Female prime ministers in the European Union, a definite change or a contingency?

A comparative study on female political representation in the highest position of national governments in the European Union

Master thesis Public Administration, Leiden University
Track: International and European Governance

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Date: 7th February 2020

Abstract

Female political representation is still a global challenge today, as women are still underrepresented in politics, despite the efforts that are taken by countries to increase their representation. This study is focused on all 28 EU Member States and analyzes why some of these Member States have or have had a female prime minister and why other Member states have not. To answer this question, based on theory and existing research about gender equality, female political representation and female leadership, this study develops a theoretical framework consisting of eight conditions that may causally affect the representation of women in high profile leadership positions. A qualitative comparative analysis shows that there are several different configurations that lead to the presence of a female prime minister, and none of the conditions all together are causally necessary for the outcome. This makes explaining the outcome for each Member State complex, but it provides new insights into which conditions contribute to a country having or not having a female prime minister.

Acknowledgements

I would like to thank all my professors for teaching me how to think critically and for all the valuable knowledge I gained the past year. A special thank you to Prof. dr. Sandra Groeneveld for the feedback she provided and helping me while writing this thesis.

Special thanks to my parents for always supporting me and my father for always critically checking my work. I also thank my friends and classmates for being understanding and keeping me motivated through this process. Lastly, I thank my son Rick, you are my biggest inspiration and you always gave me motivation through my entire academic career.

And to all women who posit a high-profile position, I have a lot of respect for you and hopefully in the future we will have a lot more women in office and that the Netherlands soon will have its first Dutch female prime minister.

Stèphanie Coomans
Rotterdam, February 2020

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1. Introduction

1.1 Background

“Belgium gets the first female PM as Sophie Wilmès takes office” and “Ursula von der Leyen elected first female European commission president” were worldwide news headlines. These headlines were not of a decade ago, but recent publications. Another recent headline was the appointment of the world’s youngest female prime minister Sanna Marin in Finland. Besides having the youngest female prime minister, the new government has 12 female and 7 male ministers (Kauranen and Virki, 2019). Unfortunately, these contemporary events are exceptions. In 2019, women are still underrepresented in political leadership positions and it is still a novelty in society when a woman gets elected. Moreover, women still face obstacles on their way to a top position (Leyenaar, 2008).

Globally, women make up 24.3 percent of all parliamentarians and 20.7 percent of government ministers (International Knowledge Network of Women in Politics, 2019). Within the European Union there are currently 5 female prime ministers among the 28 Member States (EIGE, 2019). Nowadays, the proportion of women is all-time high in the EU parliament, but still 7 out of 10 members are men. The national parliaments of the Member States show a significant variation; Sweden, Finland and Spain have at least 40 percent of each gender in office but in Hungary, Greece, Cyprus and Malta it is less than 20 percent (EIGE, 2019d). Efforts have been made to promote a gender balance, a legislative candidate quota was introduced in 9 Member States. Nonetheless, these quotas have only been successful in two countries; Portugal and Spain (European Union, 2019, p.32). As a comparison, also in the private sector, European boardrooms are still predominantly male, despite the introduction of a female quota in some Member States (European Union, 2019, p.25).

There is a growing evidence that female leadership improves the political decision-making processes and have a positive effect on gender equality policies such as parental leave and childcare and the elimination of gender-based violence (UN Women, 2019). Moreover, research shows that women in government work more in a collaborative way, are more effective in building coalitions and employ a more democratic leadership style (Ng & Muntaner, 2018). Additionally, gender equality is an important issue and the degree of gender equality widely varies across countries. However, it is worrisome that globally, women are inferior to men. This inferiority is seen in all areas of life, including in the political realm (International Cooperation and Development 2009). Men are still dominant in politics and therefore have more political power than women (Rubio-Marin, 2014).
This research has as aim to investigate why some EU Member States have or had a female prime minister in the past five years, while other have not. The focus is on prime ministers because current research mainly focused on the representation of females in government and not the position of prime minister. Furthermore, all Member States share the same main

homogenous traits, it is striking that only few Member States have or had appointed a female prime minister. Therefore, it is interesting to conduct research about female prime ministers and to find out why only a few Member States have or had a female prime minister. Considering this is one of the highest positions in a country and one of the most important positions.

1.2 Research question

This study answers the following **research question:** *Why do some European Union Member States have or had a female prime minister and other Member States did not?* In order to answer the research question, a Qualitative Comparative Analysis will be conducted. In a QCA research, the aim is to find out which conditions are necessary and/or sufficient to explain an outcome.

1.3 Relevance of the study

Societal relevance

Female representation in general is a contemporary topic. Females are half of the population and it is remarkable that females are unrepresented in most countries. Every time a female prime minister or president is sworn in, it is front page news and stirs up debates. The rate of female representation in national parliaments has increased from 11.8 percent in 1998 to 17.8 percent in 2008 and it is 23.5 percent in 2018. However, this is still below the 30 percent benchmark which is identified as the number that will have an impact in legislation (Pepera, 2018). In the European Union the representation of females has increased over the years, but the differences between the Member States remain high and the EU's score in the domain power (which looks at equality in decision-making) remains low (below 30%) (EIGE, 2019).

This research will focus on female prime ministers. Currently 5 out of the 28 Member States have a female prime minster in office (EIGE 2019f) which, is far below having parity in representation. This underrepresentation is problematic because having an equitable representation of both men and women creates a participatory democracy, where both genders are equally represented and the parliament can be more responsive to underrepresented groups (Phillips, 1998, p.198) which, consequently leads to gender equality.

The results of this research will be socially relevant because it will contribute to the current debate of having a female as head of government and could contribute to finding conditions that lead to having a female appointed as prime minister. Moreover, equality of men and women is an important societal issue, today, inequality is still a problem in societies worldwide. Also, there is also a lack of contemporary research done about female representation in top

leadership positions. As mentioned, an equitable representation is important to society because it creates a participatory democracy, which is one of the main values of a democracy.

Scientific relevance

What makes this study different from other studies, is its context. This study will only focus on the Member States of the European Union and its main concern is the representation of females as head of government. Results of current studies done about representation of women in parliament, may not apply to the position of prime minister and other factors could have an impact on high political positions. This study examines multiple concepts that are considered to increase female representation in politics, and will be able to either confirm or contradict existing knowledge. It is important that also research is done to explain the higher political positions. Current female leaders managed to obtain a high position, but could face several obstacles that are not yet identified in scientific studies.

Also, a few concepts are defined in other studies as problematic. Because at the time of their study, there was not enough empirical evidence available (e.g. not enough countries that had more than 40% of women in parliament and not enough countries with a legal quota) and some studies have different outcomes about the effect the conditions have on female political representation. Furthermore, because societies change over time, older studies conducted on female political representation could be not be applicable in the current society. Therefore, this study will provide a new insight and can contribute to existing knowledge and can be interesting for political science scholars.

Moreover, using QCA as a method will make this study interesting because of the causal complexity and equifinality. Causal complexity means that explanatory effects cannot be understood in isolation to one another and equifinality means that there are multiple pathways to a given outcome and the causal effects can be either negative or positive (Fitzgerald, 2019, p.2). Causal complexity and equifinality are the main principles of QCA and this is the main reason why QCA is chosen for this research and not the traditional comparative methods.

This research will be able to fill in the gap between the theorized concepts of other studies that explain the factors of the lack of female representation in government and the recent shifts within some EU Member States (which recently sworn in a female prime minister). The outcome of this research will give a better insight why there are differences within the European Union and which configuration(s) of conditions lead to a Member State having a female prime minister.

1.4 Thesis outline

Chapter two will provide a literature review focused on female representation in leadership positions and female leadership. Moreover, the theoretical framework will support each condition of the study with contemporary literature and will explain the relationship between the conditions. Chapter three will explain and justify the design of this study. Chapter four will provide a systematic analysis of the obtained data and will answer the main research question. Lastly, chapter five will summarize the results, answer the research question and will discuss the limitations and possibilities for future research.

2. Literature review

This chapter will elaborate on relevant theories that support this research. First, this chapter will start with a literature review; elaborating on existing literature about gender (in)equality, female representation in leadership positions and female leadership. In the theoretical

framework, concepts from the literature review will be explained and ensued hypotheses will be formulated. Lastly, the concepts result in a proposed hypothesis that could lead to a country having a female prime minister or not having one. This hypothesis will be the starting point of the analysis of this research.

2.1 Gender representation in political leadership

Gender (in)equality is an important concept that can explain why women are underrepresented in politics, because gender inequality has not only an effect on society, it also has an effect on politics and this concept can explain why most European Union countries do not have or had a female prime minister.

2.1.1 Gender (in)equality

The European Institute for Gender Equality (EIGE) defines gender equality as “equal rights, responsibilities and opportunities of women and men” and stresses that it does not mean that women and men are the same but that interests, priorities and needs of both women and men are taken into consideration and that this is seen as a human right that involves both genders (EIGE, 2019a). Gender inequality pervades in different aspects in society. EIGE defines gender inequality as “legal, social and cultural situation in which sex and/or gender determine different rights and dignity for women and men which are reflected in their unequal access to or enjoyment of rights, as well as the assumption of stereotyped social and cultural roles” (EIGE, 2019b).

The degree of gender inequality varies widely across countries. However, practically in all countries women are inferior to men, this can be seen in all areas of life; family status, labor market, social gender relations and in the economic and political life (International Cooperation and Development, 2009). Phillips (1998), adds that women have an unequal position because society is constituted in a way that women are still seen as primary caregivers to children. Furthermore, females are exposed to violence and sexual harassment and additionally, there is an unequal position in paid and unpaid labor (Phillips,1998).

There is a notion of a separation of the private and public sphere that still persists in modern society, there are still assumptions about men and women and their role in society. This characterize the culture a country has and also has an effect on how countries are governed and the ensuing policies. Celis et al. (2013), argue that this notion affects the high politics in the public sphere, it excludes certain actors and activities that focus on notions of femininity and masculinity (Celis et al., 2013).

Gender equality in politics

Gendering of institutions has been a concern in feminist political science. Several scholars have written about this phenomenon and this has fostered into feminist institutionalism (Chappell, 2006). Gendering means “the process of socialization according to the dominant gender norms” (EIGE, 2019e). Scholars argue that the enduring male domination in politics is complex and profound and that increasing the numerical representation of women alone will not result in gender equality in politics. (Celis et al., 2013) argue in their work about gender and politics that change is needed in political science as a discipline and politics to make them gender equitable and this can be achieved by understanding the roots about politics both as an academic discipline and politics as a practice and the ways they interact with each other (Celis et al. 2013). Chappell and Waylen (2013) add that political science scholars should investigate the interplay of informal and formal rules in political institutions and how ‘the rules of the game’ constrain and enable political actors (Chappell and Waylen, 2013).

Young (2005) argues that “we no longer need to ascribe a single or shared gender identity to men and women” (Young, 2005, p.22). She states that society systematically disadvantages women but the category of women is abstract, the individual experiences of women are not identified. Therefore, political science scholars should in her opinion distinguish between social structural factors and identity (Young, 2005). Weldon (2006) states that gender as a principle social organization should be examined and this should be done by examining the interaction between social structures and agrees with other female scholars that only focusing on gender in general does not completely explains the way women are disadvantaged (Weldon, 2006). The disadvantage could, for example, be race or class focused. Thus, a structural approach should be then taking these individual disadvantages into account to understand the overall social context.

Rubio-Marin (2014) emphasizes that history can explain the current form of the political arena. She argues that traditionally women are disadvantaged and women’s political rights were mitigated by women’s belated civil citizenship and the gender bias of women’s social citizenship. She adds that the ‘breadwinner and nuclear family model’ after the World War II years reinforced the private realm as a realm for women and the public realm as the male domain, this finally resulted in the dominant representation of men in employment and politics (Rubio-Marin 2014).

Thus, it can be concluded that according to the literature, gender inequality causes impediments for women to pursue a political career and to be appointment into a high leadership position.

2.1.2 Representation

Representation of women is an important concept in explaining why there is a lack of women in politics. This paragraph starts with explaining the concept of political representation and the four dimensions of political representation and it continues with elaborating on why women are underrepresented in politics.

Political representation

Political representation is a broad and complex concept and extensive literature is written about political representation. One of the most cited literature is the work of Pitkin (1967). She defines in her work four dimensions of political representation; formal representation, descriptive representation, substantive representation and symbolic representation. The dimension of formal representation describes how the respective representatives are chosen and the institutional rules and procedures are important; how are representatives selected and removed. The second dimension of descriptive representation refers to the similarity between the representatives and the represented; this can include gender, race or ethnicity. The dimension of substantive representation refers to connection between the representatives' actions and the interests of the represented (EIGE, 2019b). A common interpretation of substantive representation in existing literature, is the policy responsiveness; this means if the representative implements policies that respond to the demands or needs of the represented. Lastly, symbolic representation refers to the feelings of the represented, this entails if the represented feels they are effectively and fairly represented by the representative; what matters are the attitudes or feelings not the symbol itself (Schwindt-Bayer and Mishler 2005).

Pitkin (1967) sees representation as a multidimensional concept but argues that all four dimensions are distinct. However, she argues that each dimension is interconnected and should be viewed as integrated parts of a whole. Pitkin, is against the separating of the dimensions done by several scholars such as (Marsh and Norris, 1997), who treated each dimension separately and distinctly in their work. Pitkin's first argument is that an institution must achieve the minimum of all dimensions in order to be representative and her second argument is that there is a causal connection among the dimensions. (Schwindt-Bayer and Mishler, 2005) agree with Pitkin, and argue in their study about female representation in democracies, that other scholars fail to understand the integrated structure of Pitkin's representation concept. This study therefore proposes an integrated model of the four dimensions of Pitkin's model. In this model, linkages are made between the four dimensions of representation and according to the model the formal representation (the structure of the

electoral system) is exogenous and directly influences the descriptive, substantive and symbolic representation (Schwindt-Bayer and Mishler, 2005).

Furthermore, scholars critique the priority of substantive representation. Pitkin (1967), argues that this dimension is the core of the model. Crowley (2004) states that female representation does not much to improve the representation of women's interest (Crowley, 2004) and Hawkesworth (2003) adds that due to male backlash, women diminish women's issues (Hawkesworth, 2003).

Female representation

The underrepresentation of females in politics has been researched for decades and there is still a growing body of literature that seeks to explain why females are underrepresented in politics. Also, scholars have researched if female representation has an effect on the respective represented group. In research on female representation the distinction between descriptive representation and substantive representation is often used. Research conducted on descriptive representation is often focused on the number of women that are elected and research on substantive representation studies the effects of women's presence in parliament (Wängnerud, 2009).

Duverger (1955) wrote about descriptive representation and argues in his work *The Political Role of Women* that electoral systems determine the number of females that are elected in parliament (Duverger, 1955). Johnson and Schulman (1989), argue that women have less influence in decision-making when they are a numerical minority and that this numerical effect is greater on women than it is on men (Johnson and Schulman 1989, p.15).

With respect to research in substantive representation, (Phillips,1998) suggests in her book *The Politics of Presence* that female politicians are better in representing the interests of women, however, she does argue there is no guarantee that a woman will represent women's interests (Philips, 1998, p.166) because as Wängnerud (2009) adds, because of the rigidity in contemporary political institutions (Wängnerud, 2009). Nevertheless, Phillips agrees with Pitkin that equitable representation of both genders does create a participatory democracy; those concerned with representing a certain group in society will look to developments of new mechanisms of consultation or develop more deliberative processes of decision-making and therefore can be more responsive to the emerging concerns of underrepresented groups (Phillips, 1998, p.198). Duverger (1955), concluded in his research that women in politics have the tendency to specialize in what are known as 'typical female' fields such as health, education and housing (Duverger, 1955). This can be viewed as serving particular interests of the

represented group and this is connected to the concept of “gender sensitivity”. The Inter-Parliamentary Union (IPU) argues that a parliament that is gender sensitive, promotes the full participation of women and reflects the current needs of society without structural, substantive or cultural barriers (Salinas and Bagni, 2017).

Research in substantive representation is not extensive, (Wängnerud, 2009) argues this is because there are few countries with a substantial number of women in parliament. Moreover, she argues that also the complexity of the function of parliaments makes it difficult to research the outcomes of parliaments that have a substantial number of women in office. Likewise, substantive representation is a multifaceted variable and therefore complex to study. She does conclude that societies that have a large female representation tend to be more gender equal in other respects in contrast to societies that only elect few women (Wägnerud, 2009). Phillips, stresses this argument by saying that the interests of women are connected to how societies are constituted.

All in all, the representation of women can be analyzed and explained through the model of Pitkin (1967). Furthermore, the literature emphasizes that it is complex to study substantive female representation because it is a multifaceted variable. However, the degree of female representation can be analyzed by taking the four dimensions of political representation into consideration. Additionally, an equitable representation of both genders is important to enhance decision-making processes and to be more responsive to the concerns of underrepresented groups in society.

2.1.3 Leadership styles

This paragraph will explain the difference between male and female leadership and why there is a shift in leadership styles and challenges will be explained. These challenges could contribute to understanding why some EU countries never had a female prime minister.

Women are still underrepresented in leadership positions in both the private and the public sector, despite the fact that women have a growing presence in the workforce. Current female leadership studies can be divided into two strands. The first strand focuses on the differences on how men and women lead and the second strand examines the gendered nature of organizations. According to (Chin, 2013), the gendered nature of organizations reveals that females are devaluated in regard to their leadership capacities and suggests that females have a unique leadership style. Other existing research shows that females more likely than men have a leadership style that is effective in contemporary society. In the academic realm there are researchers who argue that gender is not related to leadership effectives and style.

(Powell, 1990); (Dobbins and Platz, 1986). The main argument of these scholars is that the contextual variables matters such as the task and the characteristics of the followers (Gipson et al., 2017). However, leadership styles are primarily masculine and most theories emphasize on the desirability of stereotypical masculine qualities in leaders (Miner, 1993).

Research carried out by Eagly and Carli (2003), indicated that the increase of female leaders has caused changes in leadership theories. They argue that in the past leadership was focused on authority and their access to economic, political and military power, and nowadays views of good leadership focus on teamwork and supporting and engaging employees. There are different explanations why there is a shift in leadership style in contemporary societies but some scholars argue it is because of the increasing workforce diversity and the weakening of geopolitical boundaries (Eagly and Carli, 2003). Book (2007), claims in his work that women posit effective leadership skills involving empowerment of employees and collaboration, in contrast, men typically have an autocratic leadership style and argues that this style does not meet the needs of contemporary organizations (Book, 2007).

Challenges

Eagly and Carli (2003) give several reasons why female leadership is rising, they argue that women changed in characteristics at the individual level, because women are more engaging in paid labor, they had to change their personal characteristics to achieve success in this new role. One could argue that these new personal characteristics are more masculine; assertiveness, freedom and power. At the cultural level, appointments of women symbolize progressive change and the traditional family roles changed. Contemporary movements and (social) media enforce the symbolic meaning of having a female leader and its effectiveness. Lastly, on the organizational level leadership styles have changed and transformational leadership is shown to be more effective for organizations (Eagly and Carli 2003).

While female leadership is rising, women also face challenges. Women in high profile positions in politics are so called ‘vanguards’, Rudman et al. (2012), explain that these women challenge traditional gender role norms and place themselves at risk and are subject to backlash (Rudman et al., 2012). This could explain why women may be reluctant to take political leadership positions.

The glass cliff theory is another example of a challenge women face, the glass theory suggests that women most likely are in a high profile leadership positions in times of crisis because in times of crisis interpersonal attributes are more important, an attribute that females more likely posit (Gipson et al. ,2017). Moreover, because of role incongruity female leaders face many

challenges and it is difficult for women to gain recognition and getting praised for achievements than their male counterparts (Gipson et al., 2017).

In conclusion, research shows that women have a different leadership style than men and that this leadership is more effective in present-day because of the increasing workforce diversity and the weakening of geopolitical boundaries. However, women face different challenges when having a high-profile political position such as the difficulty of gaining recognition and getting praised and women have to fight against traditional gender norms.

2.1.4 Historical overview: female representation in the European Union

To give more context to this study, this historical overview will depict the process of female representation in the EU. History matters and it can possibly explain why today there is such a difference in female representation within the EU.

Within the European Union different processes of progress took place when it comes to female representation in national parliaments. After the post-war period, women were noticeably underrepresented in national parliament. In the 1950s, female representation on average was 5.4 percent. Only Sweden and Finland had a significant higher number of female representation: higher than 10 percent.

The introduction of female suffrage in Europe did not happen in every country in the same year. Figure 1 depicts when female suffrage was introduced in each Member State.

Country	Year
Austria	1918
Belgium	1948
Bulgaria	1944
Croatia	1945
Cyprus	1960
Czech Republic	1920
Denmark	1915
Estonia	1917
Finland	1906
France	1944
Germany	1918
Greece	1952
Hungary	1918
Italy	1945
Ireland	1922

Latvia	1917
Lithuania	1917
Luxembourg	1919
Malta	1947
The Netherlands	1919
Poland	1917
Portugal	1976
Romania	1921
Spain	1931
Slovakia	1920
Slovenia	1945
Sweden	1919
United Kingdom	1928

Note: information taken from: Women Suffrage and beyond, (2019)

***Figure 1*:** Women's Suffrage in the EU.

Figure 1 shows that most Member States introduced women's suffrage in the early 1900's. However, there are some outliers visible, Denmark was the first country to introduce women's suffrage in 1915 and in 1976, Portugal was the final Member State to give females and males equal rights to vote for elections. One would think that female suffrage would lead to increasing female representation in national parliaments and it was envisaged as a transition to a more democratic society where women had equal rights. However, (Dahlerup, 1988) argues in her study about women's suffrage in Europe that this did not happen and supports her argument with numbers of the percentage of female representation after the introduction of female suffrage. However, she notes that in countries which introduced suffrage in the early 1900s do have a higher representation of women in parliament; Finland, Denmark, Sweden and the Netherlands are an example. But, Belgium, which introduced female suffrage relatively late in 1948, also has a high number of female representatives.

In Western European countries, a critical juncture took place in the late 1960s and early 1970s due to the emerging political and social movements that shed light on women's issues. The role of women slowly changed in the western Member States and more females went to university and joined the workforce. Consequently, female representation in parliament increased and reached over 10 percent in most Western European countries with outliers in Scandinavia, exceeding 20 percent. In the 1990s this number steadily increased to an average of 25.5 percent. There is a significant gap visible between different Western European Member States. France is an example of a country where female representation in parliament has not increased the past two decades and still is around 10 percent. In contrast, in Belgium and the

Netherlands female representation has increased over the years, about one third of the representatives are female (Stockemer, 2007).

In Eastern European Member States a different process took place. Before the fall of the Iron Curtain the Eastern European Countries had a relatively high female representation in parliament (Stockemer, 2007). Because the communist regimes had the rhetoric of social equality they promoted female representation and also set quotas to increase it (Rubio-Marin 2014). The promotion of female representation was mainly for symbolic purposes because in practice women had little influence on decision-making. After the fall of the Iron Curtain in 1991, quotas were abolished and men took over leadership positions of the new political parties. As result, the percentage of female representation in East European countries dropped significantly (Stockemer, 2007).

In the third quarter of 2019, the average female representation in the EU in national parliaments is 32 percent. Spain, Sweden and Finland are far above the EU average with respectively; 48.1 percent, 46.7 percent and 46.5 percent. Hungary and Malta have the lowest female representation, respectively; 12.1 percent and 14.9 percent (EIGE, 2019c). None of the Member States have achieved parity; a representation close to 50 percent. Looking at the European Parliament, the average female representation among the 28 Member State is 40.7 percent in Q3 2019. Sweden has the highest percentage of females in their delegation: 55 percent and Slovakia has the lowest female representation: 15.4 percent (EIGE, 2019b).

In conclusion, the history of female representation in the European Union shows that a different process took place in West and East Europe and it took decades for women to gain influence in decision-making. Additionally, the introduction of women's suffrage did not add to increasing the percentage of women's representation in all Member States. Furthermore, there is still a gap visible among the EU Member States regarding female representation, not all countries with an early introduction have or had a female prime minister.

2.1.5 Conclusion

The literature review shows that extensive literature has been written about gender (in)equality, female representation and female leadership. Research shows there is still gender inequality

all over the world which has its roots in the unequal position and the role that women have in society.

The theory of representation shows that there are different forms of representation. However, it is debatable if all forms matter and if they are connected with each other. Leadership theories conclude that women most likely have a leadership style that is effective in contemporary society but its effectiveness mainly depends on its context and that mostly only is valued in times of crisis. The glass cliff theory and role incongruity explain the challenges women face in high profile leadership position.

Lastly, history shows that within the European Union female suffrage and representation happened in different momentum, with mainly a significant difference between the West and the East of Europe.

2.2 Theoretical framework and hypotheses

Important concepts arise from the literature review and for each concept, hypotheses are formulated. All concepts are focused on explaining the dependent variable of this research: if a Member State has/had a female prime minister or not. The first five concepts are related to politics and institutions (legal quota, women in parliament, gender-balance cabinets, electoral system and women's suffrage) and the last three concepts (cultural stereotypes, educational level and labor-market participation) are societal concepts. These concepts are chosen because in the literature they are considered as factors that contribute to countries having female political representation. Consequently, these concepts can also explain whether a country has or does not have a female prime minister. It must be noted that more concepts are argued to have an effect on female political representation. But, to keep this research feasible, eight concepts are chosen to be analyzed. The concepts of legal quotas, women in parliament, gender-balanced cabinets, the electoral system and the introduction of women's suffrage are concepts that are ensued from the policies of national governments and more static. The concepts of cultural stereotypes, educational level and labor-market participation are less static and societal concepts. So, these concepts are chosen in this research because they are a combination of policies and societal factors, it will be interesting to view in the analysis if either policies or societal factors have more of an impact on a country having or not having a female prime minister. Or, if combined together they have an impact on the outcome.

2.2.1 Legal quotas

Legal quotas is a concept that is frequently mentioned in research about female representation in politics and used as a direct and most visible mechanism to increase female representation. Philips (1995) argues that quotas should be used to have a balanced representation in politics (Phillips 1998, p.63). There are two kinds of quotas, first of all, there are internal quotas within political parties, which usually has a 40-60 percent ratio. Secondly, there are legal gender quotas that are implemented in elections to national parliaments (Raaum, 2005). Rwanda is an example of a country that has a legal gender quota and this has led to a tripled number of women in the national parliament (Wängnerud, 2009).

Hypothesis 1: Having a legal quota is a condition that leads to a Member State having a female prime minister in office.

2.2.2 Women in parliament

The number of women in parliament is a form of descriptive representation and substantive representation is the outcome of female representation, according to Phillips (1998), women in politics are better in representing the interests of women. Moreover, Pitkin (1967), argues that an equitable representation is important because it creates a participatory democracy and this will also lead to more deliberative process of decision-making. Dahlerup (1998), argues that when women as a minority are around 40%, they are a balanced group and will have an effect in decision-making (Dahlerup,1988). Furthermore, feminist minority representation claims that these balanced group will not only change the position of women, but will lead to further changes in female representation in politics (Lovendusk, 2001). Thus, a Member state having more than 40% women in parliament could lead to a Member State having a female prime minister.

Hypothesis 2: Having equitable representation (more than 40%) of women in parliament is a condition that leads to a Member State having a female prime minister in office.

2.2.3 Gender-balanced cabinets

(Verge, Chowdhury, and Ulcica, 2019) define a gender-balanced cabinet as a cabinet where the representation of either men or women in any decision-making body in political or public life is not falling below 40 percent as a parity threshold. Kanter (1977) argues that when a minority group gradually becoming strong enough it can influence the dominate culture and can create change (Kanter, 2010). Lovenduski and Norris (2003), state that related to descriptive representation that when women reach a critical number of 30 percent, a steady increase of women in politics will happen because most likely elected women will recruit more

women (Lovenduski and Norris, 2003). Additionally, regarding the substantive representation, a gender-balanced cabinet will lead to a change of political behavior and public policies (Raaum, 2005). Consequently, a country with a gender-balanced cabinet could more likely lead to the appointment of a female prime minister.

Hypothesis 3: Having a gender-balanced cabinet is a condition that leads to a Member State having a female prime minister in office.

2.2.4 Electoral system

The electoral system of a country is a factor that could explain the level of female representation in politics. Several studies have shown that countries that have a proportional representation system, have a higher female representation than countries that have a plurality system (Raaum, 2005). Countries with proportional representation have higher district magnitudes and therefore this increases the total number of members to be elected. So, women have more opportunities to be included (Krook, 2010). Salmond (2006), adds that in a plurality system the constituency elects only a single politician and most of the time this is not a woman because party leaders think that a man is a more 'attractive' candidate to win because in these elections it is 'all or nothing' (Salmond, 2006).

Hypothesis 4: Having a proportional representation is a condition that leads to a Member State having a female prime minister in office.

2.2.5 Women's suffrage

Female suffrage may affect female representation in parliament and the timing of the suffrage extension of women may influence the present-day representation in parliament. Female suffrage led to women and men equally to have the right the vote and to participate in politics (Burns et al., 2001). Rubio-Marin (2004), argues that countries which had an early introduction of suffrages have currently a higher representation of women in parliament compared to countries with a late introduction of female suffrage.

Hypothesis 5: Early female suffrage is a condition that leads to a Member State having a female prime minister in office.

2.2.6 Cultural stereotypes

Inglehart and Norris (2003), claim that political culture consists of the attitudes and values of a society and this differs per country. The political culture influence female representation in politics, because traditional values can create gender inequality and is an obstacle for women

to get into office. This inequality is mostly visible in cultures where men and women have traditional roles and are not encouraged by the public and high political leaders to involve in politics. Men in these traditional cultures prefer the political realm to be a male domain and prefer a status-quo. In contrast, countries with a more liberal and egalitarian culture more likely to favor women in high political roles (Inglehart and Norris, 2001).

Another cultural stereotype expresses itself in people having a female bias. Female bias is a form of the gendered nature of people and manifests in organizations. Everyone has an unconscious bias that has been influenced by our personal experiences, cultural environment and our background, it is unconscious because we are unaware of it and it happens automatically in our brain so that we can quickly asses people and make quick judgements. Therefore, this has an impact on our decision-making (Navarro, 2019). Salinas and Bagni (2007), argue that both women and men are biased against women and that when a biased is noticed, people ignore it and this contributes to a further gender inequality (Salinas and Bagni, 2017).

Sex trait stereotypes also contribute to a female bias, these are behavioral traits or psychological characteristics that characterize men with greater frequency than women. These stereotypical beliefs about the attributes of women are prevalent and shared by both men and women. Women are viewed as being expressive and communal which refers to an interpersonally orientation. Moreover, women are viewed as sensitive, kind and helpful. In contrast, men are stereotypically viewed as being instrumental and agentic (assertive, courageous and competitive) in nature. And men are viewed as task focused, dominant, independent and ambitious and therefore viewed as the ideal leader prototype (Scott and Brown 2006).

Role incongruity theory explains that the bias towards women occurs because of two forms: perceiving women less favorably than men as leaders and evaluating the behavior prescriptions of a leader role less favorably when a woman is in a leadership position (Eagly and Karau, 2002). Therefore, it is for women more difficult to become a leader and to be successful in her role. Also, Eagly (1987) argues that women are evaluated less favorably than men when performing the same leadership behaviors (Eagly,1987). Forsyth, Heiney and Wright (1997), elaborate on this issue and found in their research that people favor men over women when selecting and evaluating leaders but found a difference between people with conservative and with liberal attitudes (Forsyth, Heiney, and Wright, 1998).

Scholars concerned with female bias found another source of bias, this bias arise when a decision-maker has to satisfy an audience or a third party. These decision-makers rely on status orderings and make choices based on what they expect will gain approval from the third party of the audience. Because a higher status is associated to male stereotypical behavior, as result, decision-makers infer that people prefer men and consequently, favor male candidates (Correll et al., 2017). This bias could differ per country and is related to how people view women in political positions.

All the above-mentioned factors are intertwined with the culture of a country and stereotyping. Therefore, cultural stereotypes will be taken into consideration in this study.

Hypothesis 6: A culture that is below average from gender stereotyping and female bias, is a condition that leads to a Member State having a female prime minister in office.

2.2.7 Educational level

The educational level of women and its link to political participation is researched by scholars. Political participation is referred to as an active engagement and involvement with political processes (Sahu and Yadav, 2018). Studies suggests that because women in the last decades had more access to higher education and contributed more in the workforce. The growing emancipation of women should increase the eligible pool of candidates for office (Sundström and Stockemer 2015); (Burns et al., 2001). Furthermore, the study of Burns, Scholzman, Verba, et al. (2001), suggests that formal educations enhance skills needed for political activity such as organizational, bureaucratic and verbal skills, also people who are high educated more likely engage with politics and more likely work on developing their leadership skills. (Burns et al. 2001).

Hypothesis 7: A higher share of highly educated women in a Member State is a condition for having a female prime minister in office.

2.2.8 Labor-market participation

Iversen and Rosenbluth (2008) claim that a low level of female labor force participation leads to female underrepresentation in politics. On the demand side this is because when women are visible in the workforce, voters are used to women having leadership positions and most likely will vote for a woman. On the other hand, on the supply side, women who are in the workforce and have managerial experience most likely are possible candidates for election. Furthermore, they argued in a previous study that women who work outside their home more likely vote and develop policy interests because working and balancing family life leads to new

challenges. Consequently, they will most likely vote for a woman in politics that will represent their interests (Iversen and Rosenbluth, 2008).

Hypothesis 8: A high labor-market participation of women is a condition that leads to a Member State having a female prime minister in office.

2.2.9 Theoretical framework

This theoretical framework shows all the relevant concepts and the *potential* causal relationship the independent variables have with the dependent variable. This is a preliminary framework that resulted from the literature review. This framework will be tested and analyzed in chapter 4 of this research. These variables are chosen because they all are mentioned in previous research about female political representation as a possible cause of having female presentation in politics and ultimately, a female prime minister. However, the variables are examined separately in other research and, but none of them are examined all together in one configuration to explain female representation in the highest position in politics.

Because there is no existing research available and it is not sure if all concepts together will lead to a country having a female prime minister, this research *expects* that all conditions together will lead to a Member State having a female prime minister. Therefore, the preliminary hypothesis that results from this framework is as follows: A Member state that has: a legal quota, women in parliament (40% females), a gender-balanced cabinet (40% females), a proportional representation, an early introduction of female suffrage, a culture that is below average from gender stereotyping and female bias, a highly educated population of females and women have a high labor-market participation, leads to a Member State having a female prime minister in office.

In QCA research, this set of a relation is expressed in the language of necessary and sufficient conditions. In the preliminary framework the causal path is expressed as follows:
LQ*WP*GBC*ES*WS*CT*EL*LMP -> FPM
And for the outcome to be negative: **~LQ*~WP*~GBC*~ES*~WS*~CT*~EL*~LMP -> ~FPM**

Table 2.1: *Variables and abbreviations*

Variable	Abbreviation
Legal Quota	LQ
Women in parliament	WP
Gender-balanced cabinet	GBC
Electoral system	ES
Women’s suffrage	WS
Culture	CT
Educational level	EL
Labor-market participation	LMP
Female prime minister	FPM
AND	*
Absence	~

3. Methodology

The chapter will explain the research design and research method that is used to conduct this research. The section on the research design will explain the chosen approach, operationalization of the concepts and justification of the choices that are made. In order to answer the research question: *Why do some European Union Member States have or had a female prime minister and other Member States did not?* Section 3.2 will explain how the data are collected and analyzed, section 3.3 will justify the choices that are made for the calibration of the variables, section 3.4 discusses the analytical approach. Lastly, section 3.5 will discuss the reliability and validity of this study.

3.1 Research Design

Previously, studies have been conducted about female representation in parliament and often traditional methods were used to study this phenomenon. The methods that were used were regression analysis (Internation Cooperation and Development, 2009) and discourse analysis (Haake, 2018). This study will use QCA as method of analysis. Qualitative Comparative Analysis (QCA) is a method that was developed by Ragin (1987), and tries to bridge the division between qualitative and quantitative research. Boolean algebra is used to examine systematically conditions across the selected cases (Ragin, 1987). Cases must be similar enough to be compared with each other and there must be a variation of outcome among the cases. When there is a variation of the outcome there will be asymmetric causality and this is a part of the complex causality which is important in QCA. The occurrence or no occurrence of the outcome will be assessed separately (Hirzalla, 2019).

In order to conduct this research, QCA has been chosen because compared to other comparative approaches, that focus on the net effects of independent variables, QCA is able to look at complex patterns, it seeks to find sufficient and/or necessary conditions or combinations of conditions that lead to a certain outcome. Also, QCA can analyze multiple cases and can explain why some cases have a different outcome than other cases (Muñoz, 2015) Furthermore, QCA is helpful to analyze complex cases, the cases in this research are complex because it concerns the Member States which all share the same homogenous traits; they are all democracies and member of the European and therefore complied to EU law. However, each Member State differs in the variables that are researched in this study and this makes it complex.

In this research, 28 cases will be examined, QCA is a most ideal method to study a smaller number individual cases (between 10 and 30 cases) because it will keep its complexity but also a lower amount of individual cases keeps the research parsimonious and it is able to highlight causal paths on a micro-level (Verweij, Teisman, and Gerrits, 2015). It must be noted

that this study only focuses on the head of the government of a Member State and *not* the head of the state of the Member State concerned. Eight conditions are chosen to be tested because guided by the parsimony principle, fewer conditions are better for QCA research. Too many conditions will be too complicated to analyze and fewer conditions will enable the researcher to closely analyze the causal mechanisms.

Another advantage of QCA is that it pays both equal attention to all cases but also treats all cases fairly, all cases are examined and no case is excluded, all various configurations that lead to an outcome are examined, this is called equifinality (Roig-Tierno, Gonzalez-Cruz, and Llopis-Martinez, 2017).

Table 3.1 shows the differences between the different approaches. The QCA approach is a combination of the variable-oriented and the case-oriented approach.

Table 3.1 *Variable-oriented vs case-oriented approach*

	Requirements			
Approach	In-depth vs. generalization	Case-based vs. comparative	Attention to context	Attention to time
Variable-oriented	Generic patterns	Comparative, not case-based	Limited	Limited
Case-oriented	In-depth, focus on idiosyncrasies	Not comparative, case-based	Yes	Yes
QCA	Iterations between generic patterns and idiosyncrasies	Case-based comparison as main feature	Yes	Yes, but weak

Source: Verweij, Teisman, and Gerrits (2015)

There are three different comparative methods: crisp set (csQCA), multi-value QCA (mvQCA) and fuzzy-set QCA (fsQCA), between these methods the difference is the way the conditions are calibrated. Table 3.2 shows the difference between the methods. It is difficult for this study to choose the best method, because there are no calibration sets available for all of the conditions. For this study, the fuzzy set method is chosen, with four-value sets, this has as advantage that the calibration is more refined than a crisp set, but not too extensive as a 6-value fuzzy-set or continuous fuzzy- set, considering the time limit for this study.

Table 3.2 *Crisp and Fuzzy calibration*

Crisp set	3-value fuzzy set	4-value fuzzy set	6 value fuzzy set	'Continuous' fuzzy set
1 = fully in	1 = fully in	1 = fully in	1 = fully in	1 = fully in
				0.9
			0.8 = mostly in	0.8
		0.67 = more in than out		0.7
			0.6 = more in than out	0.6
	0.5 = neither fully in nor out			0.5 = maximum ambiguity
			0.4 = more out than in	0.4
		0.33 = more out than in		0.3
			0.2 = mostly out	0.2
				0.1
0 = fully out	0 = fully out	0 = fully out	0 = fully out	0 = fully out

Source: (Downey and Stanyer, 2010)

QCA does not assume causal symmetry, so a second analysis must be done in order to analyze the negation of an outcome (Thygeson, Peikes, and Zutshi, 2013). fsQCA is the most suitable for this research, because this study wants to know why some countries do and others do not have an FPM. QCA can be both deductive or inductive, this research is both. It is deductive because it has as aim to test the hypotheses that are explained in chapter 2.2. And, it is inductive because this study has an expectation that the studied conditions will have an effect on the outcome, however, there is no expectation which specific configurations lead to the outcome. Lastly, the general nature of a QCA research is that it has an iterative approach, it allows back and forth movement between designing the study and the analysis (Hirzalla 2019).

3.2 Data collection

3.2.1 Case Selection

The cases selected are all countries that currently are a member of the European Union, in total of 28 countries. All these countries have in common that they have a full membership of the EU, they signed the primary EU legislation (the Treaties and general legal principles) and all countries together share the same core values: human dignity, freedom, democracy, equality, rule of law and lastly, human rights are protected by the EU Charter of Fundamental Rights (Thygeson, Peikes, and Zutshi, 2013). Besides having homogenous traits, in CQA research, cases also must be heterogeneous, some cases must have a negative outcome and

others must have a positive outcome. Within the EU Member States, the outcome of having a female PM differ, furthermore each country also differs in the independent variables. In conclusion, all Member States are in the background homogenous, but they have different outcomes and thus can be compared.

3.2.2 Method of data collection

To test the hypotheses that are discussed in the theoretical framework, different sources of quantitative data are gathered and analyzed. The quantitative data are obtained by databases from Eurostat (Eurostat, 2019), the European Institute of Gender Equality (Gender Statistics Database , 2019) and the International IDEA (IDEA, 2019).

3.3 Calibration

This section will show and justify how the calibration of the outcome and condition is done. Each condition that is tested in this research is calibrated (operationalized). For each condition, the data is translated into a membership score. There are no calibrated data sets available from other studies, so some conditions are assigned with a theoretical explanation. Moreover, they are inferred from quantitative data, however, some conditions are more complex to assign a membership score. Thus, for these conditions, subjective indicators are used. The paragraph 'Justification of the calibration' will justify each calibration and which indicators are considered.

3.3.1 Outcome

Table 3.3 depicts the calibrated data matrix of the outcome variable, this is a four-value fuzzy set. The outcome is calibrated as follows; countries that currently have a female PM are assigned as fully in (1). Countries that had an FPM between 2014-2019 are more in than out (0.67) and countries that had an FPM before 2014, are assigned more out than in (0.33). Consequently, countries that never had an FPM are fully out (0). Because countries that currently have an FPM could be a coincidence, so that is why this research also looks into the past. Additionally, this research works with current datasets, it has been decided that the more recent the country had a female prime minister, the more fully in, the country is. The justification is that countries that had an FPM a long time ago, cannot be explained with current data that is used for the independent variables.

The analysis in chapter 4.2 is based on countries that scored 1, 0.67 or 0.33 on the outcome in table 3.3. Consequently, the analysis in chapter 4.3 is based on countries that scored 0.67, 0.33 or a 0 on the outcome in table 3.3. For each analysis three different CQA scores are considered because in order to have a valid outcome in the software analysis, it is important that there is variation in the QCA scores.

Table 3.3 *Data Matrix Outcome Variable*

Country	***Country Abbreviation***	***CQA score***	***QCA degree of membership***
Austria	AT	1	Fully in
Belgium	BE	1	Fully in
Bulgaria	BG	0.33	More out than in
Croatia	HR	0.33	More out than in
Cyprus	CY	0.33	More out than in
Czech Republic	CZ	0	Fully out
Denmark	DK	1	Fully in
Estonia	EE	0	Fully out
Finland	FI	1	Fully in
France	FR	0.33	More out than in
Germany	DE	1	Fully in
Greece	GR	0.67	More in than out
Hungary	HU	0	Fully out
Italy	IT	0	Fully out
Ireland	IE	0	Fully out
Latvia	LV	0.67	More in than out
Lithuania	LT	0.33	More out than in
Luxembourg	LU	0	Fully out
Malta	MT	0	Fully out
The Netherlands	NL	0	Fully out
Poland	PO	0.67	More in than out
Portugal	PT	0.33	More out than in
Romania	RO	0.67	More in than out
Spain	ES	0	Fully out
Slovakia	SK	0.33	More out than in
Slovenia	SI	0.67	More in than out
Sweden	SE	0	Fully out
United Kingdom	UK	0.67	More in than out

3.3.2 Calibration of each condition

In QCA research, it is important that all conditions are calibrated and that a threshold is set. This research uses the four-value fuzzy set, this is chosen because this allows a more nuanced configuration and consequently a finer analysis than if chosen for the crisp set. A five-value fuzzy set or continuous fuzzy set is not chosen because adding more values would mean more thresholds had to be defined and supported by evidence and this could be too labor-intensive considering the limited of time to conduct this research.

Rihoux and Ragin (2009), describe in their work that a fuzzy-set includes two qualitative breakpoints; cases with full membership (1) and full non-membership (0). The crossover point is (0.5), this crossover point represents 'fuzziness'/maximum ambiguity; we cannot be sure how to classify the conditions because it is not fully in or fully out and data are not available. Because the four-value fuzzy set is chosen cases are assigned as follows: fully in (1), more in than out (0.67), more out than in (0.33) and fully out (0).
When the conditions are being calibrated, two choices can be made; scores are assigned by hand or the direct method of calibration can be used, the latter uses a software-based routine to assign scores to each case. Because of practical reasons, in this research, all cases are scored by hand. Moreover, according to Mello (2019), what matters is the position of the qualitative anchors, and not whether the values were assigned manually or if the software was used (direct method of calibration). In this chapter, an explanation is provided on how each condition is scored.

Justification of the calibration

- **Legal Quota:** a legal quota is suggested in the literature as a mechanism to increase female representation. In this research countries that have a legal candidate quota in both the upper and lower house are calibrated as (1). Countries that only have a legal candidate quota in the lower house are calibrated (0.67), countries that do not have a legal quota but do have a voluntary political party quota are calibrated (0.33) Lastly, countries that do not have a legal quota or voluntary political party quota are calibrated (0). A candidate quota is the actual nomination of candidates that are placed on the ballot. This quota system implies that for example 20,30,40 or 50 percent of the candidates must be women. The system of reserved seats, which means that a certain percentage or number among the elected must be women, is not considered in this research, because this system does not exist in the EU28 (Dahlerup 2009). The data for this calibration is obtained from IDEA (2009).
- **Women in parliament:** according to the theory discussed in 2.2.2, a balanced group of 40% is necessary in a parliament. The percentage of women in parliament are

calibrated as follows: above 40% (1), between 30% and 40% (0.67) between 20% and 30% (0.33) and below 20% (0). The data for this calibration is obtained from EIGE (2019c).

- **Gender balanced cabinets:** in chapter 2.2.3 the theory explained that a cabinet is gender-balanced when it is not falling below 40 percent as a parity threshold. Thus, the numbers are calibrated as follows: above 40% (1), between 30% and 40% (0.67) between 20% and 30% (0.33) and below 20% (0). The data for this calibration is obtained from EIGE (2019d).
- **Electoral system:** according to the theory discussed in 2.2.4, countries that have proportional representation (PR) have a higher representation than countries that have a plurality or majority system. This condition is calibrated as follows: countries that have a PR (1), countries that have a mixed system (0.67) and countries that have a plurality system (0.33), countries that have a majority system (0). A majority is chosen as (0) because it requires a majority of the electoral vote and not the popular vote like in a plurality system. The data for this calibration is obtained from IDEA (2009)
- **Women's suffrage:** women's suffrage is complicated to calibrate, there is no theoretical explanation available that states what is considered as an early or late introduction. Thus, in this research it is subjectively calibrated as follows: early introduction of women's suffrage from 1900-1920 (1), between 1920-1940 (0.67) between 1940-1960 (0.33) and late introduction of women's suffrage after 1960 (0). The data for this calibration is obtained from Women's suffrage and beyond (2019).
- **Culture:** culture is complicated to calibrate because it is a comprehensive concept. In chapter 2.2.6 it was concluded that a culture free from stereotyping and female bias, could promote gender equality. A country that meets this condition, most likely will agree that women have the necessary qualities and skills to fill positions of responsibility in politics. Therefore, the results of a survey taken by the Eurobarometer of the European Commission is used to test the culture condition. The question in this survey was if the person agrees or disagrees with the following statement: *"Women do not have the necessary qualities and skills to fill positions of responsibility in politics"* (Eurobarometer, 2017). The results of the survey are calibrated as follows: more than 40% agrees (0), there were a few countries that were outliers and there for 40% was chosen. The mid-range has been subjectively calibrated; between 20%-40% agrees (0.33) and between 10%-20% agrees (0.67). Some outliers score a low percentage; therefore, this is calibrated as: 0%-10% agrees (1). The data for this calibration is obtained from Eurobarometer (2017).
- **Educational level:** according to the theory explained in chapter 2.2.7, women who are higher educated most likely will engage in politics and develop their leadership skills.

To calibrate the percentages of highly educated women (who completed tertiary education), the EU28 average has been taken into consideration. The average percentage of women in the EU who completed tertiary education is 44,7% (EIGE 2018b). Thus, in this research a percentage above 60% is calibrated as (1), between 50% and 60% (0.67) between 40% and 50% (0.33) and below 40% (0). The data for this calibration is obtained from EIGE (2018b).

- **Labor-market participation:** the theory in 2.2.8 explained that a high level of labor-market participation would increase the supply and demand side of women and most likely a woman will be active in politics and voters will vote for a woman. Setting a threshold is complicated because there are no set definitions of what is 'high' participation or 'low' participation. Thus, for this research the EU28 average has been taking into consideration, the EU28 average of women (ages 20 between 64) who participate in the labor-market is 67,4% in 2018 (EIGE 2018a). Above 80% is calibrated as (1), between 67% and 80% (0.67), between 50 and 67% (0.33) and below 50% (0). The data for this calibration is obtained from EIGE (2018a).

Table 3.4 *Data Matrix Conditions*

Country	Legal Quota (LQ)	Women in parliament (WP)	Gender balanced cabinet (GBC)	Electoral system (ES)	Women's suffrage (WS)	Culture (CT)	Educational level (EL)	Labor-market participation (LMP)
Austria	0.33	0.67	1	1	1	0.33	0.33	0.67
Belgium	1	1	0.33	1	0.33	0.67	0.67	0.33
Bulgaria	0	0.33	0.67	1	0.33	0.33	0.33	0.67
Croatia	0.67	0	0	1	0.33	0.33	0.33	0.33
Cyprus	0.33	0	0	1	0	0.33	1	0.67
Czech Republic	0.33	0.33	0.33	1	0.67	0.33	0.33	0.67
Denmark	0	0.67	0.67	1	1	1	0.67	0.67
Estonia	0	0.33	0.33	1	1	0.33	0.67	0.67
Finland	0	1	1	1	1	0.67	0.67	0.67
France	1	0.67	1	0	0.33	1	0.67	0.67
Germany	0.33	0.67	1	0.67	1	0.67	0	0.67
Greece	0.67	0.33	0	1	0.33	0.67	0.67	0
Hungary	0.33	0.67	0	0.67	1	0	0.33	0.33

Italy	1	0	0.67	0.67	0.33	0.33	0	0.33
Ireland	0.67	0.33	0.33	1	0.67	0.67	1	0.67
Latvia	0.67	0.67	0.33	1	1	0.33	0.67	0.67
Lithuania	0.33	0.33	0	0.67	1	0.33	1	0.67
Luxembourg	0.33	0.33	0.67	1	1	1	0.67	0.67
Malta	0.33	0	0	1	0.33	0.33	0	0.33
The Netherlands	0.33	0.67	0.67	1	1	1	0.67	0.67
Poland	0.67	0.33	0	1	1	0.33	0.67	0.33
Portugal	0.67	0.67	0.33	1	0	0.67	0.33	0.67
Romania	0.33	0	0.33	1	0.67	0	0	0.33
Spain	1	1	1	1	0.67	0.67	0.33	0.33
Slovakia	0.33	0.33	0.67	1	0.67	0.33	0.33	0.33
Slovenia	0.67	0.33	0.33	1	0.33	0.33	0.67	0.67
Sweden	0	1	1	1	1	1	0.67	1
United Kingdom	0.67	0.33	0.67	0.33	0.67	1	0.67	0.67

Note: In appendix 1, the raw data set of the conditions can be viewed and the data sources.

3.4 Analytical approach

The data matrix with the calibrated data will be used in the software fsQCA 2.0 (C. Ragin, Drass, and Davey, 2006). Moreover, a truth table will be created in this software program to analyze the relationship between the set of cases that share a combination of conditions and it analyzes the relationship between a set of cases with the outcome. The truth table is a means for logical minimization (Boolean algebra) that is used in the final analysis (Hirzalla, 2019). Boolean minimization is the 'reduction of a long, complex expression into a shorter, more parsimonious expression' (Rihoux and Ragin, 2009). All three results of logical minimization will be reported in the analysis: the complex solution, the parsimonious solution, and the intermediate solution. The complex solution does not have any logical remainders, logical remainders are missing combinations (Toshkov, 2016). A parsimonious solution does have logical remainders and the intermediate solution includes only the logical remainders that the researcher included because these logical remainders are supported by the theory (Hirzalla, 2019).

3.5 Reliability, validity and generalizability

Reliability refers to the consistency of the analytical procedures. This also includes personal and research method biases that could influence the findings of the study. Validity is the precision in which the findings of the study accurately reflect the data. Lastly, generalizability means the transferability of the findings to other settings and applicability in other contexts (Noble and Smith, 2015).

The external validity of this research has a few implications; the external validity of the findings in this research are modest because of personal bias while calibrating the variables. Moreover, the results of the analyses are only valid in one context (the EU). Therefore, research conducted on this topic in other parts of the world, could lead to other conclusions. Thus, this lowers the generalizability of this study. However, the conditions that are used in this study could be generalized and are applicable in other contexts. Female representation is a worldwide phenomenon and not exclusively applicable to the European Union.

During the calibration of the variables, subjective choices are made. This is inevitable in this study because during the calibration not only theoretical knowledge is used but also the subjective opinion of the researcher to set the thresholds. In order to reduce this bias, all decisions made during the calibration are discussed in a previous paragraph. In the appendix, the raw data that is used in the analyses, are added to increase transparency. Furthermore, all the steps and decisions that are taken while using the fsQCA software are discussed in chapter 4. Thus, this not only increases the validity, but also the reliability, other researchers who will do the same analyses with the same data set will get the same outcomes as in this study. Additionally, to increase the external validity, the intermediate solution is chosen to be analyzed because of the inclusion of logical remainders that are supported by the theory and this increases the accuracy of the proposed configurations.

The content validity of this research has its limitations, because as discussed earlier, it is difficult to calibrate because there are no calibrated fuzzy-set data sets available. To ensure the internal validity, it is important to select cases that have a diversity in the conditions and in the outcomes (Jordan et al., 2011) In this research all of the cases are diverse and score differently on both the conditions as the outcomes. The internal validity of this study can be met by the strong causality that characterizes QCA research.

Moreover, when doing the initial analysis, contradictory configurations were observed. These are configurations that have identical causal conditions but different outcomes. In order to

solve this, the method proposed by (Rihoux and Ragin, 2009), was applied, they argue that one or more conditions should be removed and replaced with another condition(s). The condition ‘work-life balance’ was removed from this study and replaced with the condition ‘women in parliament’.

4. Analysis

The analysis of this study will first start by constructing a fuzzy-set truth table in the fsQCA software program. The data matrix is uploaded in the software and the FPM variable (female prime minister) is selected as the outcome variable and the other eight variables are selected as the causal conditions. Appendix 1 shows the raw data table and in appendix 2, the truth tables can be viewed. In the truth table the column *number* is the number of cases that have more than 0.5 membership in that corner of the vector space. In the parentheses shows the cumulative percentage of cases and the raw consistency explains to which degree membership in the corner of the vector space is a consistent subset of membership in the outcome. The PRI consistency is an alternative measure of consistency for fuzzy sets. This is based on a quasi-proportional reduction in error calculation. Lastly, the SYM consistency is an alternative measure of consistency based on a symmetrical version of PRI consistency (C. Ragin, 2017).

This chapter is structured as follows; section 4.1 will explain the analysis and results of Member States who have or had an FPM the past five years, and section 4.2 will explain the analysis and results of Member States who had an FPM more than five years ago, never had an FPM, or had one the past five years but currently do not have an FPM.

4.1 Member States that recently had an FPM

After constructing the fuzzy-set truth table, the second step is to select a frequency threshold, this is done with a frequency of at least 0.75. This frequency is chosen because according to the theory about conducting a QCA research, the threshold for fuzzy-sets should be set at least 75%. The threshold of the number of cases is set at 1, therefore, the software will eliminate all the rows below number 1. The configurations that are consistent subsets of the outcome, are at least 0.75 in the raw consistency column. Before analyzing the solutions, a necessity test for each condition is done in the software and FPM (1) is set as outcome.

Table 4.1 *Necessary conditions analysis*

Condition	***Consistency***	***Coverage***
Legal Quota	0.556929	0.823760
Women in parliament	0.675199	0.918367
Gender-balanced cabinet	0.614298	0.839566
Electoral system	0.911739	0.659221
Women's suffrage	0.822595	0.848044

Culture	0.706090	0.856223
Educational level	0.706090	0.826446
Labor-market participation	0.705207	0.824561
~ Legal Quota	0.734334	0.804642
~ Women in parliament	0.61	0.721820
~ Gender-balanced cabinet	0.589585	0.687951
~ Electoral system	0.146514	0.712246
~ Women's suffrage	0.410415	0.663338
~ Culture	0.586937	0.766129
~ Educational level	0.585172	0.796875
~ Labor-market participation	0.644307	0.878460

Notes: the coverage in this table indicated the proportion of membership in the outcome explained by the solution. The consistency is indicating the degree to the subset relationship of necessity is approximated (C. C. Ragin 2008).

In table 4.1 it is displayed that only the condition 'electoral system' is above 0.90, (which is the threshold for necessity). And therefore, closest to the outcome (1). Furthermore, the coverage should be at least 0.5, so the electoral system could be a necessary, but not sufficient, condition for a country having a female prime minister. The necessity analysis is conducted among 18 cases which scored 1, 0.66 and 0.33. Thus, this is 64.29% of the total of 28 Member States.

The fourth step is to let the software analyze the data of the truth table. For the intermediate solution all causal conditions are selected as 'present', because according to the theoretical framework, all conditions should be present in order to have the outcome present. A standard analysis was conducted and this resulted in 3 outcomes: the complex causal solutions, the parsimonious solutions and the intermediate solutions. Among researchers it is debated which solution is the most optimal. (C. C. Ragin, 2008) argues that 'a proper solution should strike a balance between including those remainders which can be included and excluding those which should be excluded'. He concludes that the intermediate solution gets as closest to the true underlying structure and with a higher likelihood of retaining robust sufficiency. (Rihoux and Ragin, 2009) are also in favor of the intermediate solution because according to them 'it incorporates only the logical remainders that are consistent with theoretical and substantive knowledge'. Therefore, in this study, the intermediate solution is chosen as most optima. Thus, only the intermediate solution will be analyzed. In Appendix 4, the complete table with all three solutions, that are produced by the software, is depicted. In table 4.2 the intermediate solution can be seen.

Raw coverage means the proportion of outcome cases that are covered by the term. The unique coverage means the proportion of the outcome cases that are uniquely covered, other terms do not cover those cases. The solution coverage is the proportion of cases that are covered by all terms. Lastly, the consistency number explains the degree to which membership in the solution is a subset of membership in the outcome.

Table 4.2 *Intermediate solution of Member states that have or recently had an FPM*

Testing parameters Frequency cutoff: 1.000000 Consistency cutoff: 0.829146	**Raw coverage**	**Unique coverage**	**Consistency**	**Cases with greater than 0.5 membership**
INTERMEDIATE				
Ws*es	0.734334	0.117387	0.861284	AT, DK, FI, LV, PO, DE, LT, RO, SK
Es*lq	0.527802	0.089144	0.897898	BE, HR, GR PO, PT, SI
Lmp*el*es	0.527802	0.000000	0.897898	CY, DK, FI, LV, LT, SI
Lmp*es*gbc	0.468667	0.000000	0.941489	AT, FI, DE, BG, DK
Lmp*el*ct*ws*gbc*~lq	0.321271	0.000000	1.000000	FI, DK, UK
Lmp*el*ct*ws*gbc*~wp	0.262136	0.029126	1.000000	UK
		Solution coverage: 0.969991	Solution consistency: 0.803363	

Notes: * means AND the 'tilde' symbol ~ means (negation, the absence of a condition)

4.1.1 Why do some countries have or had a female prime minister?

To answer the question above, it is indicated in table 4.2 that the causal path is: **ws AND es** *or* **es AND lq** *or* **lmp AND el AND es** *or* **lmp AND es AND gbc** *or* **lmp AND el AND ct AND ws AND gbc AND absence of lq** *or* **lmp AND el AND ct AND ws AND gbc AND absence of WP → Female prime minister**

These solutions cover 96% of the cases and with a consistency of 80%. This result shows that none of the conditions or one configuration alone is sufficient for the outcome. All the conditions are INUS conditions, these are conditions that are 'insufficient but non-redundant parts of unnecessary but sufficient conditions of the outcome' (Toshkov, 2016). 17 cases are covered in this configuration, France is the only case that cannot be explained in the configurations.

Causal path 1: women's suffrage AND electoral system. This path has the strongest outcome and it indicates that 73% covered instances of having an FPM and 11% of the instances were uniquely explained by this path. The consistency score of 86% indicates that this path most likely will lead to the outcome of having an FPM. Nine cases have a score of at least 0,5; Austria, Denmark, Finland, Latvia, Poland, Germany, Lithuania, Romania and Slovakia. Of these nine countries, 4 of them currently have an FPM (Austria, Denmark, Finland and Germany) Latvia, Romania and Poland had an FPM in the last 5 years. Only, Lithuania (1990-1991) and Slovakia (2010-2012) had an FPM more than 5 years ago. What is striking in this result is that all countries had an early introduction of women's suffrage, this result shows that most likely an early introduction has an effect on a country having an FPM. Moreover, all countries with the exception of Germany and Lithuania have a proportional representation, the latter both have a mixed system.

Causal path 2: electoral system AND legal quota. This path indicates that 52% covered instances of a country having an FPM and 8% of the instances of having an FPM were uniquely explained by this causal path. The consistency score is 89% and this indicates that this path most likely will lead to the outcome of having an FPM. Six cases have a score of at least 0.5; Belgium, Croatia, Greece, Poland, Portugal and Slovenia. Of all the cases, Belgium is the only country that currently has an FPM. In this second path, the electoral system is also a necessary condition, this is in accordance with the necessary conditions analysis. Furthermore, this path shows that a legal quota has a positive effect on a country having an FPM. Belgium is the only case where they have a quota in both the upper and lower house. In the other cases they have a legal quota in the lower house.

Causal path 3: labor-market participation AND educational level AND electoral system. This path indicates that 52% covered instances of having an FPM and 0% of the instances of having an FPM were uniquely explained by this path, this mean that 0 cases can be uniquely explained by only this path. The consistency score of 86% indicates that this path most likely will lead to the outcome of having an FPM. Six cases can be explained by this path: Cyprus, Denmark, Finland, Latvia, Lithuania and Slovenia. Also, in this path the condition electoral system is necessary. What is interesting that 3 cases are Eastern European countries and 2 Scandinavian countries, the only geographical exception is Cyprus. Looking at the labor-market participation, the data shows that all cases have a participation percentage that is near or above the EU average of 67,4%, this shows that this is an important condition. All cases also score above the average of 44,7% of women in the EU who completed tertiary education.

Causal path 4: labor-market participation AND electoral system AND gender-balanced. This path indicates that 46% covered instances of a country having an FPM and 0% of the instances of having an FPM were uniquely explained by this causal path. The consistency score is 94% and this indicates that this casual path most likely will lead to the outcome of having an FPM. The countries that scored more than 0.5 on this causal path are: Austria, Finland, Germany, Bulgaria and Denmark. It is interesting that 4 out of 5 cases currently have an FPM. This causal path is similar to causal path 3; educational level is replaced by a case having a gender-balanced cabinet. Austria, Finland, and Germany score above the 40% parity percentage that is set for a country having a gender-balanced cabinet. Bulgaria scores 30% and Denmark 35%.

Causal path 5: labor-market participation AND educational level AND culture AND women's suffrage AND gender-balanced cabinet AND the absence of a legal quota. This path indicates that 32% covered instances of a country having an FPM and 0% of the instances of having an FPM were uniquely explained by this causal path. The consistency score is 100% and this indicates that this casual path most likely will lead to the outcome of having an FPM. The cases that score higher than 0.5 are; Finland, Denmark and the United Kingdom. Finland and Denmark both do not have a legal quota and the United Kingdom only has a legal candidate quota in the lower house. These cases contradict the cases in causal path 2.

Causal path 6: labor-market participation AND educational level AND women's suffrage AND gender-balanced cabinet AND the absence of women in parliament. This path indicates that 26% covered instances of a country having an FPM and 2% of the instances of having an FPM were uniquely explained by this causal path. The consistency score is 100% and this indicates that this casual path most likely will lead to the outcome of having an FPM. The case with a score of at least 0.5, is the UK. This is a striking result, considering the UK is the only country

in the EU that has a plurality system and not a proportional representation system and scores low on women in parliament, 29%.

Missing case: France is the only case that cannot be explained by the above-mentioned causal paths and, therefore, is a deviant case. France had once in history an FPM (1991-1992). It could be that France once having an FPM was a contingency.

4.1.2 Tested hypothesis

The next step is to test the hypothesis formulated in chapter 2.2.9. The subset/superset analysis shows there is a consistency of 100%, which is above the threshold of 75%. However, the raw coverage is 14%, which is below the threshold of 50%. Thus, it can be concluded that the hypothesis of the theoretical framework is refuted. Section 4.1.3 will conclude the separate tested hypotheses.

Conditions	*Consistency*	*Raw coverage*
Lq*wp*gbc*es*ws*ct*el*lmp	1.000000	0.145631

Figure 2: subset/superset analysis

Sub-conclusion

It can be concluded that all conditions tested together are not causally necessary for the outcome. Furthermore, none of the individual conditions are causally sufficient for the outcome. This shows that explaining why a country does or does not have a female prime minister is complex and more factors than discussed in the theory should be added and tested. Also, even though all countries share homogenous traits, they differ significantly. However, it is interesting that two conditions are present in four out of the six causal paths; electoral system and labor-market participation. There are is one deviant case in the analysis (France) but looking at the Member States that currently have a female prime minister; Austria, Denmark, Finland and Germany all can be explained through several causal paths. Belgium can only be explained by one configuration; electoral system and having a legal quota.

4.1.3 Conclusion hypotheses tested conditions

This section will conclude each hypothesis that is tested. Firstly, a striking result is that labor-market participation is an important condition, and is in line with the hypothesis about the labor-market participation. However, looking at the raw data matrix, Sweden is the only country that scores (1) and high a high percentage of female labor-market participation (88.40%). Yet, Sweden never had an FPM. Moreover, the results show that having a (high) percentage of

women in parliament does not have an effect on the cases. Also, the condition legal quota appears in only one causal path. That is interesting, because conditions are theoretically thought to be the solution to increase female representation. Women's suffrage appears in three casual paths, so this confirms the hypothesis and, but the study done by (Rubio-Marin 2014), that was critical about the effect of early women's suffrage introduction also can be confirmed; Belgium and Portugal are both a good example of cases were suffrage was introduced relatively late compared to the other Member States, but both countries have/had a female prime minister. The hypothesis about the educational level of women, partly can be accepted, 50% of the causal paths show that is matters for having an FPM. The condition gender-balanced cabinet only appears in 33.3% of the cases, and therefore the hypothesis about this condition is considered weak, because for example, Belgium currently has an FPM, but only 23.1% are women in the Belgian cabinet. The results of this analysis also show that the electoral system hypothesis can be accepted. First of all, the necessary analysis showed that this condition scores high in this test. Secondly, the condition appears in 66.7% of the configurations. Lastly, culture can be seen in one causal path, what is interesting, because culture is thought to play an important role for the outcome, so the separate hypothesis of culture can be refuted.

4.2 Member States without a female prime minister or longer than 5 years ago

After constructing a new fuzzy-set truth table, the second step is to select a frequency threshold, this is done with a frequency of at least 0.75. The threshold of the number of cases is set at 1, therefore, the software will eliminate all the rows below number 1. The configurations that are consistent subsets of the outcome, are at least 0.75 in the raw consistency column. Before analyzing the solutions, a necessity test for each condition is done in the software and FPM is set as outcome.

Table 4.3 *Necessary conditions analysis*

Condition	***Consistency***	***Coverage***
Legal Quota	0.538092	0.869186
Women in parliament	0.518296	0.962138
Gender-balanced cabinet	0.496101	0.926092
Electoral system	0.920216	0.754179
Women's suffrage	0.718656	0.836008
Culture	0.617876	0.884880
Educational level	0.578884	0.803497
Labor-market participation	0.679664	0.917409

~ Legal Quota	0.659868	0.867508
~ Women in parliament	0.679664	0.808131
~ Gender-balanced cabinet	0.642471	0.761194
~ Electoral system	0.119376	0.748120
~ Women's suffrage	0.439712	0.845444
~ Culture	0.580084	0.851232
~ Educational level	0.619076	0.939035
~ Labor-market participation	0.557888	0.873239

Notes: the coverage in this table indicated the proportion of membership in the outcome explained by the solution. The consistency is indicating the degree to the subset relationship of necessity is approximated (C. C. Ragin 2008).

In table 4.3 it is displayed that only the condition 'electoral system' is above 0.90, (which is the threshold for necessity). And therefore, closest to the outcome (0). Furthermore, the coverage should be at least 0.5, so the electoral system could be a necessary, but not sufficient, condition for a country not having a female prime minister. The necessity analysis is conducted among 23 cases (cases who scored 0.67, 0.33 or 0 on the outcome). Thus, 82.14% of the total number of Member States.

A new analysis was conducted with the truth table. The outcome of ~ FPM is selected and the threshold was set at 0.75 and the threshold of the number of cases is set at 1. Only the cases that scored a (0) or (0.33) or (0.67) on the outcome are used in this analysis. Because a QCA research needs to have a negative as well as a positive outcome to analyze the conditions, the outcome 0.67 is also included. All causal conditions were selected as absent, because according to the theory, the absence or lower score of these conditions could lead to a country not having an FPM.
As discussed earlier, only the intermediate solution will be analyzed. Appendix 5 depicts the complete intermediate solution table. Table 4.4 shows the intermediate solution.

Table 4.4 *Intermediate solution of Member States without a female prime minister or longer than 5 years ago*

Testing parameters Frequency cutoff: 1.00000 Consistency cutoff: 0.871698	**Raw coverage**	**Unique coverage**	**Consistency**	**Cases with greater than 0.5 membership**
INTERMEDIATE				

~ws*~es	0.079784	0.020396	1.000000	FR
Es*~lq	0.659868	0.242352	0.891410	BG, EE, LV, SE, CY, CZ, HU, LT, LU, MT, NL, RO, SK
~el*~ws*~gbc	0.299940	0.020396	1.000000	HR, MT, PT
~lmp*~el*wp	0.337732	0.000000	1.000000	IT, ES
~gbc*~wp*lq	0.377924	0.020396	0.860656	HR, GR, IE, PO, SI
~lmp*~el*lq	0.377924	0.019796	1.000000	HR, IT, ES
		Solution coverage: 0.841632	Solution consistency: 0.856010	

Why do some countries do not have a female prime minister or longer than 5 years ago?

To answer the question above, it is indicated in table 4.4 that the causal path is: **absence of ws AND absence of ES** *or* **es AND absence of lq** *or* **absence of el AND absence of ws AND absence gbc** *or* **absence of lmp AND absence of el AND wp** *or* **absence of gbc AND absence of wp AND lq** *or* **absence of lmp AND absence of el AND lq → absence of a female prime minister**

These solutions cover 84% of the cases and with a consistency of 85%. 23 cases are covered in this configuration, the United Kingdom is not explained in this configuration.

Causal path 1: absence of women's suffrage AND absence of electoral system. This path indicates that 7% covered instances of having an FPM and 2% of the instances of not having an FPM were uniquely explained by this path. The consistency score of 100% indicates that

this path most likely will lead to the outcome of a Member State not having an FPM. One case has more than 0.5 membership in this causal path; France. As explained previously, France was a deviant case in the FPM (1) outcome. This causal path suggests that because of the late introduction of women's suffrage in France and having a majority electoral system, France had only once an FPM, which could be interpreted as a contingency.

Causal path 2: electoral system AND absence of legal quota. This path indicates that 65% covered instances of having an FPM and 24% of the instances of not having an FPM were uniquely explained by this path. The consistency score of 89% indicates that this path most likely will lead to the outcome of a Member State not having an FPM. In this causal path, Bulgaria, Estonia, Latvia, Sweden, Cyprus, Czech Republic, Hungary, Lithuania, Luxembourg, Malta, the Netherlands, Romania and Slovakia, score higher than 0.5. All these countries have either a proportional representation system or a mixed system. Latvia is the only country that does have a legal quota in the lower house and a proportional representation system and had once an FPM, so this seems to be a contradictory case. Bulgaria, Estonia and Sweden do not have any form of a legal quota. Cyprus, Czech Republic, Hungary, Lithuania, Luxembourg, Malta, the Netherlands, Romania and Slovakia only have a voluntary political party quota, but as it is voluntary, it could be there is still a low percentage of women in their political parties. Lithuania can be seen as an example, Lithuania currently has an all-male government.

Causal path 3: absence of electoral system AND absence of women's suffrage AND absence of gender-balanced cabinet. This path indicates that 29% covered instances of having an FPM and 2% of the instances of not having an FPM were uniquely explained by this path. The consistency score of 100% indicates that this path most likely will lead to the outcome of a Member State not having an FPM. Croatia, Malta and Portugal score higher than 0.5 in this outcome. All three countries have a proportional representation system and women's suffrage was introduced late. Especially, in Portugal where it was introduced in the 70's, as last Member State. All three countries score low on the gender-balanced cabinet condition, Malta stands out; only 6.7% are female. However, it must be noted that both Croatia and Portugal had an FPM. Portugal in 1979, which was 3 years after the introduction of women's suffrage. This could be seen as a contingency. Croatia had 3 times an FPM, but two of them were before the fall of the iron curtain, and as explained in the theory, communist regimes promoted female representation for symbolic purposes.

Causal path 4: absence of labor-market participation AND absence of educational level AND women in parliament. This path indicates that 33% covered instances of having an FPM and 0% of the instances of not having an FPM were uniquely explained by this path. The

consistency score of 100% indicates that this path most likely will lead to the outcome of a Member State not having an FPM. Italy and Spain score higher than 0.5 in this outcome. Italy scores low in the labor-market participation and educational level, but 35.8% are women in parliament which is close to parity. Spain is an interesting case, Spain has a legal quota and has a gender-balanced cabinet of 58.8% and 44% women in parliament, yet Spain never had an FPM. 61% of the Spanish women work, which is not a low percentage, but it is significantly lower compared to countries that do have an FPM.

Causal path 5: absence of gender-balanced cabinet AND absence of women in parliament AND legal quota. This path indicates that 37% covered instances of having an FPM and 2% of the instances of not having an FPM were uniquely explained by this path. The consistency score of 86% indicates that this path most likely will lead to the outcome of a Member State not having an FPM. Croatia, Greece, Ireland, Poland and Slovenia score higher than 0.5 on this configuration. What is interesting in this configuration is that all countries have a legal quota in the lower house. Yet, they score low in having a gender-balanced cabinet and having women in parliament. Greece and Slovenia did have once an FPM the past 5 years, and Poland had 3 FPM's. So, Poland could be a contradictory case, but because recent percentages (Q3 2019) were used in this analysis, it could be that the political environment in Poland has changed and therefore, currently does not have an FPM.

Causal path 6: absence of labor-market participation AND absence of educational level AND legal quota. This path indicates that 37% covered instances of having an FPM and 1% of the instances of not having an FPM were uniquely explained by this path. The consistency score of 100% indicates that this path most likely will lead to the outcome of a Member State not having an FPM. Croatia, Italy and Spain score higher than 0.5 on this configuration. This configuration is similar to causal path 4. The only difference in causal path 6 is the condition legal quota. As discussed in causal path 4, it is striking that Spain and Italy both have a legal quota in both the lower as the upper house, but compared to other countries that also have a legal quota in both the lower as the upper house (Belgium and France), never had an FPM. Croatia only has a legal quota in the lower house and as discussed in causal path 3, Croatia had three times an FPM, but in this moment scores low on the labor-market participation and educational level of women.

Missing case: The United Kingdom is not explained in these causal paths. The United Kingdom had 2 female prime ministers, one of them recently. So, this could explain why this case scores a membership below 0.5 in the outcome of this analysis.

Sub-conclusion

It can be concluded that many different causal paths explain why some countries do not have a female prime minister, and this also shows how complex it is to explain female representation in leadership positions. What is striking is that the condition culture cannot explain any of the cases, because there are several cases that score low on culture and never had an FPM. One condition is remarkable in the outcome; legal quota. This condition is contradicting in the configurations, because it is both present as absent. All configurations show that the educational level of women is an important factor, so this also confirms the hypothesis, that a country with a higher share of highly educated women most likely will have an FPM.

5. Conclusion and discussion

This chapter will start with a concise conclusion and answer to the research question. Chapter 5.2 will discuss the findings, the strengths and limitations of this study and suggestions for future research.

5.1 Conclusion and answer to research question

As mentioned in the introduction of this study, in 2020 women are still underrepresented in political leadership positions. This research aimed to identify if the variables mentioned in the theory, would lead to a country having a female prime minister. This study has shown that female representation is a complex concept and that there are different paths that could lead to a country having a female prime minister or not having one office. It confirms the theory of Wängnerud (2009), that the complexity of parliaments makes it difficult to research the outcomes of countries that have a substantial number of women in office. Also, it could be a contingency that a country has or had an FPM. Pitkin's model of the four dimensions of political representation was found to be partly appropriate to analyze the outcome of a country. The dimension of formal representation is explained by the condition of legal quotas and its effect on a country, the cultural stereotyping condition explains well the symbolic representation.

The main hypothesis, that all eight proposed conditions combined together would lead to a country having an FPM could not be confirmed. Both necessity analyses showed that the condition 'electoral system' is a necessary, but not sufficient condition for a country having an FPM. In the first analysis, 1 case out of 17 could not be explained and in the second analysis also 1 case out of 23 could not be explained. These two deviant cases can be explained. Both cases, while having another outcome than the other analyzed cases, had to be included in the analysis because of methodological reasons. However, the findings of the analysis indicate that there are different causal paths that lead to a country having a female prime minister. This finding concurs with the QCA study of Krook (2010), who concluded in her study about female representation in parliaments, that the causal effect of one condition depend upon the presence or absence of other factors. This study also concludes that one condition alone standing, cannot lead to the outcome and the configuration of different factors lead to a country having or not having an FPM.

The research question of this study: ***Why do some European Union Member States have or had a female prime minister and other Member States did not?*** This research question will be answered in two parts because QCA research is focused on asymmetric causality.

Why do some European Union Member states have or had a female prime minister?

There were 6 causal paths identified that explain why a country has or had an FPM. 17 cases were covered out of the 18 cases that were analyzed. Moreover, all 5 Member States that currently have an FPM can be explained by the 6 causal paths. Two important individual conditions to answer the research question are the conditions labor-market participation and the electoral system (either a Member State having a proportional representation or a mixed system). Both conditions are visible in several causal paths. A country that has a high labor-market participation of women also most likely has or had an FPM. This confirms the study of Iversen and Rosenbluth (2008), that when women who are visible in the workforce, voters are used to women in leadership positions and most likely will think women are capable to lead a country. Also, the supply of women will be higher and these women will most likely be candidates for election. A gender-balanced cabinet in a country also has partly a positive effect on the outcome, this condition is visible in half of the configurations.

The separate causal configuration with the highest coverage is: women's suffrage AND electoral system. This configuration explained most of the analyzed cases (9). This shows that in half of the cases the early introduction women's suffrage lead to the country having an FPM. 2 out of the 9 countries have a mixed electoral system and the other 7 have proportional representation system. This partly confirms the theory that a proportional representation leads to more women in the government and could lead to a country having an FPM.

It can be concluded that answering this research question is not straightforward, it is complex because, several configurations can lead to a country having an FPM. It was expected that the condition of women in parliament and culture would be visible in several causal paths, but the analysis contradicted this expectation.

Why do some European Union member had not a female prime minister?

There were 6 causal paths identified that explains why a country had not a female prime minister, 23 cases were covered out of the 24 that were analyzed. The condition that mostly stands out is the condition of the educational level of women in a Member State. This confirms the studies from Sahu and Yadav (2018) and Burns et al. (2001) that women with a higher education are more involved in politics and have developed more important skills that are needed to be a leader. Countries that did not have an FPM have a lower share of highly educated women. Another condition that needs special attention is the legal quota, a Member State not having any legal quota has a negative effect on the outcome, but, it does not empirically prove that a country that does have a legal quota, has a tremendous effect on a country having an FPM. Also, cultural stereotypes and female bias play a smaller role than

expected, it does not confirm that a country that has a culture of negatively stereotyping women causes a country do not have an FPM. A country not having a gender-balanced cabinet, a low percentage of women in parliament and a low percentage of labor-market participation only slightly effects a country not having an FPM, it only effects a few cases. It did not meet the expectation, it was thought these conditions would have more influence on the analyzed cases.

The separate causal configuration with the highest coverage is: electoral system AND absence of a legal quota. This configuration explained most of the analyzed cases (13). This shows that countries with a proportional representation and not having a legal quota (or only a voluntary party quota) have not an FPM. This contradicts the theory that emphasizes that a proportional representation increases female political representation.

All in all, it can be concluded that what matters are the configurations together and not the individual condition that explains why a Member State had not an FPM.

5.2 Discussion

This study has shown that fsQCA was able to identify the effects of multiple conditions on the outcome of a Member State, this confirms the advantage of equifinality and causal complexity in a QCA research. Also, its strength is that this study not only looks at why a country has or had an FPM but also which conditions contribute for a Member State not having an FPM, both individual analyses together provide more insight into this topic. The internal validity in this study is high because all cases are diverse and there is diversity in the outcome and the tested conditions. All data sets are included in this research and all the steps taken while conduction this research is explained. However, the generalizability is low in this study because the outcome of the analysis is only applicable on the EU.

The outcome of this study matches the argument of the study of Wägnerud (2009) about women in parliaments, the cases that have or had an FPM, have a larger female representation in parliament and in their cabinet and also view women as equal when it comes to leadership skills. The glass cliff theory is difficult to prove in this study; however, the case of the United Kingdom shows a unique causal path, the UK scores high on most of the conditions that are ought to lead to an FPM, and the UK had twice an FPM, but the last FPM, Theresa May, was appointed when the UK just announced the Brexit and therefore, had a complicated task to fulfill as FPM. Gender inequality is also confirmed in this study, the data shows that in some Member States women are viewed as not suitable to lead a country, also a low percentage of women in parliament in a lot of Member States, proves that women are unequally represented. However, the analysis of this study does contradict that these conditions have a significant

impact whether a country has an FPM. This gives new insights, it could be that despite the country scores low on women in parliament and the cultural condition, that it was a coincidence that a woman was appointed as FPM. Countries such as the Netherlands, Sweden and Spain, which do score well on the two above-mentioned conditions, also show that despite scoring high on the two conditions, they never had an FPM. Additionally, this study confirms the insights of the study done by Rubio-Marin (2014), about female suffrage in Europe. History does matter, because the timing of the introduction of women's suffrage is confirmed in most of the cases. Moreover, also low labor-market participation and a low educational level of women, indicates a country being more traditional and that men are more viewed as the breadwinner and that the private realm is assigned to women. This is especially seen in countries such as Hungary, Italy and Greece, although the latter did have an FPM, but was serving as PM in an interim government, until a legislative election was held and was only shortly FPM, so this appointment could be viewed as a contingency.

All in all, some theories can be confirmed in this study, some theory is partly contradicted by the analysis, but more questions arise in this discussion and again confirms the complexity of female political representation. Moreover, because the position of prime minister is an unique position, it could be that not all conditions that apply to lower positions, also apply to the high political leadership positions.

5.2.1 Methodological limitations

This study has some limitations that will be discussed in this paragraph. First of all, a fsQCA study has a high accuracy and high generality, but a low coverage. This was also seen in both analysis that were made. Secondly, both analyses there were two cases that could not be explained. This could be solved by doing a most similar system study or use process tracing for these cases, to better explain why these cases are deviant. Another limitation is the selection of the conditions, more conditions were mentioned in the theory, but to keep the research feasible due to time restrictions, not all conditions could be tested and a selection of the most important conditions was made. With regard to the calibration, as discussed in section 3.5, the content validity is low in this study, there were no existing calibrated fuzzy-sets available. Some conditions could be calibrated by using existing theory, but some were subjectively calibrated by the researcher, this could have its limitation on the final analysis. Due to the lack of extensive available data sets, the condition of labor-market participation has a limitation. The most recent data set was limited to the age 30-34 of women who completed tertiary education. Moreover, the concept of culture is broad and difficult to operationalize, so this concept was limited to only test the cultural stereotypes of women in a leadership position.

5.2.2 Recommendations for future research

This research enriched the current theories, it shows that scholars should not look at each condition independently but that they are all intertwined. It also gave more insight into the significant differences among the Member States, despite being one union. It also can be learned that the concept of having an FPM is dynamic, and conditions change frequently, however, some conditions are quite static and complicated to change, such as an electoral system. It will take time to see a change in the European Union, activists involved in gender equality, could look at each condition separately and its effect on having an FPM in office, and try to make a change within their society. For future studies it is recommended that scholars will do more research on the high-profile political positions and add more conditions to their study to see which other factors could promote a country having an FPM. An example is whether a right-wing or a left-wing party is in the government. Lithuania is an example of a country that had an FPM, but currently has an all-male government. Moreover, the economic status of a country also may influence the outcome, countries that are in crisis could have less women working or obtaining a university degree. Also, comparisons could be made with countries outside the European Union who have or had a female prime minister.

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Appendix

Appendix 1: Raw data table

Member State	FPM	<5 YRS FPM	LQ	GBC	WP	ES	WS	CT	EL	LMP
AUSTRIA	Yes	Yes	VPQ	50%	37%	PR	1918	22%	44,20%	71,70%
BELGIUM	Yes	Yes	Yes	23,10%	44%	PR	1948	16%	54,50%	65,50%
BULGARIA	No	No	No	30%	26%	PR	1944	24%	40,80%	68,30%
CROATIA	No	No	LQL	19%	20%	PR	1945	24%	41,90%	60,10%
CYPRUS	No	No	No	16,70%	18%	PR	1960	22%	64,40%	68,90%
CZECH REPUBLIC	No	No	VPQ	26,70%	21%	PR	1920	23%	40,60%	72,20%
DENMARK	Yes	Yes	LQL	35%	39%	PR	1915	8%	56,60%	74,80%
ESTONIA	No	No	VPQ	20%	29%	PR	1917	20%	57,50%	75,60%
FINLAND	Yes	No	No	57,90%	47%	PR	1906	10%	52,50%	74,50%
FRANCE	No	No	Yes	48,60%	37%	Plurality/majority	1944	5%	51,20%	67,60%
GERMANY	Yes	Yes	VPQ	43,80%	32%	Mixed	1918	13%	35,40%	75,80%
GREECE	No	Yes	LQL	9,10%	22%	PR	1952	17%	51,30%	49,10%
HUNGARY	No	No	VPQ	14,30%	36%	Mixed	1918	41%	40,50%	66,80%
ITALY	No	No	Yes	31,80%	12%	Mixed	1945	37%	34%	53,10%
IRELAND	No	No	LQL	26,70%	24%	PR	1922	16%	60,40%	68,10%
LATVIA	No	Yes	LQL	21,40%	30%	PR	1917	35%	55,20%	74,80%
LITHUANIA	No	No	VPQ	6,70%	23%	MIxed	1917	20%	68,20%	76,70%
LUXEMBOURG	No	No	VPQ	31,30%	25%	PR	1919	9%	59,80%	68%
MALTA	No	No	VPQ	6,70%	15%	PR	1947	21%	37,70%	64,10%
THE NETHERLANDS	No	No	VPQ	37,50%	34%	PR	1919	3%	52,60%	74,20%
POLAND	No	Yes	LQL	9,10%	26%	PR	1917	20%	55,50%	65%
PORTUGAL	No	No	LQL	27,80%	36%	PR	1976	16%	42,50%	72,10%
ROMANIA	No	Yes	VPQ	27,30%	20%	PR	1921	41%	28,10%	60,60%
SPAIN	No	No	Yes	58,80%	44%	PR	1931	10%	48,60%	61%
SLOVAKIA	No	No	VPQ	33,30%	21%	PR	1920	27%	44,60%	65,50%
SLOVENIA	No	Yes	LQL	23,50%	23%	PR	1945	20%	56,30%	71,70%
SWEDEN	No	No	No	52,20%	47%	PR	1919	3%	59,10%	88,40%
UK	No	Yes	LQL	30,40%	29%	Plurality/majority	1928	9%	52%	73,80%

Note: sources; LQ: IDEA (2009), GBC: EIGE (2019d) WP: EIGE (2019c), ES: IDEA (2009) WS: Women Suffrage and beyond (2019), CT: Eurobarometer (2017), EL: EIGE (2018b) LMP: EIGE (2018a).

Appendix 2: Truth table's

FPM

lq	wp	gbc	es	ws	ct	el	lmp	number	fpm	cases	raw consist.	PRI consist.	SYM consist
0	1	1	1	1	1	1	1	2	1	cases	1	1	1
1	0	0	1	1	0	1	0	1	1	cases	1	1	1
1	0	0	1	0	1	1	0	1	1	cases	1	1	1
1	1	0	1	0	1	1	0	1	1	cases	1	1	1
0	1	1	1	1	0	0	1	1	1	cases	1	1	1
0	1	1	1	1	1	0	1	1	1	cases	1	1	1
1	0	0	1	0	0	1	1	1	1	cases	1	1	1
0	1	0	1	1	0	1	1	1	1	cases	1	1	1
0	0	1	0	1	1	1	1	1	1	cases	1	1	1
0	0	0	1	1	0	0	0	1	1	cases	0.996656	0.971429	0.971429
0	0	1	1	1	0	0	0	1	1	cases	0.875	0.666667	0.666667
0	0	0	1	1	0	1	1	1	1	cases	0.871698	0	0
1	0	0	1	0	0	0	0	1	1	cases	0.853448	0	0
0	0	0	1	0	0	1	1	1	1	cases	0.853448	0	0
0	0	1	1	0	0	0	1	1	1	cases	0.833333	0	0
1	1	0	1	0	1	0	1	1	1	cases	0.829146	0.492537	0.492537
1	1	1	0	0	1	1	1	1	0	cases	0.66	0	0

~FPM

lq	wp	gbc	es	ws	ct	el	lmp	number	~fpm	cases	raw consist.	PRI consist.	SYM consist
0	0	0	1	1	0	1	1	2	1	cases	1	1	1
0	1	1	1	1	1	1	1	2	1	cases	1	1	1
0	0	0	1	0	0	0	0	1	1	cases	1	1	1
1	0	0	1	0	0	0	0	1	1	cases	1	1	1
1	1	1	1	0	0	0	0	1	1	cases	1	1	1
0	0	1	1	1	0	0	0	1	1	cases	1	1	1
1	1	1	1	1	1	0	0	1	1	cases	1	1	1
0	0	1	1	0	0	0	1	1	1	cases	1	1	1
0	0	0	1	1	0	0	1	1	1	cases	1	1	1
1	1	0	1	0	1	0	1	1	1	cases	1	1	1
0	0	0	1	0	0	1	1	1	1	cases	1	1	1
1	0	0	1	1	1	1	1	1	1	cases	1	1	1
0	0	1	1	1	1	1	1	1	1	cases	1	1	1
0	0	0	1	1	0	0	0	2	1	cases	0.926724	0.83	0.83
1	0	0	1	1	0	1	0	1	1	cases	0.897281	0.744361	0.744361
1	0	0	1	0	1	1	0	1	1	cases	0.897281	0.66	0.66
0	1	0	1	1	0	1	1	1	1	cases	0.897281	0.744361	0.744361
1	0	0	1	0	0	1	1	1	1	cases	0.871698	0.66	0.66
1	1	1	0	0	1	1	1	1	1	cases	1	1	1
0	0	1	0	1	1	1	1	1	0	cases	0.492537	0	0

Appendix 3: Analysis of Necessary conditions

```
Analysis of Necessary Conditions

Outcome variable: fpm

Conditions tested:
     Consistency    Coverage
lq   0.556929       0.823760
wp   0.675199       0.918367
gbc  0.614298       0.839566
es   0.911739       0.659221
ws   0.822595       0.848044
ct   0.704325       0.856223
el   0.706090       0.826446
lmp  0.705207       0.824561


Analysis of Necessary Conditions

Outcome variable: fpm

Conditions tested:
      Consistency    Coverage
~lq   0.734334       0.804642
~wp   0.616064       0.721820
~gbc  0.589585       0.687951
~es   0.146514       0.712446
~ws   0.410415       0.663338
~ct   0.586937       0.766129
~el   0.585172       0.796875
~lmp  0.644307       0.878460
```

```
Analysis of Necessary Conditions

Outcome variable: ~fpm

Conditions tested:
     Consistency    Coverage
lq   0.538092       0.869186
wp   0.518296       0.962138
gbc  0.496101       0.926092
es   0.920216       0.754179
ws   0.718656       0.836008
ct   0.617876       0.884880
el   0.578884       0.803497
lmp  0.679664       0.917409


Analysis of Necessary Conditions

Outcome variable: ~fpm

Conditions tested:
      Consistency    Coverage
~lq   0.659868       0.867508
~wp   0.679664       0.808131
~gbc  0.642471       0.761194
~es   0.119376       0.748120
~ws   0.439712       0.845444
~ct   0.580084       0.851232
~el   0.619076       0.939035
~lmp  0.557888       0.873239
```

Appendix 4: Solutions and cases outcome: female prime minister

```
 Algorithm: Quine-McCluskey
      True: 1

--- COMPLEX SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.829146

                                    raw         unique
                                   coverage    coverage   consistency
                                  ----------  ----------  ----------
~lq*~wp*es*ws*~ct*~el*~lmp        0.321271    0.030009    0.914573
~wp*~gbc*es*~ws*~ct*el*lmp        0.204766    0.030009    0.872180
lq*~gbc*es*~ws*ct*el*~lmp         0.293027    0.060018    1.000000
~lq*~gbc*es*ws*~ct*el*lmp         0.233892    0.030009    0.886288
~lq*wp*gbc*es*ws*~el*lmp          0.322154    0.030009    1.000000
~lq*wp*gbc*es*ws*ct*lmp           0.351280    0.059135    1.000000
lq*~wp*~gbc*es*~ws*~ct*~el*~lmp   0.174757    0.000000    0.853448
~lq*~wp*gbc*es*~ws*~ct*~el*lmp    0.145631    0.000000    0.833333
lq*~wp*~gbc*es*ws*~ct*el*~lmp     0.204766    0.030009    1.000000
lq*wp*~gbc*es*~ws*ct*~el*lmp      0.145631    0.000000    0.829146
~lq*~wp*gbc*~es*ws*ct*el*lmp      0.058252    0.029126    1.000000
solution coverage: 0.823478
solution consistency: 0.821303
```

```
--- PARSIMONIOUS SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.829146

          raw         unique
         coverage    coverage   consistency
        ----------  ----------  ----------
es      0.911739    0.117387    0.659221
~wp     0.616064    0.029126    0.721820
~lq     0.734334    -0.000000   0.804642
solution coverage: 0.970874
solution consistency: 0.673195
```

```
 Algorithm: Quine-McCluskey
      True: 1
  0 Matrix: 0L
Don't Care: -

--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.829146
Assumptions:
lmp (present)
el (present)
ct (present)
ws (present)
es (present)
gbc (present)
wp (present)
lq (present)

                          raw       unique
                         coverage    coverage   consistency
                        ----------  ----------  ----------
ws*es                   0.734334    0.117387    0.861284
es*lq                   0.527802    0.089144    0.897898
lmp*el*es               0.527802    -0.000000   0.897898
lmp*es*gbc              0.468667    -0.000000   0.941489
lmp*el*ct*ws*gbc*~lq    0.321271    -0.000000   1.000000
lmp*el*ct*ws*gbc*~wp    0.262136    0.029126    1.000000
solution coverage: 0.969991
solution consistency: 0.803363
```

Complex solution cases

```
Cases with greater than 0.5 membership in term ~lq*~wp*es*ws*~ct*~el*~lmp: Romania (0.67,0.67),
  Slovakia (0.67,0.33)
Cases with greater than 0.5 membership in term ~wp*~gbc*es*~ws*~ct*el*lmp: Cyprus (0.67,0.33),
  Slovenia (0.67,0.67)
Cases with greater than 0.5 membership in term lq*~gbc*es*~ws*ct*el*~lmp: Belgium (0.67,1),
  Greece (0.67,0.67)
Cases with greater than 0.5 membership in term ~lq*~gbc*es*ws*~ct*el*lmp: Latvia (0.67,0.67),
  Lithuania (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*wp*gbc*es*ws*~el*lmp: Austria (0.67,1),
  Germany (0.67,1)
Cases with greater than 0.5 membership in term ~lq*wp*gbc*es*ws*ct*lmp: Finland (0.67,1),
  Germany (0.67,1), Denmark (0.66,1)
Cases with greater than 0.5 membership in term lq*~wp*~gbc*es*~ws*~ct*~el*~lmp: Croatia (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~wp*gbc*es*~ws*~ct*~el*lmp: Bulgaria (0.66,0.33)
Cases with greater than 0.5 membership in term lq*~wp*~gbc*es*ws*~ct*el*~lmp: Poland (0.67,0.67)
Cases with greater than 0.5 membership in term lq*wp*~gbc*es*~ws*ct*~el*lmp: Portugal (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~wp*gbc*~es*ws*ct*el*lmp: United Kingdom (0.66,0.67)
```

Parsimonious solution cases

```
Cases with greater than 0.5 membership in term es: Austria (1,1),
  Belgium (1,1), Bulgaria (1,0.33), Croatia (1,0.33),
  Cyprus (1,0.33), Denmark (1,1), Finland (1,1),
  Greece (1,0.67), Latvia (1,0.67), Poland (1,0.67),
  Portugal (1,0.33), Romania (1,0.67), Slovakia (1,0.33),
  Slovenia (1,0.67), Germany (0.67,1), Lithuania (0.67,0.33)
Cases with greater than 0.5 membership in term ~wp: Croatia (1,0.33),
  Cyprus (1,0.33), Romania (1,0.67), Bulgaria (0.67,0.33),
  Greece (0.67,0.67), Lithuania (0.67,0.33), Poland (0.67,0.67),
  Slovakia (0.67,0.33), Slovenia (0.67,0.67), United Kingdom (0.67,0.67)
Cases with greater than 0.5 membership in term ~lq: Bulgaria (1,0.33),
  Denmark (1,1), Finland (1,1), Latvia (1,0.67),
  Austria (0.67,1), Cyprus (0.67,0.33), Germany (0.67,1),
  Lithuania (0.67,0.33), Romania (0.67,0.67), Slovakia (0.67,0.33),
  United Kingdom (0.67,0.67)
```

Intermediate solution cases

```
Cases with greater than 0.5 membership in term ws*es: Austria (1,1),
  Denmark (1,1), Finland (1,1), Latvia (1,0.67),
  Poland (1,0.67), Germany (0.67,1), Lithuania (0.67,0.33),
  Romania (0.67,0.67), Slovakia (0.67,0.33)
Cases with greater than 0.5 membership in term es*lq: Belgium (1,1),
  Croatia (0.67,0.33), Greece (0.67,0.67), Poland (0.67,0.67),
  Portugal (0.67,0.33), Slovenia (0.67,0.67)
Cases with greater than 0.5 membership in term lmp*el*es: Cyprus (0.67,0.33),
  Denmark (0.67,1), Finland (0.67,1), Latvia (0.67,0.67),
  Lithuania (0.67,0.33), Slovenia (0.67,0.67)
Cases with greater than 0.5 membership in term lmp*es*gbc: Austria (0.67,1),
  Finland (0.67,1), Germany (0.67,1), Bulgaria (0.66,0.33),
  Denmark (0.66,1)
Cases with greater than 0.5 membership in term lmp*el*ct*ws*gbc*~lq: Finland (0.67,1),
  Denmark (0.66,1), United Kingdom (0.66,0.67)
Cases with greater than 0.5 membership in term lmp*el*ct*ws*gbc*~wp: United Kingdom (0.66,0.67)
```

Appendix 5: Solution and cases outcome: ~ female prime minister

```
 Algorithm: Quine-McCluskey
      True: 1

--- COMPLEX SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.871698

                                    raw       unique
                                 coverage    coverage   consistency
                                ----------  ----------  ----------
lq*~wp*es*~ws*~ct*~el*~lmp      0.218956    0.019796    1.000000
~lq*~gbc*es*ws*~ct*~el*~lmp     0.258548    0.020396    0.926882
~lq*~wp*es*ws*~ct*~el*~lmp      0.257948    0.019796    0.926724
~wp*~gbc*es*~ws*~ct*el*lmp      0.178764    0.020396    0.897590
~lq*~gbc*es*ws*~ct*el*lmp       0.258548    -0.000000   0.926882
~lq*gbc*es*ws*ct*el*lmp         0.277744    0.079784    1.000000
~lq*~wp*gbc*es*~ws*~ct*~el*lmp  0.138572    0.019796    1.000000
lq*~wp*~gbc*es*ws*~ct*el*~lmp   0.178164    -0.000000   0.897281
lq*~wp*~gbc*es*~ws*ct*el*~lmp   0.178164    -0.000000   0.897281
lq*wp*~gbc*es*~ws*ct*~el*lmp    0.139172    0.020396    1.000000
lq*wp*gbc*es*ws*ct*~el*~lmp     0.158368    0.019796    1.000000
lq*wp*gbc*~es*~ws*ct*el*lmp     0.059988    0.040192    1.000000
lq*~wp*~gbc*es*ws*ct*el*lmp     0.218356    0.020396    1.000000
~wp*~gbc*es*~ws*~ct*~el*~lmp    0.239352    -0.000000   1.000000
~lq*~wp*~gbc*es*~ct*~el*~lmp    0.278344    -0.000000   0.931727
~lq*~wp*~gbc*es*ws*~ct*~el      0.258548    -0.000000   0.926882
~lq*~wp*~gbc*es*ws*~ct*lmp      0.318536    -0.000000   1.000000
solution coverage: 0.799640
solution consistency: 0.886893
```

```
--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.871698
Assumptions:
~lmp (absent)
~el (absent)
~ct (absent)
~ws (absent)
~es (absent)
~gbc (absent)
~wp (absent)
~lq (absent)

                    raw       unique
                 coverage    coverage   consistency
                ----------  ----------  ----------
~ws*~es         0.079784    0.020396    1.000000
es*~lq          0.659868    0.263347    0.891410
~el*~ws*~gbc    0.298740    0.020396    1.000000
~lmp*~el*wp     0.337732    -0.000000   1.000000
~gbc*~wp*lq     0.377324    0.020396    0.860465
~lmp*~el*lq     0.377924    -0.000000   1.000000
solution coverage: 0.841632
solution consistency: 0.856010
```

Complex solution cases

```
Cases with greater than 0.5 membership in term lq*~wp*es*~ws*~ct*~el*~lmp: Croatia (0.67,0.67),
  Italy (0.67,1)
Cases with greater than 0.5 membership in term ~lq*~gbc*es*ws*~ct*~el*~lmp: Hungary (0.67,1),
  Romania (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~wp*es*ws*~ct*~el*~lmp: Romania (0.67,0.33),
  Slovakia (0.67,0.67)
Cases with greater than 0.5 membership in term ~wp*~gbc*es*~ws*~ct*el*lmp: Cyprus (0.67,0.67),
  Slovenia (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~gbc*es*ws*~ct*el*lmp: Estonia (0.67,1),
  Latvia (0.67,0.33), Lithuania (0.67,0.67)
Cases with greater than 0.5 membership in term ~lq*gbc*es*ws*ct*el*lmp: Sweden (0.67,1),
  Luxembourg (0.66,1), The Netherlands (0.66,1)
Cases with greater than 0.5 membership in term ~lq*~wp*gbc*es*~ws*~ct*~el*lmp: Bulgaria (0.66,0.67)
Cases with greater than 0.5 membership in term lq*~wp*~gbc*es*ws*~ct*el*~lmp: Poland (0.67,0.33)
Cases with greater than 0.5 membership in term lq*~wp*~gbc*es*~ws*ct*el*~lmp: Greece (0.67,0.33)
Cases with greater than 0.5 membership in term lq*wp*~gbc*es*~ws*ct*~el*lmp: Portugal (0.67,0.67)
Cases with greater than 0.5 membership in term lq*wp*gbc*es*ws*ct*~el*~lmp: Spain (0.66,1)
Cases with greater than 0.5 membership in term lq*wp*gbc*~es*~ws*ct*el*lmp: France (0.67,0.67)
Cases with greater than 0.5 membership in term lq*~wp*~gbc*es*ws*ct*el*lmp: Ireland (0.67,1)
Cases with greater than 0.5 membership in term ~wp*~gbc*es*~ws*~ct*~el*~lmp: Croatia (0.67,0.67),
  Malta (0.67,1)
Cases with greater than 0.5 membership in term ~lq*~wp*~gbc*es*~ct*~el*~lmp: Malta (0.67,1),
  Romania (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~wp*~gbc*es*ws*~ct*~el: Czech Republic (0.67,1),
  Romania (0.67,0.33)
Cases with greater than 0.5 membership in term ~lq*~wp*~gbc*es*ws*~ct*lmp: Czech Republic (0.67,1),
  Estonia (0.67,1), Lithuania (0.67,0.67)
```

Parsimonious cases

```
Cases with greater than 0.5 membership in term es: Sweden (1,1),
  Slovenia (1,0.33), Slovakia (1,0.67), Spain (1,1),
  Romania (1,0.33), Portugal (1,0.67), Poland (1,0.33),
  The Netherlands (1,1), Malta (1,1), Luxembourg (1,1),
  Latvia (1,0.33), Ireland (1,1), Greece (1,0.33),
  Estonia (1,1), Czech Republic (1,1), Cyprus (1,0.67),
  Croatia (1,0.67), Bulgaria (1,0.67), Lithuania (0.67,0.67),
  Italy (0.67,1)
Cases with greater than 0.5 membership in term ~ws: Cyprus (1,0.67),
  Portugal (1,0.67), Bulgaria (0.67,0.67), Croatia (0.67,0.67),
  France (0.67,0.67), Greece (0.67,0.33), Italy (0.67,1),
  Malta (0.67,1), Slovenia (0.67,0.33)
Cases with greater than 0.5 membership in term lq: France (1,0.67),
  Italy (1,1), Spain (1,1), Croatia (0.67,0.67),
  Greece (0.67,0.33), Ireland (0.67,1), Poland (0.67,0.33),
  Portugal (0.67,0.67), Slovenia (0.67,0.33)
Cases with greater than 0.5 membership in term wp: Spain (1,1),
  Sweden (1,1), France (0.67,0.67), Hungary (0.67,1),
  Latvia (0.67,0.33), The Netherlands (0.67,1), Portugal (0.67,0.67)
```

Intermediate cases

```
Cases with greater than 0.5 membership in term ~ws*~es: France (0.67,0.67)
Cases with greater than 0.5 membership in term es*~lq: Bulgaria (1,0.67),
  Estonia (1,1), Latvia (1,0.33), Sweden (1,1),
  Cyprus (0.67,0.67), Czech Republic (0.67,1), Hungary (0.67,1),
  Lithuania (0.67,0.67), Luxembourg (0.67,1), Malta (0.67,1),
  The Netherlands (0.67,1), Romania (0.67,0.33), Slovakia (0.67,0.67)
Cases with greater than 0.5 membership in term ~el*~ws*~gbc: Croatia (0.67,0.67),
  Malta (0.67,1), Portugal (0.67,0.67)
Cases with greater than 0.5 membership in term ~lmp*~el*wp: Italy (0.67,1),
  Spain (0.67,1)
Cases with greater than 0.5 membership in term ~gbc*~wp*lq: Croatia (0.67,0.67),
  Greece (0.67,0.33), Ireland (0.67,1), Poland (0.67,0.33),
  Slovenia (0.67,0.33)
Cases with greater than 0.5 membership in term ~lmp*~el*lq: Croatia (0.67,0.67),
  Italy (0.67,1), Spain (0.67,1)
```