The Relationship between Central Banking Independence and the Onset of Civil Conflicts

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Abstract:

Among the often-mentioned causes of civil conflicts are key economic indicators such as GDP growth, oil exports, and per capita income. The field has overlooked an important aspect in their explanation: central banks, as these powerful institutions have not been studied in the literature. Central banks can impact the costs and benefits of igniting a civil conflict depending on the level of independence, lowering or increasing the risk of civil conflict. From this, I propose two hypotheses. To test these hypotheses, we will use data from UCDP/PRIO and CBI measurements from Crowe and Meade (2007) for the years 1980 to 2003. Logistical analysis was used in the statistical analysis. The results support the hypothesis that CBI and the onset of civil conflicts are correlated.
Introduction

The doors of The Riksbank opened in Sweden in 1668, marking the establishment of the world’s first national bank. In its first hundred years, The Riksbank directly financed the War with Denmark in 1675, the Great Northern War of 1700, and the Pomeranian War at the whim of the Swedish Parliament. In 1867, The Riksbank eventually became independent of any political influence, and Sweden became less entangled in military conflicts; in fact, Sweden maintained neutrality in the First and Second World Wars. Liberation of The Riksbank from political influence affected Sweden’s military activities but another question still lingers.

The case with Sweden pertained to interstate war, and after World War II, the nature of war shifted towards intrastate conflicts. In the period from 1945 to 2008, there were 1,958 military conflicts around the world; of that total, 1,718 of these conflicts were intrastate (Lacina & Uriarte 2009; see also Gleditsch et al., 2002). Even when looking at another dataset from the Correlates of War (COW) project, 3.33 million deaths from 25 interstate wars and 16.5 million deaths from 122 intrastate wars occurred from 1945 to 1998 (Ciment & Hill; see also Singer & Small, 1994). Therefore, to speak of wars in the post-WWII era is to speak mostly of civil conflicts. Just as central banking independence (CBI) had an effect on Riksbank, it would be appropriate to study this role in the onset of military conflicts more pertinent to our era, that is, intrastate conflicts. The question is then, what is the relationship between CBI and the onset of civil conflicts?

Past studies have been done on the onset of civil conflict and attempts to explain it in economic terms. One of the most prominent works is Collier and Hoeffler (2002), which found that economic greed is a better predictor of the eruption of civil conflict than political grievances. Similar research has spawned literature that looks at other economic indicators such as oil
exports (de Soya, 2002) and economic shocks (Miguel, Satyanath, & Sergenti, 2004). However, the literature has overlooked the importance of central banks and their independence as the cornerstone of a country’s monetary policy. Lijphart (1999) says, “central banks are key governmental institutions that, compared with other main organs of government, tend to be neglected in political science” (232). It is not just the gap in the literature that this project will be addressing, but rather the attempt to connect central banks and civil conflict. The latter is nonexistent in the current literature.

We will use Crowe and Meade’s measurements (2007) on CBI and the PRIO civil conflict data. Data will be controlled from other factors and analyzed using ordinary logit and rare events logit due to the intrinsic nature of the dataset. CBI and the onset of civil conflict are statistically significant results with a negative coefficient. This gives great implications for the role of central banks in civil conflicts, which will be discussed further.

This paper is divided into six sections. The first section is the introduction. Section Two briefly outlines a literature review on the CBI and the onset of civil conflicts. Section Three serves to provide a theoretical backbone to the relationship between the variables, and presents two testable hypotheses. Section Four details the methodology of how the variables are defined and operationalized, and gives a background on rare events logit, as well as the justification for this research design. Section Five presents the findings of the analysis. Finally, section Six offers a conclusion.

Literature Review

Central Banks in General

Many central banks have opened since The Riksbank was founded. After the fall of the Soviet Union, central banks proliferated around the world. White (1999) identifies central banks
as having the following common characteristics: being a banker’s bank, having a monopoly on note issues, being a lender of last resort, having the ability to regulate commercial banks, and conducting monetary policy.

Each central bank differs in its level of independence. The Maastricht Treaty of 1992 was the catalyst that placed emphasis on increasing CBI (Maxfield, 1997). CBI can be classified into three categories: personnel, financial, and policy (goal-setting and instrumental) (Eijffinger & de Haan, 1996). Personnel indicates that the central bank has the ability to appoint its own board members and determine members’ salaries. If the central bank can set its own budget, then it is financially independent. Finally, policy independence means the central bank sets its own objectives as a bank and has the freedom to use instruments it believes will best achieve its goals. However, there is no cookie-cutter formula for a central bank, as the level of independence varies from country to country. Eijffinger and de Haan (1996) found that the equilibrium of the natural rate of unemployment, stock of government debt, political instability, supervision of financial institutions, financial opposition to inflation, public opposition to inflation, and other factors all influence the level of independence enjoyed by a bank.

The different types of CBI have been empirically quantified. Most, if not all, empirical studies measuring CBI have revolved around the same categories of independence. The consensus reached by several scholars who attempted to measure CBI is to look to the statutes that established the central bank. Scholars can see how independent a bank is from the rules governing the selection of board members, the goals of a central banking institution, and other factors. The discrepancy in scores in measurement for CBI comes from the different interpretation of the statutes and the weighting of certain aspects of independence. Grilli, Masciandaro, Tabellini, et al. (1991) compiled an index on “political and economic
independence” of central banks and Alesina and Summers (1993) studied macroeconomic performance and CBI in twelve countries using this methodology. Cukierman, Webb, and Neyapti (1992) coded 72 countries from 1950 to 1989 to study inflation. Each of these research projects yields different results. For instance, the scores for the Banque de France and Banca d’Italia are different in each of these studies.

An alternative outlook on CBI is the turnover rate of a central bank’s governor (Cukierman, Webb, & Neyapti, 1992). It is presumed that a higher turnover rate of the central bank’s governor equates to lesser independence. This may be caused by intervention from the executive branch, which influences the governor to enact monetary policies that extend beyond the election cycle for fear of being reprimanded. If a governor is able to stay with a central bank for a longer period of time, his/her reputation will prevent him/her from bowing to political pressure and thus give more incentive for long-term monetary policy. Shorter turnover rates have been found to increase inflation. This study is consistent with Crowe and Meade (2007), who also expanded the turnover rates data from the Cukierman, Webb, and Neypati (1992) study.

CBI has been the focus of economists, not political scientists. The literature focuses on CBI as an instrument to fight inflation. Central banks that are independent enjoy lower inflation rates (Bade & Parkins, 1988). Both Germany and Switzerland allow their central bank to decide on profit allocation, policy direction, and member’s appointments and salaries. This allows these two countries to enjoy the lowest inflation rate of all the countries in the study. However, there is debate about the effectiveness of a central bank. Alesina and Summers (1993) argue that central banks only promote price stability. Independence is only one factor, as central banks cannot account for exchange rates and exogenous shocks, which also determine economic performance.
Further dissent comes from Crowe and Meade (2007), who found there is no real relationship between a central bank’s independence and inflation.

Central banking in non-Western European countries is less well understood. Efforts have been made by Lougani and Sheets (1997), Cobham (2009), and Hamilton-Hart (2002) to provide the academic community with insight on central banking in Central Europe, the Middle East and North Africa region, and Southeast Asia, respectively. Their analyses were primarily historical and serve as a comparative study of various monetary laws. These works focus on the rise of central banks emerging after colonialism or shortly after gaining independence. Even in Crowe and Meade’s dataset (2007), information is available for roughly one-third the number of nations. Information for sub-Saharan African countries is severely lacking. It may be that it is difficult to obtain data from developing countries that are incapable of tracking such information. Unfortunately, most civil conflicts occur in undemocratic and undeveloped countries for which much information is needed.

Economics and the onset of Civil Conflicts

The literature of civil conflict is quite extensive, but it tends to ignore the role of central banks. Much work has been done on the economic aspects before and after conflicts (Collier, 1998). The root of civil conflicts differs depending on political viewpoints, from lack of democracy to post-colonial tensions (Collier, 2003). In the literature, two themes emerge in the civil conflict literature explaining the inception of civil conflict: political and economic.

The political aspect focuses on grievances from lack of political rights, weak institutions, and ethnic dominance. Hegre, Ellingsen, Gates, et al. (2000) pointed out that semi-democracies are more prone to civil conflicts than full democracies and authoritarian governments. Semi-democracies repressed some political rights but allowed enough freedom for mobilization and
coordination of civil conflicts, as illustrated by the “inverted U” relationship. Institutions have been scrutinized for their roles in civil conflicts. Easterly (2001) argued that institutions could provide constitutional protections, clear property rights, protection from expropriation, and contact enforcement. These actions mitigate political grievances, leading to lower chances of civil conflicts. However, it is not enough to focus on the grievances, but the policies that cause them.

Ethnic differences can cause political grievances. Sambanis (2001) broke down political grievances stemming from ethnic heterogeneity into three components: radical division, linguistic differences, and religious fractionalization. Reynal-Querol (2002) found that religious differences are better indicators of civil conflicts than linguistic differences. There also has been convincing evidence that ethnic polarization, division between two equal ethnic groups, is a better predictor of conflict than ethnic dominance as demonstrated by Collier (2003). Large ethnic groups can effectively suppress a small minority, while the ethnic minority has difficulty gathering the resources to organize and coordinate a civil conflict. Ethnic minorities can cause civil conflict if they rule over a country that has a different ethnic majority, which has been found to be marginally more subject to civil conflict (Fearon, Kasara, & Laitin, 2006). The study found, however, that ethnic diversity makes a country no more prone to civil conflict than homogeneous ones, given that the countries in comparison have the same economic conditions. These facts point to the root of civil conflict being strongly economic.

The disputed second cause of civil conflict is explained in economic terms, i.e., the onset of civil conflict depends on a cost-benefit analysis of igniting a civil conflict with the expectation that the benefits of a successful civil conflict outweigh the costs involved. Therefore, certain economic factors, especially in poor countries, may germinate civil conflicts because of the low
costs and high benefits that can possibly follow. Collier and Hoeffler (1998) showed that factors such as income per capita and dependence on primary commodity exports play a larger role in explaining the onset of civil conflicts than political grievances. Higher income per capita increases the opportunity cost of a person to join a civil conflict. Dependence on primary commodity exports up to 26 percent of GDP increases the risk of a civil conflict by providing rebels with incentives to procure the natural resources to fund themselves and their civil conflict. Higher levels of dependence on natural resources actually lower risks because governments can adequately fund their policing and anti-insurgency forces. The use of primary commodity exports has been subject to debate. Ross (2004) showed that exports such as gemstones and agricultural commodities have no link with civil conflicts, while countries dependent on oil exports are more prone to civil conflicts. This is consistent with the findings of Fearon (2005), who found that oil-rich nations have fewer incentives to develop strong institutions. This causes a lack of competence and control, so rebels have more incentives to take over oil sources.

This topic is further explored in Collier and Hoeffler (2001), who argue that economic grievances are better predictors of civil conflict than political grievances, except for ethnic dominance. This study focuses on the opportunity costs of joining a civil conflict. Low income per capita, male secondary school enrollment, and economic growth increase the risk of civil conflict by lowering the opportunity costs. Collier (2003) explained that political grievances can be used as propaganda for civil conflict to gather support and funds, but rebel groups have to be financially viable. Financial viability is dependent on the rebel group’s ability to market its movements to gain donations from foreign governments and diasporas that are sympathetic to their cause. However, these factors are endogenous. Exogenous factors such as weather shocks can affect economic growth, leading to civil conflict. Economic shocks that decrease GDP
growth by 5 percent will increase the likelihood of a civil conflict by one-third and a full-scale civil war by one-half (Miguel et al., 2004). These shocks make the life of being a rebel more attractive.

*What is Missing*

The plethora of research on central banks pales in comparison to studies on political parties, the legislative branch, state-level governments, and other institutions. Whatever the reason may be for this is not within the scope of this paper; however, the consequence of this void in the literature is the allowance of such an insulated, powerful institution to be run amongst us without much understanding of how it functions. This lack of understanding translates into an ignorance of how these institutions are part and parcel of even the most basic functions of our society. In this instance, it is observations of how central banks affect the onset of civil conflicts that scholars have neglected.

This research question is important for several reasons. First, this research question will have policy implications, not only for optimal monetary performance, but also for the prevention of civil conflict outbreaks. If Collier is correct in his assessment of the economic causes of civil conflict, then rebels must consider the central bank in their calculus. This has not been addressed. Policymakers can advocate for certain reforms in their central bank in order to prevent civil conflicts within a state. Second, this will add to the current scholarly debate. Keynesians have always supported a strong central bank, while free market-oriented thinkers condemn them. This will also have bearing on the schism between those who explain the beginning of civil conflict in political terms and those who explain it in economic terms. Central banks should not be seen as fitting solely into one of those categories. Their existence is due to legislative statutes but they play a vital economic role. The most important research will address the gap in literature in
explaining the onset of civil conflicts with CBI. Information regarding CBI and civil conflicts is plentiful in their separate, respective fields, but the literature does not attempt to merge them.

This void brings in important questions to the table – questions that have been overlooked. Collier explains the economic causes of civil conflicts. Ross (2004) explored the onset of conflicts with “lootable” goods. Crowe and Meade (2007) compiled a comprehensive index on central banking transparency. There is information on civil conflicts from the COW and PRIO dataset. These conditions are fitting for a quantitative study to address the relationship between CBI and the onset of civil conflicts.

Research Theory

Theoretical Model

We can easily extrapolate and compute the necessary information to produce a result. However, such an approach would be meaningless other than as a conglomeration of data. There must be a theoretical grounding as to the causal relationship between the factors. This section serves to provide a theoretical model of how CBI and the onset of civil conflict interact with one other. Furthermore—and more importantly—this section will provide testable hypotheses deriving from the model.

The model has taken in some assumptions. These assumptions are not taken to be axiomatic, but they do possess a great degree of validity and soundness within them. To begin, it is plausible to assume that the goal of the rebel faction in a civil war is to overthrow the existing government for myriad reasons, while the goal of the government is to remain in power. The two main actors in a civil conflict are the rebelling group, R, and the government, G. When R decides to rebel, R must take into consideration the costs and benefits in its calculus. These costs and benefits may be both tangible and intangible, such as equipping a rebel group with small arms or
liberation from political oppression for an ethnic minority. Taking these factors into consideration, it is conceivable to assert that the likelihood that R will rebel is when the subjective perception that the benefits of a successful civil conflict, B, will outweigh the costs of inciting the civil conflict, C; that is, B > C. The higher the benefits and/or the lower the costs, the more likely R is to rebel.

Central banks play a pivotal role in assessing the costs and benefits of starting a civil conflict. In every nation, a central bank enjoys various degrees of independence, CBI, defined by Eijffinger and de Haan (1996). CBI is determined by the bank’s ability to have the final authority in all its actions and not being influenced by other political institutions. If CBI is low, then the central bank is dependent on G for its actions; otherwise the central bank is self-determining. It is plausible to assume that G already has a standing military, the logistics of defending itself, and most importantly, a means to fund itself. This comes in different forms of taxation, foreign aid, and central banks.

Consequently, it may be more accurate to assert that the independence of a central bank affects the costs and benefits of starting up a civil conflict. The level of independence enjoyed by a central bank is the essence of the bank. It is the primary distinguishing factor that separates each central bank from the others. Independence can, on one hand, increase the costs of igniting a conflict. On the other hand, it may amplify the benefits of a civil conflict. This cost benefit analysis is applicable to both sides, G and R. Both have interests at stake and limitations to defending them. Two rival hypotheses are derived from this argument.

_Hypothesis 1:_ The lower the CBI, the lower the likelihood of civil conflicts. If CBI is low, then it is dependent on the government’s approval for its actions. This can span from G appointing the members of the board of trustees, having the final say on policy implementation,
providing the mandate of the central bank, and other measures. This relationship can lower the likelihood of a civil conflict. First, G can use the central bank to effectively repress any movements by R. Political and economic oppression is far too great for any civil conflict to take place. This usually takes place in totalitarian regimes where the costs of starting up a civil conflict are high.

Now in the course of political and economic oppression, any action taken by R would not lead to a civil conflict because of these high costs. Second, lower CBI can prevent conflicts by forcing R to seek a way to avoid a military conflict with G. This may cause R to petition or seek international advocacy for its cause. R will recognize the power of the central bank to finance G’s military forces; therefore, any actions for economic, political, and social change have to be done peacefully. The costs of starting and sustaining a civil conflict against G are gargantuan, and R will probably lack the necessary resources.

Finally, low CBI lowers the probability of civil conflict by removing the incentives for R to rebel. Let us assume that R does have the logistics and resources necessary to start up a civil conflict against G to redress political and economic grievances. R will be fighting against an army that is funded adequately by the central bank because of the low CBI. R can lose the battle by suffering more casualties or exhausting its resources or R can successfully topple G. If R topples G, we can assume that G has invested much of its expenditures in the military before and during the conflict with R. Therefore, R will be left with a central bank whose resources are depleted. R will inherit a situation of poor economic conditions. R could use the central bank to print money to cover its expenditures, but that would lead to inflation similar to the hyperinflation in the Weimar Republic after the First World War. An alternative would be to
suspend the use of the central bank, while R rebuilds a war-torn country. Therefore, low CBI would lower the benefits that R would gain, curtailing the likelihood of a civil conflict.

**Hypothesis II:** *The higher the CBI, the lower the likelihood of civil conflict.* If CBI is high, it is able to determine its own policy goals and instruments to implement them. The dynamics between a central bank and G and R are different. Central banks that are independent have stricter lending practices, which can prevent civil conflicts in three ways. First, G may not pass policies that are conducive for civil conflicts. It may be that G does not have unlimited funds to oppress certain groups. G will be forced to utilize its budget more effectively. Ethnic or political suppression may not completely disappear but the intensity of it will be greatly stifled. Manifestation of grievances will probably not flourish to the extent of a civil conflict. Another aspect is that the central bank is able to adopt sound monetary policies because of a low governor turnover rate. Governors of central banks do not have to fear political repercussions for failure to implement monetary policies that will favor the executive and legislative branches, such as lowering interest rates during an election year. Such policies signify the lack of intervention by the other branches of government in the central bank’s affairs. This will increase the costs for R to rebel and for G to engage in a conflict.

Second, G may be more likely to consider other options to resolve issues rather than through military means. Since the central bank will not arbitrarily fund G’s military campaigns, G’s ability to use military force to resolve conflicts with R will be hindered. Third party mediations, arbitrations, or bilateral compromises may be employed before a civil conflict occurs. This approach may be more cost-efficient because, again, G can allocate revenues and resources to other sectors in its economy rather than to its military. G will know that if it goes bankrupt because of its excessive military expenditures, central banks may not provide a bailout.
The cost for G and R to continue fighting or be involved in a military conflict will increase. For R, it gives a lesser incentive to start with a violent civil conflict.

Finally, R can see that an independent central bank is no longer a “lootable” good. That is, the central bank cannot be exploited easily in the post-conflict period. R cannot use the central banks to pay off its wartime debt or print money for its own personal agenda. R will have to restructure the previous constitution or institution in order to exploit it, which takes more time and energy. This may be difficult if R was rebelling under a just cause because it may damage the legitimacy of R. R’s decision to change a central bank to be dependent on the public can view the new government unfavorably due to the perception of corruption and lack of transparency. This may impose an opportunity cost that is too much to bear by R, preventing conflicts. The benefits of gaining an independent bank are quite marginal as well, because R cannot wield it to its whim.

Research Design

These two hypotheses appear to be valid; however, we will test their soundness empirically. Much discussion up to this point on CBI and the onset of civil conflict has been lacking concrete definitions or measurements. This section will design how to measure the hypotheses. The unit of analysis will be done by country year (Albania in 1980, Albania in 1981, Albania in 1982, etc.). This will allow us to examine the level of independence and whether or not a civil conflict occurred in that given year.

Independence measure

CBI is the independent variable. Central banks are formed through statutes, providing the institutional framework in which their roles and duties are outlined. Therefore, much of the information can be derived from examination of these statutes. Four types of independence are
identified (Crowe & Meade, 2007). First, banks must limit their lending to the federal government. Second, a tenured position must be offered to protect central banks from political influence. Third, the central banks must have the final authority in their policy implementation. And lastly, the statute of the central bank must clearly define the monetary objectives.

The data compiled by Crowe and Meade (2007) examined the different types of independence in central banks. They based their dataset on an earlier study by Cukierman, Webb, and Neyapti (hereafter, CWN). Although there are other datasets on central banking (Alesina & Summers, 1993; Cukierman, Webb, & Netyapti, 1992; Eijffinger, Schaling, & Hoeberichts, 1993; Grilli, Masciandaro, & Tabellini, 1991), they do not cover as many countries as the CWN data. For instance, the Alesina and Summers (1993) dataset covers only ten countries, all in Western Europe, while the Grilli et al. (1991) covers 16 developed countries. The CWN data set covers 72 countries over decades, and was modernized by Crowe and Meade (2007) to include 15 additional countries and extend the time-series to 2003 using data from the IMF World Outlook. This expansion makes the CWN data the most recent and broadest measurement of independence. Both works coded central banks values ranging from zero to one, lowest to highest, on sixteen variables in four clusters (appointment and tenure of the central bank’s governor, policy formation, central bank objectives, and limitation on lending) that constitutes CBI. The values from the Crowe and Meade (2007) data are labeled “cwn1.” This can be contrasted with the original CWN data, labeled “cwn0.”

However, there are shortcomings to the variables and measuring CBI in general. As Eijffinger and de Haan (1996) recognized, these are only legal characteristics of CBI derived from the statutes that established them. Other measures of independence such as the quality of the board of directors, the personal traits of the governor, the informal arrangement between the
central bank and the federal government, and other intangible measurements cannot be accurately quantified. However, most scholars still use the same methodology. That is, they analyze the statutes that regulate the structures of central banks to obtain an idea of the level of independence. Besides Crowe and Meade (2007), other scholars such as Alesina (1992), Bade and Parkins (1988), and Cukierman et al. (1992) have relied on this method. Regarding the dataset, there are missing values on certain key countries. Studies in central banking are usually Euro-centric, thus making data on non-Western countries scarce. A moderate number of developing countries are completely void of any values except for the turnover rates done by Crowe and Meade (2007). Despite these shortcomings, this dataset is the best available in the literature and most appropriate for this study.

Civil Conflict Onset

The dependent variable is the onset of civil conflict. The PRIO data is one of the most comprehensive datasets of military conflicts since 1945. PRIO data defines a civil conflict as “a contested incompatibility that concerns governments and/or territory where the use of armed forces between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths” (Gleditsch et al., 2002, p. 1). A competing dataset would be the Correlates of War (COW) by Singer and Small, which is also accurate and widely used in the civil conflict field. However, their definition of civil conflict is similar to the PRIO definition except that their minimal threshold is 1,000 battle-related deaths. PRIO differentiates between civil conflicts (25 to 999 battle-related deaths) and full-blown civil wars (over 1,000 battle-related deaths). This would already include the COW data and increase the sensitivity of our data collection by coding for smaller civil conflicts, which the COW will miss.
Only two relevant categories of the PRIO data are examined: the type of conflict and the start date. In the PRIO data, there are four types of conflict: extrasystemic (Type 1), interstate conflict between two or more states (Type 2), intrastate conflict with no foreign intervention (Type 3), and intrastate conflict with foreign intervention (Type 4). This project only looks at civil conflicts; therefore the dataset will be filtered to analyze only Type 3 and Type 4 conflicts. The PRIO data also provides the starting date of each conflict, which will be used to determine the onset for our purposes. There are two types of start dates. StartDate records the date that the first battle-related death occurred in the year, while StartDate2 records the date that the first 25 battle-related deaths occurred in that year. This project will look to the latter measurement to be consistent with the PRIO definition of the civil conflicts. This project is not looking at the intensity or the number of civil conflicts that occurred in a given year, but rather the onset. In coding the data, if a civil conflict broke out in a given country-year period, then it is coded “1,” and if there is no civil conflict, then it is coded “0.”

There are some difficulties in civil conflict onset measurement. Unlike CBI, there are no difficulties arising out of individual characteristics. However, there are no concrete legislative documents outlining civil conflicts. In fact, there is much controversy as to when exactly civil conflicts initiate. The StartDate and StartDate2 values are the closest estimates PRIO can offer. Their precision is numbered 1 to 7, 1 being the highest level of certainty of the start date and 7 being very obscure in which little to no information is known. Again, these shortcomings should not hinder the project because the PRIO data is finely orchestrated and widely accepted in the civil conflict literature. Furthermore, most of the precision on civil conflicts ranges in the 1 to 4 values, which means that, at the very least, the month of the start of conflict is known. The coding aspect may present some problems. This project looks at the onset of each civil conflict,
not its intensity. Therefore, any country year that does not have a conflict will be coded “0.” This may bring in problems with countries such as Myanmar and India who have experienced multiple civil wars in a given country-year with different rebel groups, but this project will only count it as a singular “1.” This may limit our capacity to measure the true gravity of a civil war.

Control Variables

As this paper has mentioned before, the onset of civil conflict can depend on several factors. These factors must be controlled to ensure CBI actually has an effect on the onset of civil conflict. These values are taken from a variety of sources that are credible and used in the civil conflict and economics literature.

One of the prominent arguments comes from Hegre et al. (2001), who argued that the level of democracy affects the onset of civil conflicts. This will be controlled by using the POLITY IV scale, which measures 163 countries from 1800-2008 on a scale from -10 (hereditary monarchy) to 10 (consolidate democracy). The values we will look at are labeled “polity2,” which denotes the democracy score of a specific country within a year (Marshall & Jaggers, 2008).

Ethnic fractionalization must also be accounted for using the ethnolinguistic fractionalization (ELF) index. This index gives the probability that two individuals, chosen at random in a state, will be from different ethnolinguistic groups. This paper takes the replication data from Fearon and Laitin (2003), where data was based on a Soviet ethnographic index and missing variables were filled in from the CIA World Factbook, Encyclopedia Britannica, and the Library of Congress studies. Another method to measure ethnic fractionalization is to look at the percentage the largest ethnic group possesses and compare it to smaller groups. The ELF index
looks at the same values as the former method, but also takes into consideration the number of ethnic groups, as opposed to simply their size, and provides a single continuous value.

Collier (2002) spearheads the economic causes of civil conflicts, in which the GDP growth rate, male secondary enrollment rate, and per capita income are prime indicators of civil conflicts. These factors will be retrieved from the World Bank’s database for the World Development Indicators. GDP growth rate will be captured in annual percentage. Male secondary enrollment rate is captured in gross percentage of total population. Per capita income will be measured by GNI per capita using the purchasing power parity; this is contrasted with the Atlas method because it is the Atlas method that is used primarily only by the World Bank and measured in U.S. Dollars, while the PPP is more commonly used and measured in the local currency of the country (World Bank database). This provides a better indicator of the income and standard of an individual in a certain country.

Another economic cause that is pertinent to our inquiry is the topic of “lootable” goods, which have been explored by Ross (2004), Fearon (2005), and Collier (2002). This can be measured by oil and primary commodities dependence, which is the export level of these goods as a percentage of the national GDP. This project will only use oil exports expressed in percentage of total merchandise exports as a control. This will consequently ignore primary commodities export. However, the relationship between primary commodities such as agricultural goods and gemstones and the onset of civil conflicts is insignificant, weak at the best (Ross, 2004). Fearon and Laitin (2003) found oil-exporting countries are more likely to go into civil war, while Humphrey (2003) found that oil production increases the likelihood of civil conflict. The relationship between the onset of civil conflict and oil is stronger. Therefore, this project will measure this relationship using the figures for the fuel exports expressed as a
percentage of export merchandise. This differs from just oil exports, as it includes natural gas and coal, which are lootable as well.

Logistical Analysis

The dependent variable is dichotomous, coding “1” if a civil conflict occurred within a given country-year and a “0” otherwise, in a time-series cross-sectional study. This type of study is common in international relations (IR), in studying militarized and interstate conflict (Beck, Katz, and Tucker (1998). The most common model for such a study would be the ordinary logit, which is programmed to analyze studies with binary dependent variables. This type of model is used for the current project.

There are some complications, however, that arise from using a binary dependent variable in a time-series cross-sectional analysis with continuous independent and control variables. Beck et al. (1998) point out that the binary dependent variables are temporally dependent. Using logit would assume temporal independence in the binary dependent variables. For example, when using logit to look at the absence or presence of militarized conflicts with the dyad-year as the unit of analysis, the “probability of dyadic conflict in a given year…is likely to be dependent on the conflict history of that dyad” (Beck et al., 1998, p. 1263). The proposed solution is to create a dummy variable to mark the amount of time since the start of the sample.

This project will proceed to analyze the data with the logit analysis. The solution that Beck et al. (1998) suggested is not necessary for our purposes. The independent variable is continuous but not temporally dependent in the manner that Beck et al. (1998) pointed out. The score of central banking independence is simply a measure derived from the legal statutes that establish central banks. Therefore, the dummy variable to denote the start date of the sample
period is not necessary. This project simply looks at whether or not a civil conflict occurred, given the central banking score within a given country year.

Analysis

Logit Model Analysis

The data used is from the UCDP/PRIO. This dataset is filtered to cover only civil conflict from 1980 to 2008. After compiling the dataset with the CBI measurements and the onset of civil conflicts, the total number of country year observations is 229. From this database, this paper tests them against CBI data obtained from Crowe and Meade (2007) using ordinary logit. The results from the testing are detailed below. From Table 1 on the next page, we can see that the relationship between CBI and the onset of civil conflict is not statistically significant.

The first hypothesis states that the lower the CBI score, the lower the probability of civil conflict onset. The second hypothesis competes with the first hypothesis in stating that a higher CBI will result in a lower probability of civil conflict. Results from the logit analysis do not support both of the hypotheses that were presented in Section Three.

The values are, however, not too far off from statistical significance. This indicates the need for further research on the topic to fully grasp the relationship between the two variables. For this current project, we do not have the CBI scores for the countries of interest. The Crowe and Meade (2007) data contain CBI scores of mostly developed countries. According to the PRIO data, civil conflicts occur in developing countries. Then, there exists this schism between the availability of CBI scores and where civil conflicts occur, for instance, in the United States, Japan, and France, but civil conflicts are also occurring in Burundi, Rwanda, and Somalia, where CBI scores are absent. Countries that have the capacity to report the inner workings of their central bank are more likely to be developed nations. They are able to release the legal statutes
that define the central bank. Countries that are more prone to be involved in a civil conflict probably do not view releasing CBI information as their priority or simply lack the capacity to do so. A possible solution is to prioritize collecting legal CBI measurements in developing nations. Every nation has a central bank or is part of a regional bank; therefore, legal statutes that detail the mechanism and structure of central banks are available. This would equalize the division between the CBI scores and the onset of civil conflict data.

The results from the logit analysis show that a unit increase in CBI will result in a decrease in the probability of civil conflict. After running the analysis on the logit program to find no statistical significance, we ran the dataset through the Clarify program to gain further insight into the relationship (King & Zing, 2001). Clarify is a program that assists researchers in data interpretation and presentation. It first generates “M” simulations using the parameters of the statistical model we used, in this case, the logit model. Next, it sets the values for the explanatory variables we are interested in looking at. Finally, it utilizes the values of interests we have set and simulates the predicted values, expected values, and differences (King, Tomz, & Wittenberg, 2003). In this case, the Clarify program converted our binary dependent variables into continuous variables, in which we set the point of interest to the mean. We set the program to calculate the probability of civil conflict (CC=1) onset if the CBI score is set at the minimum and maximum, as illustrated in Table 2 on the next page. From this table, we can see that if the CBI score is at the minimum, there exists a 12 percent chance that the country will experience a civil conflict, while if the CBI score is set to the maximum, the probability is reduced to a mere 1 percent. This represents an 1100 percent decrease. This simulation affirms the second hypothesis.
The results from the logit analysis are undesirable for our purposes here. This is not the fault of the model, however, but of the dataset. The CBI scores are mostly from developed countries while the civil conflicts are in developing nations. Therefore, there is a schism between the distributions of the data and an ordinary logit analysis would automatically dilute the results because of the missing values. To remedy this, we used another analysis model: the rare events logit.

**Rare Events Logistical Analysis**

The data was compiled in a way to properly examine the onset of civil conflict and CBI. Since our dependent variable is dichotomous, it would be logical to use a standard logit, which is commonly utilized in the field. However, using such a method would give equal weight to both variables. In the course of this project, we recognize the overwhelming numbers of “0” in the dependent variable, denoting no civil conflict for that country year. The information in CBI is accessible for countries in Western Europe that do not typically go to civil war. Instead, civil conflicts occurred mostly in nondemocratic and developing countries for which CBI data is missing. To simply weight these variables equally would be to artificially deflate the relationship because of the missing values in the dataset. Therefore, it would be appropriate to consider the sparse outbreaks of civil conflicts rare in this particular dataset.

To address the issue of the missing values in the onset of civil conflict, it would be appropriate to use a rare event logit. This model is developed to give more weight to binary dependent variables that code “events” more than zero “nonevents.” Using this model is consistent with the reason why King and Zeng (2001) developed this method in the first place. First, there are statistical differences between dependent variables and binary dependent variables. These differences are in the mean of the variables, in which the mean of the binary
dependent variable is the relative frequency of an event as opposed to regular dependent variables, for which the mean is invariant (King & Zeng, 2001). Second, data collection methods on rare events are skewed. In collecting data, we are geared towards collecting large numbers of observations to serve our purposes. However, in an instance of a large observation with too few “events,” researchers opted to use other variables that offer poor explanations or are inadequately measured. In order to combat this situation, we can select data that is politically relevant (Maoz & Russett, 1993), but to do so would alter the nature of the program by limiting the observation of a project, skewing the sampling data, and implementing other ad hoc measures.

It does not mean that at any instance we lack the “events” in a large observation; we utilized the rare events logit. It is useful only when the distribution of the “events” is considered to be an anomaly, or rare, given the availability and distribution of the independent variable. Such a model of analysis is applicable to this project. This project looks at 210 countries with a total of 5,040 observations, but only 2,035 observations of CBI (approximately 40 percent). This is acceptable, however, if we look at the onset of civil conflict data – we have only 165 “events” and 4,875 “nonevents.” Furthermore, if we look at the distribution of these outbreaks, we see that 65 erupted in Africa alone. In this region, we have only 278 entries of CBI out of 1,152 observations. Again, civil conflicts do not occur in developed countries for myriad reasons; they transpire in countries that would most likely lack the capability to report information on their CBI. Therefore, any regression model that will aid in this analysis must give consideration to the lack of information and the distribution of civil conflict onset to weigh them accordingly. Rare events logit is suitable for an analysis as such for this project. This would give rare “events” more attention and more explanatory power. The results are shown below in Table 3.
In using the rare events logit, the findings using the codification of the legal independence of CBI present to us some statistical significance. The relationship is negative, as every increase in CBI will result in a decrease of the probability of civil conflict onset by approximately 3.2 percent. This affirms the second hypothesis in Section 3. After running the rare events logit, we utilized the Stata to compute the marginal effects of CBI. The marginal effect is the probability of the dependent variable, given a certain value of the independent variable, holding all other variables constant. In this case, it would be the probability of civil conflict onset under certain CBI scores. This function is similar to the Clarify function that we used earlier with the logit model. After running the rare events logit, we set the binary dependent variables to their mean and the CBI score to the minimum and maximum. This allowed us to test two continuous variables against each other. Using the marginal effect computation, the results are detailed in Table 4.

The results are consistent with the first computation using the Clarify program. In using the rare events logit model, the probability of a civil conflict given that the CBI score is .1, the minimum, is 13 percent. The probability of a civil conflict with the CBI score at the maximum, .98, is 1 percent. The similarity between first and second simulation on the probability of civil conflict onset given the CBI values shows that there is a relationship between the two and that relationship is inverse. The higher the CBI score, the lower the likelihood of civil conflict.

It seems that the second hypothesis is correct in its assertion using the rare events logit. Higher CBI leads to a lower probability of civil conflict. According to the theory, it may be because of the high standard of living and the political freedom citizens enjoy. Grievances are not addressed through violence but through the political process. Countries that are able to report their CBI scores are more likely to be developed nations. It is the reason why Western European
nations generally do not experience civil wars, but poorer nations in Africa and Asia, which do not report their CBI score, do.

This project is only a first step towards understanding the role of central banks and civil conflict onset. There are limitations in this project we must face. There must be research to compile CBI scores from every country that is prone to civil conflict. Every nation has a central or regional bank. Using the current data, there is almost statistical significance using the logit model. It would be plausible to assume that with a complete dataset with CBI scores, we could fully grasp the relationship between the two variables. Such research efforts can have policy implications for preventing civil conflicts through the internal structure of central banks. We can further research this topic by looking at how CBI affects the duration of a civil conflict or country in a post-conflict period. Future research in related fields can focus on the relationship between governor turnover rates as an alternative to measuring CBI. Data in that field is lacking in developing nations as well. Another suggestion for future research is looking at monetary policies leading to civil conflicts and sustaining post-conflict peace. Severe restriction in the money supply or hyperinflation would stir economic grievances that would lead to civil conflicts. It would be suitable to study the rate of inflation and the relationship with civil conflict onset.

Conclusion

The purpose of this research is to fill the gap in the civil conflict literature. There is little, if any, mention of the role of central banks and their effects on the onset of civil conflict. This paper attempts to address this gap and to connect CBI to civil conflicts. Logit and rare events logit were used to analyze data from Crowe and Meade’s 2007 CBI measures and PRIO Armed Conflict dataset.
Throughout this paper, there have been serious threats to the research design. The biggest criticism would probably be the lack of CBI scores for developing countries. The present data on CBI scores has been geared towards Western and developed countries, which typically do not experience civil wars. As Collier (2003) pointed out, countries that are economically disadvantaged are the ones most likely to experience civil conflicts. Therefore, CBI data for developing countries is desirable, if not necessary, to fully assess the relationship between CBI and the onset of civil conflicts.

This paper is a first step in assessing the role of CBI in explaining the inception of a civil conflict. Future research can be dedicated to perfecting this research by collecting data for developing countries in the manner that was just mentioned. After grasping the full relationship between CBI and civil conflicts, it would be important to understand how CBI affects the duration of a civil conflict or how they affect a post-conflict society. It could be the case that countries with high CBI are hesitant to lend to government, thus making the duration of peace much shorter and a reigniting of civil conflict more likely. Beyond that, it would be imperative to fill another economic knowledge gap in explaining the onset of civil conflicts: monetary conditions. Monetary policies are primarily conducted by central banks, thus making them a relevant factor.

After running the rare events logit, this paper found that CBI and the onset of civil conflict have a negative relationship. A unit increase in CBI decreases the probability of a civil conflict by 3.23 percent. Aside from filling a gap in the civil conflict literature, this paper’s results have major policymaking implications. Every nation has a central bank, which is organized through the nation’s legislative branch. Countries are able to tailor their central banks to minimize the probability of a civil conflict outbreak. In this case, it would be favorable for
countries to increase the independence of central banks. Civil conflict has been the dominant form of militarized conflict in the post-World War era. Any attempt to decrease the likelihood of a civil conflict, no matter how far-fetched or small, is a step toward a lasting peace.
References


*World Databank*. Retrieved from
Table 1: Logit Model results

| Variable                | Coefficient | Robust Std. Err. | P>|z| |
|-------------------------|-------------|------------------|-----|
| CBI                     | -4.37       | 3.33             | 0.19|
| ELF                     | 3.7         | 0.69             | 0*  |
| Polity V                | 0.16        | 0.04             | 0*  |
| Fuel Exports            | 0           | 0.02             | 0.932|
| GDP Growth              | 0.12        | 0.08             | 0.151|
| Per Capita Income       | 0           | 0                | 0.916|
| Sec. Enroll, Male       | 0           | 0.4              | 0.9  |
Table 2: Probability of Civil Conflict Onset at Maximum and Minimum CBI Score

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<tr>
<td>.98</td>
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CBI and the Onset of Civil Conflict  

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Table 3: Rare Events Logit Analysis Results

|          | Coefficient | Robust Std. Err. | P>|z| |
|----------|-------------|------------------|-----|
| CBI      | -3.23       | 1.74             | 0.06* |
| ELF      | 2.77        | 0.99             | 0.01* |
| Polity V | 0.05        | 0.04             | 0.21 |
| Fuel Exports | 0.01  | 0.02             | 0.69 |
| GDP Growth | 0.11      | 0.09             | 0.2  |
| Per Capita Income | 0  | 0.04             | 0.86 |
| Sec. Enroll, Male | 0  | 2.43             | 0.95 |
Table 4: Marginal Effects of Central Banking Independence

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