflict Data Project (UPDP) database and stems from the UCDP battle-related deaths Dataset, version 19.1 (Pettersson et al. 2019). According to the definition of the UCDP, this analysis defines armed conflict as the use of armed force between two parties, one of which is the government of a state over a contested incompatibility which results in at least 25 battle related deaths per year (Pettersson 2019). The use of armed force is defined as the use of arms by military forces which is causing at least 25 deaths a year, whereas arms refer to any material means of combat (Pettersson 2019). Battle-related deaths are defined as deaths which are directly linked to the conflict and include both military and civilian casualties (Pettersson 2019). For this analysis, armed conflict is proxied by the categorical variable *conflict intensity* which codes armed conflict in three categories – no conflict, minor conflict and war. The threshold used for this categorization is in line with the UCDP’s definition of conflict intensity (Pettersson 2019a). The three categories are thus defined as follows. No conflict is coded with 0 and refers to zero or less than 25 battle-related deaths. Countries experience minor or low intensity armed conflict if conflict results in a minimum of 25 but less than 1000 battle-related deaths per year, which is coded as 1. Armed conflict is defined as war or high-intensity if it results in more than 1000 battle-related deaths per year, coded with 2.

5.4.3 Control Variables

GDP per capita

GDP per capita is included as a control as low financial inclusion can be a result of poor economic performance. Annual data for the indicator has been collected from the World Bank’s World Development Indicator database and measured at current US\$. In the model, GDP per capita is included as a log, which allows for its observations to be scaled (Hasan and Murshed 2017: 192).

Inflation, consumer prices (annual %)

The inflation indicator included in this model is measured by the consumer price index and illustrates the annual percentage change in costs, consuming an average basket of goods and services. Annual data on inflation has been derived from the World Bank’s World Development Indicator database.

The Egalitarian Component Index

The data for the index was derived from the varieties of democracy (V-dem) database, jointly published by the University of Gothenburg and the University of Notre Dame, covering data on 173 countries since 1900 (Sigman and Lindberg 2015: 9). The egalitarian component index provides a measure for democracy, based on a new conceptualization which entails the aspect of inequality (Sigman and Lindberg 2015). As such, the index builds on the understanding that egalitarian democracy requires all social groups to be equally capable of participating in the democratic process and thus being able to exercise their rights and freedoms (Sigman and Lindberg 2015: 1). This in turn, requires ensuring both equal protection of rights as well as the equal distribution of resources (Sigman and Lindberg 2015: 1). As such, the index allows to measure dynamics of inequalities and displays institutional mechanisms limiting participation of the marginalized (Sigman and Lindberg 2015: 9). The index measures the level of egalitarian democracy from low to high (0-1) (Coppedge et al. 2015: 50). A higher level of the index thus indicates lower levels of inequality (Coppedge et al. 2015: 50).

Primary School Enrolment (% Gross)

The indicator of primary school enrolment is included in the model as a proxy for literacy. It denotes a ratio of total enrolment to age group that officially corresponds to primary school level. Here, primary education is considered teaching basic reading, writing and mathematics skills. Data stems from the World Bank's WDI Database.

Total Unemployment (% of total labor force)

An indicator for unemployment is included to control for its impact on financial inclusion, since studies have found significant evidence for this relation (Le et al. 2019: 1107). The annual data has been collected from the World Bank's WDI database. The indicator is a modeled estimate of the ILO and describes the share of labor seeking individuals that are without employment.

5.4.4 Other Explanatory Variables

Mobile cellular subscription (per 100 people)

The indicator on mobile phone subscription is included for the second part of the research and describes all subscriptions to public mobile phone services, including all postpaid and active prepaid accounts. The indicator is used to test whether technology can mitigate the negative impact of conflict on financial inclusion in developing countries. Annual data for this indicator stems from the World Bank's WDI database.

Individuals using the Internet (% of population)

This indicator considers individuals who have used the internet in the last three months. Data has been collected from the World Bank's World Development Indicator Database and is used to examine the influence of internet usage on financial inclusion in conflict-affected states.

5.4 Hypotheses

Based on the data described above, the analysis tests several hypotheses. These are as follows:

- H1: *Armed conflict has a negative impact on the financial inclusion of a country.*
- H2: *Higher conflict intensity has a more negative impact on financial inclusion.*
- H3: *Access to financial services and Use of financial services are equally negatively affected by conflict.*
- H4: *Mobile technologies can mitigate the adverse effects of conflict on financial inclusion.*

The following chapter presents results and a discussion of hypothesis 1 – 3. To test the fourth hypothesis on the impact of mobile technology, a brief analysis is conducted in chapter 7.

Chapter 6 Results and Discussion

6.1 Results

6.1.1 Panel I Analysis

Table 7 presents the findings of the first analysis conducted with Panel I for the time period covering the years 1990 until 2017.

Results shown in table 7 were generated by conducting fixed effect regressions on the intensity of armed conflict and the financial institutions access index (FIA). Applying this fixed effect panel data model allows to control for country and time specific effects and thus enables to decrease the omitted variable bias by controlling for unobservable influences on financial inclusion (Wooldridge 2001: 251). Table 7 presents the results of five specifications. As reported in the table, only specification 1 and 4 find a significant impact of armed conflict on FIA. Without controlling for any of the explanatory variables, results of specification 1 show that high intensity conflict (war) significantly decreases the index of financial inclusion by 0.027 points, as opposed to not having any conflict. While the models in specification 3 and 4 control for macroeconomic and institutional factors, they do not find any significant results on the impact of armed conflict. The model of specification 4 however shows that compared to not having conflict, major conflict decreases the FIA index by 0.030 points - a result which is significant at the 5% level. As a level of comparison, the sample mean of FIA is indicated in the table. It shows that relatively to the mean, the reduction of FIA is small. The significance of this adverse impact of conflict on the indicator of financial inclusion disappears, if a lagged dependent variable is included in specification 5. Coefficients for the log of GDP per capita are positive and significant at the 1% level throughout specification 1-4 and support the assumption that income effects and wealth have a positive influence on financial inclusion. Model 4 thus finds that a one percent increase in GDP per capita, increases the FIA index by 0.039 points

Table 7 : Fixed Effects Model on Financial Inclusion (Panel I 1990-2017)

Variables	Financial Institutions Access - Index				
	(0.152)				
	<i>full sample mean for reference</i>				
	(1)	(2)	(3)	(4)	(5)
<i>Conflict Intensity'</i>					
Minor Conflict	- 0.009 (0.011)	- 0.005 (0.010)	-0.005 (0.010)	-0.010 (0.010)	-0.002 (0.002)
Major Conflict/ War	- 0.027 * (0.013)	- 0.017 (0.012)	-0.016 (0.012)	-0.030 ** (0.012)	-0.004 (0.003)
<i>Macroeconomic Controls</i>					
GDP pc (log)		0.050 * (0.025)	0.049 * (0.025)	0.044 * (0.025)	0.004 (0.002)
Inflation (%)		-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.00)	0.000 (0.000)
<i>Inequality Controls</i>					
Egalitarian Component Index			0.006 (0.072)	0.035 (0.068)	0.026 ** (0.012)
<i>Socio-Economic Controls</i>					
Primary School Enrolment				-0.001 *** (0.00)	-0.000 *** (0.000)
Total Unemployment (%)				0.004 ** (0.001)	0.000 (0.000)
FIA (lag)					0.950 *** (0.029)
Constant	0.076 *** (0.012)	- 0.271 (0.187)	-0.272 (0.189)	-0.152 (1.192)	-0.013 (0.025)
Observations	2800	2800	2800	2700	2700
R-squared					
Within	0.428	0.455	0.455	0.502	0.927
Between	0.009	0.438	0.439	0.296	0.996
Overall	0.124	0.399	0.399	0.340	0.976
Number of Countries	100	100	100	100	100

Notes: Robust standard errors are clustered by country and reported on parenthesis. All fixed effect specifications include time dummies which are not presented in the table. In Specification (4) and (5), the unemployment indicator has no data for 1990, therefore the observations reduce to 2700.

' Conflict Intensity Dummy: Reference group = 0: no conflict

Significance levels: ***p<0.01; **p<0.05; *p<0.1.

6.1.2 Panel II Analysis

Tables 8-10 present the results of the regressions conducted for the second analysis which is based on Panel II covering a shorter period of 15 years.

Table 8 presents the results of the fixed effects regression of conflict intensity on bank branches per 100 000 adults (BRANCHES). This analysis finds significant evidence that armed conflict decreases the number of commercial bank branches. All models of specification 1 to 4 find a negative impact of armed conflict on BRANCHES which is significant at the 5% level for minor conflicts, and highly significant at the 1% level for high intensity conflict or war. Specification 4 which controls for macroeconomic, institutional and socio-economic factors finds that high intensity conflict decreases the number of bank branches per 100,000 adults by 1.10, while minor conflict results in a decrease by 0.59. Interpreting these findings is facilitating by comparing them with the full sample mean of bank branches, which is 11.49. This suggest that the negative impact found here is relatively small.

After controlling for the lag of the dependent variable in specification 5, results are no longer significant, and the conflict coefficient becomes considerably smaller. Similar to the results in the previous table, findings of the first four specifications on GDP per capita show significant evidence for a positive impact on bank branches, as a 1% increase in GDP per capita in model 4 increases the number of bank branches by 0.0297, per 100,000 adults. Nevertheless, these results are only significant at the 1% level and significance disappears once the lag of the dependent variable is included in model 5. The analysis on BRANCHES also finds no significant results for an impact of inflation, the egalitarian component index or unemployment on the financial inclusion indicator.

Table 9 presents the results of the panel II analysis on ATMs per 100,000 adults. Specification 1 which does not include control variables, finds significant evidence for a decline of ATMs due to war, as it indicates a decrease of 5.81. As the sample mean of ATMs for non-conflict affected countries is 28.06, results indicate a decrease in ATMs per 100,000 adults by 2 percentage points.

Including control variables, the model finds an impact of minor armed conflict in specification 2 and 3, which is significant at the 5% level. Results of specification 4 show a negative impact of minor conflict on ATMs which is significant at the 1% level. Specification 4 thus finds that minor conflict leads decreases the number of ATMs per 100,000 people by 4.29. This impact holds in model 4 where it shows that compared to not experiencing conflict, low intensity conflict decreases the number of ATMs by 4.43. As in the previous analyses, including the lag of the ATM indicator as an explanatory variable renders conflict estimates insignificant.

Table 8: Fixed Effects Model on Financial Access (Panel II 2004-2018)

Variables	Bank Branches per 100 000 adults				
	(1)	(2)	(3)	(4)	(5)
<i>Conflict Intensity'</i>					
Minor Conflict	-0.751 ** (0.309)	-0.575 ** (0.268)	-0.618 ** (0.275)	-0.590 * (0.300)	0.017 (0.096)
Major Conflict/ War	-1.513 *** (0.349)	-1.111 *** (0.334)	-1.135 *** (0.342)	-1.118 *** (0.391)	-0.096 (0.159)
<i>Macroeconomic Controls</i>					
GDP pc (log)		3.183 * (1.756)	3.221 * (1.764)	2.977 * (1.742)	0.422 (0.368)
Inflation (%)		0.002 (0.006)	0.001 (0.005)	0.002 (0.005)	0.000 (0.001)
<i>Inequality Controls</i>					
Egalitarian Component Index			3.158 (2.998)	3.319 (3.130)	1.103 (0.841)
<i>Socio-economic Controls</i>					
Primary School Enrolment				-0.024 (0.030)	0.013 (0.008)
Total Unemployment (%)				-0.070 (0.154)	-0.047 (0.048)
Branches (lag)					0.856 *** (0.021)
Constant	8.981 *** (0.483)	-14.771 (13.352)	-16.723 (13.182)	-91.422 (138.834)	-3.060 (3.045)
Observations	1425	1425	1425	1425	1322
R-squared					
Within	0.136	0.146	0.148	0.152	0.792
Between	0.038	0.222	0.257	0.261	0.996
Overall	0.023	0.213	0.243	0.243	0.983
Number of Countries	103	103	103	103	103

Notes: Robust standard errors are clustered by country and reported on parenthesis. All fixed effect specifications include time dummies which are not presented in the table. In Specification (5), including a one-year lag of BRANCHES decreases the amount of years and therefore reduces the observation to 1322.

' Conflict Intensity Dummy: Reference group = 0: no conflict

Significance levels: ***p<0.01; **p<0.05; *p<0.1.

Table 9: Fixed Effects Model on Financial Access (Panel II 2004-2018)

Variables	ATMs per 100 000 adults				
	(1)	(2)	(3)	(4)	(5)
<i>Conflict Intensity'</i>					
Minor Conflict	-4.834 ** (1.965)	-4.342 ** (1.883)	-4.296 ** (1.875)	-4.435 ** (1.832)	-0.716 (0.503)
Major Conflict/ War	-5.813 * (3.249)	-4.558 (3.392)	-4.552 (3.378)	-4.626 (3.120)	-1.357 (0.919)
<i>Macroeconomic Controls</i>					
GDP pc (log)		9.437 (6.892)	9.349 (6.889)	7.630 (6.750)	1.972 (1.444)
Inflation (%)		-0.011 (0.022)	-0.012 (0.023)	-0.005 (0.022)	0.003 (0.005)
<i>Inequality Controls</i>					
Egalitarian Component Index			-6.928 (12.203)	-6.010 (12.461)	3.501 (2.308)
<i>Socio-economic Controls</i>					
Primary School Enrolment				-0.028 ** (0.072)	-0.018 (0.019)
Total Unemployment (%)				0.149 (0.435)	-0.034 (0.085)
ATM (lag)					0.901 *** (0.014)
Constant	7.885 *** (2.337)	-63.384 (51.872)	-59.025 (53.164)	-26.682 *** (52.382)	-12.118 (10.910)
Observations	1305	1305	1305	1305	1202
R-squared					
Within	0.425	0.432	0.432	0.444	0.930
Between	0.000	0.428	0.396	0.311	0.992
Overall	0.090	0.412	0.388	0.329	0.979
Number of Countries	102	102	102	102	102

Notes: Robust standard errors are clustered by country and reported on parenthesis. All fixed effect specifications include time dummies which are not presented in the table. In Specification (5), including a one-year lag of ATMs decreases the amount of years and therefore reduces the observation to 1202.

' Conflict Intensity Dummy: Reference group = 0: no conflict

Significance levels: ***p<0.01; **p<0.05; *p<0.1.

Lastly, table 10 presents the findings of the last analysis which tests the impact of armed conflict on the usage of financial services which is measured by the number of deposit accounts at commercial banks per 1000 adults. Here, no significant evidence for a negative impact of conflict intensity could be found for any of models. Surprisingly, including the lag of the dependent variable in model 5 changes the sign of the conflict coefficients, yet these results remain insignificant. Even a closer look at the p-values does not change this impression, as p-values in all specifications are 0.4. Significant results are found for a positive impact of GDP per capita growth, suggesting that an 1% increase in GDP increases the number of deposit accounts, by 6.32 accounts per 1000 adults, as presented in specification (4). Table 10 also presents significant results on inflation which are denoted as positive and considerably bigger than in the previous analyses, yet only significant to the 10% level in specification 4 and 5.

Table 10: Fixed Effects Model on Financial Usage (Panel II 2004-2018)

Variables	Deposit Accounts per 1000 adults				
	(1)	(2)	(3)	(4)	(5)
<i>Conflict Intensity*</i>					
Minor Conflict	-57.556 (97.367)	-37.653 (88.171)	-37.145 (88.348)	-39.927 (87.070)	14.716 (17.876)
Major Conflict/ War	-133.801 (156.447)	-79.267 (139.126)	-82.532 (133.910)	-79.664 (128.249)	6.038 (34.333)
<i>Macroeconomic Controls</i>					
GDP pc (log)		663.104 *** (233.319)	661.78 *** (229.352)	632.763 *** (226.721)	209.739 *** (74.113)
Inflation (%)		0.590 (0.407)	0.544 (0.356)	0.613 * (0.355)	0.259 (0.157)
<i>Inequality Controls</i>					
Egalitarian Component Index			-287.603 (575.096)	-289.113 (571.727)	18.045 (94.769)
<i>Socio-economic Controls</i>					
Primary School Enrolment				-0.841 (1.699)	-0.040 (0.576)
Total Unemployment				7.624 (9.123)	2.238 (2.712)
Account (lag)					0.870 *** (0.036)
Constant	444.932 *** (50.466)	-4544.918 ** (1750.674)	-4382.641 ** (1742.115)	-4131.707 ** (1721.183)	-1517.35 *** (570.668)
Observations	954	954	954	954	876
<i>R-squared</i>					
Within	0.354	0.399	0.401	0.407	0.820
Between	0.001	0.339	0.318	0.316	0.939
Overall	0.046	0.327	0.310	0.311	0.926
Number of Countries	77	77	77	77	77

Notes: Robust standard errors are clustered by country and reported on parenthesis. All fixed effect specifications include time dummies which are not presented in the table. In Specification (5), including a one-year lag of ACCOUNTS decreases the amount of years and therefore reduces the observation to 876.

' Conflict Intensity Dummy: Reference group = 0: no conflict

Significance levels: ***p<0.01; **p<0.05; *p<0.1.

6.2 Discussion of Results

The findings presented in the previous chapter show a significant impact of armed conflict on financial inclusion. This provides important implications for post-conflict reconstruction efforts as it proves that financial inclusion plays a significant role in the dynamics of conflict and development. It shows that economies which are already suffering from low levels of inclusion and weak financial systems are further jeopardized and thus fail to escape insecurity. Therefore, the results support the first hypothesis and show that armed conflict negatively affects financial inclusion. The findings are in line with results found by Hasan and Murshed (2017) as they test the impact of armed conflict on financial development.

The second hypothesis assumes that the negative impact on financial inclusion enhances as conflict intensifies. This assumption was made based on reviewing the literature and following the notion that a higher intensity of conflict implies more destruction and thus a stronger impact on financial inclusion. However, this is only supported by the results in table 8, where the model finds a significant impact of conflict on the number of bank branches which increases with rising intensity both in terms of magnitude and significance. Yet, the same trend does not show in the findings for the other two models. The analysis covering the longer time period, based on panel I find significant results only for high intensity conflict however, significance and magnitude of coefficients vary as more variables are controlled for and show no clear trend. What can be observed from the magnitudes of estimators, is that although not significant, the impact of war seems to be bigger, as compared to the impact for minor conflict. Furthermore, results presented in table 9 show the opposite trend as the results on an impact of conflict on ATMs are only significant for minor conflict, while similar on magnitude.

Results of the analysis conducted on panel II are presented in table 7 also allow to compare the impact of conflict on different measures for financial inclusion. The findings show that access, measured by the number of bank branches is affected the most. On the contrary the analysis finds no significant impact of conflict on deposit accounts. This is surprising, given that in situations of conflict, the demand for deposit accounts is commonly expected to decrease as a response to weak state capacity and insecurity (Addison et al. 2005 and Addison et al. 2002). Results find a significant impact of conflict, only for proxies of the access to financial services but not for measure of actual use. However, it is important to point out that the explanatory power of this is limited given that in times of conflict people often make use of informal alternatives (Demirguc-Kunt et al. 2013a: 5 and Addison et al. 2005: 709). Since, due to the limited availability of data, this analysis is restricted to formal financial institutions the lack of significant findings for an impact on the use of financial services must not imply its absence.

Finally, all four regression models display a loss of significance as a lag of the dependent variable is included to control for the state of the financial indicators prior to conflict. In all four regression, the impact of the previous year is highly significant while rendering the coefficient of conflict insignificant. However, the decrease of significance for conflict coefficients after including lags is in line with previous research findings¹¹. It is thus assumed that the lack of significance in specification 5 does not imply the absence of an effect. More so, a closer examination of the respective p-values shows that in some cases they seem to

¹¹ See for example Hasan and Murshed (2017).

remain relatively low, albeit losing significance.¹² Based on this, it is assumed that the findings imply financial inclusion to follow a random walk while affected by shocks which stem from trends in conflict (Charles and Darne 2010).

Furthermore, findings show that the impact of GDP per capita growth positively affects financial inclusion, which is in line with previous studies as presented above.

6.3 Limitations

The analysis conducted for this research paper faces several limitations and challenges which are discussed in the following.

Addressing the concept of peacebuilding for example constitutes a conceptual challenge as it is defined as a complex nexus of different processes (Schirch 2004). To address this, the analysis approaches peacebuilding solely from an economic perspective by focusing on the aspect of post-conflict reconstruction. Although this limits the implications for peacebuilding as a whole, the decision was made for the sake of conceptual and empirical clarity. In addition to that, empirical evidence suggests that financial inclusion and human development are related (Sarma and Pais 2011), thus implying a link to other pillars of the peacebuilding nexus.

The lack of data on financial inclusion presents another major challenge, as data for most of the financial inclusion indicators is not available prior to 2004. This is of particular relevance in the context of conflict as it requires the assessment of the period starting in 1990. To address this, an index has been used which bases his values for the years between 1990 and 2004 on imputed data. The explanatory power of the results is therefore limited. This lack of data creates additional challenges which result in severe limitations (Kabakova, and Plaksenkov 2018: 204).

For the conducted regression analysis single indicators have been used to measure financial inclusion. However, given the multi-dimensional nature of the concept, a full and comprehensive assessment of financial inclusion would need to consider all dimension. In the best-case scenario, this would imply using an index. However, such an index is not available for the countries and time period covered by the analysis. Furthermore, due to the restricted availability of data on financial inclusion, only two of the three financial inclusion dimensions could be considered.

Given conflict context of this analysis, this is of particular relevance. Due to the limited availability of non-bank and informal data, this analysis focuses only on formal financial institutions, neglecting the aspect of financial markets as well as informal institutions. In the context of conflict, this presents a considerable limitation as people in conflict-affected countries are often forced to turn to informal institutions as a result of insecurity (Demirguc-Kunt et al. 2013a: 5 and Addison et al. 2005: 709). Further research could make use of new data sources to address this shortcoming.

¹² P-values in specification 5 for the regression on BRANCHES are 0.15 for minor conflict and 0.14 for war. Thus, implying a considerable impact of conflict even after including lagged dependent variable.

Chapter 7 Innovation for Peace?

Engaging in the debate around financial inclusion and development inevitably includes discussing the emerging prominence of mobile money innovations (Lashitew et al. 2019: 1201). As part of the broader concept of financial innovation and technology, mobile banking has received an increasing amount of attention over the last years (Lashitew et al. 2019: 1201 and Demirguc-Kunt et al. 2018: 1). Generally, mobile money is understood as financial products which allow to conduct financial transactions with mobile phones (Munyegeera and Matsumoto 2016: 127).

Financial innovation and especially mobile banking are of particular relevance for developing countries as they provide new forms of accessing financial systems and thus serve the many unbanked that still exist and promote economic development (Lashitew et al. 2019: 1201 and Munyegeera and Matsumoto 2016: 127). Due to this, the development of mobile banking has seen an astonishing increase in developing countries throughout the last years.

Lashitew et al. (2019) argue that the importance for financial inclusion and development stems from the fact mobile banking is able to improve efficiency and access to financial systems. As mobile transactions bear less costs and risk, they provide a good alternative to informal systems. As a result, new technologies which provide alternative to formal services are sought ensure a more inclusive access and subsequently promote more sustainable and equitable development (Lashitew et al. 2019: 1201).

In the context of this research paper, it is of particular interest to discuss the meaning of mobile money for conflict-affected countries. In fact, already in 2011 Demirguc-Kunt et al. (2013b) showed that mobile banking can present a valuable alternative to conventional services in conflict affected countries. In 2011, only 15% of the adult population in fragile and conflict affected countries was sought to own an official bank account, as compared to an average of 34% in the rest of the developing world (Demirguc-Kunt et al. 2013b). While these numbers are shockingly low and imply severe constraints for people during times of conflict, 11% of adults in those countries were reported to have used mobile banking (Demirguc-Kunt et al. 2013b). As this might imply an alternative way to cope with consequences of conflict, it may be inferred that financial innovations could play an important role for post-conflict reconstruction efforts aimed to improve growth and development.

This brief discussion on the role of mobile innovations and the findings presented in chapter 6 show that it is of great interest to further assess the link between financial inclusion and conflict by bringing into the equation the aspect of innovation and technology. Therefore, this chapter continues by presenting a small additional analysis which aims to examine whether indicators of technological innovation – mobile phone subscription and internet usage, influence the negative impact of conflict on financial inclusion. The underlying assumption presumes that promoting technological innovation – specifically innovative financial technologies – promotes and strengthens financial inclusion, and thus mitigates the negative impact of conflict.

Based on the data of panel I, fixed effects regressions were conducted, estimating the impact of conflict on bank branches per 100,000 adults, while controlling for the number of mobile phone subscriptions and the share of internet users, respectively. Each regression includes

an interaction term which links conflict intensity to each mobile phone subscriptions and internet use. Interaction terms are included as they allow to estimate whether adding technology proxies positively influences the link between conflict and financial inclusion (Balli and Sorensen 2012). Equation 2 and 3 presents the underlying models. The estimation was conducted, based on data of panel I and results are presented in table 11.

$$(2) \text{ BRANCHES}_{it} = \beta_0 + \beta_1 \text{ConflictIntensity}_{i,t} + \beta_2 \text{Mobile}_{i,t} + \beta_3 \text{ConflictIntensity}_{i,t} * \text{Mobile}_{i,t} + \gamma_t + \nu_i + \varepsilon_{it}$$

$$(3) \text{ BRANCHES}_{it} = \beta_0 + \beta_1 \text{ConflictIntensity}_{i,t} + \beta_2 \text{Internet}_{i,t} + \beta_3 \text{ConflictIntensity}_{i,t} * \text{Internet}_{i,t} + \gamma_t + \nu_i + \varepsilon_{it}$$

In order to calculate the direct effect of the proxies for technological innovation, partial derivatives were applied, and the equations by including the respective means of the innovation indicator as constants (Balli and Sorensen 2012). However, as shown in table 11, coefficients for both interaction terms are negative thus results are inconclusive and show now evidence for a positive, soothing effect of technological innovation. Although this analysis failed to find evidence, supporting the hypothesis that mobile money can positively affect the development in post-conflict society, there is reason to believe that digital and technological innovations can help to promote growth, development and ultimately peace.

This emphasizes the strong need for further research on this topic. As databases have started to collect and provide information on mobile banking and mobile money transactions¹³, future research will be able to conduct the necessary in-depth studies on the potential of new technologies in developing countries and particular its role in conflict-affected states.

¹³ Most prominent example is the World Bank's Global Findex Database, for more see <https://globalfindex.worldbank.org>.

Table 11: Fixed Effects Regression on the Influence of Technological Innovation

Variables	Bank Branches per 100,000 adults	
	(1)	(2)
Conflict Intensity'	-0.048 (0.051)	-0.413 (0.069)
<i>Mobile Phone Penetration</i>		
Mobile Subscription	0.051 *** (0.008)	
Conflict & Mobile	-0.011 * (0.005)	
<i>Internet Coverage</i>		
Internet Use		0.069 * (0.026)
Conflict & Internet		- 0.019 (0.016)
Mean (full sample)	70.58	20.81
Observations	1405	1347
R-squared	0.177	0.227
Number of Countries	103	103

Note: Mean refers to full sample means. (1) shows the full sample mean of Mobile Phone Subscriptions, (2) shows the full sample mean of Internet Use

' Conflict Intensity Dummy: Reference group = 0: no conflict

Significance levels: ***p<0.01; **p<0.05; *p<0.1.

Chapter 8 Conclusion

Financial inclusion has become one of the main concerns of development practitioners in the recent years. Its impact has shown to promote economic growth and reduce as well as inequalities. With that being said, financial inclusion can be seen as a driver of equitable and sustainable development. This research paper has drawn on this notion and examined how financial inclusion is affected by internal armed conflict based on a panel dataset covering the time of 1990-2018 for 103 developing countries. For this, the analysis measured the impact of armed conflict on four indicators – the FIA index, bank branches as well as ATMs per 100,000 adults and deposit accounts per 1000 adults. Results of a fixed effects regression model show that armed conflict has a significant and negative impact on financial inclusion. This provides important implications for post-conflict reconstruction efforts as it proves that financial inclusion plays a significant role in the dynamics of conflict and development. Peacebuilders have to consider this when designing policies for post-conflict recovery.

To build a strong theoretical framework for the empirical analysis, the research paper explores how both financial inclusion and conflict are linked to development. The aim of this is to demonstrate how they can create conditions that facilitate insecurity. On the contrary, exploring how they affect each other demonstrates their potential for inclusive and sustainable development.

The relevance of this topic is further emphasized by discussing its link with new and innovative approaches to development and peacebuilding. Although the limited amount of data inhibits a broad panel data analysis, development efforts should not overlook the potential of innovations. Rather, policies should be targeted at helping developing, and especially conflict-affected countries to leverage the potential offered by new technologies and digital innovations.

8.1 Implications for Future Research

As described above, this analysis faces several restrictions and limitations. Future research addressing these can supplement the findings of this paper and contribute to a more in-depth understanding of the channels linking conflict and financial inclusion. With this being said, subsequent research should address the potential endogeneity issues which results from including the lag of the dependent variable. As shown by Hasan and Murshed (2017), this can be done by applying the system GMM approach and allows for more robust findings. Furthermore, making use of new data sources in the upcoming years will allow for a more comprehensive analysis of financial inclusion. Future research should examine all dimensions of financial inclusion and explore the influence of mobile banking.

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Appendices

Table 2: Summary Statistics (Panel II)

Variables	N	Mean	SD	Between SD	Within SD	Min	Max
Financial Institutions Access Index	1358	0.207	0.204	0.193	0.070	0	0.939
Commercial Bank Branches per 100 000 adults	1425	11.493	12.968	12.298	3.397	0.135	92.173
ATMs per 100 000 adults	1305	23.380	27.653	23.445	13.473	0	185.324
Deposit accounts with commercial banks per 1000 adults	954	721.425	706.920	644.730	270.300	1.277	4688.703
GDP pc (log)	1545	7.654	1.040	1.030	0.174	5.350	9.928
Inflation (%)	1545	7.388	14.321	6.729	12.658	-18.108	379.848
Egalitarian Component Index	1545	0.535	0.1697	0.163	0.0479	0.064	0.91
Primary School Enrolment	1545	103.316	14.535	12.863	6.879	42.138	149.956
Total Unemployment	1545	8.080	6.436	6.297	1.459	0.273	32.973
Internet Use (%)	1437	20.810	20.494	16.270	13.743	0.0243	89.443
Mobile Cellular Subscriptions	1515	70.581	43.059	29.279	31.790	0.190	207.751
Armed Conflict Intensity'	1545	0.3055	0.574	0.461	0.345	0	2
Conflict-country dummy"	1545	0.660	0.473	0.475	0	0	1

Note: Minimum and maximum refer to overall values.

' Intensity levels have been coded 0, 1 and 2, where 0 = no conflict, 1 = minor armed conflict, and 2 = high level armed conflict/war.

" Conflict country dummy = 1 if country experienced conflict (min. 25 battle-related deaths per year) at least once in the period between 1990 and 2018.

Table 4: Correlation Matrix (Panel II)

Variables	Bank Branches	ATMs	Accounts	Conflict Intensity	GDPpc	Inflation	EC - Index	School Enrolment	Un- employment	Internet Use	Mobile Subscription
Commercial Bank Branches per 100 000 adults	1										
ATMs per 100 000 adults	0.4479	1									
Deposit accounts with commercial banks per 1000 adults	0.4043	0.7012	1								
Armed Conflict Intensity ¹	-0.1919	-0.0819	0.0415	1							
GDP pc (log)	0.3454	0.6309	0.5179	-0.1312	1						
Inflation (%)	-0.0722	-0.1035	-0.0551	0.0977	-0.1394	1					
Egalitarian Component Index	0.3674	0.3236	0.3087	-0.2018	0.2205	-0.1408	1				
Primary School Enrolment	-0.0883	-0.0243	-0.0703	-0.0313	-0.1880	0.0086	0.0691	1			
Total Unemployment	0.0805	0.1637	0.0967	-0.1532	0.3736	0.0036	0.2178	-0.0800	1		
Internet Use (%)	0.3777	0.6411	0.5799	-0.0391	0.5985	-0.1312	0.2396	-0.0862	0.1357	1	
Mobile Cellular Subscriptions	0.3232	0.6170	0.5299	-0.1052	0.5161	-0.1378	0.1832	0.0101	0.1745	0.6763	1

¹ Intensity levels have been coded 0, 1 and 2, where 0 = no conflict, 1 = minor armed conflict, and 2 = high level armed conflict/war.

Table 5: Financial Inclusion and Technological Coverage between Conflict and Non-Conflict Countries (Panel II)

	Countries	Armed Conflict Countries*			Non-Conflict Countries			T-test (p-value)
		Mean	SD	Obs	Mean	SD	Obs	
Financial Institutions Access Index	97	0.172	0.024	50	0.244	0.030	47	1.85 (0.0660)
Commercial Bank Branches per 100 000 adults	103	8.359	1.196	52	13.944	2.060	51	2.35 (0.0204)
ATMs per 100 000 adults	102	17.491	3.268	50	25.575	3.227	52	1.75 (0.0817)
Deposit accounts with commercial banks per 1000 adults	77	685.386	134.510	36	677.790	73.223	41	-0.05 (0.9593)
Internet Use (%)	103	17.973	2.019	52	24.064	2.444	51	1.92 (0.0571)
Mobile Cellular Subscriptions	103	64.129	3.999	52	76.108	4.025	51	2.11 (0.0373)

* Conflict country dummy = 1 if country experienced conflict (which resulted in a minimum of 25 battle-related deaths per year) in the period between 1990 and 2018.

Table 6: Financial Inclusion and Technological Coverage between Conflict and Non-Conflict Countries (Panel I)

Countries	Armed Conflict Countries*			Non-Conflict Countries			T-test (p-value)
	Mean	SD	Obs	Mean	SD	Obs	
Financial Institutions Access Index	0.140	0.017	66	0.152	0.028	34	1.15 (0.2518)
Commercial Bank Branches per 100 000 adults	9.682	1.244	65	13.205	2.743	33	1.34 (0.1814)
ATMs per 100 000 adults	17.884	2.658	65	26.693	4.418	32	1.80 (0.0749)
Deposit accounts with commercial banks per 1000 adults	651.657	106.451	47	642.015	90.808	26	-0.06 (0.9517)
Internet Use (%)	10.861	1.130	66	12.825	1.318	34	1.06 (0.2881)
Mobile Cellular Subscriptions	33.557	2.075	66	38.929	15.061	34	1.56 (0.1212)

* Conflict country dummy = 1 if country experienced conflict (which resulted in a minimum of 25 battle-related deaths per year) in the period between 1990 and 2018.