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THE BELGIUM POLITICAL CRISIS: A STUDY OF COALITION NEGOTIATIONS

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## ABSTRACT

In 2010, Belgium's current government resigned leading to a government formation process that left Belgium without a fully function government for 589 days. During this period, regional parties negotiated towards forming a majority government, but due to divergent interests and a lack of a deadline the negotiations continued to an unprecedented length of time. Although the caretaker government did well at dealing with the day-to-day business, the delayed process had economic and political costs to Belgium society. This paper focuses on why the negotiations took so long, why the negotiations ended, and if there are any systemic changes that could be made to reduce the length of negotiations without biasing the outcome. I find that the diverging interests caused by a changing political environment combined with the safeguards protecting negotiating parties from costs are the main contributors to the length of the negotiations. Furthermore, it was the costs from financial markets whose pressure forced parties to compromise and form a majority government. I show this through an analysis of the events, data on government formations, and a model of coalition negotiations. In addition to these findings, my model shows that gradually adding fixed costs can reduce the length of negotiations while not significantly biasing the outcome.

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## **Chapter 1**

### **Overview of Belgium**

To gain an understanding of how outside markets and European institutions affected the Belgium Political system we first must know a little about Belgium. In this chapter, I outline the important feature of the Belgium political and economic system. I discuss the events that led to the current political and economic environments. Lastly, I provide an overview of the Belgium 2010-2011 Political Crisis.

### **Political Aspects**

To understand the Belgium Political Crisis, one needs to understand Belgium's governing structure. In this section I will be relying mainly on Deschouwer (2009) book, "The Politics of Belgium" and Marc Hooghe (2012) "The Political Crisis of Belgium (2007-2011)". I will outline Belgium's governmental structure, the history of political parties and Belgium's "caretaker" government.

### **Government Structure**

The structure of Belgium's governance is derived largely from its deep cultural divisions between French, German, and Dutch communities. These divisions led to the power sharing and segmental autonomy between the cultural regions. This makes Belgium a thorough example of a *consociational democracy*, which took form as a federal parliamentary democracy under a

constitutional monarchy. Being federal, Belgium divides its powers between a central government and three regional governments. The central government has powers such as monetary policy and labor laws. The three regions, who consist of Wallonia, Flanders and Brussels, have powers over trade, development, and transportation. Largely coinciding with the three regions there are three cultural communities which are the Dutch-speaking community, French-speaking community and German-speaking community (see figure 1). The communities largely have control over education policies and cultural matters (Deschower, 2007, 54). As you can see, Belgium's regional lines are also their cultural lines, with Brussels being a bi-lingual region.

### Federalism in Belgium

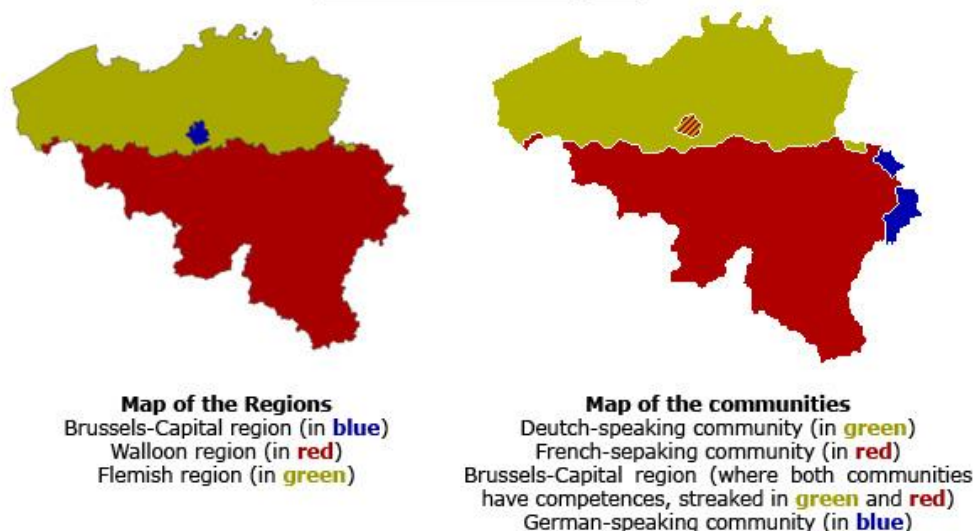


Figure 1

### **History of Belgium's Political Parties**

The 2010 Belgium Political Crisis was not a sudden emergence of conflict but the tip of an iceberg that represented a long history of internal conflict. As the previous section discussed, Belgium is a divided society, and with divisions comes conflict of interests. This divided culture



was always present in Belgium. In 1830, with the support of France, Belgium succeeded from the Netherlands. This new society was almost all Catholic and the majority spoke French. In these early periods, there were two major parties, the Catholics and the Liberals, who formed a union to push against Netherlands. Eventually this sprouted into what is known as the three “traditional” types of parties which are the Christians, Socialists, and Liberals. These three traditional party types are present in both Walloon and Flanders, but generally, the Christian parties are more prominent in Flanders and the Socialist are more prominent in Walloon. These political parties are the most important political actors in Belgium, which makes Belgium a partocracy (Deschower, 2007, 73). However, the traditional parties have been gradually losing their electorate. In 1919 the total scores for the three traditional parties were 90%, but by 2009 they were down to 70% (Deschower, 2007, 74). This was largely caused by the rise of the Green Party, Right-Wing populist and regional parties. How the parties reacted to this loss of electorate will be part of the cause of the 2010 Belgium Political Crisis.

The Christian Democrats were one of the hardest hit in the loss of electorate. The leading party for 40 years went from having 50% of votes in 1950 to only 20% in 1999 (Deschower, 2007, 76). This led the Liberal Party of Guy Verhofstadt to take the dominant position in 1999 (Hooghe, 2012). Forced into being the opposition party, the main goal of the Christian Democrats became to regain power in Brussels. This desire led them to using more regionalist rhetoric in 2001 with talk about making Belgium more of a ‘confederation’ by taking power from the central government and giving it to the regions (Deschower, 2007, 76). The desire to gain more regional power was particularly strong for the Flemish community who since 1970 became the economic powerhouse of Belgium (Hooghe, 2012). There was this feeling that the Flanders region was paying for the lesser productive Walloon region. However, this rhetoric did

not bring them back to the forefront of power in 2003 elections. Therefore, they decided to form a pre-electorate coalition with the more radical New Flemish Alliance (N-VA) to fully take advantage of the prosperous regional rhetoric. This regional rhetoric worked, and in 2007 the Christian Democrats and N-VA won the election.

The problem with regional rhetoric is that after the elections are held, regional parties must get together to form a majority coalition government because Belgium's government was designed to share power between regions. For instance, for the constitution to be amended, you need a two-third majority in parliament, with a simple majority of every language group. Therefore, to make constitutional change, as well as other changes, it is important if not necessary to form a coalition government with parties from both regions. However, when both regions go against each other during the election process with regional rhetoric, it makes it hard to form a coalition (Hooghe, 2012).

In 2007, one of the main issues pitting regions against each other was the re-drawing of the Brussels district, formerly known as Brussels-Halle-Vilvoorde (BHV). Essentially, Flemish politicians demanded the district be drawn only around the city of Brussels proper while the French politicians claimed it should extend into Halle-Vilvoorde (Hooghe, 2012). This issue was important not only because BHV consisted of 10% of Belgium's electorate but also it would increase the taxable income of the Flanders region. Therefore, if the district is re-drawn, Flanders would end up gaining more power. Beyond this, it would also mean the French citizens, in the predominately majority Dutch region of Halle-Vilvoorde, would lose access to French parties in BHV. This disagreement led to a lengthy coalition process, in which neither side gave in, and only in March 2008 was the new Prime Minister Yves Leterme (Flemish-Christian Democrat) able to take office (Hooghe, 2012). However, in December 2008 Leterme resigned due to

allegations of misconduct in the 2008 financial crisis. Van Rompuy took over in his place until he was elected to be the first permanent president of the European Council. This allowed Leterme to once again take over the role of Prime Minister in November 2009. Leterme's second government was short lived because the issue of BHV re-surfaced leading Belgium Political Crisis in which Belgium was left without a government from April 26 2010 to December 6 2011. This 589 day period set the record for a democratic nation being left without a democratically elected government.

Distribution of electoral results for federal elections by regions and party types															
	Christian Democrats		Socialists		Liberals		Regionalists		Green		Radical Right		Communists		
	FL	Wall	FL	Wall	FL	Wall	FL	Wall	FL	Wall	FL	Wall	FL	Wall	
1946	56.2	27	27.4	36.3	7.7	9.3							5.5	21.5	
1949	51.9	31.9	23.7	37.8	13.1	14.7	3.4	0.2					3.6	12.6	
1950	60.3	33.8	26	44.6	9.4	11.4							2.5	7.8	
1954	52	30.5	28.8	47.7	10.7	11.7	3.9						1.5	6.7	
1958	56.5	35.1	27.8	46.2	9.8	10.4	3.4						0.1	4.5	
1961	50.3	30.9	29.6	46.4	12.1	11.8	6.2	0.2					1.1	6.4	
1965	43.8	24.6	24.6	35.2	16.6	25.4	11.9	1.9					1.7	10.3	
1968	39.1	21	26	34.5	16.2	26.7	17.1	10.5					1.4	2.9	
1971	37.8	21	24.6	34.4	16.5	17.7	19.2	20.9					1.5	0.4	
1974	40.5	23.4	22.6	38.3	17.5	15.6	17.4	19.3					1.7	2.1	
1977	43.9	25.7	22.4	39.1	14.5	19.1	16.7	9.1	0.1	0.7			1.3	5.4	
1978	43.7	26.9	21.1	36.7	17.3	16.8	11.9	9.2	0.2	1.2	2.1		1.9	5.8	
1981	32.1	19.6	20.7	36.2	21.3	21.8	16.2	5.5	3.9	5.9	1.8		1.3	4.2	
1985	34.7	22.6	23.9	39.5	17.7	24.2	12.8	0.2	6.2	6.2	2.2		0.5	2.5	
1987	31.4	23.2	24.4	43.9	18.7	22.2	13	0.8	7.4	6.5	3		0.4	1.6	
1991	26.9	22.5	19.6	39.2	19.2	19.8	9.5	1.2	7.9	13.5	10.4		2.3		
1995	27.4	22.5	20.2	33.7	21.6	23.9	7.4		7.2	10.3	12.3		6.3		
1999	22.4	16.8	15.2	29.2	23.3	24.7	8.8	0.6	12	18.3	15.4		4.9		
2003	21.2	15.4	23.9	36.4	25.1	28.4	4.8		4	7.4	17.9		5.6		
2007	29.6	15.7	16.3	29.5	18.7	31.1			6.2	12.7	18.9		5.5		

Data obtained from is from Deschouwer (2009)

Table 1

	Election results for the House of Representatives																						
	1946	1949	1950	1954	1958	1961	1965	1968	1971	1974	1977	1978	1981	1985	1987	1991	1995	1999	2003	2007	2010	2014	
CVP-PSC	42.5	43.5	47.7	41.1	46.5	42.3	34.8																
CD&V								22.3	21.9	23.3	26.2	26.1	19.7	21.3	19.5	16.8	17.2	14.1	13.3	18.5	10.8	11.6	
CDH								9.4	9	9.1	9.8	10.1	6.7	8	8	7.7	7.7	5.9	5.5	6.1	5.5	5.0	
BSP-PSB	31.6	29.7	34.5	37.3	35.8	36.7	28.2																
SP a																							
PS																							
PVV-PLP	8.9	15.2	11.3	12.1	11.1	12.3	21.6	20.9	16.5														
Open VLD										9.6	8.5	10.3	13.1	10.7	11.5	12	13.2	14.3	15.4	11.8	8.6	9.8	
PRL/MR										5.6	7	6	8.2	10.2	9.4	8.1	10.3	10.1	11.4	12.5	9.3	9.6	
KPB-PCB	12.7	7.5	4.7	3.6	1.9	3.1	4.6	4.6	3.3	3.1	3.2	2.1	3.3	2.3	1.2	0.8	0.1	0.1					
VU				2.2	2	3.5	6.4	9.8	11.1	10.2	10	7	9.9	8	8	5.9	4.7	5.6	3.1				
FDP							1.3	2.5	4.5	5.1	4.3	4.2	2.5	1.2	1.2	1.5							
RW							1.1	3.5	6.7	5.9	3	2.9	1.7	0.2	0.2	0.1							
Groeni													2.3	3.7	4.5	4.9	4.4	7	2.5	4	4.4	5.3	
Ecolo													2.2	2.5	2.6	5.1	4	7.4	3.1	5.1	4.8	3.3	
Vlaams Belang												1.4	1.1	1.4	1.9	6.6	7.8	9.9	11.6	12	7.8	3.7	
FN																0.5	2.3	1.5	2	2	0.5	0.4	
Rad-LDRT												0.9	2.7	1.1									
ROSSEM																3.2							
List Decker																					4	2.3	
Workers' Party of Belgium (PVDA/PTB)																					1.5	3.7	
Populist Party (PP)																					1.3	1.5	
Francophone Democratic Federalists (FDF)																					1.8	1.8	
N-VA																					3.1	17.4	
Others	4.2	4	1.8	2.8	2.1	2.1	0.3	0	1.3	2	2.4	2.4	2.2	1.7	2	3.8	4.1	4.2	1.1	2.8	2.8	3.5	
	2	2	2	2	2	2	2	2	3	2	2	3	4	4	3	4	4	5	4	4	4	4	

Minimum amount of parties needed to form a majority government coalition.

Data from 1946 till 2007 collected from Deschouwer (2007). The 18.5 highlighted in 2007 represents an alliance between CD&V and N-VA.

Table 2

### **Caretaker Government**

The caretaker government is formed after regional elections for the federal government. When a government decides to resign, they present their proposal to the king. The king will plead with the parties to attempt to work out their differences, but if problems persist the king will accept the government's resignation. After the government resigns they become a caretaker government and are charged with taking care of day-to-day business while negotiations for a new government persist.

In general, the caretaker government is not supposed to make any "major" changes. However, they may work with parties in the coalition process on urgent matters that arise. For instance, during the Belgium Political Crisis the caretaker government sent troops to Libya, saved Dexia bank, supported the Euro, and authorized budgets for certain urgent matters (Bouckaert & Brans, 2012). However, major structural policy reforms to the pension system, social security system, energy supply or labor policies were left to the future government (Bouckaert & Brans, 2012). This shows that although urgent problems can be overcome, necessary long term change is sidelined until a new government is formed.

During the Belgium Political Crisis, Yves Leterme, the caretaker government's leader, attempted to expand the role of the caretaker government by interpreting the notion of 'what is necessary for the country' to include implementing European demands (Hooghe, 2012, 137). Since the duties of the caretaker government were defined before the establishment of the European Union there was some debate as to whether they should be changed. For instance, when it came time to pick the governor for Belgium's Central Bank, the European Union demanded that Belgium appoint a governor to ensure representation in the European Central Bank. Although this is normally a job left to the incumbent government, because this was of an

urgent matter for the stability of the Eurozone, Leterme's caretaker government was allowed to appoint a governor (Bouckaert & Brans, 2012).

Consequentially, by taking on more responsibility the caretaker government protects the negotiation process from external costs and circumvents the process of democracy. For instance, if negotiations are in a stalemate then protecting them from external costs only delays needed change. Furthermore, doesn't giving the power to a resigned government to fulfill European demands circumvent the Belgium people's interests? Therefore, the caretaker government not only protects society from economic and political costs but also extend negotiations delaying any needed change. However, reducing the power of the caretaker government thereby opening the parties as well as the citizens to economic and political costs seems like a counterintuitive way to shorten negotiations. A deadline may be an alternative solution that can manage the costs to parties and societies while shortening the negotiations.

### **Economic History**

After WWII Belgium experienced a thirty-year period of growth with low unemployment. During these earlier periods Wallonia was the dominant regional economy focusing on the industrial sector, mainly coal mining and the metal industry, while Flanders was more Agrarian (Jeeger, 2012). However, this period of growth abruptly ended with the oil crisis and the end of the Bretton-Wood era in the 1970's. This crisis damaged the Belgium economy leading to a series of recessions, most notably, the 1980-1982 recession which caused massive unemployment (Belgium Overview). From the mid-1980's to the mid 1990's Flanders growth was higher than Wallonia's (Jeeger, 2012). Due to Belgium being centrally located in Europe they became a prime location to export intermediate goods. Since Flanders region had access to

ports, railroads, and major highways it was in a better place than Wallonia to take advantage of export oriented industries. Therefore, you saw a switch from Wallonia being the dominant economic region to currently Flanders being the dominant economic region in Belgium. Also, it's important to note that Flanders has also become a service based economy while the industrial base of Wallonia has been faltering.

In 1993 the European Union was formed, whose headquarters would be placed in the city of Brussels. This completed the Single Market opening the door to goods, services, people and money from other European Nations. This had the significance of bolstering Flanders export market by freeing the movement of goods. Then, on June 1, 1998, Belgium Monetary Policy was handed over to the European System. Following that, the Euro was adopted on January 1, 1999. The establishment of a single currency and monetary policy had the benefit of reducing fluctuation in currency prices, eliminating exchange costs and strengthening the single market (Europa).

Although the Euro may have strengthened financial markets, it may have made Eurozone Countries more susceptible to failure of the major players. This susceptibility came to be known as the "contagion effect" in which the financial downfalls of one country could dramatically affect the finances of countries closely connected to it. In 2008, Belgium experienced this contagion effect when it had to bail out two of its biggest banks due to the financial crisis that started in the United States. Specifically, France and Belgium bailed out Dexia bank for a combined \$9 Billion, and Belgium, the Netherlands and Luxembourg bailed out Belgium's biggest bank for a combined \$16.2 billion (Lander, 2008). This of course served to increase Belgium's already high debt, as well as most European nations (see figure 2).



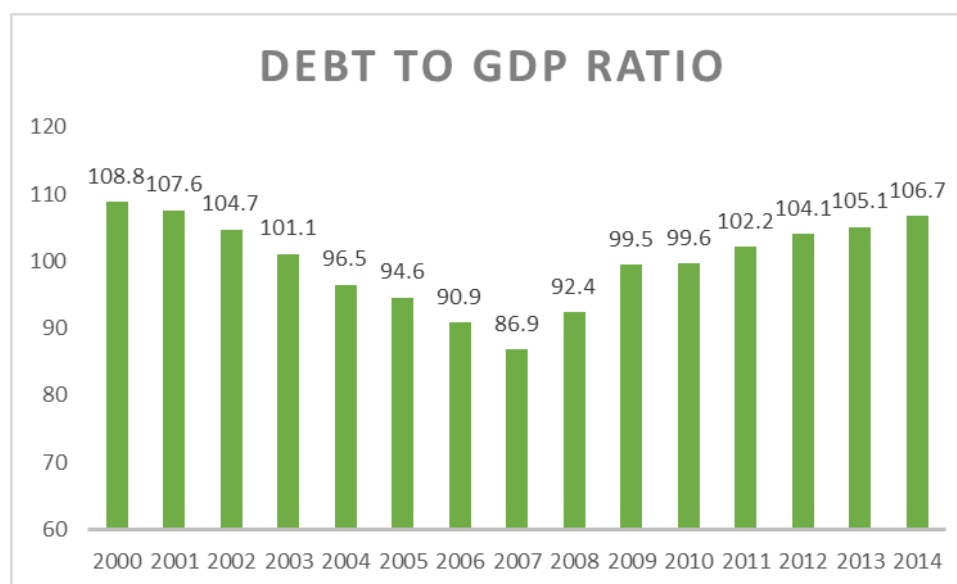


Figure 2

The Financial Crisis of 2008 quickly turned into the Eurozone Debt Crisis. The Eurozone debt crisis was started when several Eurozone member states were unable to re-pay their debt or bail out over indebted banks. Although the Eurozone created a common monetary policy, countries still maintained their own fiscal policies. This had the effect of presenting smaller countries the opportunity of borrowing large amounts of money that were previously unavailable. Before the Euro, lenders were uncomfortable lending large amounts of money to smaller countries for fear they would not be able to pay back their debt. However, after joining the Eurozone system, smaller countries could free ride off of Germans, as well as other large countries, credibility and could borrow at the same low rate. Lenders now thought that if the small countries became overwhelmed with debt, Germany and other countries would step in to pay back the debt since they were all bound by a common currency. Therefore, credit flowed, debt accumulated, and the economies of Europe become even more integrated.

Then comes the financial crisis, which forced countries to accumulate debt or allow their banks to fail. This triggered the debt crisis, and one of the major worries of this crisis was the contagion effect. Because the Eurozone countries were greatly interconnected due to the Euro, if one country failed to payback its debt it makes the lender countries weaker; possibly forcing them to default. This could create a chain reaction that could reverberate across the world (Cannon, 2015). This free riding of credibility and fear of contagion effect created by the Euro will be important in explaining the changes in the government formation process in Belgium.

### **Belgium 10 Year Bond Price Index**

One of the cited causes for the ending of the Belgium Political Crisis was the pressure exerted by the financial markets (Chapman, 2011). To check the validity of this statement I will rely on the Belgium 10 Year Bond Prices. I am using bond prices because a day before parties cemented an agreement that would lead to the formation of a majority coalition government Yves Leterme called for parties to form an agreement for fear that borrowing costs would reach unsustainable levels. In figure 3, you see Leterme's worry in the sharp rise in bond prices in November 2011. Therefore, I will analyze the significant economic and political events that may have led to this sharp rise in borrowing costs and how financial markets pressure the coalition formation process.

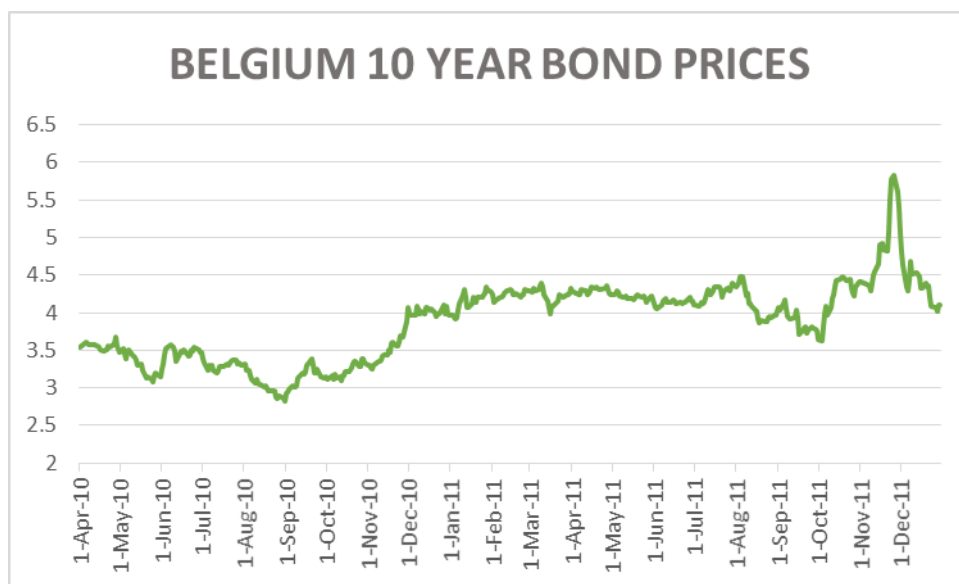
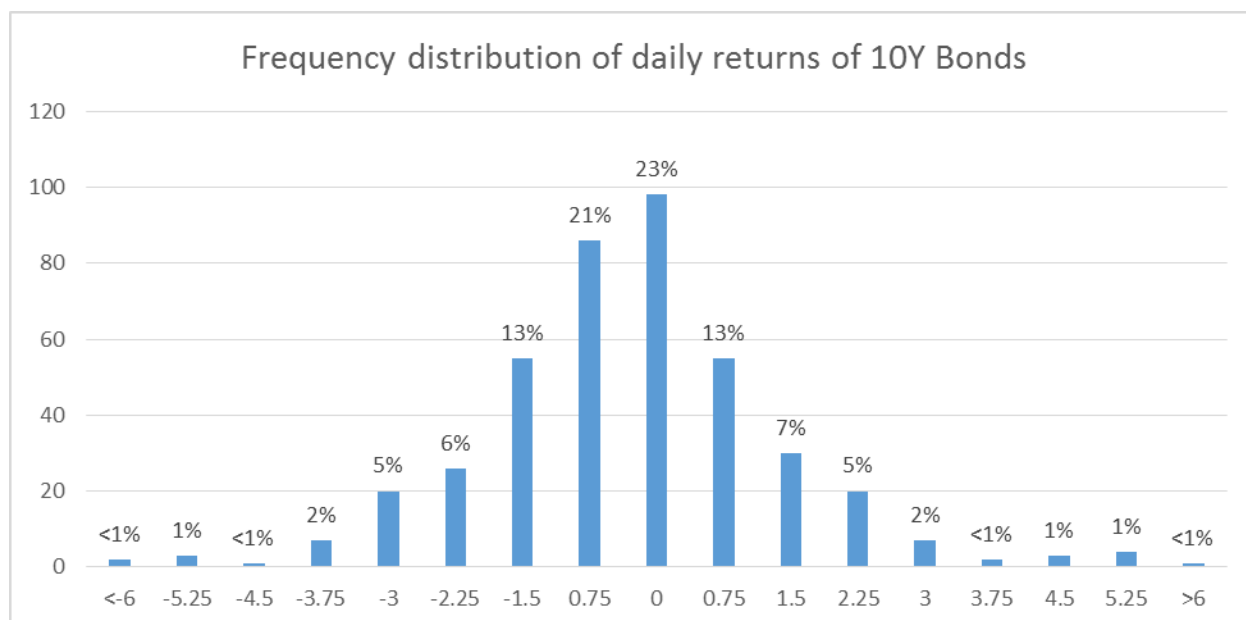


Figure 3

In analyzing bond prices, I needed a relative measure of rarity. Therefore, I used the frequency of returns to measure if a return was common place or an anomaly. In particular, any return above 3.5% or below 3.5% I will consider an anomaly. As you can see in figure 3, I am using 3.5 because less than 7% of all bond prices fall outside that range. Therefore, if a significant political or economic event happened on one of those days I will analyze and determine whether there is a causation between the rise or drop in bond prices and the significant event.



**Figure 4**

### **Belgium 2010-2011 Political Crisis**

In this section I am going to outline the major political and economic events that happened during the Belgium Political Crisis (April 26, 2010 to December 06, 2011). I will identify when major progress in the coalition formation progress was made and give possible reasons why. In future sections, I will analyze how those major events affected the negotiation process. I will be relying heavily on Thomas Jeegers (2012) outline of significant political events during the Belgium Political Crisis.

The longest political crisis in the history of modern democracies started on April 26, 2010 when the King accepted Leterme's II governments resignation. This stemmed from the inability of coalition parties to agree on the gerrymandering of the BHV district. After the resignation, Yves Leterme and his governments took the role of the caretaker government charged with overseeing day-to-day business. On June 13, 2010 elections for the new government were held. For a government to be formed, it must enjoy the confidence of the

Chamber of Representatives. Therefore, a collection of parties that hold a majority of the electorate must come together to form a coalition government. The more radical regionalist party N-VA received the most electorate in this election (see table 3). The N-VA is a Flemish regional party who has taken a hard stance on Flemish demands, such as the gerrymandering of BHV.

2010 Belgium Election Results For Chamber of Representatives

Party	Votes	%	Seats
New Flemish Alliance (N-VA)	1,135,617	17.4	27
Socialist Party (PS)	894,543	13.7	26
Reform Movement (MR)	605,617	9.3	18
Christian Democratic & Flemish (CD&V)	707,986	10.8	17
Socialist Party. Different (sp.a)	602,867	9.2	13
Open VLD (Flemish Liberals and Democrats)	563,873	8.6	13
Flemish Interest (VB)	506,697	7.8	12
Humanist Democratic Center (CDH)	360,441	5.5	9
Ecolo	313,047	4.8	8
Green!	285,989	4.4	5
List Dedecker	150,577	2.3	1
Popular Party (PP)	84,005	1.3	1
Workers' Party of Belgium (PVDA/PTB)	101,088	1.5	0
National Front (FN)	33,591	0.5	0
Others	181,429	2.8	0

Source: Electionresources.com

Table 3

For several months after the election, the parties went through a series of mediators appointed by the King who tried and subsequently failed to bring a coalition together. Then on 14 December 2010, the S&P placed Belgium under a negative outlook and threatened them with a downgrade (Jeeger, 2012). Then on February 2<sup>nd</sup>, 2011, the Monarch made an unusual move

tasking the caretaker government to present the 2011 budget, and "to answer soon European demands regarding budget policy and structural reforms in the coming years" (Bartunek, 2011). Generally, the caretaker government is not charged with such major economic plans, but it seems the unusual length of the political crisis called for an expansion in power. Furthermore, the expansion of power to appease European demands may have been foresight that European Commission would soon demand a reduction of debt and deficit under the Extensive Deficit Procedure. Under the Stability and Growth Pact a member of the Eurozone cannot exceed a deficit of 3% or a debt to GDP of 60%; unless there is continual improvement. If a country does exceed these guidelines, the European council, with recommendation from the European Commission, may put that country under the excessive deficit procedure. This procedure starts with a roadmap to reducing the country's debt and deficit, but if there is not significant reduction the Council can sanction the country .2% to .5% of their GDP. At the time, Belgium had one of the highest debts in the Eurozone of around 98% and a deficit of 4.1% (Bartunek, 2011). Therefore, the King may have predicted this outcome and charged the caretaker government to do what is necessary to prevent being sanctioned.

None of this led to the formation of a coalition, and on May 23, 2011 Fitch changed Belgium's outlook from "stable" to "negative" (Jeeger, 2012). Then on July 4<sup>th</sup>, 2011 the N-VA refused to participate in coalition talks because of a note laid out by the King. Since the CD&V were a part of a pre-electoral coalition with N-VA, this put pressure on them as to whether they would continue without the N-VA. If the CD&V did not join the now 8 party talks, the 7 remaining parties (socialists (PS), liberals (MR), Christian democrats (CDH) and greens (Ecolo) for Wallonia and socialists (SP.A), liberals (Open VLD) and greens (Groen!) for Flanders) would not have the two-third majority needed to conduct state reforms (Pressure, 2011).

However, on 21 July 2011 CD&V agreed to return to the negotiation tables after some changes were made to the proposed agreement from Di Rupo (Socialists (PS) leader) (Mitchell, 2011).

On September 24, 2011, an agreement to the separation of the BHV district was concluded. The Halle-Valvoorde portion of the district will be returned to Flemish municipalities while French speakers in those regions will retain the right to vote in Brussels lists (BHV, 2011). This compromise allowed Flemish communities to return to the Flemish electorate while not detaching the French speakers from their French parties in the capital of Brussels. This was a major turning point. However, there were still the issues of financing laws regulating how much regions receive from national taxes and the devolution of power from the federal government to the regional governments that still needed to be dealt with (BHV, 2011).

In October, 2011 several economic events occurred that caused bond prices to increase by decreasing investors trust in the caretaker's ability to stabilize the economy. The first occurred on October 7<sup>th</sup>, 2011 with Moody's decision to place Belgium's Aa1 rating on review for possible downgrade (Jeeger, 2012). Then on October 10<sup>th</sup> 2011 Belgium agreed to bailout Dexia, for the second time, by paying 4 Billion Euros (Dexia Agrees). This pushed Belgium's debt to GDP ratio up by one percent, which reduced the EU's confidence in Belgium's ability to reduce their debt/deficit to levels agreed upon in the Stability and Growth Pact (Dexia Agrees). Following this downturn, on October 11<sup>th</sup> the sixth state reform was passed, which led to the creation of a new Belgian Senate characterized by limited power. Then, on October 13<sup>th</sup> 2011, the two green parties (Groen and Ecolo) were forced to quit coalition talks reducing it to six party talks.

Pressure seemed to heat up in November. One major worry from investors as well as Europe was the lack of a budget for 2012. The European Commission was worried that without a

budget Belgium would be unable to reduce its debt and deficit, which would affect the price of the Euro. However, the problem was that even though the King mandated the caretaker government to do what is necessary for the stability of Belgium, which included appeasing European demands, the creation of a budget would be an overreach of their limited powers. Especially considering that the budget was the main obstacle in the six party talks. Therefore, on November 17<sup>th</sup> the EU threatened to sanction Belgium under the Excessive Deficit Procedure if they did not have a budget created by the end of the year (Clapham, 2012). This threat combined with a German Bond Auction failure on November 23<sup>rd</sup> and the S&P downgrade of Belgium credit rating on November 25<sup>th</sup> seemingly caused Belgium bond yields to soar.

The financial pressure on the government formation process must have been enormous because after the S&P issued its report Leterme made, for the first time, a public plea to the six parties to form a budget before markets opened on Monday for fear that borrowing costs would rise to unsustainable levels. It was important to have an agreement before Monday because Belgium was scheduled to sell bonds on Monday. Due to the bailout of Dexia and an increase in treasury buybacks, there was an unexpected increase in the gross financing requirements from 41 billion (expected) to 50 billion (actual) for 2011 (Federal Government). Regardless of the bond prices, Belgium needed to finance the 4 billion Euros it lent out in October. Therefore, out of fear and necessity the parties came together in less than 24 hours after Leterme's plea agreeing upon a budget for 2012, 2013 and 2014 paving the way for a government to be formed. With an agreement in place, this led to a successful bond auction on Monday; even if it was the highest bond yields in 11 years (Reilly, 2011). Then on December 6<sup>th</sup> 2011 the longest political crisis in modern democracy ended with Elio Di Rupo taking the oath for prime minister of the new



government, which included the socialists (PS/sp.a), the Christian democrats (csH/CS&V) and the liberals (MR/Open Vld), but excluded N-VA (Jeeger, 2012).

### **Summary**

To recap, the rise of regionalist rhetoric in 2007 led to the resurfacing of the BHV issue which caused the government shutdown in April, 2010. The big winner of the June, 2010 elections was the more radical N-VA party who were pushing the gerrymandering of BHV in Flanders favor. This led too several months of discussions with no compromise on the BHV issue. During this time, the King asked the caretaker government to do what is necessary for the stability of Europe, which included satisfying European demands. By July, 2011 the N-VA party ran out of patience and refused to continue negotiations in the eight party talks. This put CD&V (Christian Democrats) who were in a pre-electoral coalition with N-VA in a precarious position, however, they decided to continue negotiations without their partner. Then in September, an agreement was reached to split the BHV district, but allow French citizens in that area to maintain connection with their parties in Brussels. This did not end negotiations; there was still the issue of the budget. Then, from October to November of 2011 there were a series of financial crisis that increased the debt and borrowing costs. This tidal wave of financial pressure crashed on Friday, November 25<sup>th</sup> when the S&P decided to downgrade Belgium's credit rating. Afterwards, Yves Leterme called on parties to form an agreement around the budget for fears of borrowing costs reaching unsustainable levels. In less than 24 hours, the parties responded and formed an agreement which appeased the markets leading to a semi-successful bond auction on Monday. Finally, on 6 December 2011 Elio Di Rupo was sworn in as Prime Minister ending the 589 day long political crisis.

## Chapter 2

### Financial Markets and the EU

This chapter analyzes the significant events during the Belgium Political Crisis stemming from the financial markets and EU. The main obstacle in analyzing how economic events cause political pressure is how do you measure political pressure? Without a transcript of the party talks or interviews with the politicians it's nearly impossible to know what politicians were thinking when they made choices. However, there are some clues as to what may have been concerning the political elites. For instance, Yves Leterme plea to the parties to come up with a budget before borrowing costs became too high, which led to a 16 hour negotiation between the parties and subsequent creation of a budget strongly suggests borrowing costs pressured politicians. Although this is certainly not the only factor, I will assume that it was a significant factor. Therefore, I will use 10Y Belgium bonds as an indicator of "political pressure" and correlate it with significant events to try to weed out the potential effect the event had on the government formation process.

I will break this chapter into three sections: Credit Rating Agencies, Dexia Bank Bailout and European Union. In all three sections I will be looking at changes in Bond Yields on the days of significant events. Because an event could still cause political pressure even if bond prices did not rise, I will not be able to conclude any event was "insignificant". I can only suggest that if an event is correlated with an unusual raise in bond prices that it may possible have pressured politicians. This leads to the question of what is an unusual rise in bond prices? In chapter 1 I determined that a rise or drop more than 3.5% in bond yields is "unusual".

## Credit Rating Agencies

In the overview, we saw how that in less than 24 hours after the credit rating agency S&P downgraded Belgium's credit rating, party politicians came together and formed a budget. In S&P's press release they noted that the downgrade was due to an anticipated increase in government debt; inability to form a new government; and a slowdown of growth in the export sector (see press release below). Although it seems that the downgrade pressured the parties into action, did the downgrade threaten borrowing costs, as Yves Leterme put it, to rise to unsustainable levels?

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### *S&P Press Release*

*What we see as renewed funding and market risk pressure, which is increasing the perception of difficulties in the Belgian financial sector and in our opinion raising the likelihood that the sector will require more sovereign support. This, in turn, increases the likelihood that contingent liabilities will crystallize on the sovereign's public balance sheet, in our view. In the context of Belgium's already high stock of general government debt (anticipated to end 2011 at around 93% of GDP in net terms, and at around 97% of GDP in gross terms), this could potentially push net general government debt above 100% of GDP.*

*Risks to the government's budgetary position, stemming from an increasing likelihood we see that economic growth will slow, given the deleveraging of the European financial sector. With exports of over 80% of GDP, Belgium is one of the most open economies in the eurozone and is therefore in our opinion highly susceptible to any weakening of external demand.*

*The ability of authorities to respond to potential economic pressures from inside and outside of Belgium, which in our opinion is constrained by the repeated failure of attempts to form a new government. While Belgium's caretaker government has implemented temporary measures that have*

*improved the primary fiscal position during 2011, in our opinion it lacks a mandate to implement deeper fiscal and structural reforms.*

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The purpose of a credit rating agency is to assign credit ratings that indicate a debtor's ability to pay back its debt. Although this sounds like a tool investors would use to judge a country's ability to pay back its debt, there is a question if they are providing new information or reacting to what the markets already know? Ferri, Liu, and Stiglitz (1999) argued that these agencies exhibit pro-cyclical behavior, downgrading nations during crisis and upgrading in booms. On the other hand, there are many studies that show credit rating changes have significant impact on the stock market (Cantor & Packer, 1996; Reinhart & Rogoff, 2004; & Bissoondoyal-Bheenick, 2004). For example, Fatnassi, Ftiti and Hasnauri (2014) found that two days after a downgrade stock markets decreased by .41% and three days after increased by .32%.

To better understand how the credit rating agencies played a role I will look at the changes in bond yields during significant events involving the agencies. To gather the dates of these events I used Jeeger's (2012) outline of significant events during the Belgium Political Crisis. There are four times during the crisis and on after where credit rating agencies made announcements that could have affected investors' confidences. First starts on December 14<sup>th</sup> 2010, when the S&P placed Belgium under a negative outlook and threatened it with a downgrade. Then in May 23<sup>rd</sup> 2011 Fitch changed their outlook from "stable" to negative. Following Fitch, on October 7<sup>th</sup> 2011, Moody decided to place Belgium's Aa1 credit rating under review for possible downgrade. Finally, on November 25<sup>th</sup> 2011, The S&P downgraded (Isidore, 2011). Although it's after the crisis, on Dec 16 2011 Moody downgraded Belgium Aa1 credit rating to Aa3 (Moody, 2012).

When comparing Belgium bond prices to these events, you do not immediately find any discernable patterns (see table 4). Although, it must be noted that trying to interpret any patterns out of a set of five events is susceptible to significant flaw due to high margin of error. Nevertheless, In these scenarios, which I marked “after close”, I used Monday’s bond prices to represent investors reactions. Immediately you may notice the unusual drop in bond yields on November 25<sup>th</sup>. This is most likely due to the lack of formation of a budget by the Belgium parties, which was a much-cited concern for many investors. If we disregard November 25<sup>th</sup> bond prices it seems that there may be a slight upward bias, however, none of the rises in bond prices would be considered unusual. Although it’s dangerous to try to establish any conclusions from this, I think it’s possible that the downgrade may have caused a slight rise in bond yields if the parties did not establish a budget.

Date	Event	Price	Open	Change %
14-Dec-10	December 14: S&P place Belgium under negative outlook and threaten it with a downgrade.	4.061	4.014	1.78%
23-May-11	May 23: Fitch's outlook changes from "stable" to negative	4.214	4.254	-0.26%
7-Oct-11	October 7: Moody's decision to place Belgiums Aa1 rating on review for possible downgrade (after close)	4.075	3.972	2.62%
25-Nov-11	November 25: S&P downgrade Belgium (after close)	5.609	5.804	-3.82%
16-Dec-11	Moody Downgraded Belgium from Aa1 to Aa3 (after close)	4.393	4.276	1.43%

Table 4

If the change in credit rating would have only resulted in a small rise in the bond yields, why the strong reaction by Yves Leterme? Although it may have only been a slight rise, Belgium bond yields were already at a historic high. At the close on 25<sup>th</sup> of November bond prices were at 5.832, which is only a 2.88% increase away from the dreaded 6. It may have been that Belgium would have been unwilling to sell bonds at higher than current prices. If this was the case, Belgium would have fallen short on Mondays bond auction in collecting capital it to pay back an unexpected increase in yearly expenditures due to among other things the Dexia Bank Bailout. Leterme could have also been responding instead to the “fear of contagion” caused by Germans recent failure at their bond auction. I will touch on both of these hypotheses in the next sections.

### **Dexia Bank Bailout**

Although the bailout of Dexia may have been inevitable, it nevertheless increased pressure on politicians by raising the debt and reducing investors' confidence in Belgium's ability to pay their debt back. To recap, on November 10<sup>th</sup>, 2011, Belgium, France and Luxembourg financed the bailout of Dexia Bank. Belgium's share was 4 Billion Euros and a 54 Billion Euro guarantee (Peston, 2011). In part, this had the effect of further raising yearly financing requirement from an expected 41 billion to an actual 50 billion for 2011 as well as raising debt to GDP by around 1%. (Federal Government). This unexpected financing requirement and rise in debt may have affected investors as well as credit rating agencies confidence. In fact, some analysts claimed that the rise in borrowing costs during this period was largely due to the bailout of Dexia (Chapman, 2011). However, it is very hard to see any correlation. Possibly because this crisis was known for a long time, and investors made their decisions beforehand. Nevertheless, on the day of the bailout, the bond yields rose a high but not significantly (2.62 percent). Furthermore, the bailout led to a warning from the credit rating agency Moody, which it just put under review, that it could lead to a downgrade in their credit rating (Dexia, 2011). All these factors considered, I believe the bailout was an important addition to the pressure put on the parties to develop a budget to deal with the evolving fiscal crisis.

### **European Union**

In this section I will be looking at the European Unions effect on bond markets. I will separate this section into two parts. The first part will consist of the stability and growth pact, which is an attempt at trying to identify how the European Unions threat of sanctions could have

affected the bond markets. However, it will also attempt to discuss its persuasion on the political class in more general terms. The second section will discuss Germany's failure at bond auction, and its effects on not only Belgium bond markets but also other member states as well.

Essentially, I will be exploring how the EMU may have heightened fears of contagion causing other members failures to play a bigger role in Belgium markets.

### **Stability and Growth Pact**

The Stability and Growth Pact was initiated in 1999 as a safeguard to ensure EU member states pursued sound fiscal policies. There are three processes of the SGP: prevention, correction and enforcement. The Preventive arm of the SGP sets budgetary targets known as Medium-Term Budgetary Objectives (MTO). Member states are expected to reach these objectives by adjusting their structural budgetary position at a rate of .5% of GDP per year as a benchmark. Complementing the MTO, is an expenditure benchmark which aims to contain the growth rate of government spending at or below a country's medium-term potential economic growth rate (Europa).

If a country fails to maintain its fiscal spending within the guidelines of Stability and Growth Pact, they can be subjected to corrective procedures. More specifically, if a member exceeds a deficit threshold of 3% or a debt level of 60% (that is not decreasing) they may be placed under the Excessive Deficit Procedure (EDP). The EDP is a list of benchmarks a country is supposed to reach in a specified time limit to reign in their fiscal spending. The decision to subject a country to the EDP is initiated by the EU commission who sends a report with their recommendation to The Council. After receiving the report, The Council may place the country under the excessive deficit procedure; giving them a 6-month deadline to comply with



recommendations for reducing their debt or deficit. If these recommendations are not satisfied within the time limit, the Council may evoke the enforcement mechanism sanctioning the country a non-interest-bearing deposit of .2% of GDP. If the situation continues to devolve, the Council could raise the sanction to .5% of GDP or temporary suspension of assistance from the cohesion fund. The EDP has been enacted on many occasions, and currently nine countries are in some phase of the process.

When looking at the threatening to sanction Belgium under the EDP on November 17<sup>th</sup> 2011, we find that it was conspicuously close to the decision of the parties on a budget on November 26<sup>th</sup>. Although distance between two events does not necessarily mean they are connected, I think its possible considering the nature of sanctions that it could have pressured politicians. In particular, I think sanctions could have pressured parties directly by its very nature or indirectly through bond markets. Therefore, I will analyze both aspects of pressure.

In regards to whether the sanctions directly pressured the politicians, this relies on the credibility of the threat and time when the sanctions would be applied. The credibility of the threat I find to be low due to previous failure of the EU trying to apply sanctions. In 2003, France and Germany could avoid EU sanctions when the finance ministers blocked the EU initiative (Ambrose, 2003). This incident, as well as others, has placed doubt as to the resolve or effectiveness of the enforcement mechanism in the EDP. Furthermore, I have yet to find an incident where the enforcement mechanism was applied. This lack of credibility should reduce the pressure on politicians as well as investors' confidence as an enforcement mechanism.

As for the time, the sanctions would only be applied if the parties failed to develop a budget by the end of 2011. However, sanctions would have been a minor concern compared to the consequences of being unable to conduct day-to-day government activities without an

appropriate budget to guide them. Nevertheless, we can think of the sanctions as an extra incentive to developing the budget. The problem with judging the effectiveness of this threat is that the budget issue was resolved neither immediately after the threat nor right before its application. Instead, the budget issue was resolved at a seemingly strategic time between the downgrade of their credit rating and bond auction purchase. Ofcourse, when making the decision to compromise the parties knew that they would eventually be faced with the application of sanctions. Nevertheless, I do not think it was the driving issue behind the agreement.

The second way the sanctions could have pressured the parties was through the markets. However, when you look at the rise in 10Y bond yields on November 17<sup>th</sup>, 2011, the day of the threat, you find a minor increase of .61%. This is hardly indicative of a strong investor's reaction to the news. But, investors may have predicted the EU's response when the EU commission released their forecasts. These forecasts show the EU's beliefs about a country, and if the number violate the debt/deficit levels mandated by the EDP it is not unreasonable to assume that the EU may threaten to sanction the country. However, after looking at the distribution of a sample size of 25 commission reports. There was no discernable difference from that distribution and the one of every price I provided in the beginning. Although the report may help determine EU belief's, the numbers which are used to determine whether EU will sanction Belgium could be found in many sources. Therefore, its not surprising that investors do not react strongly to these events.

### **German Bond Auction Failure**

On November 23<sup>rd</sup>, 2011, Germany failed to auction 35% of its bonds which caused a shockwave of investor's reaction that pushed Belgium bond yields by 8.46% (Dobson, 2011). This by far was the most dramatic increase in Belgium bond markets. Just as surprising, was this

shockwave extended across the EMU causing increases in bond yields for every member. I believe this shockwave stemmed from a “fear of contagion” caused in part by the European Debt Crisis.

The Eurozone debt crisis was a situation where several Eurozone countries were unable to repay or refinance their debt following the Great Recession. One of the fears of the crisis was because of the integrated markets caused by the formation of the EMU, if one country was unable to repay their debt this would affect the other Eurozone countries ability to repay their debt. This fear of contagion seemed to have raised not only Belgium 10Y bond yields but all EMU members bond yields (see figure 5). This figure depicts the percent rise in EMU members 10Y Bond yields. As you can see, every members bond yields increased and some rather dramatically. Therefore, it seems that the interconnection of markets is somewhat of a double edge swords. Small countries like Belgium can procure low borrowing rates by using Germany’s credibility, but it also exposes their borrowing rates to the financial situation of Germany.

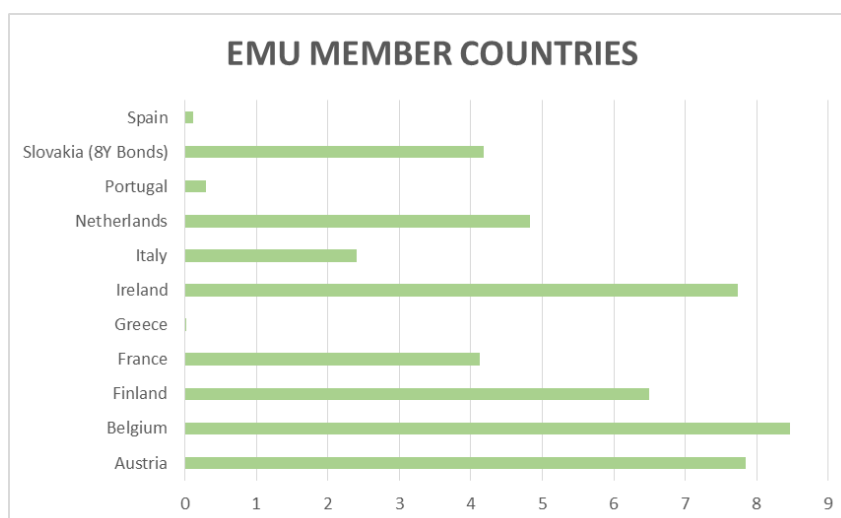


Figure 5

When we compare the effects Germany's bond auction failure had on non-EMU members we do not find as strong reactions. For instance, when compared to EU members who are not in the Eurozone, there is a mixture of positive and negative reactions with only Czech Republic showing a seemingly significant reaction (see figure 6). Since these countries do not use the Euro as their currency, it makes sense that a failure to sell enough Euros would not affect their currencies borrowing rates as dramatically. On that same note, members of the European Free Trade Association also seemed to have varied results; with Germany's neighbor Switzerland being the most dramatic.

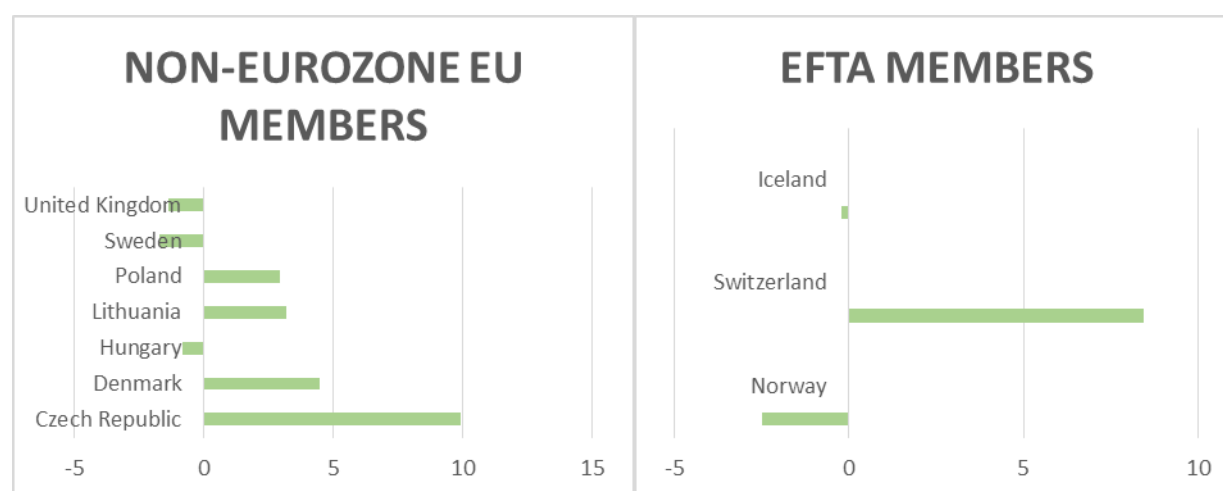


Figure 6

Even after the climax of the Eurozone Debt Crisis, it seems that when Germany fails to auction its bonds the borrowing costs of EMU members increase although not as dramatically. Because the EMU was a first of its kind, there was great uncertainty in its ability to handle the Eurozone Debt Crisis. Therefore, at the climax of the crisis it is not surprising to see more dramatic reactions by investors. In particular, more dramatic reactions to Germany's failure at bond auctions. However, since Germany's large market is the foundation of the Euro, we should still expect to see changes in other EMU members borrowing costs when Germany fails at

auction. In figure 7 we see two events after the climax of the Eurozone Debt Crisis where Germany failed to auction off all its bonds. As you can see there still seems to be an increase in the EMU member states. Although the increase is not as dramatic as before and seems to be progressively less dramatic. Nevertheless, I think we can expect to see Germany's financial situation effect the borrowing costs of EMU member states if they are the strongest economy in the EMU. This means that political pressure stemming from financial markets is more connected to the financial situation of Germany

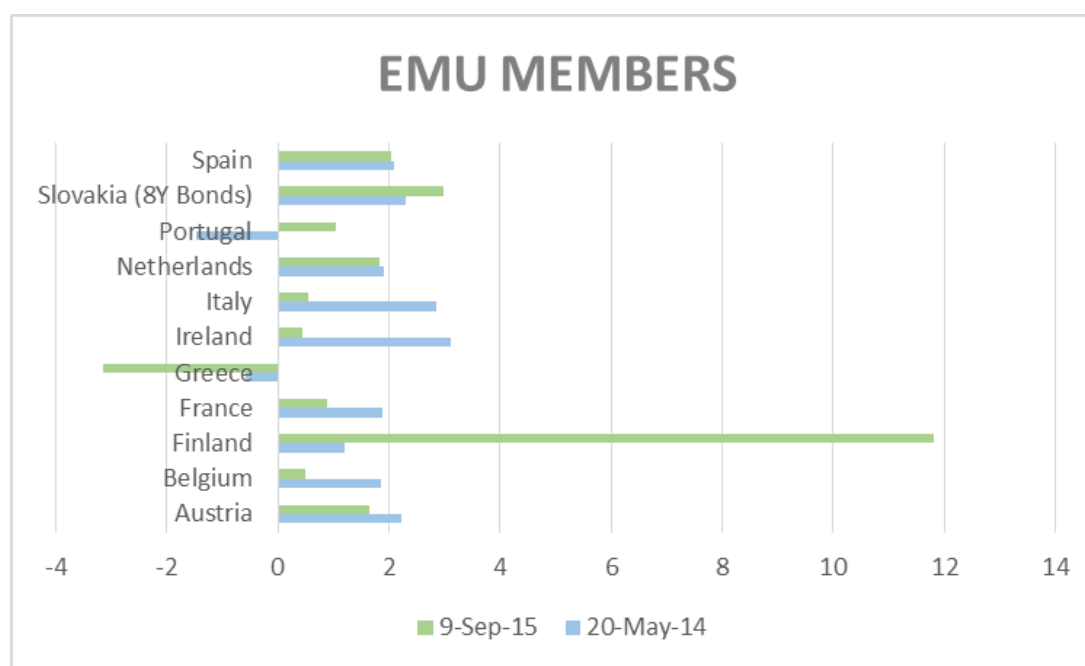


Figure 7

## Summary

In this chapter, we identified three possible events that could have raised the borrowing rates. The first of which was credit rating agencies who downgraded Belgium's credit rating. Although it is dangerous to draw too much conclusions from the limited sample, it seems like they had a minor upward influence on Belgium 10Y Bonds. The second factor was Dexia's bank

bailout. Although it is impossible to correlate such an event with bond prices as investors were watching Dexia for a long time, it was a major event that was often cited as an indicator of the current turmoil in the European banking system. The most dramatic event on bond prices was the German failure at auction. The German failure at auction combined with the downgrade by the S&P seemed to be the events that caused the parties to compromise.

## **Chapter 3**

### **Analysis of the Length of Government Formations**

In this chapter, I consider the conditions that allowed for the lengthening of the government formation process. One possible reason was that the establishment of the EU provided safeguards which enabled politicians to lengthen the government formation process (Hooghe, 2012). If this is true, then after the establishment of the EU we should have seen a lengthening of the government formation process. A second possible reason was after the Cold War Belgium's external security threats decreased allowing for internal divisions to re-emerge. A third reason is changes in party dynamics could have led to the lengthening of this political process. Also, I will consider how the bond markets and budgeting process can put a time limit on the government formation process. I will be using Deschouwer (2009) data on the length of the government formation process and party dynamics, and only filling in the last several years.

### **A Brief History of European Integration**

At the end of WWII, there was a demand for creating an institutions that would make another European war unthinkable. This demand manifested into The Schuman Plan, which aimed at preventing another European war by creating a common market for iron, steel and coal in Europe. This plan was the foundation for the establishment of the European Community Coal and Steel Community (ECSC), which was formed by France, Germany, Italy and the Benelux countries (which includes Belgium) through the Treaty of Paris in 1951. Furthering this integration, the Treaty of Rome was signed in 1957 by much the same countries. The treaty established the European Economic Community (EEC), which created a common market. In

response to this establishment, those countries who wanted reduced trade barriers, but not by transferring power to a supranational organization, developed the European Free Trade Association (EFTA). After this, there were a series of attempts and debates on further integrating Europe, but the next major changes occurred in 1993. In 1993, the Single Market Act was established which freed the movement of goods, services, people and capital for EEC members. This was followed by the Maastricht Treaty in November where the EEC was integrated into the European Union (EU). The Maastricht Treaty established three pillars known as the European Communities, Common Foreign and Security Policy (CFSP), and police and judicial cooperation in criminal matters (JHA). Furthermore, it established the Economic Monetary Union (EMU) and the European Citizen. Finally, the single currency known as the Euro was introduced in 12 of these EU countries in January 2002.

### **Analysis of Coalition Government Formation Process**

Since the late 1980's the length of time it takes to form a government has dramatically increased. Prior to 1988 the average length of government formation took around 30 days while post 1988 it took 110 days (see table 5). I will explore three events during this time that could cause coalition negotiations to lengthen. The first event was the end of the Cold War, which



reduced external security threats in Belgium. The second event was the establishment of the EU which decreased financial risk in the market. The third was the rise of regionalist and radical right parties that caused interests to diverge.

The establishment of the EU reduced financial risk, which led to longer coalition negotiations. The EU and the Euro provided safeguards through the Stability and Growth Pact. These safeguards are built to reduce risk in Europe's financial system and spread fiscal costs across countries. This combined with Germany's role as a stabilizing force gave investors more confidence that a country will pay back its debt, which reduces bond yields. As we saw, bond yields were a significant reason in the party's decisions to compromise. If the EU helps to maintain lower yields for longer time, we can reasonably assume that all else equal negotiations would take longer.

The end of the cold war and the establishment of the EU reduced Belgium's external security threats. By reducing Belgium's external security threats, divisive internal issues began to re-emerge. In table 2 you see the rise of regionalist/radical party Vlamme Belang gain electorate in 1991. Then in 2007 you see the dramatic rise of the regionalist N-VA party. These parties brought divisive issues that pit the regions against each other. With a

Date	# of days to form	# days lasted
12/2/1945	4	174
2/8/1945	6	225
13/03/1946	23	7
31/03/1946	11	100
3/8/1946	25	222
20/3/1947	7	610
26/11/48	7	213
11/8/1949	45	219
8/6/1950	1	64
16/08/50	5	511
15/01/52	6	818
22/04/54	10	1502
23/06/58	21	134
6/11/1958	2	872
25/04/61	29	1490
27/07/65	64	199
19/03/66	36	690
17/06/68	77	1239
20/01/72	74	307
26/01/73	64	358
25/04/77	45	47
11/6/1974	1	957
4/3/1977	2	43
3/6/1977	46	495
20/10/78	9	59
3/4/1979	106	288
23/01/80	7	77
18/05/80	39	142
22/10/80	15	162
6/4/1981	4	168
17/12/81	39	1397
28/11/85	45	690
21/10/87	2	54
9/5/1988	148	1238
4/10/1991	0	57
7/3/1992	103	1170
23/6/95	33	1452
13/7/99	29	1507
12/7/2003	52	1490
21/12/07	194	90
21/03/08	1	275
31/12/08	10	319
25/11/09	10	152
6/12/2011	541	901
11/10/2014	139	
	<b>Mean # days to form</b>	<b>Average # days lasted</b>
Overall	47.48888889	526.9090909
Before EU	31.37837838	472.1666667
After EU	112.1111111	773.25
Before Cold	29.28571429	452.2285714
After Cold V	111.2	817.3333333

Table 5

decreased external security threat, internal collusion was no longer as necessary.

If the EU and the end of the cold war are truly to blame for divisive rhetoric, then we should see this occur throughout EU countries. Indeed, in 2014 Ireland voted on whether to stay apart of the United Kingdom; Catalonia Spain is still trying to secede; Ukraine entered a civil war; and the National Front party is rising in France. These events and many more are suggestive that internal issues are re-emerging and interests within societies are diverging.

Divergent preferences cause stalemates within negotiations necessitating external costs to move negotiations forward. We saw in Belgium's political crisis how negotiations centered around the divisive issue of gerrymandering caused a lengthy process. These stalemates can only occur when either party are stubborn to compromise or when there is no compromisable solution. We saw stubbornness in N-VA's refusal to negotiate, but whether there is a compromisable solution is something we will explore in chapter 4.

No matter the factors that lengthened Belgium Political Crisis, the rise in bond yields ended it. Although the budgetary deadline was not established as a formal deadline for the negotiation process, the threat it posed to Belgium's ability to pay off their debt caused the bond yields to rise. The rise in bond yields made it more expensive for Belgium to borrow money and pay off their debt, which increased the likelihood they would default. These events acted as costs in the negotiation process. The costs being that if they compromised on a budget they could reduce the risk of default and the amount of money needed to pay off their debt. If they did not compromise they may end up angering the populace; threatening their hold on political power. Therefore, parties weighed the benefits of continuing negotiations to the costs of losing political power, and in this case, felt like the costs outweighed the benefits.

## Summary

In this chapter, we attempted to explain the logic behind why the Belgium Political Crisis lasted so long. We explained how the end of the cold war reduced external security threats and allowed internal divisions to re-emerge; how increased financial safeguards reduces the costs of negotiations by relieving investors and lowering bond yields; and how divisive issues stall negotiations through either stubbornness or a lack of a compromisable point. All of which are factors that can lengthen the negotiation process. Lastly, we re-iterated are previous findings that the budgetary deadline caused uncertainty that raised bond yields and thus the cost of negotiation. In the next chapter, we will build a model that replicates coalition negotiation to see whether these explanations hold up.

## **Chapter 4**

### **Coalition Negotiations**

This chapter will establish a model that captures the process of coalition negotiations in a multi-party system. The model builds off the portfolio allocation model laid out by Scott Gehlbach (2013), and the process of negotiations built by Konishii and Ray (2003). In addition to their models, I will allow for preferences not only within a policy but also between policies. This will allow for cycles of recurrent states that create a never-ending negotiation. Also, I will use backwards induction to simulate the idea of foresight. In my correspondence with the N-VA, they stated the reason for not continuing negotiations as “N-VA left the negotiating table because of the state reform and socio-economic plans put forward by Elio Di Rupo, we did not consider them a base for negotiation.” (Bram Bombeek, personal communication, April 15, 2016). I believe this shows foresight in that continuing the negotiations would lead them to a less preferable state. The model attempts to capture some of the anomaly’s we saw in the Belgium political crisis. Using this model, we will answer whether divergent preferences lengthen the negotiations; if it is in a party’s interest to be stubborn; if it is possible not to have a compromisable point; and how external costs effect the length of the game.

#### **The Model**

My model combines the use of markov chains in Konishii and Rays with the policy space in the portfolio allocation model. In addition to their models, I will allow for players to have preferences between policies; I will use backwards induction to simulate foresight; and I will create “cost tolerance”. which will imitate resistance to change. First I will define the policy

space and what it means to be in a “state”. Then I will define the process of finding the initial state, transitioning to new states, and calculating the possible end states.

The “policy space” is an  $n$ -dimensional space where  $n$  is the number of policies. Each policy lies on a continuous spectrum from 0 to 1. You can think of 0 as being the most “liberal” position and 1 as being the most “conservative” position. Each player chooses a position on the spectrum as their most preferred position for that policy. We will represent each player's choice with  $X_{ij}$  where player  $i = 1, \dots, m$  and policy  $j = 1, \dots, n$ . Once we have every  $X_{ij}$ , we will draw vertical lines extending out from each (see figure 8). The intersection of these lines is where compromises between policies can be made when forming a coalition. We will define the set of policies upon which all coalition members agree on with as  $Y_j$ .

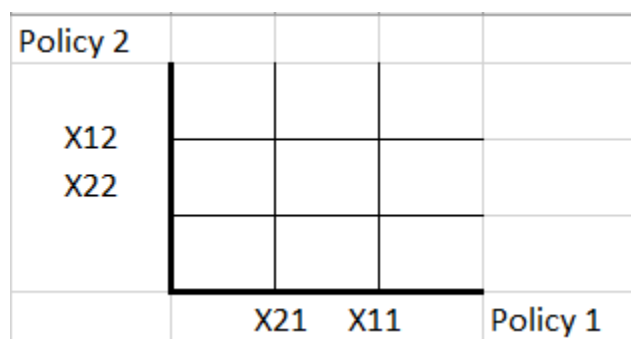


Figure 8

Not only do players have preferences within policies, but also between them. We will represent player  $i$ 's preference for policy  $j$  as  $W_{ij}$ . To find the value of  $W_{ij}$  we will have each player rank their policies from 1 to  $n$ . We will allow players to state they are indifferent between one and more policies. If they are indifferent we will reevaluate  $W_{ij}$  by letting  $r$  represent the rank and using equation (1) in figure 10. By allowing for a weighting scheme we can imitate logrolling situations in which two players with different preferred policies give up their least preferred policies in exchange for their most preferred policies (see figure 9 for an example).

Policies	Rank	Indifference	Wij	Wij (adjusted)
Policy 3	1		2/5	2/5
Policy 2	2	Indifferent	3/10	2.5/10
Policy 1	3		1/5	2.5/10
Policy 4	4		1/10	1/10

Figure 9

Now that we have defined the policy space we need to define the negotiation process. I will use Konishii and Rays markov chains to help define the process. Konishii and Ray used an abstract notion of what it means to be in a “state”. Because I defined the space in which negotiations take place in, I will define a state as a coalition which is associated with a  $Y_j$ . At each round of the game there will be a state. However, just because you enter a new round does not necessarily mean you enter a new state. We will assume that all the possible coalitions will be defined at the beginning of each game based on the kind of system you are imitating. Before we can talk about transitioning between states, we need an initial point. To find the initial point we will randomly select a player to be the “formateur”. This player will then select its  $X_{ij}$  as the initial  $Y_j$ . We are assuming that parties are policy seeking rather than position seeking, so the formateur will select a random coalition in which they are a part of to finish defining the initial state.

To transition to another state, we need to evaluate preferences of players between different  $Y_j$ . To calculate a player’s preference for a policy set proposed by another coalition in which they are a part of,  $\hat{Y}_j$ , we will use equation (2) in figure 10. The closer (2) is to zero, the more preferred the policy set  $\hat{Y}_j$ . Using this equation, we can find when it is in a player in the current coalitions interest to move to another coalition. A transition to a new state can occur when any

player in the current coalition prefers the  $\hat{Y}_j$  over  $Y_j$ . Not only must the current coalition player prefer  $\hat{Y}_j$  but also every member of the offering coalition must prefer  $\hat{Y}_j$ . To determine this, we will use the equation (3) in figure 10. If more than one player in the current coalition prefer to transition to a new coalition, randomly pick one of those players to move. If the player chosen to move has more than one coalition they prefer to the current coalition, randomly pick from those choices the coalition they move to. These transitions can be represented through something like a transition probability matrix.

$$\frac{n + 1 - r}{\sum_{j=1}^n W_{ij}} \quad (1)$$

$$\sum_{i=1}^m \sum_{j=1}^n |W_{ij} \times (X_{ij} - Y_j)| \quad (2)$$

$$\sum_{i=1}^m \sum_{j=1}^n |W_{ij} \times (X_{ij} - Y_j)| > \sum_{i=1}^m \sum_{j=1}^n |W_{ij} \times (X_{ij} - \hat{Y}_j)| \quad (3)$$

$$\left| \sum_{i=1}^m \sum_{j=1}^n |W_{ij} \times (X_{ij} - Y_j)| - \sum_{i=1}^m \sum_{j=1}^n |W_{ij} \times (X_{ij} - \bar{Y}_j)| \right| \quad (4)$$

$$P(x|y < X \leq 10) = \frac{\int_y^{10} \lambda \times e^{-\lambda y} dx}{1 - e^{-\lambda 10}} \quad (5)$$

Figure 10

The game can end in either a non-communicative recurrent state or a communicative recurrent state. A recurrent state is a state that has a probability of 1 for returning to that state. A non-communicative recurrent state means that once in that state, there are no other states that it can transition to. A communicative recurrent state is one where transitions cycle through two or

more finite recurrent states and never leave the cycle. The communicative recurrent state is created by allowing preferences between policies. This represents scenarios where no one has an incentive to compromise. To calculate party's payoff for entering a communicative recurrent state you must give each point a probability. To find the probability for each point you must set up a transition probability matrix and calculate the limiting probabilities of each point. This will tell you how much time is spent at each point and hence the probability of ending at that point. Using these probabilities, you can multiply them to the value of each point, equation (2), then the summation is a parties preference for the communicative recurrent state.

After finding the initial points, possible transitions, and ending points, we will use backwards induction to simulate "foresight". By foresight I mean that players can see where the negotiations are heading and can choose to reject offering (or accepting) a transition if they prefer the current state,  $Y_j$ , over the future state,  $\bar{Y}_j$ . Therefore, not only can the player in the current coalition reject a profitable offer but also the players in the next coalition can reject to offer. To calculate this, we will use backwards induction and the equation (4) in figure 10. If the value inside the outer absolute values of equation (4) is negative, then that player prefers the current state. If the player prefers the current state, then the absolute value will identify their "cost tolerance" for wanting to remain. Conversely, if the value is positive and the player prefers the future state, then the absolute value identifies their cost tolerance for wanting to leave the current state. If at any one state there is at least one player wanting to stay and one player wanting to leave we will mark that state with an X. This indicates points in the game where negotiations become dependent on costs.



There are two types of costs, random and fixed. By fixed costs I am referring to a deadline while random costs refer to random political and economic events. We will evaluate random costs using an exponential distribution whose mean is determined by the system you are playing in. Because exponential distributions do not work well in values between 0 and 1, we will multiply players cost tolerance and the mean by 10. Therefore, we are working within a truncated exponential distribution between the values of 0 and 10. Since the Belgium system does not technically have a deadline we will not model fixed costs. However, we will discuss the implications of fixed costs later in the chapter.

Once in a communicative recurrent state or stuck at an  $X$ , the outcome of the game becomes dependent on players cost tolerances. For communicative states, you must compare a party's preference for the communicative state to their  $Y_j$  at each round. For any round in which they prefer  $Y_j$  mark that round with an  $X$ ; otherwise, the solution to the game is given by the limiting probabilities for each state. Once at an  $X$ , we must calculate the probability of moving past that  $X$ . Starting at the highest  $X$  on the extended game, find each players cost tolerance and draw a vertical line for them with the exponential pdf overlaid (see figure 11). In figure 11 we have two black lines representing two players. Area C represents random costs whose values are lower than both players cost tolerances. If the random cost lies within C nothing happens at that round. Area B represents random costs who lie above one players cost tolerance but below the others. If the random cost lies within B the lower player gives in to the upper players demands. Area A represents random costs that lie above both players cost tolerance. If the random cost lies within A both players give in and the game ends. To calculate the probability for each area we will use equation (5) in figure 10. Using the values from equation 5 we can calculate the probability of the game ending or continuing at  $X$  using the equations in figure 11. If there are

more than one X then simply distribute the probability equally between branches. Once you have calculated the probabilities that the game ends at each point you have your final solution.

$$P(\text{Game Ends at Current Round}) = \frac{P(B)}{P(B)+P(A)}$$

$$P(\text{Game Continues to Future Round}) = \frac{P(A)}{P(B)+P(A)}$$

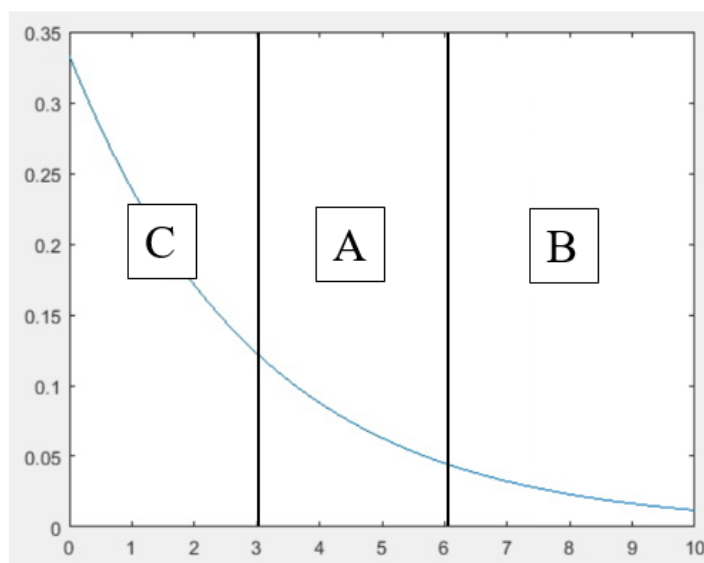


Figure 11

### Example

Let's say there are 4 parties (A,B,C,D), two policies (1,2), and three possible coalition ( $\{A,C\}, \{A,D\}, \{B,C,D\}$ ). As the model stated, we will represent each party  $i$  preference within policy  $j$  as  $X_{ij}$  and for policy  $j$  as  $W_{ij}$ . In figure 12 we see that Parties A,B,C prefer policy 1 over policy 2 and party D prefers policy 2 over policy 1. The reason I chose this preference dynamic is so that the game ends in a communicative recurrent state. Now that we have defined each party's preferences, we need to find the initial state. To do this, we will randomly choose party 3 as the formateur who will choose  $(.6,.6)$  as the initial  $Y_j$  and  $\{A,C\}$  as the initial coalition.

	$X_{i1}$ (Policy 1)	$W_{i1}$ (Policy 1)	$X_{i2}$ (Policy 2)	$W_{i2}$ (Policy 2)
A	0.2	2/3	0.2	1/3
B	0.4	2/3	0.4	1/3
C	0.6	2/3	0.6	1/3
D	0.8	1/3	0.8	2/3

Figure 12

With the initial point set, we can define the set of profitable transitions. Since we have two policies each with four distinct points we must have 16 intersection points to negotiate with. From figure 14 you can get a sense of the direction negotiations will take at any point in the policy space. For example, at (.6,.6) party C does not want to move away from this  $Y_j$ , so there can be no transition to {B,C,D} or {A,C} as they cannot propose a  $\hat{y}_j$  that C prefers more than  $Y_j$ . However, A would like to get closer to (.2,.2), in particular, A would like to get closer to .2 on policy 1. Conversely D would like to get closer to .8 on policy 2. Therefore, if D proposed (.4,.8) to A, both A and B would be moving towards their most preferred policy by giving up equal distance on their least preferred policy. Calculating their preferences, indeed we see that (.4,.8) equals .33 for party A and .1333 for party B while (.6,.6) equals .4 for Party A and .2 for Party B. Since both their payoffs are smaller for (.4,.8), it is a profitable transition. To simplify things, I identified all the profitable transitions for each round in figure 13.

ROUND 1	{A,C}	{A,D}	{B,C,D}
{A,C} @ (.6,.6)	No Preference	(.4,.8)	No Preference
ROUND 2	{A,C}	{A,D}	{B,C,D}
{A,D} @ (.4,.8)	(.4,.6)	No Preference	No Preference
ROUND 3	{A,C}	{A,D}	{B,C,D}
{A,D} @ (.4,.6)	No Preference	(.2,.8)	No Preference
ROUND 4	{A,C}	{A,D}	{B,C,D}
{A,D} @ (.2,.8)	(.2,.6)	No Preference	(.4,.8)
ROUND 5 (Path A)	{A,C}	{A,D}	{B,C,D}
{A,C} @ (.2,.6)	No Preference	No Preference	(.4,.6)
ROUND 5 (Path B)	{A,C}	{A,D}	{B,C,D}
{B,C,D} @ (.4,.8)	(.4,.6)	No Preference	No Preference
ROUND 6 (Path A)	{A,C}	{A,D}	{B,C,D}
{B,C,D} @ (.4,.6)	No Preference	(.2,.8)	No Preference
ROUND 6 (Path B)	{A,C}	{A,D}	{B,C,D}
{A,C} @ (.4,.6)	No Preference	(.2,.8)	No Preference
ROUND 7	{A,C}	{A,D}	{B,C,D}
{A,D} @ (.2,.8)	(.2,.6)	No Preference	(.4,.8)

Figure 13

Before we can transform these transitions into an extended form game to conduct backwards induction we must first evaluate the party's preferences for the communicative recurrent state. Using figure 14, we see that no matter where you start the game, you will end in

the communicative recurrent cycle located in the top left corner. To evaluate each party's preference for this cycle we must transform the cycle into a transition probability matrix then calculate the limiting probabilities.

Transition Probability Matrix

Limiting Probabilities	(.2,.8)	(.2,.6)	(.4,.8)	(.4,.6)
(.2,.8)		$\frac{1}{2}$	$\frac{1}{2}$	
(.2,.6)				1
(.4,.8)				1
(.4,.6)	1			

Limiting Probabilities

We know that...

$$P((.2,.8)) + P((.4,.6)) + P((.2,.6)) + P((.4,.8)) = 1$$

From the transition probability matrix we see that...

$$P((.2,.8)) = P((.4,.8))$$

$$P((.2,.6)) = \frac{1}{2} \times P((.2,.8)) = P((.4,.8))$$

Thus ...

$$P((.2,.8)) = \frac{1}{3} \quad P((.4,.6)) = \frac{1}{3} \quad P((.2,.6)) = \frac{1}{6} \quad P((.4,.8)) = \frac{1}{6}$$

Therefore, the expected payoff for each party in continuing the cycle is

$$\text{Party A} : .333 \times \left(\frac{1}{6}\right) + .1333 \times \left(\frac{1}{6}\right) + .2 \times \left(\frac{1}{3}\right) + .2666 \times \left(\frac{1}{3}\right) = .233$$

$$\text{Party B} : .2 \times \left(\frac{1}{6}\right) + .0667 \times \left(\frac{1}{3}\right) + .2666 \times \left(\frac{1}{3}\right) + .1333 \times \left(\frac{1}{6}\right) = .1666$$

$$\text{Party C} : .333 \times \left(\frac{1}{3}\right) + .2666 \times \left(\frac{1}{6}\right) + .2 \times \left(\frac{1}{6}\right) + .1333 \times \left(\frac{1}{3}\right) = .2332$$

$$\text{Party D} : .2666 \times \left(\frac{1}{3}\right) + .1333 \times \left(\frac{1}{6}\right) + .333 \times \left(\frac{1}{6}\right) + .2 \times \left(\frac{1}{3}\right) = .233$$

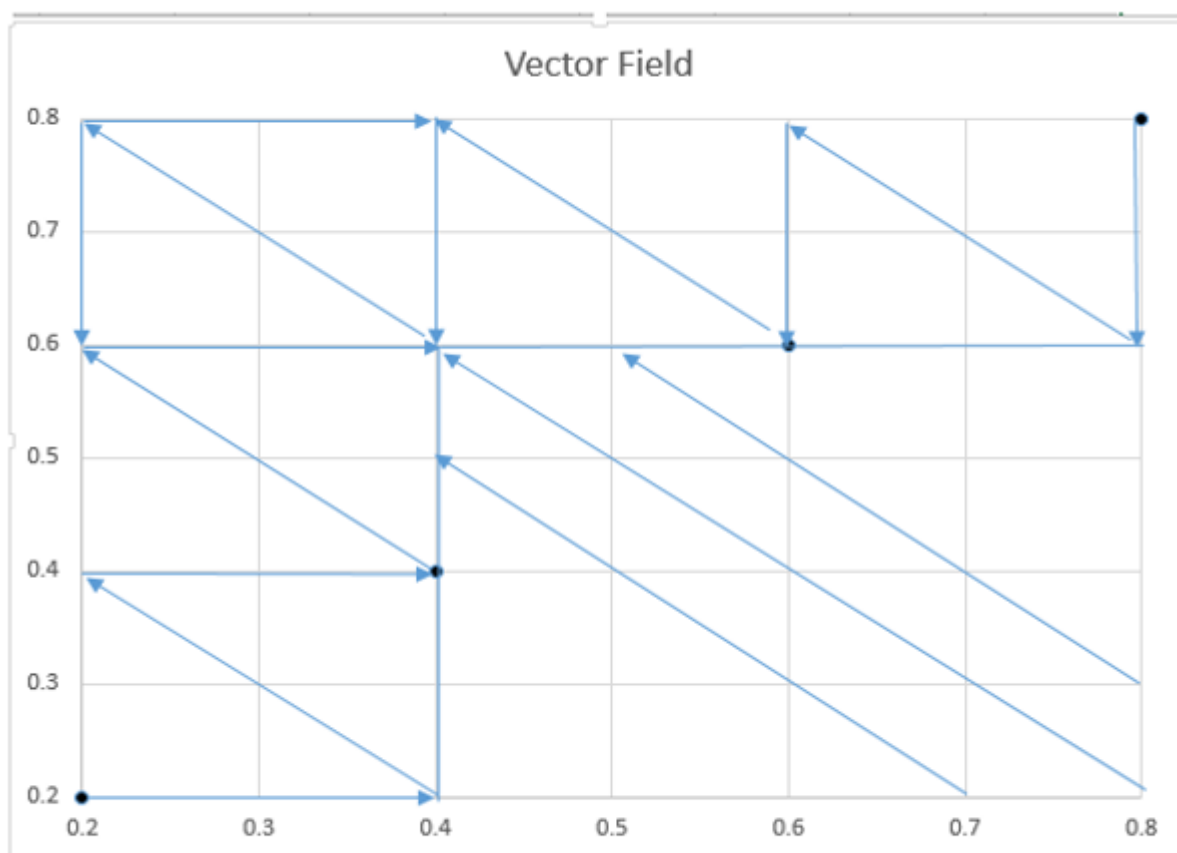


Figure 14

Now that we have all the information, we can transform the game into extended form and use backwards induction to find where players prefer the current coalition over the end coalition (See figure 15). Starting at the end node, which is the expected outcome from continuing the cycle, we find that in round 6 both players A and D prefer continuing the cycle rather than end the game at round 6. Moving to round 5 we find in the right-hand path that player C prefers ending at round 5 than continuing the cycle. Because we are still in a recurrent cycle, we can change the game so that the end node is  $(.4,.8)$ . Moving to round 4 we find that all the players either prefer  $(.4,.8)$  or cannot change the outcome. Moving to Round 3 we find that player A

prefers ending the game at round 3 instead of ending at (.4,.8). Moving to Round 2 we find that A and C prefer (.4,.6) over (.4,.8). Finally, in Round 1 we find player D prefers ending at round 1 than continuing to (.4,.6).

Using backwards induction we found that the game should end with coalition {A,C} at (.6,.6). However, player A is strongly against (.6,.6) and may not want to accept this coalition. If player A refuses, then the game will become dependent on external costs. In particular, we can find the benefits of continuing for player's A and D and the probability that a cost exceeds player D but not A, hence forcing the game to continue to the next point (.4,.6) at round 3. The benefits of continuing for player A would be  $|.4-.2666| = .1334$  and for player B  $|.2-.2666| = .0666$ . For costs, we will use a truncated version of the exponential distribution. From the results below we find the probability the game ends at {A,C} (.6,.6) is .32216 and the probability the game ends at {A,C} (.4,.6) is .67784. Since each player's costs are the same in round 3, if the game continues to round 3 it will certainly end at round 3. Therefore, the previous results are the solution to the game.

$$P(x|1.334 < X \leq 10) = \frac{\int_{1.334}^{10} e^{-1.334x} dx}{1 - e^{-10}} = .26338$$

$$P(x|.666 < X \leq 10) = \frac{\int_{.666}^{10} e^{-.666x} dx}{1 - e^{-10}} = .51374$$

$$P(\text{game ends}) = \frac{.51374 - .26338}{.51374 + .26338} = .32216$$

$$P(\text{game continues}) = 1 - P(\text{game ends}) = 1 - .32216 = .67784$$

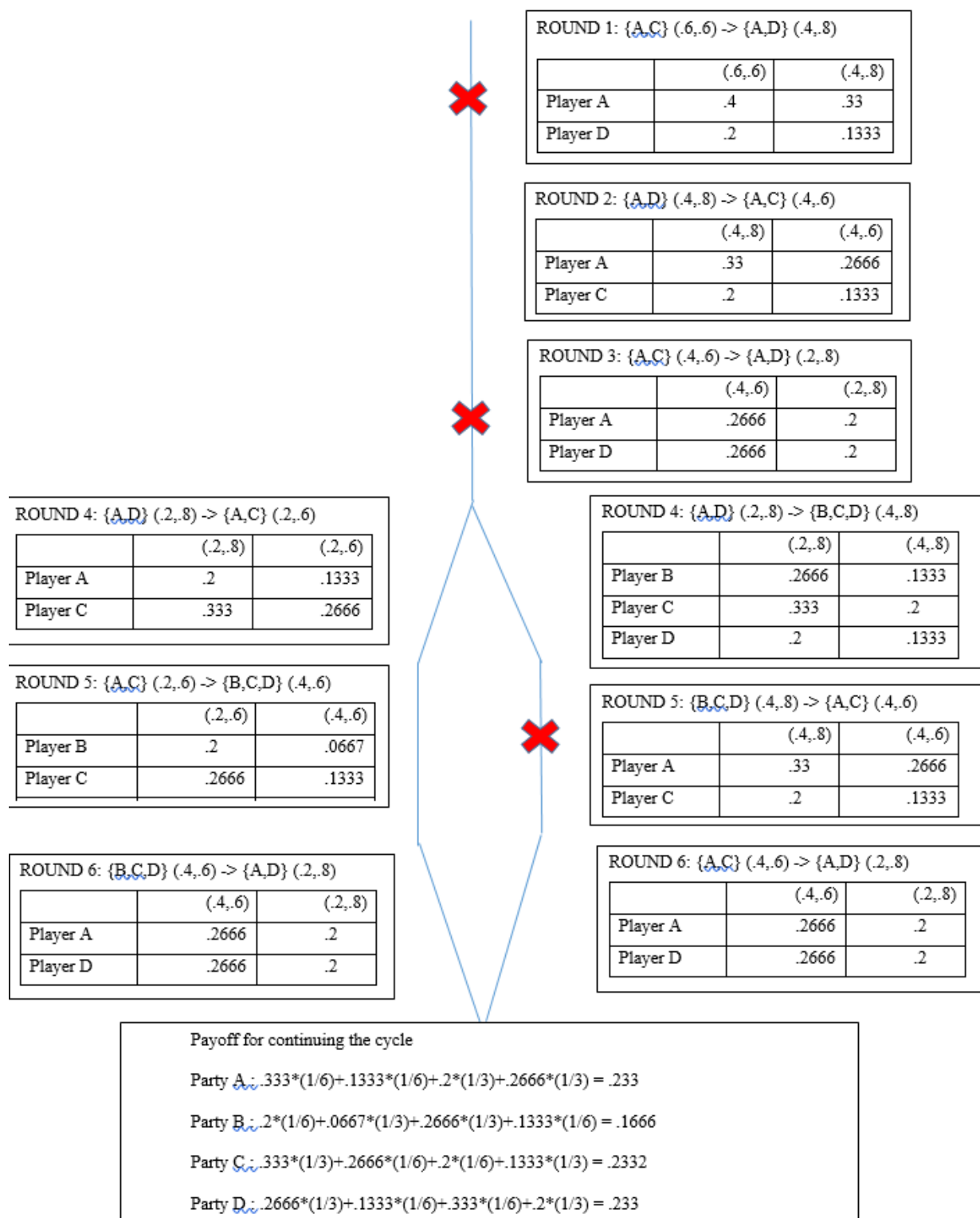


Figure 15



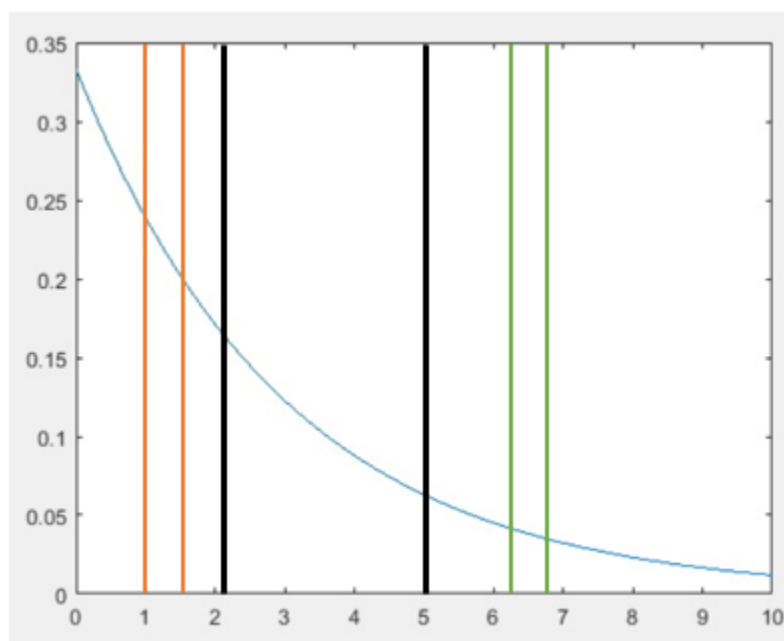
### Randomized Costs versus Fixed Costs

From the model, we saw that external costs determine the outcome in situations where the offering player and accepting player disagree on whether to continue or end the game. The problem is that random costs can take a while to move the negotiations forward. In the Belgium Political Crisis this delay left the society without a fully functioning government for almost two years. This section will explore how adding fixed costs would change the length and outcome of the negotiations.

Stalemates in negotiations come about when there is a conflict of interest between the offering player and the accepting player. The offering player is the player who is apart of the future coalition, offering  $\hat{Y}_j$  to the accepting player who is a part of the current coalition. Even if the offering players prefers the offered policy set,  $\hat{Y}_j$ , they may be aware that continuing down this path will lead to a  $\bar{Y}_j$  that they prefer less than the current  $Y_j$ . In this scenario, the offering player will not offer  $\hat{Y}_j$  to the accepting player. On the other hand, if the accepting player prefers  $\bar{Y}_j$  over  $Y_j$  they may refuse to accept  $Y_j$  and try to force the offering player to offer. At this point, whether the offering player offers depends on each player cost tolerance. Depending on the dynamics of their cost tolerance this creates three possible situations. The first is one where both players have low cost tolerance. The second is where one player had high cost tolerance and the other has low cost tolerance. The third is where both have high cost tolerance (see figure 16).

The length of the negotiations depends on which type of game we are playing. Low tolerance and high/low tolerance games have a high probability of being a short game while high tolerance games have a high probability of being a long game. In addition, there are two types of

high tolerance games. In figure 17 we see that there are high tolerance games where players tolerances are far apart and close apart. To change either of these types of high tolerance games into a short game we can add fixed costs. There are two types of fixed costs, one that accumulates gradually over time and one that is taken all at once. The outcome of the game depends on the type of fixed cost.



**Figure 16**

**Red**- Low Tolerance    **Green**- High tolerance    **Black**- Low/High Tolerance

If fixed costs accumulate gradually then the outcome will be like that of the random costs. In figure 17 imagine the bars moving slightly to the left towards 0 after each round. By doing this, you are slowly removing the area in which nothing happens (area C), but because the curve is decreasing and marginally increasing you are increasing the likelihood that the lower tolerant player gives in and decreasing the likelihood that the game ends. However, for both

types of high tolerance games benefits gradual costs provide to the high tolerant player is relatively insignificant. Therefore, the outcome of adding fixed costs gradually will still be dependent on the random costs.

If fixed costs occur all at once then the outcome depends on what area of the distribution the fixed costs lie in. Using figure 11, if the fixed costs lie in C then we remove some of the probability that nothing happens while letting the outcome still depend on the random costs. If the fixed costs lie in A, then we remove some of the probability that the game will continue, but the outcome still depends on random costs. If the fixed costs lie in B, then we are forcing the game to end. In the latter two scenarios we are favoring the high cost tolerant player. Ideally, we would like to set the fixed costs equal to the lower bounded tolerance. This would end the game in the next round while letting the outcome depend on random costs.

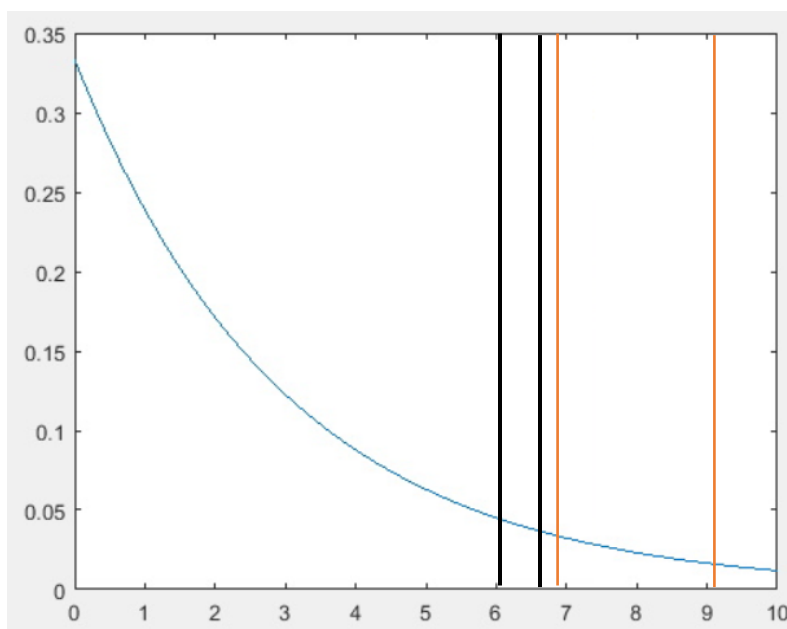


Figure 17

Red- High Tolerance Great Distance    Black – High Tolerance Little Distance

One critique of a deadline could be that it creates the incentive for players to arbitrarily extend negotiations so that they can leverage pressure from the deadline. My model suggests that players will leverage their higher tolerance no matter if there is fixed costs or random costs. If players will leverage their high cost tolerance no matter what, then it may be beneficial for society to implement fixed costs. This will reduce the length of negotiations while only slightly effecting the outcome given you implement gradual fixed costs or fixed costs equal to the lower bound. Ideally we would like to implement fixed costs that are equal to the lower bounded tolerance, but realistically gradual fixed costs better safeguard against bias as we do not know players exact lower bound.

### **Summary**

From this model, we can better understand what happened in the Belgium Political crisis. It seems that it is possible for negotiations to not have a compromisable point. By considering player's preferences between policies, we can end up in communicative recurrent cycles that go on to infinity. In addition to these cycles, we saw that it was possible for parties to refuse a profitable transition. By taking into consideration the path a negotiation is going a party can compare the current state to the future state. This may explain why the N-VA refused to negotiate because they felt that it would lead to a less preferred future state. In these disagreements, external costs played a significant role in determining the outcome of the game. It is possible to shorten these disagreements by adding fixed costs. Depending on how you add the fixed costs you may end up biasing the outcome in favor of the higher tolerant player. To avoid benefiting the stubborn player, systems should implement fixed costs gradually so that the outcome is still dependent on the random costs.

## Chapter 5

### Conclusion

In this paper, we analyzed why the Belgium Political Crisis lasted so long, what served to end it, and if there are any systemic changes that could reduce the length of negotiations while not changing the outcome. In chapter 1 we found that regional rhetoric by the parties brought divisive issues to the forefront of negotiations, which created stalemates in negotiation process. These stalemates were ended due to an encroaching budgetary deadline that left investors increasingly uncertain of Belgium's ability to repay its debt causing a tidal wave of financial pressure in the form of higher bond yields. These bond yields threatened enormous costs to society, which increased pressure on negotiating parties forcing them to compromise. In chapter 2 we found that in collusion with an approaching budgetary deadline, a combination of increased debt from Dexia's bailout; a downgraded of Belgium's credit rating; and Germany's failure at bond auction led to the increase in bond yield that forced parties to compromise. In chapter 3 we used data on the length of government formations to show there had been a marked increase how long it takes to form a government since 1988. We explained how the end of the cold war, introduction of the EU, and changes in the party dynamics could have led to longer negotiations in government formations. In chapter 4, we tested our findings through a model of coalition government formations. We found that divisive preferences can create high cost tolerances which increases party's resistance to random external costs and cause longer negotiations. We found that implementing gradual fixed costs can reduce the length of negotiations without significantly biasing the outcome.

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## Benjamin Shapiro

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### Objective

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During my time in the Navy I learned a lot about myself; in particular, I learned that I do not want to spend my life creating solutions that only work for a subgroup of humanity, I want to create solutions that work for everybody. I learned that I want to work alongside passionate people with tireless work ethic all colluding to solve difficult problems. I want to not only pursue justice but also help to define it. I believe my superb analytical and creative problem solving skills will be of great value to your association.

### Education

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The Pennsylvania State University (University Park, PA) Expected Graduation December 2016

- B.S. (Honors) Economics, B.A. Political Science; **B.A. Mathematics**
- Honors/Awards: Schreyer's Honors College, Edward C. Budd Scholarship, Chaiken Trustee Scholarship, Baynard & Ethel Kunkle Scholarship, Osher Re-entry Scholarship
- Extracurricular: Research Assistant, Head Teacher Assistant, Economic Association Member

### Experience

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Cryptologic Technician Technical (United States Navy) Rank- E-4 November 2008 - November 2012

#### **Leading Petty Officer (2011-2012)**

- Managed the Electronic Warfare division onboard USS Rodney M Davis (FFG 60) resulting in the Electronic Intelligence Warfare Certification.
- Led a team in gathering intelligence, disseminating information, and countering missile threats.
- Technical and operational expert of over 50 pieces of radar and missile equipment.
- Scheduled and monitored the completion of over 500 preventative maintenance checks a year.

#### **Intelligence Officer (2009-2012)**

- Created and presented 52 operational/intelligence Power Point briefs to the ship's captain, officers and "need to know" enlisted.
- Organized and trained 30 individuals in photographic and video intelligence gathering.
- Conducted 32 intelligence gathering missions resulting in the seizure of 2.2 metric tons of cocaine and the processing of 26 drug traffickers.

**AWARDS:** -Navy Achievement Medal 2010    -Navy Achievement Medal 2012    -Sailor of the Quarter 2011  
-Enlisted Surface Warfare Pin 2009    -Good Conduct Medal 2011    -Deployment Ribbon 2010

### Extracurricular/Volunteer Activities

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**Research Assistant** The Pennsylvania State University (2016)

- Organized and coded 80,000 data points on interest groups within the United States
- Developed a function that cut coding time in half.

**Morale Welfare and Recreation Vice President** U.S. Navy (2009-2012)

- Planned, organized, and hosted over 10 community events such as picnics and holiday parties.
- The largest event was a holiday party for 200 shipmates where I managed a \$30,000 budget.

### Skills/Languages

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C++ • LaTeX • Stata • MATLAB • Python • R • Access • Excel • Power Point • Intermediate Spanish • Research • Leadership