DOES CRITICAL MASS LEAD TO CRITICAL ACTION?

Impact of female parliamentarians on climate policymaking in EU Member States.

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Precious Unegbu
Student number: 01910368

Promotor: Prof. Dr. Claire Dupont

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ABSTRACT

While women are leading frontline climate action and activism, they remain underrepresented in environmental decision-making in the European Union, facing various systematic barriers to advancement. The academic debate on the relationship between women and the environment have focused on themes like ecofeminism, virtuousness, vulnerability, adaptation, climate responsibility, differential knowledge, and risk perception. However, little attention has been paid to women's capacity to contribute positively to climate decision-making. Moreover, extant studies on the descriptive representation of women in climate decision-making often assume that women possess a unique affinity for environmental issues, and that increasing the number of women in parliament will automatically translate to greater substantive representation on environmental matters. However, these studies do not examine how this translation occurs in practice.

The present study aims to fill these gaps in the literature by investigating two main research questions: a) What is the relationship between a **critical mass** of women in national parliaments and **critical action** on climate policy in European Union member states? b) How does a critical mass of women in parliaments of EU member states translate to critical action on climate policy? And how is this relationship affected by party political ideology? To answer these questions, this study applies **mixed methods approach**, whereby the first question is answered using **quantitative analysis** and the second question is answered using **qualitative analysis (document analysis)** of three case studies: Belgium, the Netherlands and Ireland.

Based on data from the 27 EU member states I demonstrate that female representation in parliaments does cause EU member states to adopt more stringent climate policies. Based on the analysis of plenary debates from the three selected case studies, I find that while party ideology is important in determining parliamentarian's support for climate policies, women – despite being in the minority – uniformly expressed support for ambitious climate goals during climate policy debates, contributed equally to the debates, and placed emphasis on particular climate policy themes. Gender equality in political representation could be an untapped resource in the fight against climate change in European Union member states.

Keywords: women in parliament, climate policy, climate decision-making, descriptive representation, substantive representation, critical mass, critical action

PREFACE

Thesis title:

 Does critical mass lead to critical action?

Sub-title:

The impact of female parliamentarians on climate policymaking in EU member states.

It is with great pleasure that I present this thesis, the culmination of my master's studies in Public Administration and Governance at the University of Ghent. This work explores the intersection of two topics that are particularly close to my heart – gender equality and climate change – and I am delighted to have had the opportunity to delve deeply into this fascinating and challenging area of research. Over the past year, I have devoted myself wholeheartedly to this project and I hope the final work reflects both the depth of my commitment and the extent of my passion for the subject matter.

Precious Unegbu

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LIST OF ABBREVIATIONS

CCPI: Climate Change Policy Index

EU: European Union

FE: Fixed Effects

GHG: Green House Gas

LSE: London School of Economics

MP: Member of Parliament

UNFCCC: United Nations Framework Conventions on Climate Change

CHAPTER 1: INTRODUCTION

1.1 Problem definition

> "From the first person to launch legal action on climate change to today's inspirational young activists, women help to shape the climate movement for the better and they should be further empowered to participate in climate-decision making at all levels" – Elénore Soubeyran (Policy Analyst, LSE)

The relationship between gender equality and the environment is becoming more widely recognized, with growing acknowledgement of the distinct gendered effects of environmental degradation, as well as the need for greater women's empowerment to support environmental action (Strumskyte et al., 2022). The contribution of women to climate decision-making is indispensable. Women's participation in political decision-making has resulted in lower carbon-dioxide emissions and more ambitious climate decision-making (Mavisakalyan & Tarverdi, 2019). Women, when involved in decision-making, contribute substantially by pushing for more concrete and fundamental reforms (Paffenholz et al., 2016). Furthermore, addressing gender inequality and including women in environmental policy and planning leads to better environmental well-being in countries (Austin & Banashek, 2018). In both developed and developing countries, women continue to play significant roles in the adoption of green technologies, leading discussions on climate change at the international level, and driving the implementation of more sustainable business practices in top corporate boardrooms (Womens Forum for the Economy and Society, n.d.).

Despite the growing acknowledgment that women contribute positively to climate decision-making, they continue to be excluded from environmental decision-making despite being at the forefront of climate action (Strumskyte et al., 2022; Jeffs, 2022). Globally, only 15% of environment ministers are women and in Europe, this is around 26%. Furthermore, at COP27, the country negotiating teams consisted of less that 34% women. In her book A Bigger Picture, Climate Activist, Vanessa Nakate states that "girls and women are more than half the world's population. If we are to successfully address the climate crisis, we need women in the rooms where decisions are being made that affect the climate". The exclusion of women from climate decision-making prevents them from contributing their valuable and unique perspective to climate change action (Commission on the Status of Women, 2008).

1.1 Theoretical relevance

The bulk of research on the relationship between gender and the environment have focused on how women are inherently closer due the environment due to their productive and reproductive capacity, the differential impact of climate disasters on women, and their lessened adaptive capacity due to patriarchal social roles and/or lack of access to the essential resources that facilitate adaptation. Focusing solely on the vulnerability and virtuousness has caused the element of gender to be made invincible in climate debates, since it is assumed that the problem "the vulnerability" of women is clear (Arora-Jonsson, 2011). This in turn leads to

the strengthening of social gender roles and inequalities (Tschakert & Machado, 2012). Such essentialist presuppositions of women's tendency for environmental conservation deny the agency of women when it comes to the environment (Arora-Jonsson, 2011). Additionally, some studies have also discussed the increased knowledge women possess of the environment due to their role in agriculture. This differential knowledge in turn has led women to have a greater perception of environmental risks. The role of women's leadership in environmental governance still remains understudied.

Furthermore, existing research on the relationship between the representation of women in parliaments and climate policy outputs is often descriptive in nature. This means that the focus is mainly on the correlation between the number of women in parliaments and climate policies or carbon dioxide emissions and little to no studies examine substantive representation or how female legislators act to achieve these stringent climate policies. There is need for more research on how women's representation in decision-making bodies affect environmental outcomes (Ergas & York, 2012). There is also need for more research that examines the impact of women in parliaments on substantive representation in different countries or contexts (Wängnerud, 2009).

The present study aims to fill these gaps in the literature and contribute to the growing body of knowledge on the impact of women on climate decision making, by researching both descriptive (critical mass) and substantive representation (critical action) in the context of climate policy. The investigation comprises of two main parts. First, the study examines the relationship between women's parliamentary representation and climate policy outputs across the 27 member states of the European Union. Second, the study conducts an in-depth case analysis of plenary debates on climate policy in Belgium, the Netherlands and Ireland, with a focus on how substantive representation occurs and the impact of party ideology on this relationship. This study is as far as I am aware, the first of its kind as it combines research on descriptive and substantive representation.

1.2 Societal relevance

The climate problem is clear, the world is in a state of emergency and urgent action is need (UNEP, n.d.). Leading up to COP26, much of the discussions focussed on the need for more commitments towards resolute action, such as becoming carbon neutral by 2030 and achieving net-zero emissions by 2050 (Grandi, 2021). No place on earth is immune to the effects of climate change. Temperatures are rising around the globe, fuelling environmental degradation, natural disasters, conflict and so forth (United Nations, n.d.-c). People in already disadvantaged positions are more likely to be negatively impacted by the climate crisis. Poor people, particularly those in developing countries, and especially those who rely on agriculture are disproportionately affected (Osman-Elasha, n.d.). It is therefore crucial to act now, and this action requires the insights and perspectives of women, as they constitute half of the world's population.

Besides the climate problem, this study draws attention to gender inequality which is another equally important problem plaguing the world today. Gender equality is not just a fundamental human right, it is a

necessary foundation for development and the creation of a sustainable world (United Nations, 2022). Women and girls represent half of the world population and therefore half of its potential (United Nations, n.d.-a). Despite the widespread acknowledgement of the importance of gender equality, countries continue to fail to create truly equal societies. Besides the underrepresentation in environmental decision-making, women still face job restrictions in 86 countries and equal pay for equal work is not guaranteed in 94 countries (World Bank Group, 2022). Approximately, 2.4 billion women around the world do not have equal access to the job market (World Bank Group, 2022). In Europe, the problem of gender inequality persists in the job market, in political representation and other aspects of life (Euronews, 2021).

The climate crisis does not affect genders equally. Women and girls are more likely to be disproportionately affected by environmental degradation (UN Women, 2022). This is because climate change serves to exacerbate existing gender inequalities and poses a dire threat to the health and livelihoods of women across the world (UN Women, 2022). Women represent a higher percentage of the poor in many communities and have restricted access to resources that aid adaptation such as land (Osman-Elasha, n.d.). Certain patriarchal norms and gender roles prevent female out-migration in times of climate disasters and reserve household tasks for women such as farming, cooking, and walking long distances to water sources (Ravera et al., 2016).

The problem, however, is that much of the discussion continues to focus *solely* on the disproportionate impact of climate change on women. Discussing gender and climate change mainly in terms of the vulnerability of women detracts attention from the problem of gender and power inequalities in climate or environmental decision-making (Arora-Jonsson, 2011). Vulnerability itself arises due to inequalities in power (Arora-Jonsson, 2011). It is imperative to move past this perspective, to acknowledge women's agency, capacity, and knowledge to adapt, mitigate and respond to climate change (Huyer et al., 2020). Evidence from other studies show that achieving gender equality in climate decision-making may be one step in the right direction towards resolving climate issues. Mavisakalyan & Tarverdi (2019) established that gender inequality in political representation is one of the underlying causes of the lack of political commitment to address climate change around the world. Furthermore, this research underscores the need for equal opportunities to participate and contribute meaningfully to climate policymaking, not only because of the differential knowledge, risk perception, vulnerability, and adaptive capacity of women but also as a matter of fairness.

1.3 Research aim and outline

The main aim of this study is to research the relationship between the political representation of women in parliaments and the stringency of climate policy outputs in EU member states. To this end, the following two main research questions are formulated:

- What is the relationship between the critical mass of women in national parliaments and critical action on climate policy in EU member states?

- How does a critical mass of women in national parliaments of EU member states lead to critical action in the context of climate policy? How is this relationship impacted by party political ideology?

To answer these questions this research starts with outlining the relevant literature on gender and climate in chapter 2. The current academic debate on these issues is divided into six main parts. Hereafter, the theoretical framework is discussed in chapter 3. In this chapter the relevant concepts for this research are discussed in detail. These various concepts are then unified in a conceptual framework at the end of the chapter. In chapter 4, the empirical design and research ethics are explained. Chapter 5 contains the quantitative research methodology and the results, and in chapter 6, the methodology and results for the qualitative analysis is outlined. In chapter 7, the hypothesis formulated as part of the quantitative research is discussed, the research questions are answered, and conclusions are drawn. This chapter ends with a number of suggestions for policy improvement and future research.

CHAPTER 2: BACKGROUND

2.1 Gender and climate

The complex relationship between gender and climate has been well documented and has a long history in feminist research. Study of the academic literature on the relationship between women and the environment reveal six main thematic categories: **virtuousness**, **vulnerability**, **adaptation**, **knowledge and risk perception**, and **climate governance**. The subsequent paragraphs discussed the current academic understanding of these themes

2.1.1 Virtuousness

The idea of women's virtuousness in relation to the environment has its roots in areas of research termed "ecofeminism". This area of literature which originated in the west conceptualizes the relationship between gender and the environment primarily in ideological terms (Agarwal, 1992). Ecofeminism stipulates that women have an inherently close link with nature which comes from their female biology and reproductive capacity (Leach, 1992). Women are seen by this view as possessing more knowledge of plants, animals, and ecological processes around them (Dankelman & Davidson, 1988), hence making them the main stay of the indigenous dairy industry and forestry and being the "custodians of bio-diversity" (Shiva et al., 2014). In her book Women and the Environment, Annabel Rodda (1991) describes women in developing countries as having direct contact with the natural environment or a close contact with the trees and the forest in their roles as users, producers and collectors of food, fuel, and fodder. Whereas men consider the forest in terms of commercial possibilities, women see it as a source of basic domestic needs. Due to this natural connection with the environment, women are more vulnerable to the impacts of environmental degradation. More recent ecofeminist debate presented by Greta Gaard (2015) views environmental health and habitats as issues women traditionally organize around. Women and LGBTQ issues have been marginalized due to climate change being discussed as a scientific problem which requires technological and scientific solutions. Such gender-blind analysis leads to exclusion of data and perspectives that are crucial in climate change considerations. Gaard adds that climate change discourse has not accurately presented the gendered character of first-world overconsumption produced by masculinist ideologies.

2.1.2 Vulnerability

The concept of gendered vulnerabilities to the impacts of climate change is well researched. As opposed to the ecofeminist views on gender and the environment, researchers interpret these vulnerabilities not as an intrinsic or natural attribute of women but as a reflection of pre-existing socio-economic inequalities. The

majority of research on vulnerabilities focus on women in the Global South. Climate change can lead to physical vulnerability or social vulnerability. Physical vulnerability has to do with the direct and increased health risks associated with climate change such as the increased exposure to disease pathogens, airborne diseases, nutritional deficiencies and or morbidity (Few, 2007). Social vulnerability on the other hand, is shaped by "people's resources, behaviour as well as by the broader societal processes and inherent within it is the notion of differential coping capacity" (Few, 2007). In other words, the level of vulnerability to climate change is not the same for all individuals in a given social context. Socio-economic and non-climatic issues such as poverty, discrimination or socio-cultural practices can shape differential risks to climate change. On cultural norms for example, age-old norms and practices have lowered women's exposure or understanding of early warning systems and access to information (Bhadwal et al., 2019; Cannon, 2002). This reduces the capacity of women to take protective measures during critical moments, thereby resulting in an increased vulnerability to extreme weather events (Bhadwal et al., 2019). For example, female mortality in the 1991 cyclone and flood in Bangladesh, was five times higher than male mortality (Hansson, 2007). This was as a result of strong gendered cultural patterns, such as the fact that most women had not been taught to swim and warning signals posted in public spaces but were not seen by women who were bound to their houses (Hansson, 2007).

Furthermore, specific gendered socio-economic patterns built into everyday life, have caused women are more likely to die as a result of a natural disasters than men are (Neumayer and Plümper, 2007). Women often have higher levels of pre-disaster poverty due to their unequal status in the workforce, are more likely to be employed in the informal sector, have less occupational mobility and equitable access to land (Nelson et al., 2002; Agarwal, 2019). Access to assets such as land and water rights, agricultural technologies, social capital, livestock, and other resources can prove essential in adapting to changes in production capacity caused by climate change (Rao et al., 2017).

It is important to highlight that women do not experience degradation uniformly. The effects are often mediated by the "livelihood" system (Jackson, 1993). Some women often receive remittances from migrant males, have liquidated assets or kin-based entitlements which mitigate the effects of environmental degradation (Jackson, 1993). For instance, Ravera et al (2016) found that a small group of women in Bihar, India, who belong to higher castes, have a higher level of education, and wealth are more able re-negotiate their roles in decision-making and develop proactive eco-system-based management strategies that decreases their vulnerability to risks. In essence, refugees, women on low income, elderly, disabled, and migrant women are particularly vulnerable to environmental degradation (Nelson et al., 2002; Hansson, 2007)

2.1.3 Adaptation

Adaptation to climate change takes place when adjustments are made to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and the associated extreme weather events

(Adger et al, 2007). Empirical studies reveal that adaptation strategies of men and women to environmental changes are varied and are influenced by specific socio-political, environmental, and economic contexts.

Men and women adapt to changes in the environment in different ways. Women may seek more paid employment, secure loans, join social groups, prioritize community-based strategies that promote long-term food and nutrition security (Onta & Resurreccion, 2011; Ngigi et al., 2017; Behrman et al, 2014; Tatlonghari & Paris 2012). Men are more likely to adapt new technologies, migrate, and suffer from physical isolation and emotional stress (Ngigi et al., 2017; Tatlonghari & Paris 2012). However, these differences are far from gender neutral. Inequalities in access to resources and gender norms impact what adaptation strategies are used by man and women. Women's livelihood options in the face of climate adversity are more limited than men due to factors such as gender norms, lack of access to resources, exclusion from profitable activities, lack of access to information, lower levels of education and so forth (Eriksen et al. 2005; Mitchell et al., 2007; Jost et al., 2015; Djoudi & Brockhaus, 2011; Ngigi et al., 2017; Sultana, 2013; Azad et al., 2013). Gendered norms, ascribed roles and inequalities in resources and power, constrain more women from taking initiatives to curb the effects of climate change (Tatlonghari & Paris 2012; Aryal et al., 2022; Behrman et al, 2014).

The ability of women to adapt to the adverse effect of a changing climate is linked to their access to resources that facilitate this adaptation. Ravera et al., (2016) demonstrated that traditional socio-economic aspects such as unequal access to land and resources pose a barrier for women in adopting proactive strategies in countering the effects of climate change. In Bangladesh for example, the disproportional level of poverty plaguing female-headed households reduces their capacity to create safe conditions in the face of impending floods or cyclones (Cannon, 2002). Furthermore, inequality in access to health care and nutrition for Bangladeshi women reduces their capacity to cope with the effects of a hazard (Cannon, 2002). Eriksen et al (2005) found that the exclusion from highly profitable economic activities such as bee-keeping and heavy domestic work prevented women from investing time in income generating activities. This resulted in women having less opportunities to diversify their sources of income making them more susceptible to climate change impacts.

Similarly, gender roles, pre-existing social structures, and stereotypical views on what is male, and female affect the options individuals or groups have when adapting to a changing environment (McKune et al., 2015). These pre-existing social structures are also often inextricably linked to access to resources. For example, the choice of migration as an adaptation strategy, is dependent on social gender norms and access to resources that enable migration. Because women are expected to care for their homes and families coupled with restricted access to resources that enable migration, out-migration is an adaptation strategy reserved for men, and for women migration is not an option regardless of the external conditions (McKune et al., 2015). This is demonstrated by researchers Schofield & Gubbels (2019) who found that although migration is a strategy used by men and women in the Jangwani area of Dar es Salaam, men were more interested in moving

out of the area altogether, while women spoke of temporarily moving to a location close to their house. The reason for this was that women lacked networks for alternative shelter or the resources to pay for transportation or accommodation elsewhere. Other studies have also established migration as the primary coping/adaptation strategy for men in the face of climate disasters (Assan et al., 2018; Whittenbury, 2012).

2.1.4 Responsibility

Another aspect of the debates on gender and climate change is that of responsibility for greenhouse gas emissions. This area of research is not extensively developed because the evidence of gender differences in responsibility is highly contested (Pearse, 2017). The existing literature mostly focuses on gendered patterns in consumption and transportation. Men tend to travel, consume more alcohol and tobacco than women, hence causing them to consume more energy (Räty & Carlsson-Kanyama, 2010; Cohen, 2015; Permana et al., 2015; Johnsson-Latham, 2007). Gerd Johnsson-Latham, (2007) concluded that rich women were more likely to buy less-expensive and recurring consumer goods for the entire family such as food, clothing and household articles and men were more likely to own expensive capital goods like homes and cars. According to Johnsson-Latham, women consume less because they have less resources that facilitate consumption. However, Brough et al., (2016) suggests that the gender gap in sustainable consumption is not due to difference in access to resources, but as a result of personality differences. There is a prevalent association between green behaviour and femininity causing men to be less likely to embrace environmentally friendly products and behaviours.

Despite intellectual efforts to attribute responsibility for greenhouse emissions to a certain gender, Skutsch, (2002) has argued that such arguments are not just difficult but utterly pointless. For example, although more men use cars than women, household energy (such as heating and cooling) is consumed equally by both men and women. In fact, seeing as women are responsible for cooking, they too could be blamed for greenhouse gas emissions from unsustainable use of fuelwood supplies (Skutsch, 2002). This perspective is included as background information to create a complete picture of the debate on gender and climate change but is in no way a relevant perspective for the current study.

2.1.5 Knowledge and risk perception

Studies demonstrate that knowledge and believes held on climate issues tend to differ amongst various social groups including men and women. Regarding climate risk perception, women are comparatively more concerned about risks associated with climate change and the environment than men are (Bord & O'Connor, 1997; Mohai, 1997; Eisler et al., 2003; Blocker & Eckberg, 1997; Brody et al., 2007; Khan et al., 2020). Researchers Flynn et al., (1994) found that not only did white women perceive environmental health risks to be much higher than white men, but white males also tended to perceive risks as much smaller and much

more acceptable than other groups (non-white men and women). Some studies however indicate that women's concern for the environment might be dependent on the context. Women express higher levels of concern for local environmental issues especially those that pose health or safety risks to those in their immediate surrounding or community. Gender differences in concern for more general environmental issues are more moderate (Blocker and Eckberg, 1989; Davidson & Freudenburg, 1996). Although the majority of studies on the subject, conclude that women are more concerned with environmental risks than men are, a few studies find the opposite. For example, MacDonald and Hara (1994) found that males were slightly more likely than females to express environmental concern. According to the authors, this could be as a result of the marginalization and exclusion of women from debates on climate issues (MacDonald & Hara, 1994).

The academic debate on gender differences in climate knowledge is less conclusive than that of climate risk perception. While certain studies conclude that women have less environmental knowledge compared to men (Eisler et al., 2003; Davidson & Freudenburg, 1996), others find that women *report* being less knowledgeable, but are not necessarily less informed (Bord & O'Connor, 1997). This last aspect is supported by more recent research from McCright (2010) who demonstrated that women indeed have greater assessed scientific knowledge of climate change but are more likely to underestimate this knowledge than men are. In the Global South, women gain specialized knowledge of changes in long-term climatic patterns as a result of their involvement in agriculture (Bee, 2016). This specialized knowledge causes them to have a greater risk perception environmental change (Bord & O'Connor, 1997).

Some of the most striking findings in gender difference in climate knowledge and risk perception relates to what is described as the "White Male Effect". This theory posits that, conservative white men are more likely than other adults to report a greater personal understanding of global warming but are also more likely to deny or reject the scientific consensus on climate change (McCright & Dunlap, 2011). This phenomenon is essentially an identity-protective cognition which causes conservative white men to protect their own believes by rejecting ideas or activities that challenge their cultural identities (McCright & Dunlap, 2011; Kahan et al., 2007). This in turn translates into overconfidence in beliefs and insensitivity to the climate change risks (McCright & Dunlap, 2011; Kahan et al., 2007; Flynn et al., 1994). Kahan et al., (2007) attributes this identity-protective cognition to differences in how men and women form their identities. Women's identities are linked to domestic roles and men's identities or feeling of personal virtue is often tied to success in the market.

2.1.6 Climate governance

Women are evidently absent from the climate policymaking process and the climate debate is perpetuating the undervaluation and misunderstanding of women's contribution to environmental management (Denton, 2002). Several of the important social sectors for decisions on climate policies have a male dominance and this is a pervasive problem in modern societies (Denton, 2002; Boyd, 2002). For example, Villagrasa (2002)

notes that during the 1997 Kyoto Protocol, women were underrepresented as formal delegation heads or in other decision-making positions of their respective communities. Not only are the bureaucrats representing their nations predominantly men, but more importantly the underpinning approach to climate mitigation policy is masculine and patriarchal. In other words, gender issues are largely absent from climate decision-making leaving room for technical and highly simplified solutions (Boyd, 2002; Dymén et al., 2013). Today, the problem of underrepresentation of women in climate change decision making is still an actual problem. Despite women and girls around the world demanding more climate action at the national and international levels, their voices are still underrepresented in the climate decision-making process (UNFCCC, 2019).

Policy makers and academics have proposed gender mainstreaming as a means of solving the gender gap in climate decision-making (Dymén et al., 2013; Hemmati & Röhr, 2009). This means that the integration of a gender perspective in the various aspects of policy making and implementation, will ensure equal participation of women in climate decision making. In practice however, gender mainstreaming might not always yield the intended results. For example, Brown (2011) concluded that while gender inequalities were recognized in the National Adaptation Program of Action (NAPA), women still had limited participation in discussions on issues of climate change. Simply including women and other marginalized groups in environmental management, in disregard for social relations is problematic (Arora-Jonsson, 2014). In other words, adding women to existing structures and organizations that continue to be dominated by certain groups of men is not enough. To solve the issue of disadvantage, these structures need to be changed to accommodate the subjective positions, needs and ideas of women. Studies have shown that more descriptive representation does not necessarily yield more gender sensitive climate policies. Path dependency and deeply institutionalized masculine norms in existing institutions may cause policy makers, regardless of their gender, to accept and adapt their opinions to the masculinized environment in which climate policies are formed, (Magnusdottir & Kronsell, 2015; Magnusdottir & Kronsell, 2016). According to Alston (2014), if gender mainstreaming is undertaken through organizations that do not question women subordination or view gender-based violence as normal, then gender mainstreaming policies can reinforce gender inequalities as opposed to resolving them.

Furthermore, women are not a homogenous group and may have set different priorities depending on their interest, socio-economic status and so forth. For example, Magnusdottir & Kronsell (2015) found that despite the equal representation of men and women in Scandinavian administrative and political units, climate strategies were often silent regarding gender. The authors explain this disparity by suggesting that female policymakers may be part of a high-consuming, high-GHG-emitting elite with different interests from working class, immigrants, or elderly women.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Gender equality in parliament: substantive and descriptive representation

In her book "The Concept of Representation", Hanna Pitkin (1967), describes descriptive representation as a form of representing which does not involve any form of acting at all. According to Pitkin, descriptive representation focuses on the characteristics of the representative, on what *he is* or *is like*. The proportionalists as Pitikin describes those in favour of descriptive representation, equate true representation to resemblance, and reflection. This idea ties into the "Politics of Presence" proposed by Anne Phillips (1994). According to Phillips, social differences such as age, race, and gender shape the experiences of underrepresented groups and ensuring the physical and symbolic presence of marginalized groups in political institutions is what guarantees adequate representation. Substantive representation on the other hand, involves "acting for others, an activity on behalf of, in the interest of, as the agent of, someone else". Studies focusing on the substantive representation of women however need to explain the concepts of "women's interests" and "gender equality" (Wängnerud, 2009). The core idea behind this aspect of research is that women, due to their experiences, have certain interests that are not adequately addressed in a political system dominated by men (Wängnerud, 2009). As a result, the equal representation of women or gender equality in parliaments is needed to ensure that women's interests are considered in policymaking.

3.2 Critical mass: descriptive representation

Research focusing on the descriptive representation of women often uses the share of seats in parliament as an indicator of the political inclusion of women and consequently, substantive representation. The idea that an increase in the number of women in parliament will increase the importance of gender-related issues, is referred to in academic research as **"the critical mass theory"**. This idea can be traced back to the work of scholars like Kanter (1977), who proposes that the life of women in the corporate world is influenced by the proportions in which they find themselves.

This theory by Kanter focuses on the corporate world and is extended to the political sphere by Dahlerup (1988), who argues that an increase in the number of women in parliaments make it seem "rather hopeless to try to remove women from the public sphere". Furthermore, Dahlerup concludes that more women in politics will mean more emphasis on family matters, the environment, equality, child, and sexual policies. This is because an increase in the number of women in parliament, creates a more supportive legislative climate, which in turn encourages women to speak out on women's issues when they sense support from their female colleagues. This supportive climate also stimulates male officials to take leadership roles in women's issues. Research on the critical mass theory focuses exclusively on opportunities for women to cooperate and form coalitions or connections with one another, hence concluding that a critical mass is enough to increase women-friendly policy outcomes (Sarah & Mona, 2008). A critical mass, however, is not a prescription for action, but rather explains why some groups lack influence over public decision-making.

Many countries around the world aim to achieve a critical mass of women in their parliaments by introducing gender quotas. In politics, gender quotas involve setting up a minimum percentage or number for the representation of certain groups (UN Women, n.d.). There are three main quota types. The voluntary party quota involves the commitment of a party to nominate a certain percentage of female candidates on its electoral lists (UN Women, n.d.). Candidate quotas are anchored in law and demand that a certain percentage or number of candidate positions are reserved for female candidates (UN Women, n.d.). Reserved seats as the name suggests, are seats that can only be filled by women. This last type is a more direct means of ensuring more women are elected (UN Women, n.d.). Research shows that the implementation results in a number of benefits such as a better international reputation (Bush & Zetterberg, 2021), better quality of elected officials (Júlio & Tavares, 2017), promotion of meritocracy, improvement in the criteria used in selecting and evaluating politicians and neutralizing an overly masculine parliamentary environment (Murray, 2014).

Quotas are however not always advantageous. According to Mansbridge (2005), quotas play an important role in guaranteeing democracy, however quotas need to be implemented in their most flexible form, as the need for quotas is expected to decrease as the cultural and structural conditions that prevent the political representation of women improve. Furthermore, quotas need to be implemented in a conscious way that prevents or limits essentialism. Essentialism refers to the belief that women elected by means of a quota system have some essential characteristics that prevents them from being represented by others without such traits or characteristics (Mansbridge, 2005).

An increase in the number of women in elite politics can alter policy outputs and improve the lives of citizens, particularly female citizens (Bratton & Ray, 2002). This is due to an increased political concern for women's rights, social policies, and constituency work (Norris, 1996; Bratton, 2005; Thomas 1991; Schwindt-Bayer, 2006; Xydias 2007). Homola (2021) found that governing parties were more likely to fulfil their election promises when there is an increase in the level of female representation. Focusing on Belgian parliaments, Celis (2006) found that women members of parliaments were women's most fervent representatives and contributed positively to how women were represented. Other studies also demonstrate that an increase in the presence of women in legislative bodies, have broader implications for areas **outside of "women issues"**. For instance, studies demonstrate that an increase in women's legislative representation decreases conflict behaviour and military spending (Caprioli, 2000; Koch & Fulton, 2011). Overall, there is an agreement in research that gender indeed has an impact on legislative behaviour, what varies between the different studies is the strength of the impact (Wängnerud, 2009). Depending on the **context**, the magnitude of the impact female parliamentarians have on the policy process may differ, what is clear however is the direction of the gender gap in attitudes: female representatives are generally more leftist compared to their male counterparts and are more inclined to support new policies, particularly those related to environmental protection (Wängnerud, 2009).

The critical mass theory and conclusions from various other empirical studies thus indicate a relationship between the presence of women in parliaments and an improvement in the quality and quantity of policies. I thus hypothesize *that in member states with a greater number of women in their parliaments, will have more ambitious climate policy outputs.* A specific threshold as proposed by Kanter (1977) is not specified because as suggested by Grey (2006), it is possible that a different critical mass is needed to achieve progress on climate policies.

H1: Member states with a greater number of women in their parliaments (critical mass), will have more ambitious climate policy outputs (critical action)

3.3 Critical action: substantive representation

Research on substantive representation is fairly new and there are no clear set of indicators used in assessing substantive representation (Wängnerud, 2009; Franceschet & Piscopo, 2008). Furthermore, studies also question if *looking like* constituents automatically lead *to acting for*. In other words, is being a women sufficient grounds for legislators to promote or advocate for the interest of women. Those who argue against descriptive representation often assume that because not all women have a shared identity, one representative cannot speak or act for the entire group (Young 1997). According to Young (1997), sharing specific attributes such as gender, class or race is not sufficient to properly represent constituents. Instead, taking a look at the actions of legislators provides better insights into *how* the substantive representation of women occurs.

Substantive representation is defined as the **actions** legislators undertake on behalf of some or many women (Franceschet & Piscopo 2008). It encompasses various activities such as introducing and supporting bills, voting on legislation, networking with like-minded colleagues, and raising awareness about women's issues (Franceschet & Piscopo 2008). Several studies demonstrate that women in parliaments are more likely to sponsor bills and/or introduce legislation that focus on women's interests (Bratton, 2005; Vega & Firestone, 1995; Jones, 1997). For instance, Tremblay (1998) found that female MPs in Canada integrated women issues in their mandate of political representation more overtly than their male colleagues.

Certain researchers have highlighted the positive contribution of women to climate change policymaking. During the Kyoto protocol, women played a strong and important role for climate protection due to their networking and interpersonal skills and ability to think in the long term (Villagrasa, 2002; Buckingham, 2010). Furthermore, greater female representation in parliament has been associated with lower carbon dioxide emissions or stricter environmental policies (Ergas & York 2012; McKinney et al., 2015; Mavisakalyan & Tarverdi, 2019; Fredriksson & Wang, 2011). For example, Lv & Deng (2019) found in their research that female legislators were more likely than their male colleagues to advance environmental protection. Similarly, Ramstetter & Habersack (2019) found that female members of the European Parliament

were significantly more likely to support environmental legislation than men are. These results remain true even after controlling for political ideology and nationality. According to Mavisakalyan & Tarverdi (2019), the involvement of women in political decision-making has led to reduced carbon-dioxide emissions and more ambitious actions towards addressing climate change. Female parliamentarians are also more likely to take liberal voting positions on a wide array of issues such as civil rights, environmental protection, social welfare and so forth (Green, 2003; Reingold, 2008; Welch, 1985). In fact, a more recent study by Debus & Hansen (2014) demonstrates that female parliamentarians did not always follow the party position when the interests of women were at stake. Other studies suggest that environmental concerns are driven more by party affiliation and less by the gender of the legislator (McAllister & Studlar, 1992). However, gender does affect the party affiliation as women are more likely to be affiliated with left and green parties than men (Sundström & McCright, 2014; Fraune, 2016).

Substantive representation in this research is studied in line with the framework proposed by Celis & Childs (2012). I focus on *how substantive representation* occurs in parliaments of EU member states. The main focus is not solely what women do, but *what parliamentarians do* to promote ambitious climate policies. This helps to have a broader view on *who* acts on climate issues and move away from essentialist portrayals of what 'men' and 'women' parliamentarians should do or how they should act. These actors are thus labelled '**critical actors**'. According to Celis & Childs (2012), *critical actors are those who act individually or collectively to promote women friendly policies*. I thus employ an exploratory approach towards understanding substantive representation in the context of climate policies. This means that I do not specify any hypothesis or expectations before analysing the parliamentary debates on climate policies. Instead, I focus on the differences, if any, between female and male parliamentarians during climate policy debates in EU member states national parliaments. Advocating for stringent climate policies by MPs is labelled in this study as **critical action.**

Asking how critical action or the substantive representation of women occurs also forces the need to consider the impact of ideological differences between women (Celis & Childs, 2012). In European countries party pressure is strong when it comes to voting in chamber and it is necessary to use indicators that capture impacts in earlier stages of the parliamentary process such as debates, bill introduction and so forth. This conclusion is also echoed by Celis (2008).

3.3.1 What are women's interests

One main aspect of research on substantive representation is the definition of women interests. Researchers enquire if female MPs represent or advocate for these so-called women interest issues. However, defining what these issues are continues to pose a challenge for studies in this field. Scholars have long wondered what women's interests are and why these interests may differ from that of other social categories. Earlier studies ascertain that women develop common interests due to their productive and reproductive roles or

disadvantaged socio-economic positions. This in turn causes women to have interests that are different from that of men (Sapiro, 1981; Diamond & Hartsock, 1981). According to Sapiro (1981) women as a social group share particular social, economic, or political problems that do not closely match those of other groups and as a result, they share a particular viewpoint on the solutions to these problems. Mansbridge (1999) asserts that in situations when the group interest is not uncrystallized or not fully articulated, descriptive representation is needed to ensure the substantive representation of interests. According to Phillips (1995), establishing interest is not a means to conclude that all women have the same interest but is more a method to differentiate between the interests of men and women. Scholars later on started to point to how differences in life experiences (not reproductive or biological roles) explained the distinct interest of women and more importantly, how these experiences have political relevance. The social background of representatives became increasingly important (Celis et al., 2014). This is illustrated by Mansbridge (1999) who argues that descriptive representation (resembling the representative) is absolutely essential for the deliberative democracy, not simply because of a shared gender, or race also due to shared experiences. Mansbrigde argues that only those who share similar experiences as the group or are existentially close to the issue are capable of adequately portraying the interests of the group.

Studying women's interests in the context of substantive representation can be challenging because different studies employ different definitions of women's issues or interests. Lovenduski (2001) defines women's issues as those issues that mainly affect women, either for biological reasons or for social reasons. Beckwith (2011) differentiates between interests, issues, and preference. According to her, identifying women's interests has nothing to do with an essentialist classification of women as a group but rather involves recognizing the life circumstances of women and providing women equal opportunities to advance their human capabilities and improve their lives. This means that women need to be adequately represented in deliberative democratic contexts in order to ensure that women's interests are sufficiently identified and expressed. Wängnerud (2000) defines women's interests are those policies that increase the autonomy of women.

The fact that various researchers employ different definitions in describing what women's interests are, indicate that this is a highly contested concept. Some of the most important issues in the debate on what exactly women's issues are, relate to the question of subjective and objective interests, and how gender relates to other social categories such as race, class and so forth (Wängnerud, 2000). Subjective interests are women interests that are highlighted by politically active women themselves and is suggested as a method of avoiding the controversies attached to a more "objective", "a priori" or "top-down" approach to defining women's issues or interests (Celis, 2006). Besides the tendency to ascribe women interests in a top-down fashion, certain studies also assume that women, men, and their interests are rigid and unchanging (Wängnerud, 2009). What is defined as women's issue is also subject to intersectionality. Framing issues in a single axis, in terms of one characteristic for example, gender, can result in failure to acknowledge the differences among women as a result of race, class, sexuality and other categories of difference (Smooth, 2011). These differences also

become intertwined, resulting in complex interests. It is thus almost impossible to define what women's interests are a priori because a previously established thematic selection of women interests does not take the diversity in women's interests into account (Celis, 2006).

3.3.2 The environment as a women's interest issue in the European context

Climate change and the environment is unlike other issues such as abortion or childcare that have long been established as women interest issues in research (Dolan, 1998). Studies which argue that the descriptive representation of women results in substantive representation employ arguments of vulnerability and virtuousness, differential adaptive capacity, differential knowledge and risk perception, and responsibility (see chapter 2) to argue that female MPs are more likely to support strict environmental policies. However, this is a contested argument, with some researchers arguing that climate policy is an issue outside of the classic "women interest issues" (Salamon, 2022). As a result, it is difficult to define climate policy as an issue of special interest to women, because while some studies argue that female parliamentarians help to achieve stringent climate policies, others conclude the opposite. Research indicating the former, show for instance, that while male and female parliamentarians in the European Parliament, expressed similar concerns for the environment, women were significantly more likely to support environmental legislation than men even after political ideology and nationality are controlled for (Ramstetter & Habersack, 2020). Similarly, Sundström & McCright (2014) found that female parliamentarians in Swedish parliaments express greater concerns for the environment at the county and municipal levels. A more recent study by Salamon (2022), found that women's parliamentary participation led to an increase in renewable energy consumption in high and middle income countries.

In contrast, other studies have shown that a critical mass of women in parliament does not necessarily result in better climate policymaking. For instance, Magnusdottir & Kronsell, (2015) found that a critical mass of women in Scandinavian parliaments did not necessarily lead to gender sensitive climate policymaking. Interviews revealed that policy makers were largely unaware of the gendered nature of climate issues in the Scandinavian context. One of the explanations provided by the authors for this finding is that female policymakers in Scandinavia may be part of "the high-consuming, high-GHG-emitting elite, with interests and views far from that of groups who consume and travel less and live, for example, in dense urban areas under poor conditions".

Climate issues may or may not be an issue of special interest to women depending on the context, the specific interests of female parliamentarians themselves or other factors. To avoid making essentialist claims that the environment is inherently an area of special interest for all female parliamentarians in Europe due to their reproductive or productive roles or shared disadvantaged positions, I refrain from making priori assumptions that climate change or policy is an issue that is solely of special interest to women. Instead, in line with the suggestions proposed by Celis et al., (2014), I avoid a priori definitions, in favour of a more inductive approach. This means that in concluding whether or not the climate crisis is an issue of special interest to

women in EU member states, I look to what female legislators themselves say during climate/environmental policy debates. This approach helps to avoid essentialist claims that women or female parliamentarians everywhere have the same needs and desires.

3.4 The significance of the political context: party ideology

As briefly highlighted above, the outcome of the legislative process or legislative success may be greatly dependent on the context or institutional rules. Political context is a necessary condition for translating sheer numbers of women into women-friendly public policies (Beckwith & Cowell-Meyers, 2007). Certain formal and informal rules can restrict the ability of a female legislator to move from bill introduction to bill passage (Franceschet & Piscopo, 2008). Celis (2008) identifies four main contextual factors that may affect the substantive representation of women: the proportion of women present in legislative bodies, political parties and party discipline, the presence of women networks and the positional power of women within legislatures. The present studies focus primarily on the impact of political parties on substantive representation. Political parties have an impact on the substantive representation of women both on the basis of content and representatives involved (Celis, 2008). For example, Franceschet & Piscopo (2008) found that party ideology greatly reduced the success of women's rights initiatives.

Studies on party ideology and support of politicians for issues that directly affect women, indicate that politicians from left-wing parties are more supportive of promoting women's issues than conservative or right-wing politicians (Beckwith & Cowell-Meyers, 2007; Lovenduski & Norris, 2003; Grossmann & Hopkins, 2015). Studies also indicate that green/libertarian left-wing parties are generally more inclined to support pro-environmental policies (Neumayer, 2003; Knill et al., 2010). Traditional left-wing parties too, are more pro-environmental than their right-wing counterparts (Neumayer, 2004). Nations with strong leftist parties are associated with lower emissions, and faster incorporation of environmental demands from consumers and environmental activists into their party programs and policy objectives (King & Borchardt, 1994; Neumayer, 2003). Leftist parties are also more inclined to support female candidates thereby increasing the number of female MPs in parliament (Caul, 1999). Gender also affects party affiliation as women are more likely to be affiliated with left and green parties than men (Sundström & McCright, 2014; Fraune, 2016).

3.5 Conceptual framework

Critical mass: descriptive representation of women in national parliaments of EU member state

Critical action: substantive representation: more ambitious/stringent climate policies

Party Ideology
Left wing / right wing parties
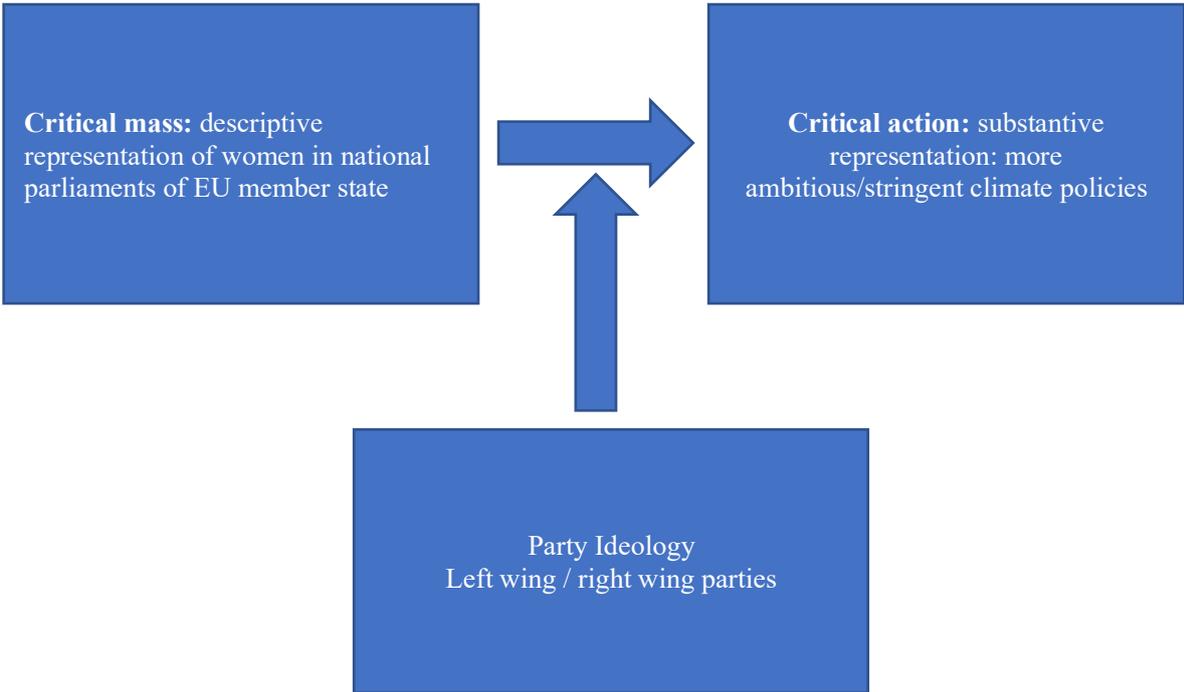
CHAPTER 4: EMPIRICAL DESIGN AND RESEARCH ETHICS

4.1 Empirical design

To understand the relationship between a critical mass of women in parliaments and critical action in climate policy, this study employs a **sequential** (quantitative followed by qualitative) mixed-methods research design. A mixed methods research design offers richer insights into the phenomenon being studied and allows information to be captured that might be missed when using only one research design (Caruth, 2013). In the present study, both methods are combined for the purpose of **expansion**. This means that the depth and breadth of the study is expanded by combining these methods. The rationale behind the quantitative component is to analyse the relationship between the descriptive representation of women in parliaments of EU member states and the stringency of their climate policy outputs. This is done by estimating an Ordinary Least Squares Model and three Fixed Effects Models of panel data for the period of 2016-2021 for the 27 member states of the European Union. The motivation for the choice of periodicity, data used, and other relevant elements are explained in detail in chapter 5.

The aim of the qualitative component on the other hand, is to provide in-depth and contextualised information on how a critical mass of women leads to critical action in the context of climate policy. While the quantitative analysis helps to establish a statistical relationship, it does not explain how this relationship occurs or the role of specific context related factors such as party ideology. As described by Wängerund (2009), the magnitude of the impact female parliamentarians has on the policy process may differ depending on the context. The qualitative analysis involved a content analysis of parliamentary documents from three case studies (Belgium, the Netherlands and Ireland). These cases were selected based on the results from the quantitative analysis. In total 78 documents containing plenary debates from 2019 were analysed. The motivation for this date and these countries is explained in chapter 6.

The results of the quantitative and qualitative analyses are outlined separately as they address different research questions and focus on different empirical contexts. This means that while the quantitative analysis focuses on the 27 member states of the European Union, the qualitative analysis centres on three case studies. The result of the quantitative analysis is thus needed to select what specific countries or cases are analysed in the qualitative section. How these results intersect is outlined in the discussion section.

The subsequent chapters provide a comprehensive discussion of both the quantitative and the qualitative analyses, covering the empirical contexts, the data collection, the data analysis, results, and discussion.

4.1 Research ethics

In research, reliability is the accuracy of the instrument used or the consistency with which the results are obtained while validity measures the extent to which a concept is accurately measured (Heale & Twycross, 2015). There are two main types of validity - internal and external validity. Internal validity refers to the "extent to which research findings are a true reflection of reality rather than being the effects of extraneous variables" (Brink, 1993). External validity addresses the degree or the extent to which the results can be applicable across groups (Brink, 1993).

For the quantitative part of this study, reliability and validity is guaranteed in various ways. Firstly, the data was obtained from reputable organizations, like Eurostat, World Bank, EIGE, GermanWatch, among others. These sources are used in various other published studies. The data for the Climate Change Policy Index for instance was requested directly from GermanWatch after the signing of a Non-Disclosure Agreement (NDA). How this index was calculated is explained in detail in 5.2.1. A Cronbach's Alpha test was also carried out to test the reliability of the data and guarantee validity. Furthermore, a number of regression assumptions were tested for before the regression models were specified, based on these tests some corrections were carried out in the regression model itself. For instance, the test for homoscedasticity revealed that there was some heteroscedasticity present in the data. This is often the case when cross-sectional panel data is used. To correct this, heteroscedasticity-corrected standard errors were used in calculating the regression models. Finally, besides an Ordinary Least Squares Regression Model, this study also estimates three Fixed Effects Models to limit the occurrence of omitted variable bias. This study focuses on the climate policies of EU member states, as a result, the findings cannot be generalized to countries outside of these member states. This is because the EU has developed a comprehensive set of climate laws and policies that apply to its member states. Some countries in Europe are however not members of the EU and may have their own national climate legislation.

To ensure reliability in the qualitative portion of this research, plenary debates on climate policy from three different countries were analysed by making use of a consistent methodology. A codebook was developed based on the data from Belgium, and these codes were subsequently applied to the analysis of the Dutch and the Irish debates. By using this approach, the analysis is unform and comparable across all three countries. To guarantee internal validity in this study, the developed codes or themes are allowed to emerge from the data, ensuring that they are relevant to the contexts and connected to the research question (i.e., all codes are related to ambitious climate policy). In presenting the results, I make use of excerpts from the data to support my claims and conclusions. The main aim of the qualitative analysis is not to provide generalizable results, instead the goal is to discover how critical action or substantive representation occurs in the context of climate policy. Although there are some similarities in the findings across these three countries, the sample size is not large enough to draw generalizable conclusions.

CHAPTER 5: QUANTITATIVE ANALYSIS - METHODOLOGY AND RESULTS

5.1 Empirical context

This first research question centres on the relationship between the a critical mass of women and the stringency of climate policies or critical action. In order to answer this question, the first section of this study employs a quantitative analysis which centres on the 27 European Union Member states. While each member state has its own distinct features and history, many member states share similar political, economic, and cultural characteristics that allows for comparability between these nations. For instance, member states participate in a common market, which means that they share many economic policies and regulations (European Union, n.d.). Furthermore, a common legal framework, cultural exchanges, shared values on democratic principles, rule of law and human rights, all contribute to a degree of comparability between member states (European Commission, n.d.). This makes it easier to draw meaningful comparisons and identify patterns across countries.

Besides the element of comparability, the European Union has developed comprehensive policy frameworks for addressing the central themes in this research, namely, *gender equality* and *climate change.* The Gender Equality Strategy for instance, outlines policy objectives and actions needed achieve a gender-equal Europe by 2025 (European Commission, 2020). The European Green Deal outlines a set of proposals aimed at aligning the EU's climate, energy, transport, and taxation policies with the goal of reducing net greenhouse gas emissions by a minimum of 55% by 2030, compared to 1990 levels (European Commission, 2019). The 27 member states of the European Union thus form the **population and sample** for the quantitative section of this research.

5.2 Data Collection

This study uses data for 2016-2021 for the 27 European Union Member states. This periodicity is chosen due to the data availability constraints and allows for the analysis of the most recent data across all variables and for all countries. Control variable, Public Opinion on Climate is not uniformly complied each year (for example, biannually or triennially). More information is provided on the computation of this data is provided below.

5.2.1 Dependent variable

The dependent variable in this study is the climate policy output of European Union member states. To quantitatively analyse progress of member states towards achieving ambitious climate policy outputs, the Climate Change Performance CCPI index is used. This data is not readily available online and was requested directly from the GermanWatch Organization, which provides this data to unfunded researchers at no charge,

after signing a Non-Disclosure Agreement (NDA). This agreement outlines the terms and conditions for data use, such as, a prohibition to redistribute the provided data or usage for commercial purposes.

The CCPI evaluates the progress of countries towards limiting the global temperature rise to 2°C or even 1.5°C (Burck et al.,2022). This index assesses countries' climate policies, their recent developments, current levels, and well-below-2°C compatibility of GHG emissions, renewable energy sources, energy use (to measure energy efficiency) and their targets for 2030. The index focuses mainly on four categories: GHG emissions, Renewable Energy, Energy Use and Climate Policy. Although all four categories and the overall index provides useful information on the climate change performance of member states, the data on **climate policy is the most important for the purpose of this study**. This data is selected from the rest and forms the main dependent variable in this research.

The choice to focus solely on climate policies and no other aspects of the index, is for three main reasons. Firstly, the research question centres on the achievement of ambitious climate policy outputs (and not the other aspects of climate change performance). Secondly, one can expect that parliamentarians have a direct impact on the climate policy output in a specific member state than other factors included in the index. This is because in democratic countries, policy objectives usually go through a parliamentary process before they can be implemented. Thirdly, climate policy has a considerable impact on all other categories of the CCPI (Burck et al., 2022). This means that GHG emissions, Renewable Energy and Energy Use can be changed only through successful climate change policies (Burck et al.,2022).

The Climate Policy category of the CCPI is calculated based on performance ratings by climate and energy policy experts from non-governmental organisations, think tanks and universities within respective countries (Burck et al.,2022). These experts provide ratings on national and international efforts of climate policies. This is done by means of a questionnaire in which policy experts are required to give a rating from one ("weak") to five ("strong") on the most important initiatives of their government (Burck et al.,2022). In countries where there are no independent experts, the national policy of such countries is rated as scoring average. Besides national policies, the Climate Policy category of the CCPI also examines countries' performance at UNFCCC conferences and other international, multilateral agreements (Burck et al.,2022). Again, experts are required to assess the recent performance of their country in these settings.

5.2.2 Independent variable

The independent variable in this study is the number of seats held by women in national parliaments from the Eurostat website. The national parliament is the legislative assembly, and the indicator refers to both the lower and upper house, where relevant (Eurostat, 2023). The data on the number of seats held by women in national parliaments is originally gathered by the European Institute of Gender Equality, which divides the

data into four quarters for each year. In the present study (and the Eurostat data) only the fourth quarter is considered.

5.3 Control variables

Both climate policy outputs and the number of women in parliament are affected by a range of factors. In order to ensure that the baseline results are not purely circumstantial, a number of control variables are included.

5.3.1 Gross domestic product per capita (GDP per capita)

The GDP per capita is the measure of the monetary value of final goods and services in a country during a certain period (IMF, 2019). Previous studies have shown that as GDP per capita increases, countries emissions increases tend to slow down. This is because higher income levels may lead to an increased demand for stringent climate policies and environmental protection (Tucker, 1995; Mavisakalyan & Tarverdi, 2019). High income countries have also been found to have stricter enforcement of environmental protection rules, have more knowledge or technology intensive economies which promote more climate conscious production and consumption (Liu, 2020). The GDP data used in this study is retrieved from the World Bank data base. The data is first transformed into a log variable to reduce the impact of extreme variables.

5.3.2 Public opinion on climate change

Studies show that public opinion is associated with the introduction of renewable energy policies in Europe. Office-seeking leaders are inclined to introduce policies that are preferred by the domestic public and thus if the public desires environmental protection, then the government introduces such policies (Anderson et al., 2017; Shum, 2009). In order to assess the public opinions on climate change in European Union member states, this study employs the data from the Eurobarometer. Of particular interest for the current study, is the percentage of people in each member state, that consider climate change to be the single most serious problem facing the world as a whole. The data for the years 2016, 2018 and 2020 are missing and are estimated for the purpose of the analysis, using the Expectation-Maximization Algorithm method (model-based method). This method replaces each missing data point with a set of m>1 plausible values to generate a complete data set (Sinharay et al, 2001). This method yields consistent results and is reliable (Strauss et al., 2003).

5.3.3 CO_2 emissions per Capita

Following Mavisakalyan, A., & Tarverdi, Y. (2019) and Fredriksson and Neumayer (2013), I control for CO_2 emissions per capita. According to Fredriksson and Neumayer (2013), the CO_2 emissions reflects the motivation of consumers to maintain low fossil fuel prices, as well as the vested interest of fossil fuel producers in lobbying to keep climate change policies weak. In other words, there is a significant financial stake for CO_2 emitters which causes them to lobby against stringent climate policies (Fredriksson & Neumayer, 2013). The data for CO_2 emissions in this study is derived from the European Sustainable

Development Report (ESDR) and is calculated based on the CO_2 emissions embodied in fossil fuel export, the CO_2 emissions from fossil fuel combustion and cement production and the CO_2 emissions from imports (Lafortune et al., 2022).

5.3.4 Trade openness

This study controls for openness to trade in line with previous similar studies (see and Asongu & Salahodjaev 2022; Mavisakalyan & Tarverdi 2019). Trade openness simply put, is the sum of a country's exports and imports as a share of that country's GDP (Our World in Data, n.d.). General openness to trade is expected to promote multilateral cooperation to solve environmental problems. In practice however, the expected effect of openness on the stringency of climate policies might be ambiguous because as Neumayer (2002) points out, trade openness might only promote multilateral cooperation on environmental issues, when this cooperation does not impinge upon the interests of exporting countries. Similarly, Managi et al. (2009) found ambiguous results for the impact of trade on environmental quality. These researchers find that trade only benefits the environment in OECD countries and has detrimental effects on the emission of sulphur dioxide (SO_2) and carbon dioxide (CO_2) in non-OECD countries. The data on trade openness employed in the present study is derived from the World Bank Data Bank.

5.3.5 Democracy index

The democracy index is simply an index that measures the state of democracy in various countries. The index is based on five categories: electoral process and pluralism, functioning of the government, political participation, political culture, and civil liberties (Economist Intelligence, 2022). The level of democracy in a certain country is expected to have a positive effect on the political presence of women (Paxton et al., 2010). Democracies have also been found to have more stringent climate policies and thus a reduction in environmental degradation (Neumayer, 2002; Farzin & Bond, 2006; Mavisakalyan & Tarverdi 2019; Li & Reuveny, 2006). The data for the democracy index is retrieved from the Democracy Index report by the Economist Intelligence (Economist Intelligence, 2022).

5.3.6 Population size

This study thus controls for population size because extant research has established a relationship between population size and climate change or the political empowerment of women. While some studies argue that although population size does not solely lead to climate emissions, it plays an important role in the destruction of biodiversity and in climate change (Ganivet, 2020; Dodson et al., 2020). Other studies find that population size is an important driver of climate actions. For instance, Bedsworth and Hanak (2013) found a positive and significant relationship between population size and efforts to combat climate change such as energy efficiency, green buildings, water use efficiency and so forth. The political empowerment of women has also been found to lead to lower fertility levels and thus lower levels of population size (Phan, 2013; Saberi et al., 2018).

5.3.7 Mean years of schooling

The mean years of schooling covers the average number of people aged 25+ who have engaged in formal education Global Data Lab. (n.d.). In line with Mavisakalyan & Tarverdi (2019), I control for the impact of education. Individuals with higher education levels tend to be more concerned with social welfare and behave in a more pro-environmental way (Meyer, 2015; Wang et al., 2022). Education has also been found to have a positive impact on gender equality attitudes (Kostenko et al., 2016).

5.4 Data analysis

The data in this study is analysed using the SPSS and EViews software for statistical analysis. The descriptive statistic for every variable is first presented, then these variables are tested for their internal consistency to determine their reliability. A correlation analysis is then carried out to determine meaningful relationships between the studied variables. Finally, a number of regression analyses are conducted to discover the relationship between the dependent, independent and control variables. In order words, the relationship between a critical mass of women in parliament and the climate policy outputs of EU member states is determined while controlling for possible confounding factors.

5.4.1 Descriptive statistics

Table 1 reports the variables included in this study, their sources, means and standard deviations. The mean values indicate the average score of the 27 European Union member state on each variable studied. While the standard deviation measures the distance between a specific score and the mean (Van Thiel, 2021). For instance, the CCPI mean suggests that most countries score approximately an average of 9,8 for this indicator. The standard deviation suggests that the majority of countries score between 5,3788 and 14,2914 for this indicator.

Table 1 Summary Statistics

Variable name	Description and source	N	Mean	Std. Dev	Min	Max
CCPI	Climate Change Policy Index (2016-2021) Source: Burck et al. (2022)	162	9.8351	4.45630	0.90	19.74
Women in Parliaments	Number of women in Lower and Upper house (2016-2021) Source: Eurostat	162	28.8272	9.67035	10.10	49.60
GDP per Capita	Gross Domestic product per capita (2016-2021) Source: World Bank	162	35238.374278	23851.8703963	7596.4640	136701.3960
Public Opinion	Public Opinion on climate change (2017, 2019, 2021) Source: Eurobarometer	162	18.2168	8.88184	3.44	50

CO$_2$	CO$_2$ emissions (2016-2021) Source: Lafortune et al. (2022) (European Sustainable Development Report)	162	64.947	11.2750	40.3	86.7
Trade Openness	Trade as share of GDP (2016-2021) Source: World Bank	162	134.4520	69.52976	55.29	388.12
Democracy Index	Index of state of democracy (2016-2021) Source: Economist Intelligence	162	7.9337	.92562	6.38	9.93
Population Size	Annual population size in thousands (2016-2021) Source: World Bank	162	16549327.222	21894586,562	455356	83196078
Mean Years of Schooling	The mean years of schooling of adults aged 25+ Source: Global Data Lab	156	12.3277	1.26327	8.90	15

5.4.2 Test of internal consistency

Testing the internal consistency of a set of variables indicates whether items on a test, that are intended to measure the same construct, produce consistent results (Tang et al., 2014). In other words, this provides a way to test the reliability of the variables included in analysis. Testing for reliability is important because it ensures that the scores observed reflect more than just random error and is precursor for validity. This last aspect means that if the scores observed are not consistent then, it is impossible to conclude that these scores accurately measure the domain of interest, or if these scores are valid (Wells & Wollack, 2003). The reliability of the variables is tested by using the Cronbach's Alpha, which measures the internal consistency of a test of scale (Tavakol & Dennick, 2011). The Cronbach's Alpha is expressed as a number between 0 and 1, with a higher value indicating more reliability. Table 2 thus indicate that all variables included in this study thus achieve the norm of an alpha between 0,70 and 1 indicating that these variables are thus reliable.

Table 2 Internal Consistency (Cronbach's Alpha)

Variable Name	Cronbach's Alpha
CCPI	0.797
Women in Parliaments	0.800
GDP per Capita	0.798
Public Opinion	0.795
CO$_2$	0.806
Trade Openness	0.742
Democracy Index	0.798

35

Population Size	1
Mean Years of Schooling	0.978

5.4.3 Bivariate Correlation Analysis

Correlation measures the association between two variables. When variables are correlated, a change in the magnitude of one variable results in a change in the magnitude of another, this can be in the negative or positive direction (Schober et al., 2018). In this study, the Pearson correlation coefficient is used in assessing the linear relationship between the various variables. This coefficient ranges from -1 to +1, where a value of 0 indicates that there is no linear relationship between both variables and values closer to 1 reflect a stronger relationship between both variables (Schober et al., 2018).

Table 3 shows that there is a strong significant, positive, and small relationship between the Climate Change Policy Index and the number of women in parliament (r=0.523[**]), the GDP per capita of a member state (r=0.396[**]), the Democracy Index (r= 0.273[**]), public opinion on climate change (r=0.419[**]). There is a strong significant negative correlation between the CCPI and the CO_2 emissions (r=-0.340[**]). Although the results indicate a negative relationship between Trade Openness and the CCPI, this relationship is very small and statistically insignificant (r=-0.084). The same goes for Population Size (r=-0.049). The number of women in parliament has a negative and strongly significant relationship with the CO_2 emissions (r=-0.316[**]) and Trade openness (r=-0.363[**]). This relationship is however positive and significant for democracy index (r=0.170[*]). In the case of GDP per capita and public opinion, the relationship is positive and strongly significant, with (r= 0.542[**]), (r=0.503[**]) respectively.

The CO_2 emissions display a negative and strongly significant relationship with every variable except the population size, for which this relationship is positive, small, and not statistically significant. CO_2 has a particularly high correlation with the GDP per capita (r=-.742[**]). This relationship is negative which is contradictory to conventional knowledge and evidence from other studies that a growing GDP per capita results in increasing carbon dioxide emissions (Kasperowicz, 2015). However, some researchers argue that there is a difference between the long-run and short-run effect of economic growth and CO_2 emissions. In the short term, this relationship is positive but in the long run, the relationship becomes negative due to the development of new low-carbon technologies (Kasperowicz, 2015).

Interestingly, the mean years of schooling shows a negative relationship with the number of women in parliament (r= - 0.104) and shows no significant correlation with the CCPI. This contradicts conventional wisdom that the number of women in parliaments or the stringency of climate policies is supposed to increase as the mean years of schooling increases.

Table 3 Bivariate Statistics

	CCPI	Women in Parliament	CO$_2$	Trade Openness	Democracy Index	GDP	Public Opinion	Population Size	Schooling
CCPI	1	.523[**]	-.340[**]	-.084	.273[**]	.396[**]	.419[**]	-.049	.156
Women in Parliament		1	-.316[**]	-.363[**]	.170[*]	.542[**]	.503[**]	-.087	-.104
CO$_2$			1	-.461[**]	-.443[**]	-.742[**]	-.425[**]	.072	-.518[**]
Trade Openness				1	.217[**]	.350[**]	.072	-.283[**]	.243[**]
Democracy Index					1	.365[**]	.358[**]	-.166[*]	.184[*]
GDP						1	.599[**]	-.291[**]	.100
Public Opinion							1	-.187[**]	.151
Population								1	.175[*]
Mean Years of Schooling									1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

5.5 Regression assumptions

Before a regression analysis can be conducted, several assumptions must be considered and tested for. Serious violations in assumptions can lead to biased conclusions about the relationships between variables being studied (Williams et al., 2013). The underlying assumptions of a regression model aids the appropriate interpretation of the regression model and its limitations (Tranmer et al., 2020). The five main assumptions of a regression model are, a continuous dependent variable, a linear relationship between the dependent variable and each of the independent variables, a normal distribution of the data, multicollinearity, and homoscedasticity (Tranmer et al., 2020).

5.5.1 Variable Types

The first assumption of a linear regression model is that the dependent variable(s) is continuous (Tranmer et al., 2020). Continuous variables can have an unlimited number of values between the minimum and maximum measurements (McCue, 2007). The dependent variable in this study is a continuous variable because it measures the climate policy outputs of countries and ranks their efforts on a scale from 0 to 20. The score of each country can take on any value between this range. Table 1 shows that the 27 EU member states score between a 0.94 and 19.24, indicating that the member states can score any value within this range.

5.5.2 Linearity

Linear regression modelling assumes that the relationship between the dependent variables and the independent and control variables is linear or in a straight line (Tranmer et al., 2020). Residual plots can be used in identifying this relationship and help in determining if a linear regression is appropriate in modelling the given data and display so called residuals (Park & Dereche, n.d.). The residuals are "leftover" values or values obtained after the expected value is subtracted from the actual value (Park & Dereche, n.d.). The expected value is obtained through the line of best fit as displayed in Figure 1 and the residual plots shows how the data points deviates from this line of best fit. (Park & Dereche, n.d.) Ideally, the residual plot will show no observable pattern as the presence of a pattern might suggest a problem with some aspects of the linear model (James et al., 2013). Figure 1 indicates that the conditions for linearity are met in this research.

Figure 1 Residual plot as a measure of linearity
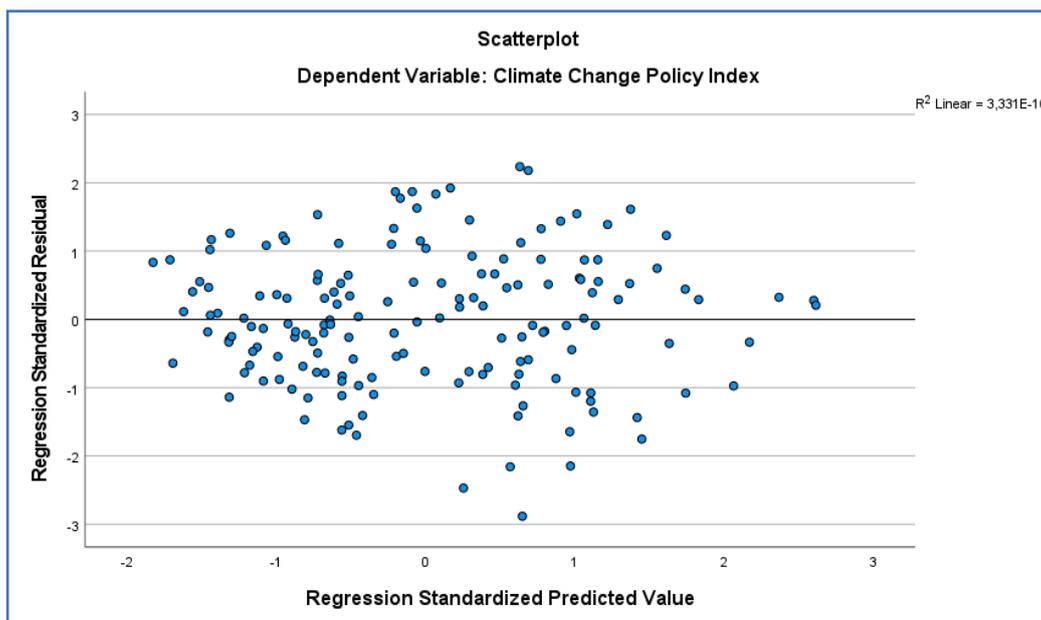
5.5.3 Homoscedasticity

Homoscedasticity refers to the distribution of the residual or error terms. If the variables in the model are homoscedastic, then the residuals have constant variance. When using panel data however, cross-sectional units may be varying in size and as a result, display heteroscedasticity (Baltagi et al., 2010). The Breusch-pagan test can be used in evaluating whether heteroscedasticity or cross-section correlation is present in the data (Halunga et al., 2017). When the p-value is lower than 0.05, we can then conclude that heteroscedasticity is present in the regression model (Statology, 2022).

Table 4 Breusch Pagan LM Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	441.8411	325	0.0000

The results of the Breusch-Pagan LM test indicates that there is clearly a problem of heteroscedasticity as expected when working with panel data. Adjusting the standard errors of the coefficient is one method of resolving the problem of heteroscedasticity panel data regressions (Hoechle, 2007). In this study, I adjust the standard errors of the coefficients and correct the outputs for heteroscedasticity by using the White's (cross-section) heteroscedasticity-corrected standard errors in EViews.

5.5.4 Normally distributed residuals

A multiple regression analysis requires the residuals of the response and explanatory variables to be normally distributed (Tranmer et al., 2020; Williams et al., 2013). The residuals are the difference between the observed values and the values predicted by the estimated regression model (Williams et al., 2013). A p-p plot or histogram can be used in assessing the assumption that the residuals are normally distributed (Tranmer et al., 2020). A variable is normally distributed when its histogram or density function is bell shaped with only one peak and is symmetric around the mean (Dietary Assessment Primer, n.d.). This indicates that there are fewer very low or very high outliers included in the data (Crossman, 2019). In the p-p plot, if the residuals are normally distributed, then the scatter dots should fall on or tightly close to the normal distribution line (The Pennsylvania State University, n.d.). The p-p plots and the histogram in figure 2 thus demonstrate that the dependent and independent variables in this study, fulfil the assumption of normally distributed residuals.

Figure 2 Normal distribution plots
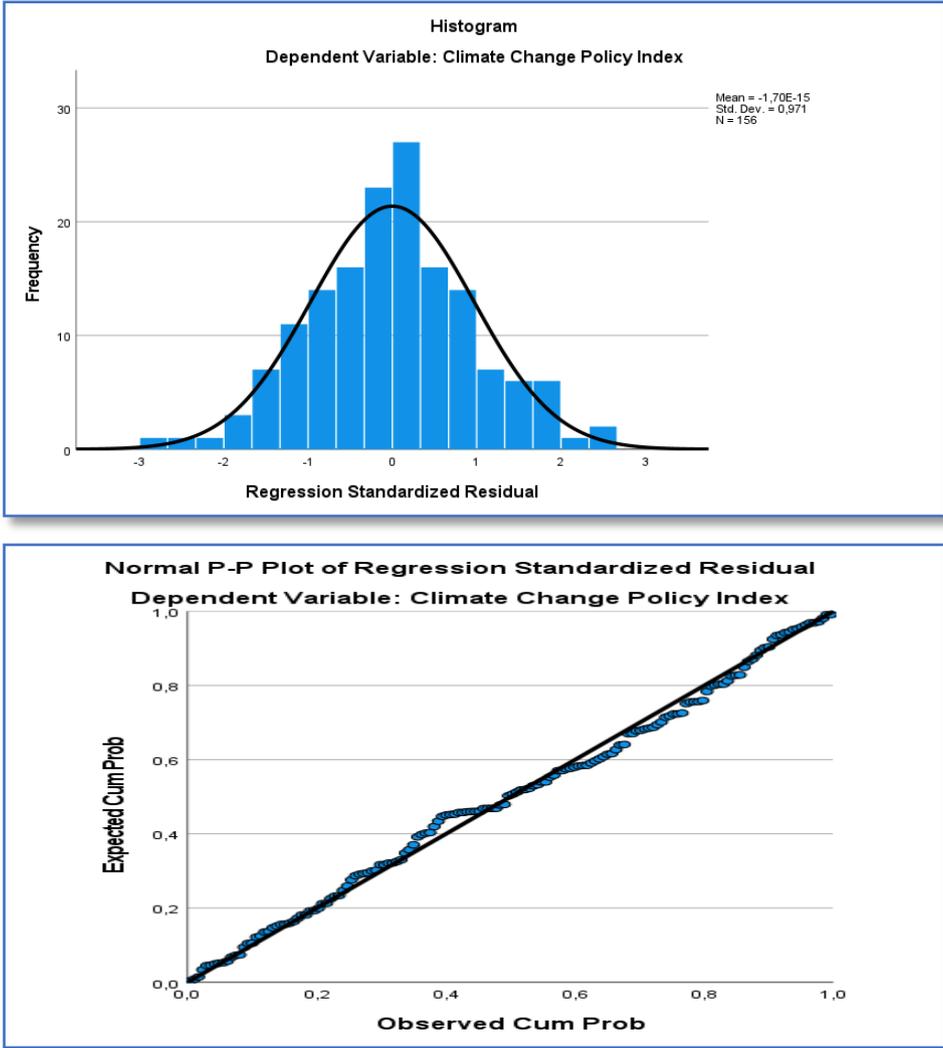
5.5.5 Multicollinearity

Finally, the linear regression assumes that the explanatory variables are not highly correlated. When two variables are highly correlated then, they are considered collinear (Tranmer et al., 2020). When variables are collinear, the model becomes unstable and can no longer differentiate between the different effects (Tranmer et al., 2020). Signs of multicollinearity include a high correlation between the explanatory variables, beta coefficients that are in the opposite direction to expectations based on theory and so forth (Tranmer et al., 2020). The variance inflation factor (VIF) provides an indication of how much the variance of the regression estimates has been increased due to multicollinearity. If the VIF values are greater than 10, then multicollinearity might be an issue (Tranmer et al., 2020). Table 4 illustrates that the conditions for multicollinearity are met in the present study.

Table 5 VIF Statistics

Variable	VIF Statistics
Women in Parliaments	3.208
CO2 Emissions	5.401
Trade Openness	2.745
Democracy Index	1.428
GDP per Capita	5.518
Public Opinion	1.895
Population Size	1.262
Mean Years of Schooling	2.082

5.6 Results

5.6.1 Regression model

To evaluate the effect of the proportion of women in parliaments on the climate change policy outputs of country i, the following model is estimated:

$$CCPI_i = B_o + B_1 WomenInParliaments_i + C_1 X_i + \ldots + C_n X_i + e_i$$

Where $CCPI_i$ is the outcome or dependent variable for each country, B_o is the intercept or constant term, *WomenInParliaments$_i$* is the independent or predictor variable for each country, X_i are the control variables and e_i is the error term that captures the unexplained variation in the dependent variable. B_1 is the regression coefficient that represents the effect of the independent variable and C_1, C_n are the regression coefficients that represents the effect of each control variable. Figures 3 shows the relationship between the number of women in parliaments and the CCPI and indicates a positive relationship between both variables, i.e., countries with more women in parliaments tend to also score higher on the climate change policy index. Although this shows that both factors are correlated, this is not an indication of causality as there might be many other factors that contribute to the climate policy outputs of a member state.

Figure 3 Regression dialog A: the number of women in parliaments and the CCPI
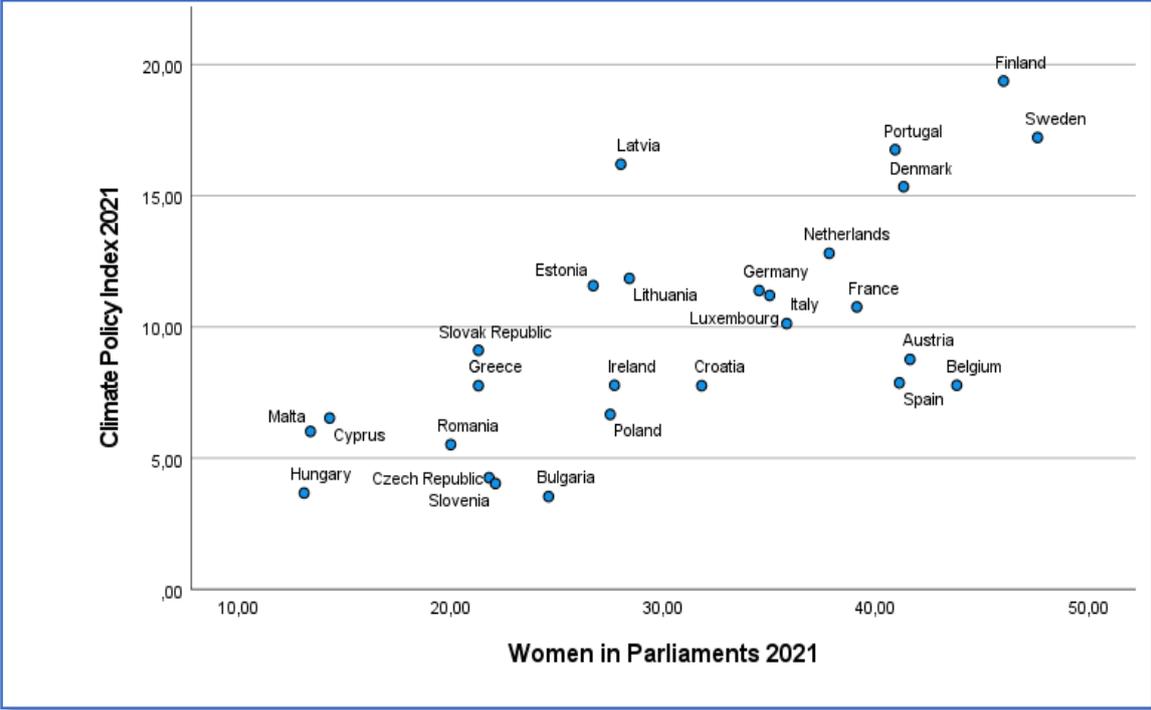
5.6.2 OLS and Fixed Effects Models

In this section, I first estimate a pooled OLS regression to determine the relationship between the response and explanatory variable. Next, I estimate a fixed regression (time and cross section model) as this helps to limit omitted variable bias and aid in the estimation of causal relationships between the response and explanatory variables (cf. infra).

5.6.2.1 OLS Regression Model

Table 6 Regression output: Pooled OLS

	I	II	III	IV	V	VI	VII	VII
Women in Parliaments	0.241*** (0.023)	0.212*** (0.032)	0.212*** (0.033)	0.208*** (0.021)	0.231*** (0.029)	0.224*** (0.056)	0.226*** (0.028)	0.241*** (0.033)
CO_2 Emissions per Capita		-0.076*** (0.01)	-0.076** (0.014)	-0.078* (0.015)	-0.074* (0.017)	-0.0712* (0.042)	-0.066*** (0.016)	-0.027 (0.036)
GDP (log)			0.010 (0.782)	0.131 (0.588)	-0.518 (0.509)	-1.765 (2.331)	-1.651 (1.159)	-0.073 (1.663)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trade				-0.000 (0.002)	-0.000 (0.003)	0.000 (0.006)	-0.000 (0.003)	-0.001 (0.003)
DI					0.419** (0.211)	0.518*** (0.184)	0.530*** (0.171)	0.449** (0.271)
Public Opinion						0.068* (0.040)	0.069* (0.040)	0.037 (0.048)
Population Size (log)							0.169 (0.266)	0.094 (0.251)
Mean Years of Schooling								0.513** (0.202)
Constant	2.883*** (0.671)	8.689*** (1.443)	8.633** (3.905)	8.449** (3.646)	7.193* (3.941)	10.426* (5.458)	8.206*** (6.094)	-6.234 (11.106)
R^2	0.273	0.307	0.307	0.307	0.312	0.324	0.325	0.337
Adjusted R^2	0.269	0.299	0.294	0.208	0.290	0.298	0.294	0.301
F-Stat	60.343***	35.364***	23.428***	17.465***	14.213***	12.428***	10.602***	9.373***
N	162	162	162	162	162	162	162	156

Note: $*p<0.1$ $**p<0.05$ $***p<0.01$

The ordinary least squares (OLS) estimates of the regression equation outlined above is presented in Table 6. Column 1 reports the bivariate relationship between the proportion of women in parliaments and the CCPI. As expected, a positive highly significant coefficient on women in parliaments is estimated, indicating that a 10 point increase in the number of women in parliaments results in a 2.41 point increase in the CCPI. In column 2, the first control variable, CO_2 emissions is added to the model, which leaves the coefficient on women in parliaments positive and highly significant. The coefficient on women in parliaments does slightly reduce. This is not surprising seeing as studies point to the negative and statistically significant association between the political empowerment of women and reductions in CO_2 emissions (See: Ergas & York, 2012). The results of the bivariate statistics presented in table 3 also show that CO_2 emissions is negatively and highly significantly related to both the CCPI and number of women in parliaments.

Democracy Index is then included into the model in column 5, this variable shows a positive and strongly significant relationship with the CCPI. This is in line with studies like Neumayer (2002) or Mavisakalyan, A., & Tarverdi, Y. (2019) which conclude that democracies are more inclined to have better or more stringent climate policies. Public opinion, included in column 6, has a positive and significant relationship with the CCPI. This aligns with other studies which conclude that office-seeking leaders are more likely to introduce policies that are preferred by the domestic public (Anderson et al., 2017; Shum, 2009).

Mean years of schooling is then included in column 8 as a control variable. This variable demonstrates a positive and strongly significant relationship with the CCPI, which confirms the notion that highly educated individuals are more likely to act in a pro-environmental way (Meyer, 2015; Wang et al., 2022).

Across all specifications the relationship between the number of women in parliaments and the CCPI remains positive and highly statistically significant at the 1% level ($p<0.01$). After the inclusion of all control variables, column 8 indicates that a 10 point increase in the number of women in parliaments is results in a 2.41 point increase in the climate policy output of a member state. With the inclusion of every variable from column 1 to 8, there is a steady increase in the R-squared from 27.3% to 33.7%. This indicates that the extra variables, help to better explain the variance in the response variable and every column or model is highly statistically significant. Once all variables are included in column 8, the results of the R^2 show that 33.7% of the variance in the Climate Change Policy Index can be explained by the model. This relationship is highly statistically significant.

5.6.2.2 Fixed Effects Regression Model

In this next phase, I take the possibility of omitted variable bias into account by controlling for variables that are unobservable, unavailable or variables that cannot be controlled for or measured (Torres-Reyna, 2007). While model 1 takes a number of control variables into account, these are not all the variables that can impact the stringency of the climate policy output in a specific member state. To this end, I estimate three fixed effect models. The fixed effects time model controls for unobserved confounders affecting all the countries in the same period. These are variables that might change over time but not across entities for example international agreements (Torres-Reyna, 2007). The fixed effects cross-section model controls for unobserved time-invariant confounders at the country level, i.e., variables that do not change over time but might differ across member states such as cultural factors (Torres-Reyna, 2007). In the last model, the time and cross-section unobserved confounders are controlled for. The fixed effects model also allows for causal inferences from longitudinal and non-experimental data (Mummolo & Peterson, 2018; Allison, 2009).

Table 7 Regression output with fixed effect models

	Model 1: OLS	Model 2: FE (Time)	Model 3: FE (Cross Section)	Model 4: FE (Time and Cross Section)
Women in Parliaments	0.241*** (0.033)	0.239*** (0.026)	0.233*** (0.094)	0.112** (0.055)
CO_2 Emissions per Capita	-0.027 (0.036)	-0.010 (0.036)	-0.106 (0.155)	-0.222 (0.168)
GDP (log)	-0.073 (1.663)	0.863 (1.573)	-2.362 (3.240)	-19.385** (7.732)
Trade Openness	-0.001 (0.003)	-0.001 (0.003)	-0.007 (0.029)	0.014 (0.020)
Democracy Index	0.449** (0.271)	0.416 (0.239)	-0.581 (2.406)	0.539 (2.798)
Public Opinion	0.037 (0.048)	0.0233 (0.050)	0.072 (0.060)	0.072* (0.036)
Population Size (log)	0.094 (0.251)	0.103 (0.281)	2.738 (26.38)	-27.811 (26.489
Mean Years of Schooling	0.513** (0.202)	0.617*** (0.235)	-0.058 (0.277)	-0.414 (0.304)
Constant	-6.234 (11.106)	-12.245 (10.426)	6.858 (174.20)	298.815 (209.415)
R^2	0.337	0.372	0.767	0.807
Adjusted R^2	0.301	0.315	0.704	0.745
F-Stat	9.373***	6.493***	12.183***	12.918***
N	156	156	156	156

Note: *p<0.1 **p<0.05 ***p<0.01

FE (Time): Fixed effects model for Time invariant confounders

FE (Cross Section): Fixed effects model for Cross Section invariant confounders

FE (Time and Cross Section): Fixed effects model for Cross Section and Time invariant confounders

As stated in the paragraph above, the time fixed-effects model controls for unobserved variables that may change over time but not across entities. The results in table 7 indicate that when time-variant factors are controlled for, a 10-point increase in the number of women in parliaments results in a 2.39-point increase in the CCPI. This relationship is also highly statistically significant. Average years of schooling also has a positive and strongly significant relationship with the CCPI. The direction of the relationship between the explanatory and response variables is more or less the same as in the OLS model, except for GDP per capita where this relationship was positive in the OLS model but negative in the Fixed Effects Time model. This variable, and other control variables in the model, are not significant and are thus not strong enough to explain the variance in the response variable. The R^2 in this model also increases compared to the OLS model. When unobserved and time variant factors are controlled for, the model explains 37.2% of the variance in the Climate Change Policy Index. This model is highly statistically significant at the 1% level.

Next, the cross-section fixed effects model is estimated to control for country specific unobserved or unobservable factors. In this model, a 10 increase in the number of women in parliament results in a 2.33-point increase in the Climate Change Policy Index. Again, this relationship is highly statistically significant. Interestingly, when country specific factors are controlled for, the direction of the relationship between the response and some control variable changes compared to the OLS model or the Fixed Effects Time model. This is the case for the Democracy Index and the Average Years of Schooling. The R^2 in this model is significantly higher than in the OLS and fixed effects time model. When country specific unobserved or unobservable confounders are controlled for, the estimated model explains 76.7% of the variance in the Climate Change Policy Index can be explained by the model. Similar to the OLS and fixed-effects time model, this relationship is significant at the 1% level.

In the last model, I control for time and cross-section unobserved or unobservable confounders. In this model a 10-point increase in the number of women in parliament results in a 1.12-point increase in the CCPI. This is comparatively lower than in the other estimated models. Like in other models, the significance level of the coefficient remains highly statistically significant. There is a negative and statistically significant relationship between GDP per Capita and the CCPI, indicating that when time and country specific confounders are controlled for, an increase in GDP per capita results in a decrease in the CCPI. The relationship between public opinion and the CCPI, is positive and statistically significant. This means that a 10-point increase in the public opinion results in a 0.72-point increase in the Climate Change Policy Index. In this model, the R^2 increases to around 80.7%, hence, when time and country specific confounders are controlled for, this model explains 80.7% of the variance in the CCPI and is significant at the 1% level. Across all models, the relationship between the number of women in parliaments and the CCPI remains positive, varies between 1.12 and 2.41, and remains high statistically significance. In other words, the number of women in parliaments of European Union member state does positively affect the stringency of its climate policy outputs.

CHAPTER 6: QUALITATIVE ANALYSIS - METHODOLOGY AND RESULTS

While this first section indicates that there is an important causal relationship between the number of women in parliaments (along with other factors) and the stringency of climate policy outputs, it does not provide information on exactly *how* this occurs. In this next section, I explore how critical action (substantive representation) occurs in the context of climate policy outputs and how specific context related factors such as party ideology affects this relationship. This section starts by motivating the selection of the case studies. The chosen cases are then analysed in more detail to understand how the representation of women in parliaments may affect the climate policy outputs in this context. The main aim of this section thus is to answer the second research question.

This "how question" requires an in dept analysis of the relationship between the number of women in parliaments and the climate policy outputs in a real-life setting. This is because *how a critical mass of women may lead to critical actions in climate change policy may be subject to contextual factors that cannot be readily assessed in a statistical analysis*. To select a specific case, the results of the bivariate analysis from the quantitative analysis is employed.

Figure 5 Climate Policy Index vs Women in Parliaments per country 2016-2021
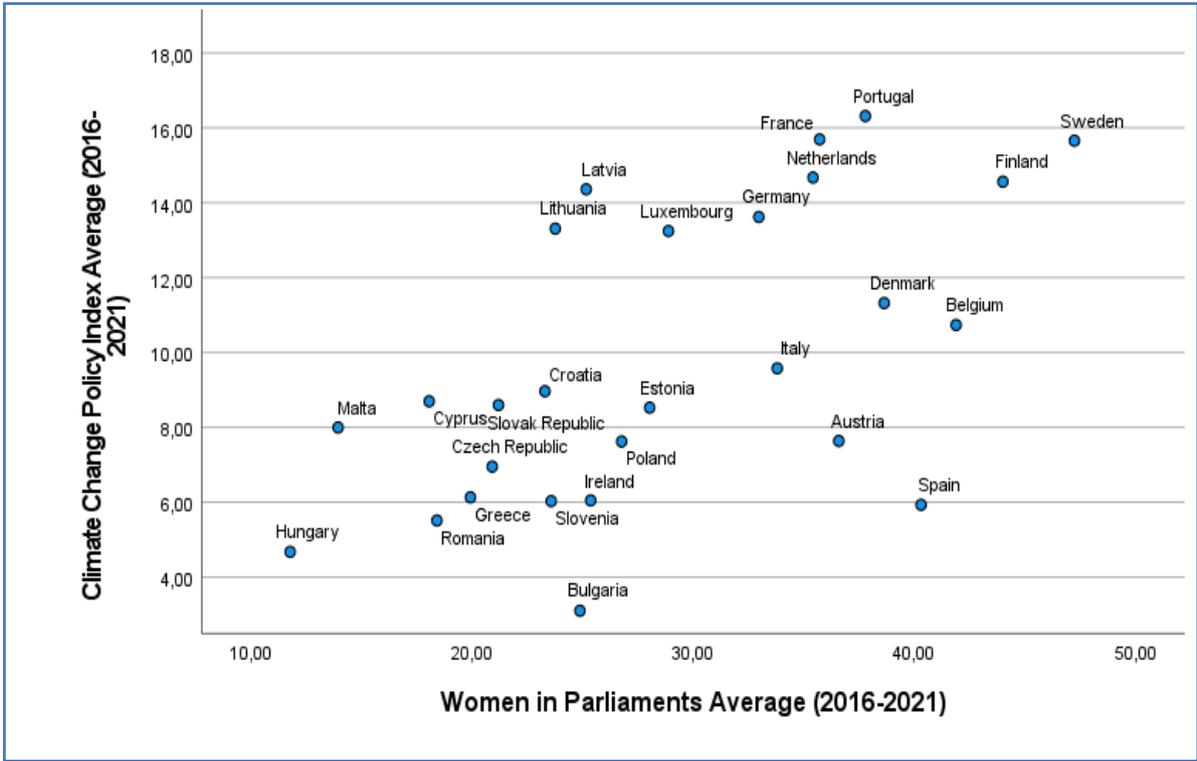
6.1 Empirical context

Overall, figure 5 shows a positive linear relationship between the number of women in parliament and the climate policy outputs of member states, however, when a closer look is taken at the countries themselves, it becomes obvious that certain countries are on trend, while some others are outliers. There are more female parliamentarians in Belgium than in neighbouring countries like the Netherlands, Germany, or France, yet these countries score higher than Belgium on the CCPI. Ireland is a country in North-western Europe but scores similarly to many East European countries on the number of women in parliaments and the CCPI. This trend then begs the question of what context-specific factors are at play? How does the party ideology of parliamentarians in these countries, impact the relationship between a critical mass of women and the stringency of climate policy outputs?. To answer these questions, I choose to analyse two on-trend countries: Netherlands and Ireland and one off-trend country or outlier: Belgium.

These specific countries are selected because the plenary debates are in English, Dutch or French, which are languages I am proficient in. This prevents the problem of a language barrier and helps to ensure that my analysis and interpretations are accurate. Furthermore, countries are similar because they are all parliamentary democracies, meaning that their climate policy outputs are discussed and voted upon by elected members of parliament. They also all have varying levels of female representation in their parliaments and score differently on the CCPI. For instance, while the Netherlands has a high number of women and scores high on the CCPI, Ireland on the other hand has fewer women in parliaments and scores lower on the CCPI. This difference in political systems can influence how climate policy is formulated and implemented. Because these countries are all EU member states, they have similar climate policy commitments but different levels of progress towards meeting these commitments as shown in figure 5. Comparing the climate policy outputs of these countries can provide insights into how gender equality in parliament can impact climate policy outputs in three different contexts and if there are any similarities between the countries.

6.1.2 Belgium

Belgium is a federal state made up of three communities which are language related (Flemish-, French-, and German speaking) and three regions which are territory related (Flanders, Wallonia, and Brussels Capital) (De Mulder, 2005). In 2019, there were twelve political parties in the Belgian national parliament, with the nationalist conservatives, liberals, social democrats, and christian democrats forming the ruling coalition. There were 59 male MPs and 41 Female MPs in the Belgian national parliament (European Institute for Gender Equality, 2023).

The Belgian climate policy process is quite complex due to the federal state structure. Power is divided between the regions and the federal level which results in a plethora of decision-making bodies and processes (FOD Volksgezondheid, 2019). Nuclear energy policies and offshore wind energy fall under the purview of the federal government, whereas the responsibility for environmental policy, as well as the planning and

implementation of renewable energy and energy efficiency measures, rests with the regions (Dupont, 2020). This leads to the challenge of having an integrated and coordinated approach to climate policy (Dupont, 2020). This distinct division in the Belgian political landscape (opposition between progressive and ambitious climate goals) at the federal level, makes it difficult to effectively pursue ambitious climate policies and increases the likelihood of policy failures (Dupont, 2020; Happaerts et al., 2012)

6.1.3 The Netherlands

The Netherlands is a decentralised unitary state. This means that the provinces and municipalities have extensive power to govern their own internal affairs (European Committee of the Regions, n.d.). In 2019, the Dutch House of Representatives, had 150 members, of whom 50 were women and 100 were men (European Institute for Gender Equality, 2023). There were about 13 parties in the House in 2019, with conservative liberals, social liberals and the christian democrats forming the ruling coalition.

Climate change forms an important part of Dutch national policies as the country has taken several steps to cut down its greenhouse gas emissions by 2030 and achieve climate neutrality by 2050. This includes accelerating the transition away from fossil fuels, energy tax reforms, a number of adaptation and mitigation strategies and so forth (Chen et al., 2023). Climate policy is a collaborative effort between the national government, provinces, and municipalities. The Dutch national government sets the overall policy direction for climate initiatives by providing funding, establishing targets and strategies, developing laws or regulations and so forth (Ministry of Economic Affairs and Climate, 2020). This means that the data analysed in this study for the Netherlands provides a complete view of all relevant climate policy debates for 2019. The provincial governments and municipalities play a vital role in the implementation of certain policies aimed at reducing emissions (Ministry of Economic Affairs and Climate, 2020).

6.1.4 The Republic of Ireland

Ireland is a unitary, parliamentary republic. The legislature (Oireachtas) consists of a lower house (Dáil Éireann) and an upper house, (Seanad Éireann) (Civic Nation, n.d.). In 2019, there were 22 women and 77 men in the Irish House of Representatives. Like many other EU countries, Ireland has developed a series of national climate change policies to tackle the climate breakdown and achieve the EU target of a 55% greenhouse gas reduction by 2030 compared to 1990 levels. These include, but are not restricted to, the Climate Action Plan, the National Adaptation Framework, and the SDGs National Implementation Plan (CARO, n.d.). Despite these efforts, Ireland has been accused of having a "stiff opposition to climate action nationally and in the EU" (CAN Europe, 2018). Figure 5 reveals a relatively low level of attention and investment in climate policy, compared to other similar EU countries. Some authors argue that this is due to a weak environmental NGOs and relatively low public concern with climate change which has caused politicians to believe that climate policy is not important for re-election (Ladrech & Little, 2019). Others

explain that the lack of ambitious climate goals in Ireland is due to resistance from businesses, the agricultural interest group, and the civil service (Torney, 2017).

6.2 Data collection

I collect documents containing plenary debates on climate policy for the year 2019. This year was chosen because it is described as the "year the world woke up to climate change" (Bennett, 2019). Warnings about the urgency of the climate problem became part of the global conservation as both young and old started to realise the earnestness of the problem (Bennett, 2019). There was a surge in youth-led climate activism (e.g., Friday for Future protests) with millions of young people across the world taking to the streets to demand climate action (Neas et al., 2022). During the high-level meeting on climate and sustainable development held in 2019, the then, United Nations general assembly president, Maria Fernanda Espinosa Garces stressed that the world only has about 11 years to avert impending climate disasters (United Nations, 2019). Similarly, the 2019 United Nations Environment Programme's Emissions Gap Report warned that unless the global greenhouse gas emissions fall by 7.6 per cent each year between 2020 and 2030, the world will not be on track towards achieving the goals of the Paris Agreement (UNFCCC, 2020). The year 2019 also saw some increased ambition to address climate change such as the replenishment of the Green Climate Fund, commitments made at the United Nations Climate Action Summit (UNFCCC, 2020).

The debates are taken from the lower houses or house of representatives of all parliaments. This is because the lower house represents the broader public and are elected by the people and has more legislative or decision-making power on climate policy, in all three countries. A total of 9 plenary debates focusing on climate policy were collected for Belgium, 49 for the Netherlands and 20 for Ireland. I chose to examine plenary debates and no other parliamentary documents such as committee reports or bills & acts for a number of reasons. Firstly, plenary debates are a rich source of information as they capture the discussions, arguments, and opinions of lawmakers on climate policy. Secondly, bills or acts are more technical or legalistic making it harder to discern the intent and motivations of lawmakers. Finally, not all bills or acts carry the names and party of parliamentarians who vote for or against certain policy propositions. This makes it difficult to discern how gender and party-political ideology may impact support (or lack thereof) for stringent climate policy.

6.3 Data analysis

To analyse the documents mentioned above, a document analysis method was used, specifically an exploratory approach to analysing the parliamentary debates on climate policy. This approach was deductive, and no hypothesis or themes are formulated prior to studying the documents (Casula et al., 2021). I use a content analysis method in the NVivo software packet to analyse plenary debates on climate policy in the three countries. As the number of available documents for Belgium was limited, a thorough examination was conducted, leading to the identification of several main themes. To develop these themes, I combined an open

and axial coding systems. The debates were first read leading to a large set of codes (open coding), these codes and the underlying data were then re-read to find meaningful connections and categories (axial coding). The developed themes were subsequently used in analysing the plenary debates for the Netherlands and Ireland. The table below provides a summary of the frequency of these themes in the documents.

Table 8 Frequency of themes: Belgium, the Netherlands and Ireland

Themes	Belgium	Netherlands	Ireland
Climate change	31	244	192
Climate policy and climate goals	25	231	93
Renewable and sustainable energy	6	107	26
Biodiversity	3	231	71
Fossil fuels	7	77	51
CO_2 reduction	32	254	42
Nuclear energy	2	48	1
Climate transition	70	139	208
Stakeholder Engagement	7	75	31
Fiscal measures	10	153	61
Future generations	6	28	24
Climate adaptation	1	22	1
Climate neutrality and the Green Deal	11	137	31

6.4 Results

The climate related debates in the Belgian national parliament in 2019 centred on the COP 25 and the Green Climate Fund. The parliament needed to decide on several issues related to the Belgian commitment towards solving climate issues. This included the adoption of more ambitious emission reduction targets, the development of a long-term strategy for a low-carbon economy, and the implementation of measures to promote sustainable mobility and energy efficiency. The Belgian parliament also had to decide on the allocation of financial resources to support climate action both domestically and internationally, and to ensure that the transition towards a low carbon economy takes certain social and economic aspects into account. The Green Climate Fund was established by governments around the world and is aimed at responding to climate

change by helping developing countries reduce their greenhouse gas emissions and adapt to the impacts of climate change (Green Climate Fund, n.d.).

The analysis of the parliamentary speeches on climate policies revealed several patterns or themes. The main themes that emerged from the data are:

Table 9 Main themes and meaning

Theme	Meaning
Climate Change	• Taking action to prevent climate change and further deterioration of the environment.
Ambitious Climate Policy Goals	• The need for concrete, ambitious, and long-term policy measures to achieve the climate goals. • The need for parliamentarians to take up their responsibility in combating climate change by pushing for more stringent climate policies.
Renewable and sustainable energy	• More investments are needed in renewable energy sources.
Biodiversity	• The need to stop the loss of biodiversity.
Fossil fuels	• The need to divest in fossil fuels.
CO_2 reduction	• The need for more ambitious policies to reduce the emission of greenhouse gases such as CO_2.
Nuclear energy	• A combination of nuclear energy sources as a means of guaranteeing the affordability and supply of energy in Flanders.
Climate Transition	• Doubling the investment in the climate transition (as part of the Green Climate Fund). This is a recognition the historical responsibility of Europe for climate emissions and thus a means of achieving a socially just climate transition or climate justice. • Cost of the climate transition and ensuring that investing in a socially just climate transition does not force the government to save in other equally essential policy areas such as health care. • The need for a climate transition that does not increase the financial burden for families that are already struggling financially.
Stakeholder Engagement	• The need to involve citizens, companies, and other relevant stakeholders more in climate decision-making.
Fiscal measures	• More fiscal measures for the aviation sector and big multinationals who contribute heavily to the emission of greenhouse gases. • CO_2 tax (carbon tax): tax levied based on the carbon emissions required to produce certain goods and services.
Future generations	• The importance of protecting the planet for future generations. • The urgency of taking action to prevent irreversible damage to the planet and future generations.

Climate adaptation	• Ensuring that there are plans in place to aid adaptation to the consequences of climate change.
Climate Neutrality and the Green Deal	• The ambition to achieve climate neutrality by 2050 and thus achieve the ambitions of the European Green Deal

6.4.1 Gender Differences

6.4.1.1 Belgium

The results indicate that no gender advocates more for stringent climate policies than the other. Overall, there were more male parliamentarians than female parliamentarians that addressed the parliament on the issue of climate change. Both male and female parliamentarians pushed for more ambitious climate policies through sustainable and socially just climate transitions, the need for collaboration at the national and international levels, stimulating participation of citizens, companies and so forth. Women however, tended to emphasize certain specific aspects relevant to climate policy.

Female parliamentarians placed greater emphasis on issues such as the promotion of participation between companies, citizens, and the government to develop ambitious climate goals. The results also reveal a greater emphasis on the need to listen to the youth, and the importance of safeguarding the environment and scarce resource for the future generations. One female parliamentarian expressed that: "All over the world, society is mobilizing for the climate, for the preservation of our planet, because we do not have a planet B, because this planet is the only one, we can leave to our children and grandchildren". Another stressed that "It is this generation that can do something in the next decade. If we take up the gauntlet and look at what binds us together, I believe that we can make a difference for generations to come and can work effectively on concrete solutions". Female parliamentarians also tended to be in support of doubling the investments in the Green Climate Fund (as opposed to a budget neutral approach which involves saving in some policy areas in order to finance other areas). According to the parliamentarians, doubling the fund will guarantee that the financial investments in other development areas are not reduced and re-invested in the Green Climate Fund. This is a means to achieve a just climate transition. Achieving climate neutrality by 2050, in line with the goals of the European Green Deal, was also stressed by female parliamentarians in the Belgian Parliament.

Conversely, male parliamentarians placed emphasis on the financial costs associated with a sustainable climate transition. Factors such as the current Belgian budgetary framework were highlighted as arguments for a budget neutral investment in the Green Climate Fund. According to one male parliamentarian "doubling a contribution, means that we have to take that money (from) elsewhere. One cannot just hand out pennies without putting the necessary savings measures alongside it, and we were largely concerned that this would happen". Another stressed that "Considering the budgetary state of our country, I am surprised to see the number of bills passing through here that seek to spend even more. I am happy that you, as president, are

watching over budgetary discipline. You said when you took office that you would seek the opinion of the Court of Audit. That is good. Secondly, it is an illusion to think that spending more on development cooperation always means spending better". Other cost related aspects of the sustainable climate transition were also highlighted such as the implementation of fiscal measures aimed at increasing the taxes paid by the aviation sector, reduction of subsidies granted to the largest multinational corporations that contribute significantly to greenhouse gas emissions, the significance of divesting in fossil fuels and need for investing in nuclear energy sources. According to some male parliamentarians, "the joining of forces between nuclear energy and investments in renewable energy is the only way to achieve realistic climate goals".

6.4.1.2 The Netherlands

Compared to the Belgian national parliament, the Dutch parliament exhibits a comparatively higher level of engagement with climate policy that other parliamentary bodies as evidenced by the considerable number of plenary documents on climate policy (as presented in table 8), as well as the specificity and diversity of climate issues deliberated in the parliament. In addition to broad themes like themes like CO_2 reduction, renewable energy sources, or affordable climate transitions, debates in the Dutch parliament often focused on concrete initiatives, like the reform of current agricultural methods, which contributes to greenhouse gas emissions, or the decline in insect population which poses a threat to global food security. For example, the majority of parliamentarians emphasized that around "80% of food crops depend on pollinators such as bees" and this decline in insect population poses a threat to food security. Similar to Belgium, no particular gender advocated more for better climate policies than the other. Generally, male parliamentarians spoke more often during climate policy debates than women. Both male and female parliamentarians called for urgent and ambitious action to advert the potential disastrous effects of the changing climate. Except for a few dissenting voices, the majority of Dutch parliamentarians consent on the need to create a "habitable planet" and that "everyone is completely dependent on nature and biodiversity". Many parliamentarians also acknowledged the role of climate change in the severe droughts experienced in the country in 2019.

However, gender differences are evident in how biodiversity and renewable or sustainable energy sources discussed. On biodiversity, female parliamentarians emphasized the role of biodiversity in supporting the health of ecosystems and the benefits of biodiversity for future generations. For instance, one female MP expressed the need to "... protect nature now, otherwise you put yourself and your children, other generations, in great danger". Some female parliamentarians also emphasized importance of environmental protection for its own sake, rather than as a means to guarantee food security. One female parliamentarian explained that "nature does not belong to anyone, nature is a value in itself, which you should fundamentally want to protect because of that intrinsic value". Male MPs on the other hand, focused on the economic and the social benefits of biodiversity. One male MP explain that "it is in our common interest to keep biodiversity strong in the Netherlands. This is important not only for nature in the Netherlands, but also for our farmers, horticulturists, and food supplies. These groups need robust biodiversity for their business".

Regarding renewable and sustainable energy, female MPs brought up concerns about the sustainability and environmental impact of biomass. They emphasized that biomass cannot be considered a sustainable source of energy and the need to focus on energy sources that are "promising for the future". Male MPs by contrast, focused on the cost of the sustainable energy and the potential of biomass as a renewable source of energy. They also argued for the potential of natural gas and bioenergy as a "transitional fuel" which will function as a bridge to more sustainable and cleaner sources of energy. One parliamentarian stated that, "Without any technical justification, we are getting rid of natural gas as soon as possible, even though we know that methane is the cleanest fossil fuel. And we possess it in abundance. As a transition fuel, natural gas is indispensable and, moreover, we should cherish and maintain our gas infrastructure while it is still uncertain what the energy carrier of the future will be". Similarly, another male MP argued in favour of biokerosene as a transition fuel, stating that, "biokerosene is a transition fuel in that regard, because it is, of course, a biomass product".

All female parliamentarians who participated in the climate policy debates consistently supported environmental protection, biodiversity conservation, taxing major polluters, an affordable climate transition for households and so forth. While the majority of male parliamentarians also recognized the importance of these themes and others, a small minority denied the existence of climate problems all together, claiming the CO_2 reduction efforts are totally insignificant or that certain greenhouse gases are even beneficial to life on earth.

5.4.1.2 The Republic of Ireland

The 2019 plenary debates reveal that the climate crisis is comparably a much less discussed issue in the Irish parliament. In fact, there are only 20 documents containing debates on climate change, and table 8 reveals that the many central themes to the climate issue – such as climate adaptation, or CO_2 reduction – were not frequently discussed. Similar to the cases of Belgium and the Netherlands, both male and female parliamentarians were fervent in their demands for ambitious climate policies, although more men spoke during the debates than women. Nevertheless, both genders highlighted the lack of progress towards achieving the EU's climate goals in Ireland and described the situation as evolving "from poor to extremely poor". They also criticised the current government for not doing enough to address the climate problem, blocking climate bills introduced by the opposition and having an almost religious fate in the market and new technologies to solve climate problems. However, there were certain gender differences in how parliamentarians defined the climate problem and the necessary solutions. Female MPs emphasized human action as the main cause of the climate issue and highlighted the potential catastrophic impacts of climate change on other issues such as food, water, housing and even democracy and human rights. They highlighted solutions such as educating the public on recycling, enforcement of all existing environmental laws, sustainable agriculture and forestry, investments in relevant state authorities and ecological staff, and tackling illegal dumping. Male MPs, conversely, advocated for more efforts to guarantee energy efficiency of social

houses and investments in infrastructure such as roads which will reduce travel time and thus reduce the emissions of greenhouse gases.

Furthermore, the documents illustrate that the climate transition was the most important themes or topic of debate, corresponding with the results presented in figure 8. While both genders advocated for a just climate transition and a need to reduce the risks associated with a transition to a zero-carbon future, there were important gender differences in their proposed approaches to achieving these goals. Female MPs emphasized the role of the developed world in contributing disproportionately to global greenhouse gas emissions. As a result, the climate burden is not evenly distributed with countries like "Mozambique, Malawi and Zimbabwe suffering from extreme weather events, even though they are responsible for only a tiny fraction of emissions compared with their counterparts in Ireland and elsewhere in Europe". The impact of certain sustainable solutions on developing nations were also underscored. For example, a female parliamentarian argued that advocating for the use of electric cars can be problematic as the materials needed for their production, such as lithium, are sourced from lands owned by indigenous people. Female MPs also placed emphasis on putting sustainability before economic growth, and the need for ecological farming, climate-smart agriculture and the keeping fossil fuels in the ground. One female MP argued that "by allowing licenses to take more fossil fuels out of the earth, we are adding to the planet's overall carbon emission".

Besides the need for a just climate transition, female MPs also drew attention to the devastating impact of biodiversity loss on nature and the need to protect the environment for future generations. They attributed biodiversity loss to the inadequacy of government policies and human actions which contribute to the extinction of species. To address this issue, female MPs called for coordinated strategies and integrated policies across all departments and public bodies, massive investments in afforestation and other green infrastructure. They advocated for the prioritization of quality (not quantity) and protection of biodiversity in the farming industry. Female MPs also placed a great deal of emphasis on the responsibility of current legislators in leaving a habitable planet for future generations, with one female MP stating "that young people are taking pioneering roles in highlighting climate change. They are proud of their country but fearful for their future and want the necessary action to be taken".

Male MPs on the other hand, centred their arguments on the creation of a fair economy which guarantees employment security for farmers and others, whose sectors were affected by the transition to a just economy. For example, one male MP stated that "no workers or small farmer should lose out as a result of transitioning to a zero-carbon economy". Furthermore, stakeholder engagement during the climate transition process was also deemed critical, with male MPs advocating for public consultations, peer-to-peer learning and bottom up communication processes to ensure that all relevant voices are heard, and their interests are considered. In addition, emphasis was also placed on the role of fossil fuels or biogas as a transition fuel and the need for investments in infrastructure projects such as better roads which will reduce transition time and thus CO_2 emissions, or electric trains and cars.

5.4.2 The Impact of Party Ideology

In all three countries, there are hardly any gender differences in *what climate initiatives* are supported when party ideology is considered. Parliamentarians tended to speak in the names of their parties and not in their own names. The first indication of this in the data is the use of "*my party thinks or "may party proposes"* by many parliamentarians. MPs from the same party tended to support or oppose the same policies and define problems and solutions in the same way. Left-wing, extreme left-wing parties and centrist parties with progressive views on climate tend to be more supportive of climate policies than right-wing or extreme-right wing parties.

5.4.2.1 Left-wing political parties

In Belgium, left-wing and extreme left-wing parties expressed more concrete and uncompromising demands for climate policies and advocated for immediate, ambitious, and radical climate goals. They placed emphasis on the need for more investments in renewable and sustainable sources of energy, far-reaching divestment in fossil fuels, a just climate transition, increased taxation on organizations with the highest levels of pollution and so forth. Remarkably, the majority of female speakers who delivered speeches on the Green Climate Fund and the Belgian position during the COP25 belonged to left-wing parties and spoke in favour of more stringent environmental policies.

Left-wing and progressive parties in the Netherlands focused on economic growth as the root of climate issues rather than the solution, and attributed climate change to human activities such as agriculture and animal breeding. For example, when discussing the causes of the death of insects, one parliamentarian expressed that "the likely causes are well known: intensive agriculture, too much nitrogen and phosphate from our livestock's manure, and agricultural toxins". Furthermore, these parties endorse initiatives that impose more fiscal measures on the largest polluters. The aim is to use the resulting tax revenue in subsidizing the climate transition for households in the Netherlands. In addition, these parties emphasize the need for collaboration not only at the European Level but also with other partners and stakeholders to ambitious climate goals. Finally, these parties are also particularly vocal in highlighting the need to consider the impact of climate policies on future generations.

Similar to Belgium and the Netherlands, left-wing, centre-left, and centre-right parties in Ireland tended to support stricter and more ambitious climate policies. However, these parties had different opinions on how these climate goals can be achieved. The left-wing and centre-left political parties in the Irish parliament opposed the implementation of carbon taxes, arguing that a just transition cannot be achieved through market incentives. Furthermore, such policies would have a greater negative impact on "ordinary people" and increase poverty. One parliamentarian argued that "the carbon tax, or the increase in it, is on the consumption of fossil fuel energy by ordinary people, that is, on their energy, transport and heating bills". MPs from left-

wing and centre-left parties also called for a complete divestment from fossil fuels, along with increased taxation of large corporations that emit significant amounts of greenhouse gases. In contrast, parties on the centre-left and centre-right argued in favour of carbon taxes. According to these parties, carbon tax is one of the measures needed if Ireland is to deliver the scale of urgent change needed to achieve its climate goals. They suggested that the revenue from these taxes should then be *"ring-fenced"* – dedicated to specific environmental initiatives and not used for general government spending.

5.4.2.2 Right-wing political parties

The liberal, conservative right-wing and conservative centrum parties in Belgium also expressed support for stricter climate policies while emphasizing the issue of cost. They recommended budget-neutral investments in the Green Climate Fund and argued that "investing more in development efforts does not always mean better and more efficient investments". Similarly, in the Netherlands, these parties also expressed support for ambitious climate goals but with certain reservations. While they acknowledge the need for a sustainable transition, they also highlight that this change must be gradual and take the economic concerns of farmers into account. These parties also agree on the importance of biodiversity but prioritise finding a balance between preserving biodiversity and ensuring the availability of adequate living and working spaces. Notably, unlike the two countries, there were no extreme right parties represented in the Irish parliament in 2019.

Finally, the extreme right-wing parties in the Belgian and Dutch parliaments were strongly opposed to stringent environmental policies. They disagreed with the scientific consensus on climate change and rejected the notion that there were any climate issues at all. In Belgium, these actors argued for instance, that the worldwide demand for energy cannot be met with the current supply of renewable energy, or that CO_2 emissions are not necessarily detrimental to the planet since they serve as a source of food and oxygen for plants. In the Netherlands, these parties argued that the air quality, nature, and biodiversity in the Netherlands have increased, not decreased in the last years. They also expressed that the Dutch climate policy efforts are insignificant and should be completely abandoned. For example, one member of an extreme right-wing party expressed the following: "Does what the Netherlands does then lead to gigantic results when it comes to reducing those already few CO? No. It leads to a temperature reduction of 0.0007% in the Netherlands, four zeros and then a 7. On behalf of the State, the national lawyer said as much in an appeal lawsuit against Urgenda. I quote, "It has no measurable effect on climate change."".

CHAPTER 7: DISCUSSION AND CONCLUSION

This last and final chapter of this thesis brings the findings from the different parts together and discusses the connections with the theoretical framework and exiting literature. The hypothesis and research questions are then answered. Finally, this chapter concludes with a number of limitations and recommendations for policymakers and future studies.

7.1 What is the relationship between critical mass and critical action?

The quantitative part of this research investigates the relationship between a critical mass of women in national parliaments of EU member states and critical action on climate policy. After careful review of the literature and application of the appropriate theoretical framework, the following hypothesis was formulated: *Member states with a greater number of women in their parliaments, will have more ambitious climate policy outputs.* To test this hypothesis, a number of regression models were estimated. Based on the results of these regression models this hypothesis can be confirmed. The results show that there is a **causal relationship** between the number of women in parliament and the climate policy output of member states even after controlling for a number of variables that might impact this relationship. When unobserved or unobservable confounders are controlled for, the relationship between these variables remain positive and highly statistically significant across all specifications. I thus find evidence in support of the **critical mass theory** or politics of presence as proposed by Dahlerup and Kanter. As hypothesized, an increase in the number of women in parliaments does result in an increase in the stringency of climate policy outputs. Furthermore, these finding support similar studies such as Ergas & York (2012) or McKinney et al., (2015), who argue that the representation of women in parliaments leads to stricter climate policies.

Besides the number of women in parliaments, other factors are relevant for explaining the climate policy outputs of EU member states. Similarly, like I find here for EU member states, higher levels of democracy (Neumeyer, 2002; Farzin & Bond, 2006) and education (Meyer, 2015; Wang et al., 2022), have been shown in other studies to lead to more stringent climate policies. Public opinion and GDP per capita are also relevant factors in explaining the stringency of climate policy outputs produced by EU member states when time and country-specific factors are accounted for. In line with Anderson et al., (2017) and Shun (2009), I find that in EU member states with greater public support for climate policy tend to adopt more effective climate policies. The results of the analysis demonstrate that as the GDP per capita of EU member states increases, climate policy stringency decreases. This finding does not correspond with previous studies from Tucker (1995) or Liu (2020), which suggest that increased income levels lead to more demands for climate policies and environmental protection. On the contrary, the results of the present study suggest that sustained economic growth may be detrimental for climate action. Countries may need to focus on 'sustainable growth' as opposed to pure economic growth in order to achieve a net-zero-carbon-economy (Serin, 2022).

The most important finding remains the impact of gender equality on climate policy. While certain variables contribute to explaining the climate policy outputs of EU member states, only the number of women in parliaments remain statistically significant across all models, even after controlling for different variables.

7.2 How does critical action occur and what is the impact of party ideology?

The second research question this study aims to answer is *how* a critical mass of women in national parliaments of EU member states translates to **critical action** in the context of climate policy, and the role of party ideology in this debate. To answer these questions, I analysed the 2019 plenary debates from three parliaments in Europe. In investigating how critical action occurs, I investigate *who acts* and not *if* women act, this allowed me to look at the actions of both female and male parliamentarians. As discussed in the results section, more men spoke during the various debates than women, which is expected considering the higher number of male parliamentarians in all three parliaments. Despite being in the minority, female MPs were as vocal in their demands for ambitious climate policies as their male counterparts. There were some important differences between female and male MPs in the *sorts* of climate action they demanded. In all three countries female MPs were uncompromising in their demands for climate action as they did not seek to balance economic growth with climate action, they pushed for placing sustainability before economic growth, they called for the protection of the environment for its own sake and for the sake of future generations. They demanded compensations to developing countries for the contribution of the developed world to the climate problem and emphasized the role of human action in contributing to environmental degradation. I thus find evidence for women as **critical actors** in the climate policy debate as proposed by Celis & Childs (2012). However, this study does not find evidence supporting Ramstetter & Habersack (2019) & Mavisakalyan & Tarverdi (2019), who argue that women *are more likely* to support climate legislation than men are. What I do find however, is that both men and women support strict climate policy equally but emphasize different aspects.

As discussed in chapter 3, one central debate in substantive representation is the issue of **women's interests**. While some studies suggest that the environment is an area of special interest to women, others argue the opposite. However, conclusions cannot be drawn on this issue based on the findings in the presents study. Specifically, the data does not indicate that female Members of Parliament advocated for ambitious climate goals due to a sense of inherent attachment to the environment, a heightened perception of vulnerability, or superior knowledge and understanding of climate-related risks.

Finally, this research considers the impact of **party ideology** on the relationship between critical mass or descriptive representation and critical action or substantive representation. As explained in 5.4.2, parliamentarians from (extreme) left-wing political parties expressed stronger and uncompromising support for stringent climate policies. This is in line with Celis (2008), who argues that contextual factors such as

political parties and party discipline impacts the translation of critical mass to critical action. This finding also aligns with studies like Neumayer (2003) and Knill et al., (2010), which conclude that left-wing parties are more inclined to support pro-environmental policies.

There are hardly gender differences in *what climate initiatives are supported or opposed*. Male and Female MPs from the same parties tended to support or oppose the same climate initiatives. One possible explanation for this phenomenon is the party discipline in many European countries. Belgium, the Netherlands, and Ireland are characterised by a partitocracy (also particracy) and party loyalty or party unity. Meaning government by parties or a form of government in which political parties are the basis of the rule (Calise, 1994). Members of parliaments are reduced to mere party agents (De Winter & Dumont, 2006; Andeweg & Thomassen, 2011; Depauw & Martin, 2008). These political parties not only function as gatekeepers to what demands, and interests are make it to the political agenda. They also have an important role in the policy-making process by promoting solutions and framing problems based on the party's ideology (Pattyn et al., 2017). As a result, members of parliament from the same political party tend to vote together as a bloc more often than individually on issues (Gallagher & Mitchell, 2005). Party discipline and the imperative to adhere to the party's standpoint may limit the expression of individual opinions or suppress gender-specific perspectives. This finding supports studies like McAllister & Studlar (1992), which argue that party affiliation is an important determinant of environmental concern.

Party ideology influences the support (or lack thereof) of male and female parliamentarians for *specific climate initiatives*. However, gender differences remain in *what themes or aspects of these initiatives* are emphasized. For instance, while female and male MPs from the Green Party in the Dutch parliament advocated for better biodiversity protection, female MPs emphasized the need to protect biodiversity for its own sake, while male MPs emphasized the importance of biodiversity for agriculture and farming.

Although party affiliation was not the main focus of this study, the results revealed that there were important gender differences in party affiliation. The analysis revealed that no female MPs from extreme right-wing parties participated in the discussions in all three countries and all female parliamentarians spoke in favour of stringent climate policies. This finding aligns with Sundström & McCright (2014) or Fraune (2016)'s argument that women are more likely to be affiliated with leftist political parties.

7.3 Does critical mass lead to critical action?

Simply put, **a critical mass of female MPs in parliaments does lead to critical action on climate policies in EU member states.** The finding of this research aligns with similar studies in the field (see: Ergas & York 2012; Mavisakalyan & Tarverdi, 2019) which suggest that increased political representation of women in parliament leads to better or more stringent climate policy outputs. Moreover, the presence of female parliamentarians contributes to the **prioritization of key themes** such as heeding the voices of the youth, safeguarding the environment for future generations, protecting biodiversity to ensure the health of

ecosystems, the negative aspects of biomass as a transitional fuel, the recognition of human action as the main cause of climate issues and so forth. This recognition of human action as the main cause of climate issues is in line with Tvinnereim et al. (2017), who finds that female Norwegians were more likely to mention human action as a primary cause for climate issues. The equal representation of women in decision-making positions paves the way for new policy perspectives and gender equality guarantees that certain themes make it to the policy agenda (Profeta, 2017).

To my knowledge no previous study has demonstrated that female MPs emphasize specific themes related to climate policy in EU member states. This study thus presents a new and stark finding: Not only does the representation of women in parliaments lead to better climate polices, but women also emphasize themes that are indispensable for effectively addressing environmental degradation.

7.4 Limitations

There are a number of limitations to this study. For Belgium particularly, the competences on climate policies are divided among the different levels of government. As a result, climate policy in Belgium involves complex interconnections between national, regional, and local authorities. The plenary data analysed in this study is from the national level and may thus lead to incomplete conclusions on who the critical actors are.

Party discipline and the imperative to adhere to the party's standpoint might limit the expression of individual opinions or suppress gender-specific perspectives. Therefore, it is difficult to know if the opinion of a parliamentarian on climate change is gender related or merely a reiteration of the party's standpoint. While analysing plenary debates can provide valuable insights into the impact of gender on climate policy, there are some limitations of using only this data source in the qualitative analysis. Plenary debates do not capture the full range of decision-making on climate policy as there are other sources of information such as bills and legislation, or debates in parliamentary committees.

7.5 Recommendations

This final section starts by first outlining a number of recommendations for policymakers and beyond and followed by suggestions for future research.

7.5.1 Policy Recommendations

This study shows that women may be a missing piece of the puzzle in climate action. Therefore, women should be equally included in climate decision-making not only in parliaments but in key climate decision-making positions or as lead representatives in future UNCCC climate change conferences. Improving the status of women around the world may be an important part of the equation in reducing greenhouse gas emissions and curtailing environmental degradation. This is not only because women bring different and

important perspectives to the climate debate but also as a matter of equality and equal representation. The use of quota systems or the reform of political parties to enhance women's participation are possible approaches to increase representation.

7.5.2 Theoretical Recommendations

This study contributes to enhancing the growing understanding of the gender-environment nexus; however, there are several promising avenues for future research to build upon these findings. Firstly, the current study's data limitations prevent definitive conclusions regarding climate as a women's interest issue. Conducting interviews or surveys with female MPs could provide valuable insights into whether the environment is indeed an area of particular concern for them. Secondly, future studies can expand beyond plenary documents and explore additional data sources to comprehensively investigate how critical action unfolds at different policy stages. This broader perspective would yield a more comprehensive understanding of the process of representation. Thirdly, while this study focuses on EU member states, its generalizability to countries outside of the member states and other continents is limited. Further studies could broaden the scope of the analysis by examining other regions and countries, particularly in the Global South. Finally, research on the gender-environment nexus from the Global South centres almost exclusively on adaptation and vulnerability. Although these themes are important, it is equally crucial to conduct studies that highlight the significance of including women in climate-related decision-making processes.

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