UNIVERSITETET I AGDER

Gender, Excellence and Academic Research Funding

A quantitative study of the relationship between gender and excellence in Norwegian research funding programmes.

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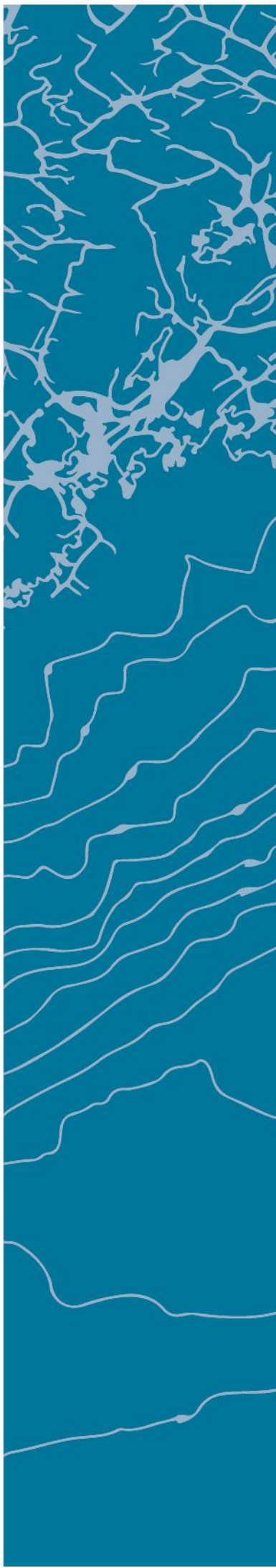

Abstract

This thesis investigates the relationship between excellence and gender in academic research funding. Previous research conducted in Scandinavia has shown that excellence efforts might be damaging for gender equality. I reassess this hypothesis by comparing the application behaviour and successfulness in obtaining research funding of women and men across two highly competitive funding schemes in Norway: one that explicitly stresses excellence in the programme title (the Centre of Excellence programme) and one that does not (the Independent Projects programme). Grounded in organisation theory, I hypothesis that organisational factors, such as organisational learning cumulating over time affects how men and women respond to organisational stimuli, such as excellence. My main findings suggest women are generally less likely to apply as centre leaders in the Centre of Excellence scheme, even when adjusting for the composition of the pool of potential applicants based on researchers' academic rank. However, women are as likely as men to apply in more recent calls (given the number of potential applicants). Comparing success rates for men and women, the results show that women outperform men in both funding programmes, but this difference is generally substantially larger in the Centre of Excellence scheme. This implies that there may be a self-selection effect at play among women when stressing excellence in research funding. However, after conducting logistic regression, there seem to be no statistically significant covariation between gender and being granted or not.

Preface

The theme of gender balance in academia never seems to lose my interest or attention. This has been 1,5 years with a lot of reading and reflection, and I felt the necessity to tell the world about my findings and the importance of gender equality in a sector of society that could be seen as highly influential. Thus, the task of this grew larger, but thankfully, thanks to my *excellent* supervisor and co-supervisor, Zuzana Murdoch and Benny Geys, I managed to produce a thorough mapping of the Centre of Excellence scheme in Norway, and it's possible implications for gender equality. This could also never been done with out the financial support from Senter for Likestilling, represented by Åsta Einstabland. By participating in their project Nordic gender equality policy in a Europeanisation perspective I gained access to valuable networks. I am also thankful to May-Linda Magnussen, who took me under her wing at Agderforskning and introduced me to this ever-interesting subject. Further, I would like to thank Prof. Heike Kahlert and the participants of the international workshop I attended this fall, which was ever inspiring. I am very grateful for the information and dataset made avaialbe to me by the NFR, represented by Wenche Berntsen, as well as the respondents to my interviews. Lastly, but not leastly, I would like to thank all you that stood on the sideline, not able to, but very willing to help, my ever patient partner, my supporting family, and my disobedient dog who made sure to send me off to yet another day at university.

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Kristine P. Miland.

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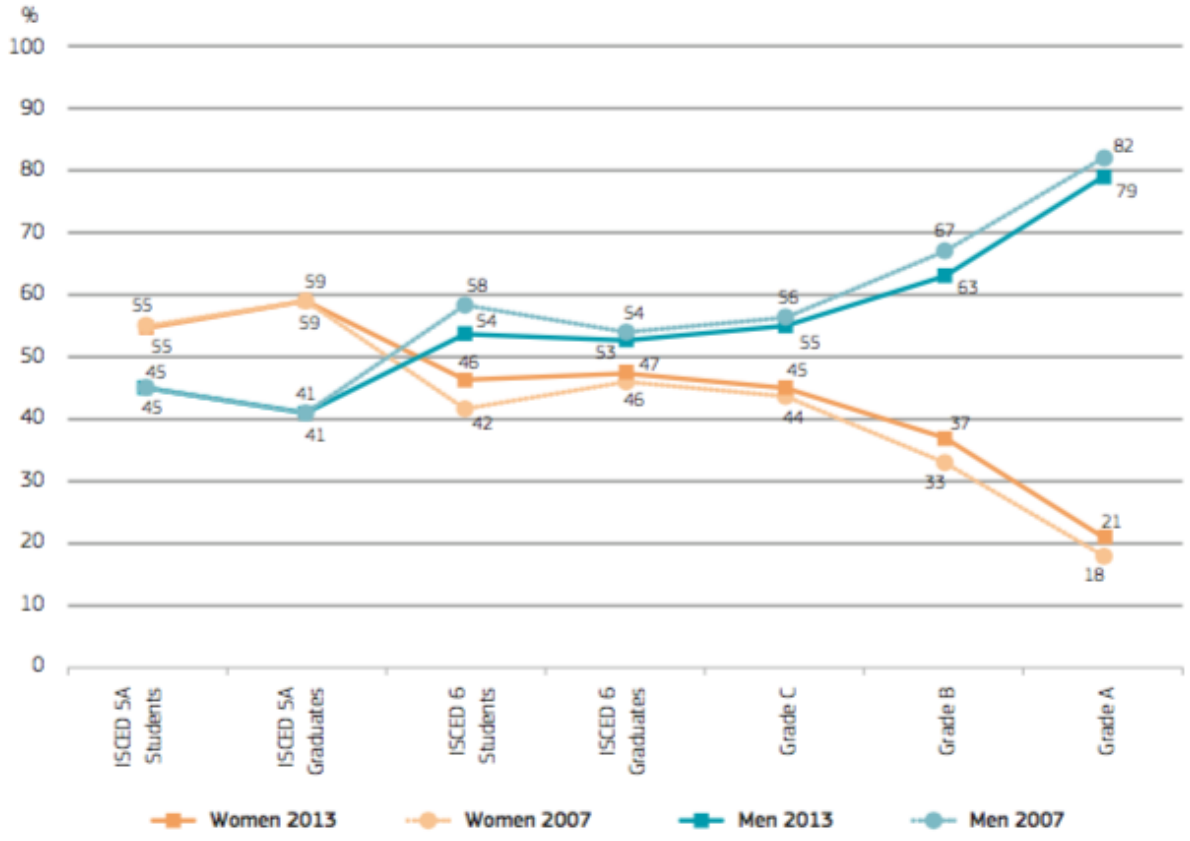
1. Introduction

Despite the strong and active promotion of gender equality in academia in many countries over the last decades, women remain heavily underrepresented in the higher echelons of academia both across Europe and beyond (EC 2015). Reports show that female researchers, compared to male, are less likely to be offered tenured positions, receive less payment, and are less likely to be awarded research grants (Ellemers 2014). Further, EU reports (EC 2000; 2004; 2009) have documented the persistence of gender differences vertically, i.e. academic rank as well as horisontally, i.e. among disciplines, indicating that men are selected disproportionality to their number in the recruitment pool, no matter the country, rank and discipline (Rees 2011). This presents a gender inequality in academia as well as economic deffiency (Bergman & Rustad 2013; Ellemers 2014), based on the belief that research talent is equally distributed among men and women (Hyde 2014)

Fig 1. Proportion of women and men in a typical academic career, students and academic staff, EU-28, 2007–2013 (Source EC 2015).



In this figure we see that women constitute a larger share of the students on lower levels in the EU, however, during the PhD phase (ISCED 6 in the figure), the share of male students

exceed that of the female students. The gap between them then increase in the higher echelons. As these are not the same individuals, this cannot be seen as a development, however, longitudinal studies show that the increase in for instance female professors is not representative in the growth of female students. Put differently, the low share of female professors can not solely be explained by time, i.e. that professors of today studied in a time where there were fewer female students.

The academic literature studying the underrepresentation of women in senior academic positions suggests they may face a glass ceiling (Cotter et al. 2000; Bain & Cummings 2000). Previous studies have concentrated on the demographics of the scientific community, gender disparities in compensation and rank, as well as policy efforts by higher education organisations to increase the representation of women in academia (Jackson & O'Callaghan 2009).

In this master thesis, I aim to further develop our understanding of the sources behind the persistent gender (im)balance in academia by focusing on academic research funding. Access to resources is important for academic success (EC 2009), such that gender differences in funding could reflect one mechanism behind gender differences in academic careers. The question of gender and research funding has fairly recently begun to attract attention and is still much less often addressed in the literature (EC 2009).

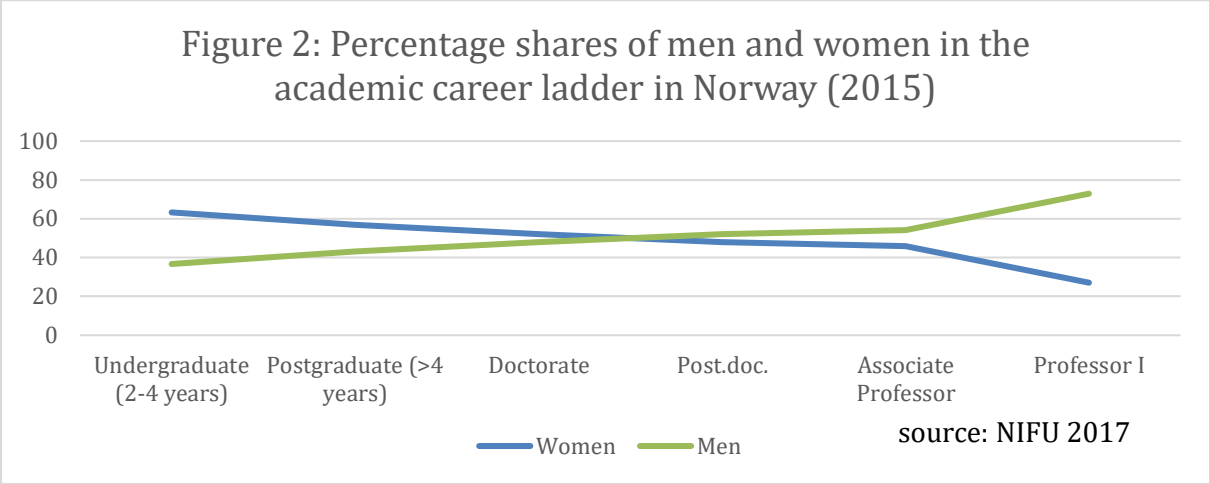
Simultaneously, one of the most prominent research policy features since the early 2000s has been the aimed at promoting high quality research, often classified as frontier, outstanding, excellent, ground-breaking and transformative research (Langfeldt et al. 2016). I thereby specifically focus on the possible role of the increasing stress on 'excellence' to allocate research funding. However, there is call for a debate to why excellence initiatives benefits male researchers over female (Bergman & Rustad 2013The report "Gender and excellence in the making" (EC 2000) provides a first in-depth discussion of the relationship between gender equality and excellence, and suggests that considerations taken to promote these elements may conflict with each other. This appears to be confirmed in later Scandinavian studies. Research conducted on Nordic Centres of Excellence (Aksnes et al. 2012), for instance, found that most centre leaders were men. Likewise, a report from Sweden (Sandström et al 2010) concluded that the excellence initiatives are damaging for gender equality. Because discrimination is prohibited by law (Bergman & Rustad 2013), it could be relevant to

investigate the institutional practices of organisations in which gender and excellence plays a role.

Considering such possible negative consequences for gender equality of increased stress on excellence in research funding programmes, it is important to gain understanding of the ways in which constructions of excellence are connected to the reproduction of inequalities in academia through theoretical and empirical work (Van den Brink & Benschop 2011). Thus, my main research question for this master thesis is: "Does stressing excellence in research funding schemes affect the gender balance in applications and funding?". From a theoretical perspective, an increased stress on excellence can be viewed as a structural element of research funding programmes that affects the decision-making process of individual researchers with respect to this programme.[1] Based on the research mentioned earlier I hypothesise that women might be less likely to apply for funding schemes more explicitly framed as excellence initiatives. The ensuing differences in application behaviour may also affect success rates, since it may lead only the best women to apply (possibly improving their odds of funding).

I verify these predictions by analysing application behaviour and success rates of male and female researchers to different research funding schemes in Norway. Norway is an interesting case because international reviews of Norwegian research in the 1990s found that there was great room for improvement (NFR 2015), and the Norwegian government responded to these findings by a shift in policy that stressed excellence as an aim to be striven for and demanded in Norwegian research (St. mld. Nr. 27 (2000-2001)). The result of this policy focus was the first call for Norwegian Centres of Excellence in 2001. Interestingly, the lack of gender balance among the centre leaders of the successful first-wave applicants was extensively discussed in Norwegian media and considered a problem by many researchers. Some measures were taken to even out the gender balance in subsequent calls, but still there are more male than female leaders of Centres of Excellence in Norway (NFR 2009). It remains an open question, however, whether the programmes' explicit stress on excellence can provide a partial explanation for this observation.

[1] Deriving from classical organisation theory (Gulick 1937; Hammond 1986; March and Olsen 1989, 1996), the argument can be summarised as follows. Institutional factors such as the organisational structure are important for shaping individuals' decision-making behaviour due to the institutionalised and contextualised nature of human rationality (Simon 1965; March & Olsen 1996). In my setting, the stress on 'excellence' can be perceived as one such institutional factor affecting funding application decisions (more details below).



As a comparison to the first figure, the trend in Norway is similar to that in Europe.

In my empirical analysis, I try to address this potential relation between excellence and gender imbalance by comparing two Norwegian research funding schemes that differ predominantly in their explicit stress on research excellence: the Centre of Excellence programme (N=370) and the Fri Prosjektstøtte ("Independent projects") funding scheme (N=9468). As such, I try to unmask the differences posed by the stress on excellence on the gender balance among applicants and granted applicants in the two funding programs. In my attempt to gain knowledge about the general patterns in the researcher population I perform a broad-based mapping of potential relations between excellence and gender in the two datasets. Through statistical analysis, in addition to regression and logistic regression analysis, I describe and map out patterns on a large set of cases that in the future can be used to investigate the relationship in depth.

To frame the discussion, I apply insights from organisational theory to explain behaviour and the context in which gender and excellence might be embedded which also serves the purpose of formulating hypotheses about application behaviour and successfulness in obtaining funding related to gender. The Norwegian case is interesting as both gender equality and excellence are explicit goals of the Norwegian Research Council as well as for the Norwegian government. I believe it is important to thoroughly get an understanding of the context of these policy goals to gain insights in the relationship between gender and excellence. Both the rationale behind, and structure of implementation is interesting to the discussion at is serves

the purpose of mapping out where the interpretation of excellence becomes salient, as well as to see the possible trade-off between the two formulated goals.

My main findings are that on an aggregated level, there seem to be differences between the application behaviour of men and women in the excellence-inititative, compared to the comparison case, however, when looking at each year, the likelihood of applying, measured by the number of professors, is quite similar for men and women. As earlier research have found that there might be differences between disciplines, I revise my hypothesis when looking at the difference in application behaviour between genders in each discipline. Here the pattern of gender differences reappears for most disciplines, however, for mathematics and natural science the reverse occurs. This suggest that excellence as a structure element might trigger some disciplines over others, which also nulls out the gender difference.

Secondly, when comparing successfulness in obtaining research funding in the excellence initiative compared to the other competitive scheme, a statistical analysis show that female researchers are more successful than men in CoE, given the number of female applicants. For the other funding programme the success rates are similar. This might suffest that there is a self selection in play that causes female researchers to apply only when they are specifically qualified, possibly because of organisational learning and organisational explanations to gender differences in self-perception. However, when using logistic regression to analyse the same, we find no significant covariation between gender and being granted or not. The analysises is complemented with a number of qualitative interviews with central actors from the Norwegian Research Council, discussing the potential driving forces behind low percentages of female applicants and centre leaders in the CoE-programme.

The remainder of this master thesis is structured as follows. Firstly, I present a brief review of relevant literature in the field, which together with a broader theoretical approach in the third chapter creates the basis for my main arguments and hypothesises. Secondly, the methodological choices relevant for my investigation are discussed before I present my findings and discuss them with insights from the theoretical discussion and previous findings from literature. Lastly, a conclusion summarises the main arguments and results of this paper, as well as propose questions for further research.

2. Literature on gender and excellence

In light of my main research question – 'Does stressing 'excellence' in research funding schemes affect the gender balance in applications and funding?' – this section provides a detailed overview of the relevant literature on gender and excellence in research. The first part deals with previous findings regarding the role of gender in researchers' access to funding in academia. The second part then goes deeper into the understanding of the concept of 'excellence', and how its assessment might induce gender biases. This chapter, together with the third chapter, that discuss the theoretical grounding of my discussion by providing insights from organisational behaviour, will be the sources of the main research hypothesis and the central arguments for my empirical analysis.

2.1 Gender imbalance in academia

Application behaviour is the first important question when investigating what role gender plays in research funding. Most empirical evidence shows that, in general, more men than women apply (EC 2009; Bornmann, Mutz & Daniel 2009). Brouns (2000) finds that more men than women apply for three types of Dutch research grants, even adjusted by the number of PhDs in a given year in a given discipline. Blake & La Valle (2000) also provide evidence that women are less likely to apply for grants and that the main influence behind application behaviour is related to, among other things, academic rank (seniority) and employment status (in terms of tenure). Because women are more often than men situated in the lower grades and in fixed-term positions (Vabø et al. 2012), they are less likely to be eligible for funding (EC 2009). This is also reflected in Sandström and Hällsten (2004), who find that the probability to apply, adjusted for academic position, is equal for men and women. However, Blake & La Valle (2000) also show that institutional support is important for application behaviour. It is also possible that women's lower application rates are linked to informal and formal networks (see Husu 2001), and the gendered division of academic labour (Guarino & Borden 2016). Another explanation for low application rates is that the perception of a gender-biased funding system may prevent and discourage women from applying (EC 2009).

In addition, EC (2009) argue that an important factor of application behaviour is the amount of funding requested in applications for research grants, and possible gender differences in this. There have been varying evidence; in the German Research Foundation researchers found that there was no gender difference in applied amount, controlled for different

disciplines (ibid). However an analysis of Italian data show that women on average applied for smaller amounts of funding than men, except in engineering/informatics and economics (ibid).

Even though women are less likely to apply for funding, research shows that the success rates are often similar for both genders. Bornmann, Mutz & Daniel (2007, 2009) conducted two meta-analyses to assess this question. Whereas their first study (2007) found that men had statistically significantly greater odds of receiving grants than women, an extension and re-analysis of their study (2009) found evidence that worked in both directions: qualified male researchers were rated higher than equally qualified female researchers, but unqualified men were rated lower than unqualified women. Other studies have often found that success rates in obtaining research funds are equivalent for men and women (Blake & Lavalle 2000; Brouns 2000), particularly when controlling for academic rank (Waisbren et al. 2008). However, Brouns (2000) found that when controlling for discipline, women were very successful in "hard, natural sciences" and less successful in disciplines that are traditionally popular among women (e.g., the humanities). In another study conducted on data from the National Research Organisation in the Netherlands, Brouns (2004) found that research proposals with a quantitative research design are more likely to be funded than qualitative research projects. This can be disadvantageous for women, because qualitative research is more common in fields of science where women are well-represented. Henningsen & Liestøl (2013) also find that research projects marked "excellent" were more often situated in the exact sciences than not, which implies that the search for excellence leads to funding subjects that only have moderate attraction for women. In the same line of thinking, Vabø et al. (2012) argue that gender segregation between fields of science reflects a social and intellectual validation hierarchy of disciplines.

There are also several studies indicating that women have significantly higher success rates than men (EC 2009). This implies that there might be a self-selection effect in play, whereby only highly qualified women decide to apply. In the report "The gender challenge in research funding" commissioned by the European Commission (2009), it is argued that because of the difficult career opportunities women face, those women who have climbed up the academic ladder are a group of 'super-performers'. This view is also supported by a qualitative study of the evaluation of prestigious grants in the Netherlands, where Brouns (2000; 2004) found that female applicants on average had slightly better publication scores than men. She argues that

this could imply that due to a self-selection process, women would not apply for funding if they were not particularly well qualified. Andersen and Henningsen (2009) also address this issue and write that women are generally more reluctant to apply than men. Therefore, they are on average more qualified when they do apply, which in turn would give rise to higher success rates for women.

2.2 Assessing excellence

The assessment of research excellence is not a straightforward matter, and several reports indicate that there may exist important gender biases in funding assessments. Because of data limitations, I will unfortunately not be able to test the potential gender biases in research projects' evaluation process (for example, by comparing the share of women on evaluation panels). I will therefore only discuss this briefly, and rather point out the differences between "normal" evaluations for funding and evaluation of "excellence".

Firstly, in the evaluation of scientific work, bibliometric data is often used as a proxy for quality (Brouns 2006). In addition, such data serves as a seemingly unbiased and easy to use measure (EC 2004). Yet, overly strong reliance on bibliometrics may involve biases. Indeed, bibliometrics often value publication productivity, which is known to be lower for women than for men (O'Brien & Hapood 2012; Sandström et al. 2010; Rørstad & Aksnes 2014). It is also argued that citations may be a deficient measure, because it favours those with high social capital and large networks (Feller 2004), research "done in the mainstream" (Sørensen, Bloch & Young 2015) and some disciplines over others (O'Connor & O'Hagan 2016). This can be damaging to gender equality because women have less access to academic networks (Vabø et al. 2012; EC 2009) and have fewer international collaborators (Vabø & Ramberg 2009). Therefore, relying on bibliometrics as a measure of quality could be measuring what is measureable rather than what is valid (Sørensen et al. 2015). Moreover, Guarino and Borden (2016) found in a quantitative study that, on average, women report performing more service to their departments, faculties and universities than their male counterparts, regardless of rank and discipline. This can affect publication productivity as well as time for applying for funding.

There is also evidence of the difficulties of eliminating gender bias from peer review. For instance, Langfeldt (2006) shows that using established researchers as gatekeepers in evaluation panels implies some biases towards the disciplines that are represented in the

panel. Further, Langfeldt (2006) elaborates on the fundamental uncertainty in peer grant review, for instance caused by lack of information and criteria open to interpretation. This is perhaps even more evident in excellence initiatives where criteria like "great leadership", "strategic potential", "ground-breaking research" may be difficult to measure and evaluate (Langfeldt, Aagaard, Borlaug & Sivertsen 2016; Sandström et al. 2010). Because of this, the way review is organised affects the outcome of the review (Langfeldt 2006). In other words, the assessment of excellence becomes context sensitive (O'Connor & O'Hagan 2016). If we look at the context, the ETAN-report (EC 2000) found that gatekeepers of research funding largely are middle-aged male academics. This can be problematic if there are any homo-social processes in play (O'Connor & O'Hagan 2016; EC 2004). Homo-sociability refers to the tendency to favour people like oneself: for example, evaluators will refer to their own qualities, characteristics or experiences in explaining what they focus on when identifying excellence (O'Connor & O'Hagan 2016; EC 2004). One could also argue that because of the uncertainty inherent in excellence-schemes, there is more 'room' for homo-social processes. The inherent immeasurability in excellence makes that the gatekeepers are in a position to influence the definition and evaluation of excellence (Husu 2004). Seemingly gender-neutral criteria may then have gendered outcomes, in such a way that eligibility criteria can be understood as gatekeeping.

Because of the mentioned potential biases, researchers have found that transparency and accountability are important to compensate for uncertainty (EC 2004; EC 2009; EC 2011). Brouns (2004) showed that women had a greater chance of success in programmes where selection procedures were clear and selection committees were held accountable. This refers to clarity in, for instance, criteria used in decision-making and selection of evaluation committees (EC 2011). In the mentioned study, Brouns found that evaluators who have to explain their judgement are more sensitive to equal assessments. Further, information about decision-making in evaluations should be available so that someone can be held accountable, in line with the EC (2004) recommendation for transparency when assessing excellence. Brouns (2006) also argued that explicit standards reduce gender bias by not allowing the assessors to interpret abstract criteria.

I will argue below that such gender differences in application behaviour and success rates may be even greater for "excellence" initiatives in research funding, since the assessment and evaluation criteria are at least perceived to be higher for such funding schemes, in addition to

possible uncertainty related to the excellence-criteria. Other studies show that significantly more men than women apply for "excellence prizes" in Denmark (Andersen & Henningsen 2009) and in Swedish excellence-programmes (Sandstrøm, Wold, Jordansson, Ohlsson & Smedberg 2010). This expectation can be based on a number of arguments (see chapter 3).

3. Theoretical background

3.1. The role of organisations in understanding the relationship between gender and excellence.

To discuss the relationship between gender and excellence from a theoretical perspective and to derive my empirical hypotheses, I take organisation theory as a starting point. More specifically, my theoretical (and empirical) analysis will treat research funding institutions' focus on 'excellence' as an aspect of their organisational structure designed and implemented (i.e. a policy instrument) to obtain a specific goal (i.e. improvement of scientific quality). This chapter will first discuss why organisation theory is the appropriate theoretical approach by highlighting some of its most relevant features for my argument. Then, I will discuss when and how organisations work to shape individuals and their behaviour. Finally, I build on these theoretical insights to argue that the implementation of an increased stress on excellence in research funding initiatives might bring about unintended side effects in terms of gender (im)balance. This is an important point since gender balance in academia constitutes another important goal for the Norwegian Research Council as well as for the Norwegian government as a whole (NFR 2014a; Ministry of Children and Equality 2015)

Davis & Scott (2006) argue that organisations merit attention because they are a part of everybody's everyday life. This holds both for formal organisations (for instance, a school or workplace) and informal organisations (for instance, a family or a group of friends). Knowledge about organisations – the way they are structured, as well as when and how they can affect the people embedded within them or otherwise engaging with them – is thus of importance for the individual and the public, as well as scholars interested in understanding individual decision-making processes. The scholarly literature on organisations and organising is extensive, and has made substantial progress in its effort to describe and explain life in organisations as well as the life *of* organisations. My thesis will build on the insights

from this extensive literature to frame the discussion on (the relation between) gender and excellence with what we know about structures and behaviour from organisation theory.

A traditional view on organisations can be called an instrumental perspective. Early organisation theorists focused on how the design of organisations directly and indirectly affects the outcome of individual and organisational decision-making processes (Gulick 1937; Simon 1965). In this line of argument, the formal organisational structure is viewed as an instrument that can be utilised in order to achieve specified or articulated goals. From an instrumental perspective, the key argument is that organisations have information on the consequences of different forms of organisational measures, and can use this information to purposely implement specific measures to affect – or guide – the behaviour of those in the organisation (Christensen et al. 2009) given the bounded rationality both individuals and the organisation deal with (Simon 1979; March 1978). These theories have been extensively applied to both private-sector and public/governmental organisations, and can be said to apply to all types of organisations. As such, they can also provide a useful framework for my analysis of public/governmental organisations (i.e. public organisations providing academic research funding). This argument is further strengthened by the consideration that public organisations are often viewed as instruments directed towards reaching a goal considered to be important for the society as a whole (ibid). In this sense, any structural measures implemented in or by public organisations (e.g., as instances of public policy) become instruments for affecting the behaviour of individuals in – or engaging with – these organisations.

Another view on organisations takes into the account that organisations are not purely mechanical instruments, but social systems (Jacobsen & Thorsvik 2013). Cyert & March (1963) view organisations as a coalition of groups with different and possibly incompatible goals. The interactions between these groups in turn affect individual behaviour and therefore the organisational output. The key argument here is that there is more to an organisation than just the instrumental, formal structures. This is more commonly expressed by March and Olsen's (1989) argument that behaviour is not only affected by formal rules, but also driven by a logic of 'appropriateness' connected to a person's position. This view of organisational life posits that people will adjust their behaviour to appropriately fit their role in the organisation and the situation they are in. These 'add-ons' to organisational behaviours support an institutionalist perspective on organisations encompassing the social constructs and

practices of organisations (Davis & Scott 2006; Scott 1995; Suddaby & Greenwood 2009). This view of organisations moves beyond the purely structural aspects of any organisation and also puts the spotlight on the moral and cultural regulations imposed by organisations. The informal rules can be related to what Selznick (1957) calls the infusion of significance, meaning and values on organisations posed by institutions. Institutions in this sense can be understood to be repetitive social behaviour sustained by normative systems (Suddaby & Greenwood 2009). In this way, a system of both formal and informal rules, backed by surveillance and sanctioning power, is believed to affect behaviour (Scott 1995).

These two perspectives need not be seen as opposite or mutually exclusive. Rather, they arguably constitute two complementary tools for understanding organisations and, in turn, how organisations affect the individual embedded in them. The purpose of describing both views is also to emphasise that any organisation may have effects exceeding those driven by its purely structural elements – and that the implications on individual behaviour of organisations as structures and social systems are intertwined in possibly not so predictable ways. For instance, an initially purely structural instrument can be – or over time become – infused with institutional value, and thereby affect individuals within the organisation differently than expected (or, at least, expected based on purely instrumental, structural grounds). I will in fact argue in the next two sections that this is likely to be the case for the effect of increased stress on excellence in academic research funding initiatives.

3.2. The organisation shaping the individual[2]

In this section, I build on insights from two traditions within organisation theory (presented in the previous section) to discuss when and how organisations shape individual behaviour through the social practices embedded in organisations as well as its formal structure. The main reasoning here is that the behaviour of any individual is formed by the organisational context they are embedded in (Selznick 1996; Peters 2011).

An instrumental perspective on organisations will view behaviour and decision-making as a set of responses to specific stimuli (Simon 1965). The presumption is that by changing, for

[2] The mentioned organisational elements are only one set of factors that affect the individual's decision-making behaviour. For instance, personal factors (among them needs and personality) in addition to characteristics of the situation the individual is confronted with (among them information, time and resources) are also important elements deciding behaviour (Jacobsen & Thorsvik 2013).

instance, organisational structure and process, one can affect behaviour (Christensen et al. 2009). Behaviour in this sense is wider than purely formal decisions, but also includes gathering and exchange of information, elaboration of alternatives for action and experiential learning (Egeberg 1999). A classical theory of organisational theory will assume that actors are autonomous and perfectly rational (Peters 2011), which in theory would make organisational behaviour easily predictable by knowledge about the environment, combined with the assumptions of perfect rationality (Simon 1979). However, Simon (ibid) and March (1978) argued that because individuals in fact do not meet the conditions for full rationality, the mechanisms to facilitate decision-making are rather an output of bounded rationality. Bounded rationality refers to the limited computational capabilities of the individual dealing with problems of too little or too much information of the potential consequences of decision making. To deal with the bounded rationality of actors, organisations provide cognitive and normative shortcuts and categories that simplify and guide actors' choice of behaviour and roles (Simon 1957). Organisations also discriminate between what conflicts should be attended to and what conflicts should be de-emphasised (Egeberg 2003). An instrumental perspective will thus assume that organisational structure can constrain choices and create action capacity in a certain direction (Egeberg 1999). This follows March & Simon's (1958) line of thought where it is believed that organisations can shape the behaviour of individuals by creating pre-set routines to guide 'routine behaviour'. Further, organizational structures in this perspective become systematic devices for simplifying, and routinizing information in decision-making situations (Schattschneider 1975).

In addition, organisations have social significance, for example by providing the setting for, among other things, socialisation, communication and formation of norms (Davis & Scott 2006). From an institutional perspective, organisations constrain and regularise behaviour by a system of rules, whether formal or informal, backed by surveillance and sanctioning (Scott 1995). In this sense, organisational behaviour is not only a result of structural procedures, but also socialisation processes (Gulick 1937). In this context, socialisation processes, and thus membership in the organisation, in addition to the formal processes mentioned above, create a "logic of appropriateness" which affects the individual's behaviour (Peters 2011).

3.3. Policy problems, unintended effects, gendered effects

From the previous two sections, it is clear that these various theoretical approaches to organisations assume that one can use organisational measures – such as the organisational structure – to obtain well-defined, specific goals by shaping individual behaviour. My central argument in this section is that the implementation of excellence-initiatives in academic research funding is an example of one such structural-organisational process. Importantly, for the purpose of this thesis, it is not necessary to discuss whether the intended policy goal of increased research excellence has been reached or not. Rather, given my overarching research question it suffices to concentrate on how and why the implementation of this (structural) policy might induce potential unintended side-effects in terms of gender (im)balance among research funding applicants and granted projects (Christensen et al 2009, Andersen & Serritzlew 2007). Clearly, such unintended side-effects can potentially become policy problems in their own right when the pursuit of one policy aim (i.e. increased excellence) creates negative implications for other policy aims (Schattschneider 1960), e.g., gender balance in academia. In this section, however, I leave these normative issues aside, and focus the discussion on how public research funding organisations' increased stress on 'excellence' in funding policy-instruments can have unintended effects on women in academia (which I will refer to as 'gendered' effects).

As mentioned previously, the traditional instrumental view on organisations studies individual and organisational decision-making based on the structures faced by individuals. This line of argument often implicitly assumes that organisational structures and instruments affect organisational members equally – i.e., independent of gender, class or race. It is the structure that drives behaviour, and there is assumed to be a direct connection between the structural characteristics of an organisation and the behaviour of individuals (see above). Nonetheless, to the extent that organisational structures are (or become) infused with institutional value as part of a social system (Jacobsen & Thorsvik 2013; Davis & Scott 2006; Scott 1995; Suddaby & Greenwood 2009), it no longer is guaranteed that the same structures affect all individuals equally or lead to the same outcomes under all circumstances. For instance, a longitudinal study of top management teams in Denmark found that the success of gender diverse teams was contingent of the organisation structure (Ostrup & Villadsen 2014).

Gender is likely to have a particularly important function here, since it plays an important role in shaping individual experience and perspective (Keller 1985; Young 1990). Hence,

seemingly gender-neutral practices may affect men differently than women, and organisational instruments – such as the development of its structure – can in reality become gendered practices (Keiser et al. 2002). Organisations and the way they are structured then are no longer gender neutral – even when there is no initial intention to benefit either gender by the development of a particular organisational structure (Acker 1990; Kanter 1977). In line with such an argument, Ely & Meyerson (2000) discuss how assumed gender-neutral social practices may (re)produce inequities. They thereby define social practices both in terms of the formal and informal activities of organisations (for instance, structural policies and procedures) as well as the informal patterns of everyday social interaction. Given the historical predominance of men in most organisational settings (certainly a higher level of the decision-making chain), Ely and Meyerson argue that many organisational practices de facto tend to reflect and support the experiences and life situations of men in organisations. They do not necessarily sufficiently take into account the possibly diverging experiences and situations of women.

Recent research in organisational psychology has suggested a number of potential mechanisms through which such effects might work. A first of these highlights that gender differences in, for instance, career development between men and women might in part relate to differences in the way men and women experience work situations or organisational features (Ellemers 2014). An example of this might be how women's career paths can be viewed more as a "labyrinth" than a hierarchical ladder because they must navigate difficulties that men do not encounter, due to implicit gender bias (Eagly & Carli 2007). There is also evidence suggesting that there are biased expectations towards gender differences in career ambitions due to family commitments (Ellemers 2014).

In addition, initially relatively small differences between men and women can over time magnify as they learn which behaviours are appropriate and encouraged in the organisation (Ellemers 2014). Gender differences in organisations can thus be affected by the interplay between what the organisation values/encourages and a difference between the behavioural preferences of men and women (ibid). This cumulative learning or regulation of behaviour in organisations over time can lead to different behaviour of men and women. For instance, Fox & Lawless (2011) find that women are less likely than men to *perceive* themselves as qualified to run for office, despite comparable credentials and backgrounds, in a survey of more than 2,000 potential political candidates in the US. This is also supported by

psychological research which shows that female students, compared to male students, tend to underestimate their performance, which in turn signals that the self-perception of women and men are different (Wigfield, Eccles, and Pintrich 1996; Beyer 1998). Further, Fox & Lawless (2005) argue that the political opportunity structure can affect the initial decision to run for office. In another article (2010) Fox & Lawless find gendered patterns of recruitment, which poses a disadvantage for women. It is difficult to determine what comes first, but it seems logical that because women are less likely than comparably positioned men to be recruited to run for public office by all types of political actors (ibid), they may perceive themselves as less qualified, which in turn affects decision behaviour.

This in turn can be explained by gendered responses to organisational structure elements. Another example of this is that *framing of* organisational elements can affect the behaviour of men and women differently. Framing is relevant due to the bounded rationality discussed previously, as a way that the individual structure the meaning of reality by connecting concepts and ideas (Nielsen 2015) and thus form preferences on which individuals base their actions (Druckman 2011). Framing of, for instance, a policy instrument, can lead to alternative representation it which in turn can result in distinct evaluations and preferences (ibid). For instance, studies of people's willingness to allow hate groups to arrange protests find that it is dependent on whether the issue is framed in terms of free speech or in terms of public safety (e.g. Nelson, Clawson & Oxley 1997). Thus, framing equivalent information can differentially affect individual's behaviours (Hasseldine & Hite 2002). Further, Fagley & Miller (1997) find gender differences in framing effects. This is supported by Fujimoto & Park (2009), who discovered that men and women respond differently to a "voluntary public goods provision experiment" dependent on whether the contribution to a public good was framed positively or negatively. This suggest that men and women might respond to organisational instruments differently, relative to the framing used to characterise it. Framing can also have indirect gendered effects. For instance, Nelson, Oxley & Clawson (1997) argue that a framing of something that stress the alleged failings of a specific social group may affect opinions and behaviour. This is, again related to bounded rationality, due to that the individual cannot consider all information about an issue at a given moment, and their behaviour will thus be a product of ideas easily accessible in their mind. What is accessible is in turn affected by for instance media or other sources of information. This has implications for gender as it is widely discussed in the society that women perform poorer in, for instance

STEM-fields. This also relevant for the focus on gender in excellence schemes (see section 4.3.2.)

In these ways, gender constitutes an important explanatory variable in decision-making behaviour (Fulton et al. 2006). Furthermore, the initially small differences between men and women can have crucial important cumulative effects (O'Connor & Fauve Chamoux 2016). There is also reason to believe that these effects are salient in developing of behaviour in groups. In this way, different types of organisations can have a different outcome regarding to gender, i.e. that there is a type of organisational learning that affects behaviour towards a common identity specific to a specific organisation.

In conclusion, this chapter has discussed how gender differences in behaviour in organisations is not necessarily solely due to characteristics of women and men as individuals (Kanter 1977), but might also be in part a reflection of the structure of the organisation. Organisational instruments and policies can be viewed as a type of social practice that can produce or maintain differences between men and women while appearing to be gender neutral. Accumulated over time, these gendered outcomes of organisational processes may even work to present structural barriers to individuals of one gender (in practice usually women). To link this discussion to my research question, my core argument therefore is that research excellence as an element of the organisational structure within research funding initiatives may have unintended gendered effects on application/granting behaviour. The extent to which such theorised gendered effects materialise – and, particularly, gender (im)balance among applicants for excellence-initiatives – is, of course, an empirical question. I turn to an empirical analysis of this question in the next sections of my thesis.

3.4. Hypothesises

Based on the existing literature and the theoretical discussion above, the main research hypothesis for my empirical analysis is that the increased use of 'excellence' as a policy tool in research funding may induce a lack of gender balance among applicants and granted applications. The central theoretical argument for this proposition – as explained above – holds that an increased stress on 'excellence' could be viewed as a structural element of research funding programmes, which affects the decision-making process of individual researchers with respect to this programme. Initially small differences between male and female researchers can over time be magnified through organisational learning and regulation

(Ellemers 2014), for instance gender differences in recruitment (Fox & Lawless 2010), which in turn can lead to gender differences in responses to organisational structure (Fox & Lawless 2011; Fagley & Miller 1997). Together, these effects suggest that gender might constitute an important explanatory variable in decision-making behaviour (Fulton et al. 2006), and therefore organisational processes may have gendered outcomes, i.e. that women might be less likely to apply for funding schemes more explicitly framed as 'excellence' initiatives. The ensuing differences in application behaviour may also affect success rates, since it may lead only the best women to apply (possibly improving their odds of funding).

Firstly, I hypothesise that application behaviour is different for male and female researchers in funding schemes explicitly stressing research 'excellence' compared to other funding programmes. Following Bornmann et al. (2009), it is likely that fewer women apply than men in general. However, the arguments made above imply that women may be even less likely to apply for excellence programmes (Sandström et al. 2010; Andersen & Henningsen 2009). This expectation is further strengthened because of the uncertainty associated with criteria that are difficult to measure, such as "excellence" (Langfeldt et al. 2016; Sandström et al. 2010), and the context sensitivity of the evaluation given this uncertainty (O'Connor & O'Hagan 2016).

Hypothesis 1: Women apply less than men in funding schemes explicitly stressing research 'excellence' compared to other funding programmes.

However, following Sandström & Hällsten (2004), such gender differences in application behaviour could be explained by academic rank, since the eligibility requirements for applications to excellence schemes tend to be more restrictive. As such, the share of female applicants is at least in part decided by the number of potential female applicants. Because women are more often than men found in the lower grades of academia (Vabø et al. 2012), this could mean that fewer women are eligible to apply. If divergent application patterns between men and women in excellence funding schemes are really driven by the increased focus on 'excellence', these differences should persist once adjustments have been made for academic rank. This leads to my second hypothesis.

Hypothesis 2: Women apply less than men in funding schemes explicitly stressing research 'excellence' compared to other funding programmes – even after controlling for gender differences in the potential applicant pool.

Thirdly, as another element of application behaviour, there might be differences between how much men and women apply request in funding schemes (EC 2009). This might be related to the abovementioned self-perception differences between men and women, which, as Fox & Lawless (2010) showed were related to the decision to run for office. Applied to this case, it could be that because women perceive themselves as less qualified, they will request a lower amount of funding compared men. This will not be tested empirically however, as my data does not allow it. Given the available data I can only assess whether there is a difference between what male and female researchers apply for.

Hypothesis 3. Male applicants apply for a larger amount of funding, compared to female applicants, controlling for other variables.

Fourthly, if women are more reluctant to apply to 'excellence' schemes (see hypotheses 1 and 2), this may lead to a self-selection effect whereby women do not apply unless they are particularly well qualified (EC 2009; Brouns 2000, 2004; Andersen & Henningsen 2009). As a consequence, they might be more successful than men in obtaining research funding under excellence schemes, since the selection of women among applicants would be of a higher average quality. Because excellence funding schemes target especially talented researchers and therefore set the criteria for granting even higher, it is reasonable to believe that this effect is stronger for such programmes than for other funding schemes.

Hypothesis 4: Women are more successful in funding schemes explicitly stressing research 'excellence' compared to other funding programmes.

Finally, even though both application and success rates of men and women can be equal on an aggregated level, gender differences can appear when divided in to fields of science. As mentioned earlier, Brouns (2000) found that women were more successful in hard sciences, which traditionally has been male-dominated, and less successful in softer sciences. Further, because it seems as though 'excellence' is more often found in some disciplines than others

(Henningsen & Liestøl 2013), one might expect that the application and success rates of men and women differ substantially between fields of science.

Hypothesis 5: Application and success rates can differ in terms of gender when adjusting for field of science.

4. Methodological approach

In this chapter I will give account for, and reflect on, my methodological approach to my research, and the experiences I have made in the search for answers to my research questions. The purpose of the chapter is to give an overview over the research process: beforehand work, data collection, assimilation and analysis as well as an elaborate case description. This is important because with any given research question, there are generally multiple ways to address it. Hence, it is important to discuss in detail what are the ways I designed and conducted my research so that it is possible to properly assess the validity of my explanations of a social phenomenon (King, Keohane, & Verba 1994). The focus in this chapter thus will not primarily be on the observable properties of my sample, but on judgments about the process by which the data was generated, making out the research design for my study (Gerring 2011). The chapter is structured as follows: First I discuss my chosen research design and the research process, secondly I present my cases and compare them. Thirdly I describe the data and analysis I have used. Lastly I discuss the validity and reliability of my inquiry.

To study the relationship between gender and excellence one could take on many different research designs. Traditionally there has been a methodological divide between qualitative and quantitative approaches (Mahoney & Goertz 2006). Quantitative approach tends to be based on numerical measurements of specific aspects of phenomena, whereas a qualitative approach generally focuses on a small number of cases and is concerned with a rounded or comprehensive account of some event or unit (King et al. 1994). A qualitative approach aims at developing "thick" concepts and theories (meaning complex or multidimensional), which is suitable for description and for making inferences about simple causation on a small number of cases (Coppedge 1999). This approach is often appropriate to investigate phenomena that are yet to be researched, or that we know little of (Johanessen, Kristoffersen, & Tufte 2004),

which is the case for my study. In a field as little researched as gender and excellence, there would be some clear advantages of a qualitative approach. For example, one could interview potential applicants for excellence-schemes and get important knowledge about the factors deciding whether to apply or not. Further, one could look closer at the evaluation committees to investigate their perception of excellence. I believe that this information is very much valuable for understanding the complex relationship between excellence and gender, but the nuance and depth achievable with a qualitative method is at the cost of being able to generalise.

Because the possible interactions between gender and excellence remain unknown, it is in my view necessary to first provide a broad-based mapping of patterns on a large set of cases, which would allow gaining knowledge that is able to represent general patterns in the population, i.e. researchers. In general, a quantitative approach supports generalisation better than a qualitative approach (Coppedge 1999). By obtaining the best overview possible, my thesis can be seen as a building block in the larger task of mapping the relationship between gender and excellence, which in turn can be used as a basis for theory development at a later stage (George & Bennett 2005). In this sense, the purpose and focus of this thesis is not to explain causal relationships, but rather to describe and map out potential relations where in the future one can continue investigations and make causal inferences (Gerring 2012). Therefore, it is my opinion that to best achieve knowledge about the relationship between excellence and gender at this point, it is necessary to quantitatively describe the situations where, and potential outputs of, the forums in which the two factors meet.

4.1. The research process

Starting at the beginning, there is often an irrational element in the discovery of a research question, because the researchers in many instances have a personal and idiosyncratic reason for choosing a specific topic (King et al., 1994). However, according to King, Keohane & Verba (1994), two considerations should be taken into account when determining the scholarly value of a research project. Firstly, research should pose a question that is important for political, social, or economical life, or for understanding something that significantly affects many people's lives. Secondly, research should make a contribution to the literature on the field. As I have written in the introduction, I believe that gender equality in academia is of importance for the society in whole. Regarding my contribution to the literature, this field of study is somewhat scarce, which also poses problems in the next step of the research process:

choosing theory, which I will discuss later.

There are certain limitations regarding time, resources and size to the master-thesis format. This affects the boundaries of my investigation of the relationship between gender and excellence. Through an extensive search of literature on the field, I discovered several reports on the role of gender in research funding. Research funding made an interesting opening to the discussion on gender and excellence, as this is possibly one of the most explicit uses of the word 'excellence', in addition to the importance for academic careers. The reason behind choosing the excellence initiative in Norway was also due to practical limitations. Information about Norway and the Research Council of Norway was more easily available due to language and familiarity. Further an analysis of several countries would have made the format of a master thesis insufficient. This being said, there would be clear advantages to compare the excellence initiatives in, for instance, the Nordic countries to gain more nuanced knowledge, on possible national differences in the relationship between gender and excellence.

Despite the existence of several official reports and numerous newspaper articles there is currently little available theoretical scholarship on the topic , especially in the field of political science. However, based on King, Keohane & Verba's dictum that "[a) social science theory is a reasoned and precise speculation about the answer to a research question, including a statement about why the proposed answer is correct." (1994:19), one could argue that arguments drawn from earlier empirical records could be used for theorizing on my data. As such, I derive my hypothesises from earlier research conducted on women in academia. In choosing the literature to build the hypotheses, it was important to choose hypotheses that were falsifiable, by for example choosing a dataset that would give me as many observable implications of the hypotheses as possible. This is important, because more data and a greater variety of data will test the hypotheses more times, and in that way build a stronger evidence (King et al., 1994). Since my thesis does not aim at causality specifically, the hypothesises will be used to establish whether there is a relationship between gender and excellence or not.

Furthermore, and importantly, I chose to frame the discussion from an organisation theory perspective. This is mainly due to my own educational anchoring in political science and organisation theory. In addition to that, I believe an organisation theory approach contributes to the theoretical understanding and discussion on the relationship between gender and excellence, mainly due to the way of understanding behaviour. As argued in Chapter 3,

element of the organisational structure within research funding initiatives may have unintended gendered effects on application/granting behaviour. By framing, and therefore grounding, a discussion in a theoretical framework one can gain understanding about relationship.

4.2 Case selection

To investigate my research question, it was quite natural to choose the one explicit excellence initiative in Norway, the Centres of Excellence-programme (in Norwegian: Sentre for fremragende forskning, hereafter CoE). This will be thoroughly presented in the next section. Because I wanted to isolate the effect of the explicit use of excellence in my analysis, I searched for other funding schemes which were comparable to the CoE-programme in terms of emphasis on scientific quality, but without the explicit excellence-criteria. Borrowing terminology from experimental research designs, this would allow me to view CoE as my 'treatment' funding scheme, whereas the comparable case could act as a 'control' programme. In my search for this I looked at funding programs that were as highly competitive, and therefore prestigious, as CoE. To be able to compare disciplines as well (which is relevant for the literature as previously mentioned), it was important to find funding schemes that applied to all fields of science.

The FRIPRO-programme early became a contestant for comparison. The FRIPRO-programme contains several types of funding, one of them including "Toppforsk" (can be translated as Top-research), which is similar in terms of connecting larger groups of researchers "to reach the top of their field" (NFR 2014b). However, this type of funding had only been active in 2015 and 2017 (ibid). Because of the CoE-programme was established much earlier, I decided that it would be more interesting to compare it with a programme that had run simultaneously. This is mainly due to the possibility that the relationship between gender and excellence might be related to the share of female professors at a given time. Because the share of female professors has increased over time, it is likely that the potential pool of applicants for the CoE programme changed over the course of the duration of the programme (see NIFU 2017). The most similar FRIPRO activity in terms of duration and size was then the FRIPRO "Forskerprosjekt" (Researcher project). In the next section I will further elaborate on why the two programmes are comparable, apart from the explicit use of excellence in the CoE-programme.

4.3 Case description[3]

In this chapter I present my cases, the CoE- and FRIPRO scheme. Firstly, I will present CoE, as it is the reason for my inquiry, and the background for implementing an excellence initiative in Norway. The further description includes the main features of the scheme, changes over time, any gender equality focus, the application process and evaluation criteria in the two programmes to point out the similarities and differences between the two. Lastly, I will conclude on how and why the schemes are comparable for the purpose of this thesis.

4.3.1. Background

In this section I firstly describe the adoption of excellence in the Norwegian government policy on research funding. This is because it is useful to know more about the context and rationale behind excellence initiatives to further gain knowledge about relationship between gender and excellence. This section serves the purpose of emphasising the considered importance of the excellence initiative, as well as understanding it as a structural instrument used for affecting the behaviour of researchers. Secondly, I discuss the focus on gender equality inherent in Norwegian politics, including in the Norwegian Research Council (hereafter NFR), to better understand the context in which the excellence-initiative is implemented. The Norwegian case is particularly interesting, to investigate whether the gendered patterns of excellence as discussed in Chapter 2 persist even in a national and systemic research context that promote gender equality at an institutional level (O'Connor & Fauve-Chamoux 2016). This is also to emphasise that gender equality in research is an explicit political goal of the policy implementations undertaken by the NFR and the Norwegian government.

Excellence has since the mid 1990's been a central concept in research policy in many European countries (Sørensen, Bloch & Young 2015; NFR 2014c). Further, excellence has been operationalised by Networks of Excellence (established in the European Union's 6th framework programme) and Centres of Excellence (OECD 2014). In this chapter I wish to investigate how the Norwegian government has adopted excellence initiatives seen in comparison with a potential EU 'push' for excellence.

The Norwegian official documents discussing excellence are focused on improvement of quality in Norwegian research. International reviews of Norwegian research undertaken in the

[3] The material for this section will be discussed further in the data description p. 4.4

1990's found that there was great room for improvement (NFR 2014c) and the response from the Norwegian government was a strong quality focus, for example with a 'quality reform' where it is stated that excellence (translated from Norwegian: fremragende) should be strived for and demanded (Ministry of Education, Research and Church Affairs 2001). Another White Paper communicated that research funding should be directed at quality-improving measures (Ministry of Education, Research and Church Affairs 1999), among these, Centres of Excellence as the first general scheme for excellence in research in Norway (OECD 2014). In the same White Paper, the importance of cooperation with EU on research is expressed, especially with participation in the EU's framework programmes for research and innovation through the EØS (eng. EEA) agreement. In a speech in Brussels, the Norwegian minister of Trade and Industry (2000) stated that Norway is committed to a stronger European research co-operation, in particular by playing an active role in the development of European centres of excellence. This is also expressed in the Department of Education and Research's EU-strategy in 2004, where it is stated that the changes in the EU should be reflected in Norwegian education- and research policy[4]. Further, European cooperation in research is viewed as one of the most important measures to improve the quality in Norwegian research[5]. In 2006(a), the then Minister of Education and Research stated that Norwegian research activities are well integrated in the EU framework programmes and that Norwegian research is strengthened by the cooperation. This view is also supported by the Ministry of Education and Research (2012) which states that the participation in the EUs framework programmes is important to increase the quality of research in Norway. In an evaluation of Norwegian research in 2016, the Productivity commission concluded that Norway must look towards the leading research nations in Europe for implementing a political priority on research, autonomic research institutions and research leadership by renowned researchers (NOU 2016:3).

In conclusion, it is reasonably to say that the European focus on excellence (Sørensen et al. 2015) affected Norwegian policy concerned with improving the quality of research, resulting in the establishment of Norwegian Centres of Excellence. The documents describing the CoE programme are very focused on scientific quality. To the best of my knowledge, there seems

[4] Quote from the strategy (Ministry of Education and Research 2004): "Endringene i EU bør reflekteres i norsk utdannings- og forskningspolitikk. Spesielt vil det fremover bli viktig å utvikle forholdet til de ti nye medlemslandene i EU."

[5] Quote from the strategy (Ministry of Education and Research 2004): "Utnytte europeisk forskningssamarbeid for fremme kvalitet i norsk forskning (jf sentre for fremragende forskning, Abel-prisen og Holberg-prisen) og fremme slike miljøer i europeisk sammenheng"

to be little discussion whether scientific quality equals excellence or not. Indeed, this seems to be taken for granted. In the NFR's preliminary report (2000) however, the scientific quality concept is discussed, in terms that it should include originality, solidity and relevance to scientific development. However, it also states that national and 'thematic' priorities must be taken into consideration, so that the establishment of Centres of Excellence results in a social return.

In the same preliminary report, considerations for gender equality are discussed, which can be said to reflect the fact that the Nordic countries have had gender equality in research on the politic agenda for several decades, longer than in most other European countries (Bergman & Rustad 2013; Husu 2004). For instance, legislation prohibits gender discrimination in the labour market and within the educational systems. In addition, it is formulated by the governments that they shall promote gender equality (Bergqvist et al. 1999). This reflects the ideals, beliefs and argumentation on gender equality of the Nordic countries, which is grounded by concerns for democracy, legitimacy and quality (Bergman & Rustad 2013). Firstly, gender equality, or rather lack thereof, is considered a democratic concern (Bergman & Rustad 2013; Ministry of Education and Research 2006b). The democratic concern relates to the ideal that men and women should have the same rights and possibilities to conduct research and have careers in academia, which is widely accepted in the Nordic countries (Bergman & Rustad 2013). Secondly, gender equality is also considered to be connected to the credibility and legitimacy. Underlying this is the view that research should be conducted by a researcher population representative of the general population (ibid). Lastly, it is assumed that scientific quality is equally distributed between men and women (Burke & Richardsen 2016), and thus an underrepresentation of women means an underrepresentation of talent (Bergman & Rustad 2013).

To summarise, this section discussed the context within which both gender equality and excellence exist, and how these are communicated and implemented in Norway. I have concluded that both excellent research and gender equality/balance in research are explicitly formulated goals.

4.3.2. The Centre of Excellence programme in Norway

4.3.2.1 Main features of the programme

As mentioned earlier, the implementation of the CoE-programme in Norway was due to broad political agreement on the need to promote increased quality in Norwegian research after several international evaluations finding room for improvement (NFR 2009). Modelled after several European and international excellence-initiatives (NFR 2000), the first funding announcement was issued in 2001 by the Norwegian Research Council (hereafter NFR), who is responsible for the implementation and execution of the programme (NFR 2009)[6]. The CoE-programme is considered to be the NFR's most prominent funding instrument for promoting quality in Norwegian research (NFR 2011a), by developing word-class areas for research aimed at increasing international cooperation (Ministry of Education and Research 2012). This is also illustrated on the programme's website:

> "The [CoE] programme gives Norway's best scientists the opportunity to organize their research in centres in order to reach ambitious scientific goals. The research should be innovative and have major potential to generate ground-breaking results that advance the international research frontier." (NFR 2017a)

The mentioned opportunity is provided by giving the granted centres long-term and generous funding (NFR 2011a). The time frame for each centre is about 10 years and the annual budget framework is around 350 million NOK (about 36 million €) divided among the two generations of centres that are operating at a given time (NFR 2017a). The rationale for organising the excellence initiatives in centres is to "work with ambitious ideas and complex problems that require coordinated, long-term research activities within or across disciplines to achieve their goals" (ibid). The calls for applications state that the goal for the programme is to produce research that "have major potential to generate ground breaking results that advance the research frontier" as well as "work with ambitious ideas and complex problems" (NFR 2011b). It is also communicated that the objective for the scheme is to establish "research centres that conduct targeted, focused, long-term research of high international calibre" (NFR 2011c).

It is emphasised in several documents that the main criterion used in selecting the centres is scientific merit (for instance NFR 2004; NFR 2009; NFR 2011abc). The centres are intended

[6] The Research Council of Norway also provides the basic source of funding for the scheme (NFR 2004). The host institution acts as Project Owner and "bear the practical, scientific and financial responsibility for the establishment, operation and closing down of the centre" (NFR 2011c).

to consist of research groups located at the same site (building complex), and connected to a host institution (NFR 2011). A host institution may be a university, university college or a research institution. However, most (83%) are hosted by universities (NFR Project Databank 2017). The establishment of the centres has been seen as successful (NFR 2009), which resulted in three more calls for application conducted in 2005, 2011 and 2016. The four calls together have resulted in 44 centres, of whom 23 are still active (NFR 2007; NFR 2017c).

Together with CoE, FRIPRO is considered the most important tool for improving the quality of research in Norway (NOU 2016:3; Ministry of Education and Research 2012). FRIPRO is one of the NFR's funding programmes which in 2017 distributed almost 1 billion NOK to 120 research projects. It provides funding for independent projects on the basis of scientific merit and is open to all research areas and disciplines (NFR 2017b). On NFR's websites it is stated that

> "FRIPRO is an open, national competitive arena that covers all fields of research. It aims to promote scientific quality at the forefront of international research, boldness in scientific thinking and innovation […]" (NFR 2010).

The programme intends to promote research of high scientific quality, as well as encourage bold projects (NFR 2010). Outstanding scientific quality, together with scientific renewal and boldness is emphasised when selecting applications for funding (NFR 2017b). A presentation of the scheme communicates that "FRIPRO is all about exceptional quality and groundbreaking results" and further that the proposed project should contribute to scientific advances and expand the current knowledge base (ibid). Further, the scheme is aimed at the best researchers within the field (ibid). The FRIPRO "Researcher Project" grant is intended to attract "established researchers with excellent track records – with outstanding, innovative projects in the forefront of science" (ibid). The project funding for this grant is 5-10 million NOK which ends after 3-4 years (NFR 2016b).

4.3.2.2. Evaluation process[7]

The application evaluation process in CoE witnessed some changes over the years, but the main form is the same[8]. Firstly, there is a prequalification stage where a panel of at least three

[7] This section only includes information on the three first calls for applications for CoE (CoE I, CoE II and CoE III), because data on the last call (CoE IV) is not included in my dataset.
[8] In this section I refer to the document "Information for applicants for the funding announcement for the establishment of Centres of Excellence (SFF III)" (NFR 2011) unless otherwise stated

international experts conducts an evaluation and scores the application on a scale from 1-7 based on the evaluation criteria which I will discuss later. Secondly, the applications evaluated as qualified for advancement (based on the application material and the statement of the panel), are selected for the last round. In the two first calls, an interdisciplinary committee[9] performed this task (NFR 2009), but in the third call there were three discipline-specific committees responsible for the applications from the disciplines they represented. Lastly, the CoE-committee (consisting of members from the NFR Board of Executives) formally selects the applications going through to the last round. In the last round, preferably the same experts from the first round, assess each application, before a joint international scientific committee, chosen from the panels in the first round, rank the applications on the basis of the assessment from the experts in a prioritised list of applications. This list is then presented to the CoE-committee, who has the final decision-making authority. From interviews I conducted with members of these panels it became apparent that the role of the CoE-committee had less to with selection/evaluation, but was mainly concentrated on the budget allocations as well as making sure that the assessment procedures were done correctly. To elaborate, the committee was responsible for deciding how many centres on the list compiled by the discipline-specific (for CoE III) or interdisciplinary (CoE I and II) committee, that should be funded. One of the interviewees said that the only assessment they did was deciding whether there should be few centres with large amounts of funding, or several centres, but then with considerable budget cuts.

In the FRIPRO evaluation process[10], each application is sent to referee panels which usually consists of 4-7 acknowledged researchers situated outside of Norway. The members of the referee panels are chosen because they are considered "generalists" within the field of science the panel is supposed to cover. The panel meet and give a unified assessment on all evaluation criteria on a scale from 1-7 for each application. A ranked list of the applications with overall scores 6 and 7 is then sent to a granting committee specific to the discipline. Each committee and its leader is appointed by the Research Board for the Division for Science. Each granting committee consists of up to 12 national and international researchers with "high scientific expertise, that combined covers the committee's area of research in the best possible way". In

[9] t is worth noting that in the first call for applications for CoE, there were considerations undertaken for business and societal relevance. This was introduced in the call itself as a criterion. In addition, a NFR-representative was present in the evaluations in the interdisciplinary panel to assess the applications on business- and societal relevance (NFR 2009).

[10] Information about the evaluation process through the years (from 2004 in my data) was not available on the NFR websites, so all of the information presented here is collected from the 2017 call (NFR 2016b).

addition they should be gender balanced. The committees make the final decision on who to grant, based on the referee panels' written evaluation and ranked list.

4.3.2.3. Evaluation criteria[11]

In the information provided to the applicants it is stated that the main criterion used to assess and prioritise the grant proposals for CoE is a high level of scientific quality (merit) in relation to international standards. This criterion applies to both the planned research activity and the centre's key scientific staff.

The overall assessment of scientific quality is based on the following criteria:

- Scientific merit
- The project manager and project group
- Feasibility
- International cooperation
- Dissemination and communication of results

Each of the criteria is elaborated in an attachment. Scientific merit is assessed in relation to originality/innovation, the strength and adequacy of research questions, theoretical approach and operationalisations and knowledge about the research front among others. The wording in the description of scientific merit is the exact same as the wording in the description of the same evaluation criteria in FRIPRO. This also applies to other criteria, such as 'project manager and project group' (which mainly is evaluated on the basis of expertise, experience and publication record) and 'dissemination and communication of results' (mainly plans for publication, scholarly and public). In addition, in a separate part of the information to the applicants, it is stated that "It is expected that a strong leadership will be established for the centres under the scheme, and that they will exercise a high degree of autonomy in relation to the host institution, both from a scientific and an organisational perspective". None of the other criteria, apart from the main scientific quality-criteria, is further emphasised in the document. The criteria 'feasibility' is also similar to the 'implementation plan and resource parameters'-criteria in FRIPRO. Included in both schemes is the phrase "Plans for project implementation, including milestones and deliverables". The other parameters concern budgetary expenses (resources and personnel).

[11] This information is gathered from NFR 2011; NFR 2013b unless stated differently.

The evaluation criteria for the two schemes differ only when it regards the 'national and international cooperation' criterion and 'value added generated by establishment of the centre', which is included in the CoE, but not in FRIPRO. The first criterion is evaluated "on the extent and quality of the cooperation activities" and the second in relation to how a centre may contribute to research activity in the field, researcher training in the field and the host institution and the other partners. Lastly, there was one criteria included in FRIPRO, but not in CoE, called 'boldness in scientific thinking and scientific innovation', which can be compared to the adjectives used to describe excellence in CoE (i.e. innovative, advance frontiers, groundbreaking etc).

After interviews with administrators in the NFR it became clear that some of the evaluation criteria in most NFR grants are standardised, which explains why the wording is exactly the same in the two programmes. It was further explained that the criterion for scientific merit is a collective criterion for the NFR. Hence, when this is supposed to be measured, the calls are expected to use the standardised wording. One of the administrators said that this was mainly due to simplicity issues for the applicants, i.e. that recognisable texts made it easier for the applications (Interview no. 2). Another administrator explained that they changed the criteria for the fourth call for applications undertaken in 2015-2016, because they felt that the "focus was wrong" and that there were too many criteria (Interview no. 1). This led to the adaptation of criteria from the European Research Council in the fourth call for CoE (CoE IV) because they experienced that applicants were more familiar with the understanding of them.

Due to the standardised criteria, the ratings from 1-7 are also defined in the same matter, as shown here:

1: Poor
2: Weak
3: Fair
4: Good
5: Very good
6: Excellent
7: Exceptional

Although one might imagine a disparate emphasis between the two programmes on the different criteria, this is not mentioned in the documents. When asked about this, the

interviewed administrators from the CoE and FRIPRO programme said that although there is no official weighing, the scientific merit-criteria is the determining factor for funding in both programmes (Interview no. 2). One administrator furthermore explained that the correlation between the total score and the score on the scientific merit is high, compared to the other criteria (Interview no. 1).

In addition to scientific quality, the Research Council attaches importance to whether research projects consider any potential impacts on the natural environment and internationalisation (referred to as the projects' contribution regarding international networks, mobility and measures that enhance Norway's attractiveness as a host for research activities). More relevant to the theme of this thesis is the emphasis put on the two factors "recruitment of women" and "gender balance in the project", which will be discussed in the next section.

4.3.2.4. Gender equality considerations

In the first call of CoE, where 13 new centres were announced, there were no female centre leaders, and an overweight of men also among the lower positions. This caused a series of critical media reports (NFR 2009; Austgulen 2004; Bostad 2007). A report conducted by the NFR (2009) states that the second call for applications added additional focus on gender equality and thus related closely to the emphasis on gender balance in academia in general. As a result, the NFR decided to ask host institutions to i) encourage their researchers to put forward women as centre leaders in their application, and ii) include ambitions for gender equality in their applications. Perhaps most importantly, the NFR stated in the call for applications that there would be a "moderate quotation" of female centre leaders (and centres with strong representation of women in important positions) among applicants of the same quality. However, this measure was not used in the CoE II, which is explained by that it was not relevant for the applications in this round (i.e. there were no applications where the quality was equal and where the one application had a female centre leader and the other had a male). The same regulations were used in CoE III (NFR 2011). However, as far as I have found, there is no information on whether the moderate quotation was applied or not. The same measure is available in FRIPRO. Among applications of similar quality, there is the possibility to prioritise projects led by female project managers (NFR 2014).

Lastly, "gender balance in the project" and "recruitment of women" was incorporated as an 'additional factor' to the evaluation criteria in CoE III (NFR 2011). For the first point, the Research Council states that they consider "it important for projects to promote increased recruitment of women to higher academic position and within the MST subject areas (mathematics, science and technology)". The second factor is elaborated by stating that "the Research Council works actively to enhance the gender balance in the Norwegian research sector" and further that by "seeking to ensure" gender balance in the proposed research group, the project can contribute to this. These factors were also mentioned in FRIPRO, but not elaborated on as in CoE. Yet, it is stated that "the Research Council will take into account whether applications that are applicable for funding safeguard ethics, the environment and gender perspectives in research in a satisfactory manner." (NFR 2013b).

From my statistical analyses, it also became clear that I needed additional information about the NFR-context, so I conducted several interviews (described in detail in section 4.4.3). As a part of my comparison of the two programmes, information from these interviews is relevant, in addition to describing the context in which excellence and gender is present in.

The importance of gender equality in the NFR research funding schemes was emphasised by all the respondents. One respondent from the CoE-committee said that gender equality was high on the agenda of the Board of Executives of the NFR at the time of the third call (Interview no. 3). An administrator from the CoE-scheme said that the NFR focused on gender equality in, among other things, writing the calls for application. By this the respondent meant that they were observant to whether there could be hidden effects that affected applicants of differing gender. The administrator from FRIPRO said something very similar: i.e. when they (the NFR) form a criterion they always think about how this potentially can affect female and male applicants, and whether they have to adjust something to weigh up for a potential imbalance.

However, when asked about potential gender/gender equality discussions in the CoE-committee, none of the respondents could remember whether this took place or not. One respondent (Interview no. 4) said that it was likely that they were oriented about the gender equality perspective, but he could not remember it with any certainty. Further, the respondent said that there were no controversies regarding gender equality in the discussion of the committee, and that this could be interpreted as a reflection of the fact that the gender

perspective was maintained in the application assessments. The other respondent from the committee said that even though he could not remember if they discussed gender equality, this did not mean they did not. The respondent also added that they thought, or hoped, that somebody did. From this, it could seem as though gender equality measures is important on paper, and in the administration, as another interview indicate[12], but in decision making, especially when the focus is on excellence, gender equality is in the background. This might reflect a tendency to include excellence in discussions on gender, but not vice versa.

4.3.2.5. Conclusion – similarities and differences

The two funding programmes are similar on several accounts. Firstly, the rationale behind both programmes is to generate "ground breaking research". In other words, both programmes are supposed to increase the quality of Norwegian research (NOU 2016:3). This was also supported by the administrators interviewed from the NFR (Interview no 1 and 2). One stated that "[the programmes] are comparable when it comes to encouraging the best research and putting much emphasis on scientific quality" (Interview no. 2). They further explicitly mentioned the criteria as comparable (Interview no 1 and 2). The evaluation criteria share perhaps the most apparent similarity between the two programmes, mainly because they are in both cases geared towards funding research excellence and both programmes explicitly target "high quality research in line with international standards" (NFR 2012; NFR 2013a). Importantly, the wording employed in the elaboration of the evaluation criteria is exactly the same across both funding schemes. Furthermore, both programmes appeal to groups of researchers, with one person appointed project leader. This project leader is also explicitly personally evaluated in both funding schemes, so that personal achievement plays a key role in the assessment process in both settings. One aspect that differentiates the two programmes, however, is that funding for FRIPRO is provided for about 3-4 years, whereas the CoE funding lasts for up to 10 years. Another difference is that the CoE funding makes the stress on excellence more explicit by mentioning this word in the programme title.

An administrator from the NFR stated that the even though the two programs both aim to

[12] One administrator expressed explicitly the concern for gender equality among applicants and granted applicants. The respondent said they thought the 'whole situation' was difficult and 'troublesome' (in two different sentences) (Interview no. 2.)

promote 'excellent research', they differ mostly regarding the intended purpose (Interview no. 2). They explained this by emphasising that the reason for larger funding in CoE was to establish a *centre*, and the possibilities this presents in terms of cooperation and interdisciplinary opportunities between a larger group of highly competent researchers, compared to funding of research projects in FRIPRO. Another administrator said that the "groundbreaking" nature of the research was important in both programmes. However, due to different budged frames, the feasibility of a project was more important in a CoE than in a research project in FRIPRO (Interview no. 1).

From the discussion above, it is clear that both schemes are highly comparable in the sense that they focus on awarding research funding to a very select groups of top researchers. Yet, the main difference is that the reference to the 'excellence' criterion is explicitly mentioned in CoE, but not in FRIPRO. I will exploit this difference in my empirical analysis.

4.4 Data description

4.4.1 Statistical data from the NFR

For my analysis, I required information about the applicants for each funding scheme. To gain access to this data, I e-mailed a special adviser for the CoE-scheme at the NFR with the request for anonymised information about a) all the applicants' gender, field of science, applied amount and evaluation scores and b) the evaluation committee's composition regarding gender and field of science as well as each evaluator's score on a given application. My data request was forwarded to several people in the administration of the Norwegian Research Council, and was responded by the Department Director of the Department for Research Infrastructure (Asbjørn Mo) who was interested in my request and forwarded my mail to Hege Skog, the Department Director of the Department for Strategic Development and Analysis. Further on I had contact with Senior Adviser Wenche Berntsen in the same department, who in turn gave me two datasets with most of the information I requested. Missing was information about the committees evaluating the applications. I was then informed that it was not possible to connect information about the evaluation committee to each application.

The datasets include 9468 observations from 2004 to 2016 of FRIPRO and 370 observations of CoE for the three calls (2001/2002, 2005/2006, 2011/2012)13, summarised in the tables

[13] Data from the fourth call (CoE IV) was not available at the date of my inquiry.

below. The share of women among applicants for FRIPRO is 29, 542% while the same share for CoE is 14,59%. Among the granted applicants, women constituted 29,51% for FRIPRO, and 20,58% for CoE. Following this, the success rate for women, measured by the number of female granted applicants divided by the total number of female applicants, is 11,84% for FRIPRO and 12,96% for CoE. Further, the similarly measured success rate for men is 11,79% for FRIPRO, and 8,54% for CoE.

Table 1. Calls for CoE

	Frequency	Percentage of applications
CoE I	128	34,6%
CoE II	98	26,5%
CoE III	144	38,9%
Total	370	100%

From this table, we can see that almost 40% of the applications came in the third call (CoE III).

Table 2. Years of FRIPRO calls for application and applicants

Year of call for FRIPRO	Frequency	Percentage of applications
2004	842	8,9%
2005	768	8,1%
2006	628	6,6%
2007	622	6,6%
2008	703	7,4%
2009	802	8,5%
2010	773	8,2%

2011	775	8,2%
2012	841	8,9%
2013	667	7,0%
2014	592	6,3%
2015	683	7,2%
2016	774	8,2%
Total	9470	100%

We see that for FRIPRO the percentage of applications is quite evenly distributed on each year.

Table 3. Gender of proposed centre leader in CoE and of PI fripro.

	Frequency		% of applicants	
	CoE	FRIPRO	CoE	FRIPRO
Female	54	2786	14,6%	29,4 %
Male	316	6682	85,4%	70,6%
Total	370	9468	100%	100%

From this table we can read that most applications(85,4%) in CoE proposed a male centre leader, whereas 14,6% of the applications proposed a female centre leader. Regarding FRIPRO, the share of applications proposing a female Principal Investigator is close to 30%, and the remaining 70% of the applications proposes a male PI.

Table 4. Number and percentage of applicants stemming from the disciplines in both schemes, for all years/calls.

	Frequency		% of applicants	
Discipline	CoE	FRIPRO	CoE	FRIPRO
Agriculture and fisheries science	8	8	2,2%	0,1%
Humanities	20	1119	5,4	11,8%
Mathematics and natural science	202	3049	54,6%	32,2%
Medicine and health sciences	45	3477	12,2%	36,7%
Social sciences	45	1518	12,2%	16%
Technology	50	298	13,5%	3,1%
Total	370	9469	100%	100%

Table 4 shows which disciplines are represented among the applications. For CoE, agriculture and fisheries science present a very small part of the applications, whereas mathematics and natural sciences present almost 55% of all applications. 13,5% of the applications are from researchers within technology. Medicine and health sciences and social sciences have the same amount of applications (12,2% of the total applications), whereas applications from researchers from the humanities constitute 5,4%. For FRIPRO, most applications stem from medicine and health sciences (36,7%), followed by mathematics and natural science (32,6%). Social sciences constitute 16% of the applications to FRIPRO. Together with humanities (11,8%), the traditionally called "soft sciences" constitute almost 30% of the applications. Agriculture and fisheries science and technology constitute a relatively small part of the total number of applications.

Table 5. Scores of the applicant for the two programmes

	Frequency		% of scored applicants	
Score	CoE	FRIPRO	CoE	FRIPRO
Missing	231	5148	(62,4% of total)	(54,4% of total)
1	-	4	-	0,1%
2	-	70	-	1,6%
3	3	321	2%	7,4%
4	17	1002	12,2%	23,2%
5	40	1600	28,8%	37,0%
6	43	1060	31%	24,5%
7	36	265	25,9%	6,1%
Total	139	4322	100%	100%

In this table I present the scores the applications received. As previously mentioned, each application was scored on a scale from 1-7 whereas 7 was the "exceptional". The scores on the application from the two first calls of CoE (CoE I and II) were not available in my dataset and is defined as missing in my dataset. In addition, none of the applications received scores lower than 3. A possible explanation of this could be that there were no applications lower than a three, or possibly the lower scoring applications had their score removed from the dataset. However, this is not described anywhere in NFR documents, as far as I could find. From the applications that did receive scores in CoE III, we can see that most applications were scored 6 (31,9%), followed by 5 and then 7. One can say that the distribution of scores is situated in the higher scores, which indicates that most applications were evaluated as very good, excellent or 'exceptional'. Regarding FRIPRO, all categories (i.e. 1-7) were presented, but the applicant's scores were only available for 46% of the applications. Most of the

applications (84,7) were scored between 4 and 6, and a very low share received the highest score.

Due to the many categories of the applied amount in each application, I chose to present these numbers with summary statistics.

Table 6. Summary statistics of applied amount divided by a million.

	Mean	Std. error of mean	Median	Minimum	Maximum	Skewness
CoE (N=370)	119,7	3,16	130,1	0	263,9	-0.46
FRIPRO (N=9470)	7,13	0,03	7,3	0	85,5	2,447

From this we table we see that in the raw data the minimum amount requested among the applications was 0. Clearly, this is unlikely to be accurate as it does not make sense to apply for no funding when applying for a grant scheme. Furthermore, the maximum value is at 264 million NOK for CoE, which is well over the average yearly budget for all the centres in total. Due of these potential outliers in the dataset, I run a scatter plot to see how the applied amount is distributed. This is shown in the figures below:

Figure 3. Scatter plot of applied amount and by application identification number for CoE.

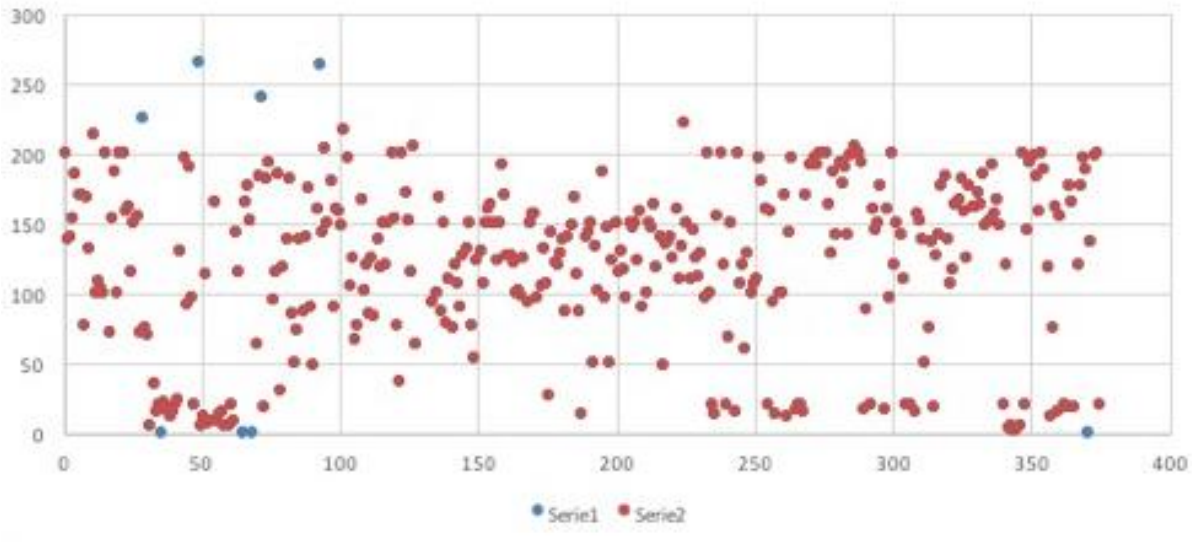
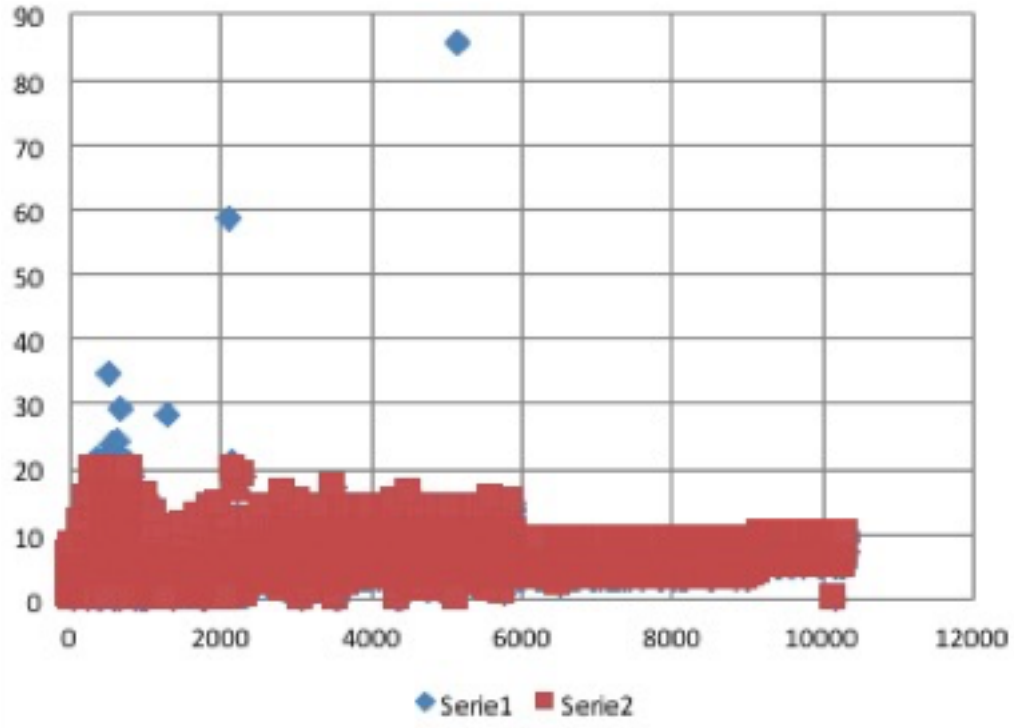


Figure 4. Scatter plot of applied amount and by application identification number for FRIPRO.



In figures 3 and 4, the blue dots represent the values I detected as outliers in the dataset. As one can see, they deviate from the other values and can cause potential disruptions in the analysis. The cut off points for CoE were 20-200 millions, for FRIPRO it was 2-20. After removing the outliers from the dataset, I recalculated the summary statistics of the new variable shown in the table below.

Table 7. Applied amount adjusted for outliers.

	Mean	Std. error of mean	Median	Minimum	Maximum	Skewness
CoE (N=362)	119,6	3,1	130,1	20,2	221,8	-0.55
FRIPRO (N=9425)	7,09	0,03	7,32	0,2	20	0,473

Starting with CoE, the average amount requested by the applicants were 119,6 million NOK. The standard error of an average is an expression of the standard deviation divided by is a function of the standard deviation and the sample size, which tells us something about the uncertainty of the average. A large value of the standard error of the means that the average is sensitive to changes. However, from this data the standard error of the average is quite small compared to the average, which would suggest that there is little uncertainty connected to the average. This can also be due to the relatively large sample size (N=370). The skewness of the sample tells us about the symmetry in the distribution. A normal distribution will have a skewness of 0. In my dataset, the value of skewness is -0,55, which means that the data is moderately skewed.

Similarly for FRIPRO, the average amount requested by the applicants were 7,09 million NOK. The standard error for the average is also relatively small. The skewness for FRIPRO, when removed for outliers, imply a more normal distribution, compared to the initial number.

A correlation analysis was also conducted to show to which extent to variables are related to each other (Midtbø 2010). The co-variation is measured by Pearson correlation coefficient (Pearson's R) which show the strength and direction (positive or negative). Pearson's R vary from -1 to +1 where 1(absolute number) equals perfect correlation. Values of Pearson's R close to 0 suggest that there is no linear relationship between the two chosen variables.

Due to the number of variables and the following correlation-analysis-table, I chose to shortly describe some of the relationship here. The full tables can be found in the appendix.

Firstly, for CoE, the variable granted, where a value of 1 indicate being granted, is positively correlated with applied amount (N=362), score (N=139) and discipline (N=362) significant at most at the 0,05 level (2-tailed). My analysis of the discipline-variable show significant correlations at most at the 0,05 level with score, applied amount, call and granted. The gender variable is not significantly correlated to any other variable than Call for CoE.

Secondly, for FRIPRO, the variable granted is significantly positively correlated to score (N=4322), and negatively correlated, although with Pearson's R values close to 0 with applied amount and discipline. Further, the correlation analysis show that gender is significantly correlated with applied amount and discipline.

4.4.2. Data from NIFU

I also made use of secondary data to be able to address my second hypothesis (see above). Specifically, I collected data about the gender composition of researchers in the higher education sector from the Nordic Institute for Studies in Innovation, Research and Education (NIFU). In their online R&D statistics bank, they provide information about R&D personnel in the university and college-sector sorted by field of science, position and gender for the years 2003, 2005 and 2007-2013[14] (NIFU 2017). In the table below the share of female professors in each field is presented for these years.

[14] Information about later years (up to 2015) was also available (NIFU 2017), but not relevant for the analysis as my data only extend to 2012.

Table 8. Shares of female professors in the different disciplines.

	Humanities	Social sciences	Mathematics and natural sciences	Technology	Medicine and health sciences
2001	24,34 %	15,34 %	6,85 %	2,82 %	14,25 %
2003	24,86 %	18,63 %	10,02 %	4,98 %	17,41 %
2005	24,22 %	19,14 %	10,07 %	6,47 %	20,59 %
2007	24,37 %	21,24 %	12,17 %	6,16 %	22,59 %
2008	26,40 %	21,59 %	13,83 %	6,94 %	24,24 %
2009	27,07 %	22,58 %	14,11 %	9,54 %	25,20 %
2010	28,24 %	23,19 %	14,86 %	10,02 %	27,62 %
2011	30,14 %	24,97 %	16,31 %	10,13 %	30,04 %
2012	30,69 %	27,07 %	16,97 %	10,53 %	32,47 %
2013	30,56 %	27,74 %	17,31 %	10,34 %	34,93 %

Unfortunately, data on gender was not available for researchers in the research institute sector. This could pose a problem in case the two funding programmes are popular among people employed by research institutes, who are allowed to apply under the rules of both funding schemes. However, when looking at the CoE centres that have been granted, all centre leaders are employed by a university (NFR 2016a). Because of this, I argue that the loss of gendered data on research institutes is not problematic in this case. For the FRIPRO programme, however, there are researchers from institutes among the granted applications. In addition, it is difficult to know who are the pool of potential applicants for FRIPRO. Researchers cannot apply for FRIPRO before six years after disputation of their PhD, but there is no upper limit. Therefore, potential applicants could in theory be employed as researchers, assistant professors and professors. However, when looking at the granted projects in this scheme, it is likely that it mainly targets professors (NFR 2017d).

4.4.3. Qualitative data

Lastly, I conducted a limited number of semi-structured interviews to gain further insights into NFR's evaluation criteria as well as the relation between gender and excellence among people with administrative or evaluator experience in the NFR. I contacted[15] one administrator from each of the two programmes analysed, as well as four members of the CoE-committee from the third CoE call (in 2011)16. The relatively small number of interviewees was due to time and resource limitations, including the fact that the members of CoE-committees are only publicly available for CoE III. I chose to interview the CoE-committee because this programme's most explicit stress on excellence makes of it key interest to my analysis. It would have been relevant to interview the panel members (see evaluation process), which had the greatest responsibility for, for instance giving scores, but due to my concerns of the overall-picture I chose the CoE-committee as they had a broader perspective on the scheme as a whole as well as knowledge about the background and rationale for the implementation, as board members of the Board of Executives in the NFR. The names of the panel members for the third call is available online (NFR 2011a; NFR 2016c), including a total of 15 persons from three disciplines (humanities/social science, life sciences and natural science/technology). In addition for my conernc of the borader picture, the panels all consist of international researchers, which could pose difficulties in both contacting them, as well as attaining information from them, given the limited time frame of my thesis.

The administrators were contacted because they have been working with the programmes from a different perspective, as well as having insights and experiences from early on in the application process. The administrators also have important knowledge about the similarities and differences between the two schemes, and to what degree the two programmes can be considered as comparable. This is critical to the comparative nature of my research design. All six persons I contacted also replied to my enquiry, although only four of them were available to be interviewed within the time period available. I therefore conducted three relatively short interviews over the telephone, each lasting approximately half an hour (Interview 1: 35,5 min., Interview 2: 26,11 min., and Interview 3: 25,24 min.). and the final respondent answered the questions set out in my interview guide per e-mail. Note that although I made an interview-guide to provide some structure to the conversations, the actual

[15] All were contacted by e-mail autumn 2017.
[16] There were six committee members, but I could not attain the e-mail address for the remaining two.

interactions could more accurately be called semi-structured interviews. By this I mean that I asked some questions decided upon before the interview, but let the interviewees share as much insights as possible without interference, and picked up on their responses for further clarification questions. Furthermore, the focus of both sets of interviews was slightly different in that the administrators were asked to elaborate upon the comparability of the two schemes and the role of gender, whereas the members of the CoE-committee were asked to elaborate on their role as evaluators as well as the role of gender. As such, I produced two closely related interviews guides. The interview guide for the CoE-committee members was as follows.

1. Background - How the interview is used (anonymity, read through) - Age, disciplinary background, researcher/non researcher
2. Theme I: Evaluation criteria - Weighing of evaluation criteria - The definition of excellence - Was the discussion of the excellence-term discussed? - Where the possible discussions on the term discussed regarding differences between disciplines?
3. Theme II: Gender and excellence - was the relationship between gender and excellence discussed - Potential driving forces behind a low amount of female applicants - Where there any discussion on the quality of female applicants
4. Eventual follow-up questions

The interview guide for the administrators was as follows:

1. Background - the intended use for the interview (anonymity, read-though) - Age, disciplinary background, researcher/non researcher
2. Theme I: Comparability of FRIPRO and CoE - in terms of similar/identical evaluation criteria - weighing of criteria - overall comparability
3. Theme II: Gender and excellence - On the agenda – in what terms - Few female applicants - Measures undertaken to attract female applicants - Relative success of the female applicants - The role of gender in evaluation processes
4. Eventual follow-up questions.

4.5 Analysis

4.5.1. Regression analysis

I chose to perform regression analysis to determine the relation between the gender of the proposed centre leader (Female applicant = 0, Male applicant = 1) and the requested amount of funding the application aims at. A regression analysis shows what percentage of the total variation in the dependent variable is explained by the independent variable. The percentage of explained variance is expressed by the square root of Pearsons R (R2), which varies between 0 and 1. If the value of R2 is close to 1, the independent variable(s) explain most of the variation in the dependent variable, while a value of R2 close to 0 explains almost nothing of the variance (ibid). In this part of my analysis, the dependent variable is the amount of funding requested by the applicants. Derived from the X hypotheses, I attempt to find out whether male researchers apply for a more funding than female researchers. This leads to gender being the independent variable chosen to explain the variance on the dependent variable.

However, it is not likely that gender can explain all, or even most, of the variation in the applied amounts. Therefore, I have chosen to also include some control variables. This minimizes the possibility for missing variable bias and helps to better isolate the relation between gender and applied amounts. Firstly, there could be differences between the disciplines: for instance, medicine research is likely to cost more money in terms of lab equipment than a history project. Therefore, I included discipline-dummy variables to be able to control for differences between disciplines. Dummy variables are used for variables on an ordinal scale. This means the values of the variable can be sorted, but they do not have a category width that represents equal increments of the underlying attribute (Stevens 1946). Practically, this means that even though I can separate the disciplines in different categories, I cannot say anything about the difference between the categories. Secondly, I wanted to know whether the applied amount was related to whether the application was granted or not. This is arguably a proxy for self-perceived quality, as better applicants might be more likely to apply for higher funding and be more likely to be funded. Furthermore, due to the low share of female granted applicants, this potential relation between self-perceived quality and funding requests could explain potential gendered effects on the applied amount (particularly if women have lower self-perceived quality compared to equally qualified men). Lastly, I also included the scores the applications received as a control variable. This is due to the fact that exceptionally good applications (i.e. 6s or 7s) may have requested a higher amount, simply because of the quality of the application. However, these scores only are available from the last call of CoE (see table 4), and therefore induce a much smaller number of cases. Hence, I chose to perform two separate regressions with and without this control variable.
Based on the above discussion, my regression model for testing hypothesis x thus is:

$$Y_{\text{applied amount}} = a + x_{\text{gender}}b_1 + x_{\text{discipline}}b_2 + x_{\text{granted}}b_3$$

Further, for the model including the assessment scores, the regression equation will be as follows:

$$Y_{\text{applied amount}} = a + x_{\text{gender}}b_1 + x_{\text{discipline}}b_2 + x_{\text{granted}}b_3 + x_{\text{score}}b_4$$

In both equations, the dependent variable is the amount applied for in a given application (Y). The regression coefficients estimation the relation between this dependent variable and the independent variable are given by b_1, b_2, b_3 and b_4 (Midtbø 2010). The regression coefficient

is an expression on the change in the dependent variable associated with an incremental change in the independent variable, when all other independent variables are kept unchanged. For instance, b_4 is an expression on how much the applied amount increases or decreases when the score is changed from, say, 5 to 6, controlling for all other variables. The constant a represents the value of Y when the values of all other variables equal zero. Note, finally, that for the discipline-variables I coded mathematics and natural sciences as 0, technology as 1, medicine and health sciences as 2, social sciences as 3 and humanities as 4. The interpretation of the constant a will then be the amount applied for by a female applicant from mathematics and natural science, who was not granted and received the lowest score.
Clearly, there are many other possible explanation variables. For instance, it would have been interesting to include scientific merit (CV-data). However, this is not available in this dataset. The exclusion of such potentially important variables can make my model an underspecified one (Achen 2002), which should be taken into considerations when interpreting my results.

4.5.2. Logistic regression

To study the relationship between gender and excellence, I investigate whether the gender of the applicant (as independent variable) affects the chance of being granted (as dependent variable) in excellence-funding compared to another competitive funding grant (conditional on having applied for a particular funding scheme). In my dataset, the CoE-programme is the excellence-funding and FRIPRO is the comparable funding grant. The variable measuring the gender of the applicant then becomes the gender of the proposed centre leader for CoE and the gender of the Principal Investigator for the FRIPRO programme. I also included discipline-dummy variables and control variable to pick up any differences between disciplines that might affect the estimated coefficient for my main relation of interest. The disciplines were analysed as categorical variables in SPSS.

Because the variable "granted" is a dichotomy (i.e. you can just be granted or rejected), I cannot use standard OLS regression (Gray & Kinnear 2012). Because linear regression assumes that the conditional proportions or probabilities define a straight line for values of the independent variable, a linear regression model would imply a possibility for predicting values of the dependent variable outside the 0-1 interval (Pampel 2000). Pampel (2000) further argues that even if a straight line could estimate the nonlinear relationship in some instances, there still would be problem with the assumption in standard regression models that the effect of one variable can stay the same regardless of the levels of the other independent

variables. A dichotomous dependent variable likely violates this additivity assumption for all combinations of the independent variables. In addition, regression with a binary variable violates the assumption of normality and homoscedasticity in standard linear regressions (ibid). Because there are only two observed values for the dependent variable, only two residuals exist for any single value of an independent variable and the distribution of errors cannot be normal nor homoscedastic. Even in large samples, the standard errors in the presence of heteroscedasticity will be incorrect, and tests of statistical significance will be invalid (Pampel 2000).

Further, logistic regression analysis assume that the sample size is appropriate. By this I mean that the size of the sample must be large enough, given the number of predictors. Further, logistic regression assume that there is no multicollinearity, i.e. that the independent variables are correlated with the dependent variable, but not with the other independent variables. Lastly, there should be no outliers the dataset. Outliers means values that are at an abnormal distance from other values in a random sample from a population(Grubbs 1969). Outliers in the dataset can cause a case to be strongly predicted by the model to be one category, but in reality be classified in the other category (Grey & Kinnear 2012).

Logistic regression solves the problems of nonlinear relationships, heteroscedasticity and non-normality (ibid). By eliminating the floor and ceiling (i.e. 0 or 1), we make the dependent variable limitless (Gray & Kinnear 2012). Logistic regression estimates the log-odds of onset for different values of the independent variable. In my analysis, I want to find out the probability of being granted, i.e. that the value of the dependent variable (Y) equals 1, given the value of the independent variable, gender. To do this one must convert probabilities into odds, because unlike a probability, odds have no upper boundary. In the equation below, $\tilde{Y}$ represent an estimate for the probability that Y=1, i.e. being granted.

$$Odds = \frac{\tilde{Y}}{1-\tilde{Y}}$$

This equation represents the odds of being granted. However, odds can have a lower boundary. By taking the natural logarithm of the odds, we remove this lower boundary and achieve the recoded dependent variable in logistic regression.

$$Logit(\tilde{Y}) = \log(\frac{\tilde{Y}}{1-\tilde{Y}})$$

The logit allows us to have an approximately linear relationship between the dependent and the independent variable, while it also implies that the same change in probabilities translates into different changes in the logits. Specifically, small differences in probabilities result in increasingly larger differences in logits when the probabilities are near the bounds of 0 and 1 (Gray & Kinnear 2012). This allows a theoretically meaningful nonlinear relationship between the probabilities.

My logistic regression model can then be defined as:

$$\tilde{Y} = P(Y = 1) = \frac{e^{(a+x_1b_1+x_2b_2+x_kb_k)}}{1 + e^{e^{(a+x_1b_1+x_2b_2+x_kb_k)}}}$$

Where e is the intercept for natural logarithms, x reflects the independent variables. The parameters a and b are regression coefficients that must be estimated.

The regression coefficient b shows us the change in the predicted logged odds of experiencing an event (Y=1) for a one-unit change in the independent variable independent of the level of these independent variables (Pampel 2000). For binary independent variables (such as gender), a change in one unit implicitly compares the indicator group (males) to the reference group (females). However, these estimated coefficients can be difficult to interpret intuitively. What one can interpret more easily is the sign of the coefficients. A positive coefficient means that an increase in the independent variable will lead to an increased probability of being funded (Y=1) relative to not being funded (Y=0). Even so, by interpreting the odds-ratio one can make a more substantial interpretation. The odds ratio is the anti-logarithm for the coefficient in the regression analysis, represented by Exp(B). To see the effect of a dummy variable, such as gender, on the dependent variable, this is relatively simple: 100(OR-1) (Pallant 2010). This shows the percentage change in the odds that Y=1, when the value increases by one unit (Tabachnik & Fidell 2007). When the variables have more values than two, the method is more complicated and one hasto multiply the odds-ratio with the number of changes in values of the independent variable (100(ORi-1) (Eikemo & Clausen 2007).

In conclusion, by using logistic regression analysis I can indicate the relative importance of the chosen independent variables, gender, discipline and applied amount on my dependent variable, being granted. In addition, it allows me to assess how well this set of variables explains variation in the granted-variable and gives us an indication of the adequacy of my

model by assessing goodness of fit, which will be discussed in the empirical analysis (Pallant 2010).

4.6 Validity and reliability

Social science is separated from casual observations in the effort to arrive at valid inferences by systematic inquiry (King, Keohane & Verba 1994). However, all inquiry procedures have limitations. We cannot collect all relevant data, or conduct the perfect experiment, thus limited information is often a necessary feature of social inquiry. Thus it is important to address the inherent uncertainty and improve the reliability, validity, certainty and honesty of our conclusions.

4.6.1 Reliability

Reliability refers to whether the chosen set of variables measures what is consistent in what it is intended to measure (Hair et al. 2013). In this sense, reliability does not relate to what should be measured, but rather how it is measured. This mainly applies to the possible errors in measuring a variable, and can be tested by repeating the analysis with the same measure. If the results are the same, one can say that the measuring of the variable is reliable (Ringdal 2007). The concept is of importance for my thesis in the sense that the variation in my data material should not be affected by my research design or data collection. One benefit of quantitative methods is it's natural accuracy, and little room for subjective misinterpretations, which in turn adds on my investigation's reliability (Grønmo 2011). As most of my data, i.e. information about the applicants, is given to me by the NFR I have no real influence in how these numbers are collected. However, there is no reason to believe that this is not gathered in a reliable way. Regarding my analyses, (regression, logistic regression and statistics), they conducted using SPSS, a statistical software package (IBM 2017), which will not produce different results after repeated analyses.

The interviews conducted for this thesis, however, can be a source of lack of reliability in my thesis. As the names of the different evaluation panels/committees were not available online, a part from the information from CoE III, it could pose some problems regarding the reliability of my analysis. The potential distinctive characteristics of CoE III vs CoE I and II could in theory have consequences in for instance the discussion within the committee,

different focuses of the call. As an example, in the CoE there was an explicit "societal relevance"-concern (Interview no. 4). One could imagine that this could have effects on the answers of the respondents. Further, as in all interviews, the conversation and answers could be relative to who is conducting the interview. Put differently, another researcher could have gotten other answers if the interview was to be replicated. This especially salient due to the semi-structural form of the interviews. However, I believe that the benefits of the chosen form, i.e. receiving information I possibly would not have gotten by only direct questions, are larger than the possible loss in ex-post verifiability, i.e. reliability.

4.6.2. Validity

Whereas reliability is related to the consistency of the measure(s) (Hair et al. 2013), validity refers to the "approximate truth of an inference" (Shadish, Campbell & Cook 2001 p. 34), or knowledge claim (ibid). Determining whether my investigation is valid or not, can be judged to what extent the presented evidence support my inferences as being correct. There are different approaches to determining validity, which in sum can give an estimate whether an investigation is valid or not. There are also some differences concerning whether an investigation attempts at causal versus descriptive inferences. In this thesis, the main focus is to make descriptive inferences, i.e. determining whether there is a relationship between excellence and gender. However, I use tools, regression and logistic regression, which often imply causality. Because of the duality of my method of developing my inferences, I chose to discuss validity from Adcock & Collier's (2001) concept of measurement validity, as well as Cook & Campbell (1979) which mainly concerns causal inference.

Firstly, Adcock & Collier (2001) refer to "measurement validity" in the attempt to link a concept to observations. In an investigation, we want to make observations that meaningfully capture the ideas contained in the concepts. Because most of my variables included in my statistical analysis are not technically "concepts", i.e. they are easily definable, I will not devote space for operationalisations of these. Therefore, for the purpose of this thesis, this is mainly relevant to capturing the "excellence" concept in discussion. In this sense, measurement validity will refer to whether my observations of the CoE-programme meaningfully contain "excellence". This is also argued previous in this chapter, but put in words with terminology borrowed from Adcock & Collier's (2001) article, the CoE-programme is the indicator of the excellence-concept in determining the content validity of

my investigation. Another aspect is to what extent FRIPRO encompass "an equally competitive" funding scheme. This is argued in the comparison-case in section 4.3.2.5.

The other concept in my research question, gender is operationalised by the sex of the proposed centre leader. The gender of project leaders is particularly important because they are an important figure in the research environment they represent, and it is likely that they can influence the staffing of the rest of the centre. This could in turn affect the gender balance in the centre in total. For instance, O'Connor & Fauve-Chamoux (2016) find that the gender of the project leader affects attitudes towards diversity relative to other considerations. Alternatively, I could have investigated the total gender balance in proposed centres, but given concerns of anonymity and simplicity in the dataset, this was not possible.

Gender has also been operationalised in my analysis by the share of female professors to determine the pool of potential female applicants. A problem posed with using the number of professors to determine the pool of potential applicants for both schemes is that most likely not all professors are eligible for applying for CoE. Given that it is such a prestigious scheme, it mainly targets very experienced researchers as centre leaders. Without additional data, it is impossible to say how many males and females are in fact eligible. Hence, my focus on all professors as a target group is best seen as an approximation.

Related to measurement validity is one of Cook & Campbell's(1979) types of validity, construct validity. Construct validity refers to the connection between a key concept and the chosen indicators (Gerring 2011). With construct validity in mind, the chosen research design should not deviate from the theory, or else the hypothesises cannot be proven or disproven. For my thesis, it has been important to ground my hypothesises in organisational theory, and see how organisational behaviour can be understood in my observations. For instance, it is of my opinion that I accurately measure (a part of) organisational behaviour by investigating the decision to apply or not, as well as how much the applicants request. Further, construct validity means that the chosen research design and observations should give valid and sustainable answers to the research question (Lund et al. 2002).

Regarding my third hypothesis on gender differences in success rates, I measure success rates by dividing the number of granted applicants on the number of applicants for both genders.

However, because of a very low number of granted applications in CoE, the success rates are very sensitive to small changes in the number of granted proposals. In comparison, the large N of the FRIPRO dataset does not involve a similar problem. In addition, as we can see from the summary statistics above, I should point out that the large share of applicants from mathematics and natural science in CoE could make it difficult to compare success rates with other disciplines. This is less problematic from the perspective of my central research questions, however, since I am mainly interested in gendered differences in success rates within each discipline.

Further, it could be argued that this is not a good way of measuring success rates, as it is dependent on the number of applicants. Because there are few female applicants, and given the gender equality considerations undertaken by the NFR, it could be possible that this is not a realistic measurement of success. Also given that there are few female applicants, the term "success" might be misleading, for instance if there 90% male centre leaders for a given call. A potential comparison could be to measure the successfulness in obtaining research funding on the total number of female professors. However, as discussed before, it is not likely that all professors are eligible as centre leader, given the high bar admittance of the CoE-programme.

In conclusion, these data issues should be kept in mind when interpreting the findings reported later.

5. Empirical analysis and discussion

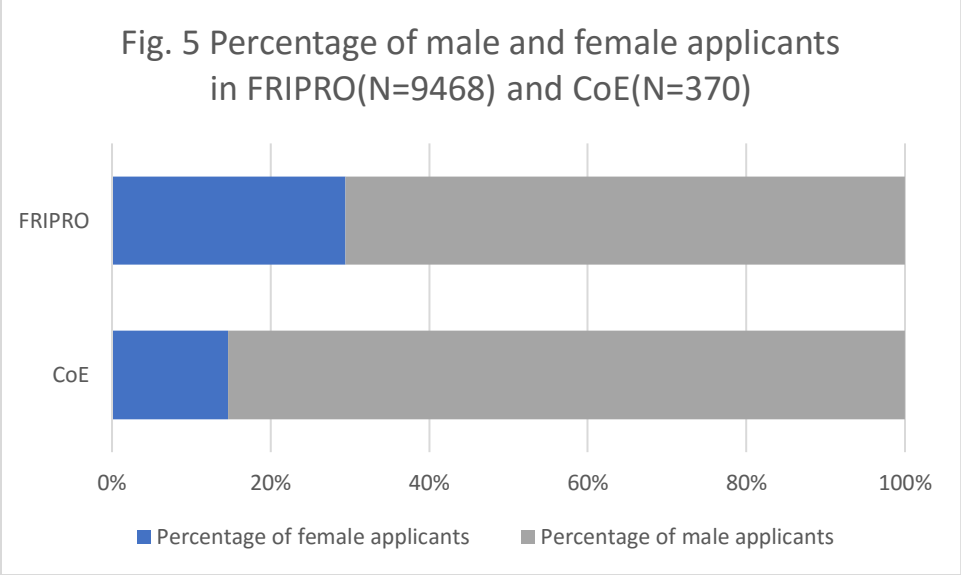
In this section I present the information discovered in the two datasets regarding application behaviour and success rates. In addition, I link my findings with the literature mentioned earlier and the hypothesis formed.

5.1. Application behaviour

5.1.1. Statistical analysis

Over the years, there have been three Centre of Excellence-calls in Norway. These have accumulated 370 applications. 128 persons applied for the first call, 98 for the second and 144 for the third. The share of women among proposed centre leaders was as low as 4,69% for the first call (6 women), but has since increased to 14,3% in the second call (14 women) and

23,6% in the third call (34 women). The same trend can be observed for the FRIPRO data. In the first year available in my dataset (i.e. 2004), there was a share of female applicants of 20,9%. Since then there has been a steady increase of female applicants leading up to an all-time high share of female applicants in 2010 (34,5%). Since then it has stabilized at about 30%. Including all years, the percentages of male and female applicants in the two programmes are shown in figure 1 below. As we can see, the share of women among applicants for FRIPRO (29,4%) is twice as big as the share of women among proposed centre leaders for CoE (14,6%).



In line with hypothesis 1, this figure suggests that women are less attracted to the CoE programme. Referring to Chapter 2 and 3 this suggest that the stress on excellence constitute an organisational stimulus that affects the behaviour of female researchers differently than that of male researchers (Simon 1945; Keiser et al. 2002. This difference could be explained by cumulative effects of initially small differences between the experiences and situations of men and women, that through years of organisational learning and/or regulation, result in different, and perhaps gendered, responses to organisational structure (Ellemers 2014). Differences between men and women in institutional support (Blake & La Valle 2000), access to networks (Husu 2001; Feller 2004; Vabø et al. 2012), international collaboration (Vabø & Ramberg 2009), division of labour (Guarino & Borden 2016), and self-perception (Fox & Lawless 2010) could also be examples on how the cumulative gendered effects of seemingly gender neutral organisational processes together present structural barriers to women advancement in academia. In this sense, the gendered outcomes, i.e. low share of female

centre leaders, might in part reflect the social practices and structure of the organisation rather than the characteristics of individuals (Kanter 1977; Scott 1995; Selznick 1957). This is in contrast to the instrumental view on organisations, i.e. that organisational structure can constrain the choices and create action capacity of the individual towards a defined goal (Egeberg 1999; Christensen et al. 2009). In this sense, the implementation of the excellence initiative, aimed at increased quality of research, had unintended side effects on the gender balance among the applicants.

However, as earlier research find, gender differences among applicants for research funding can be explained by rank (Sandström & Hällsten 2004; Blake & La Valle 2000), because women more often than men is situated in the lower grades of academia (Vabø et al. 2012; EC 2015). To get a better idea of the application behaviour of women relative to their position in the pool of *potential* applicants for the two programmes (see hypothesis 2), I have gathered data on the shares of women in academia in Norway from NIFU (2017). The CoE-scheme only targets full professors, and the average share of female professors during 2001-2012 (the period of the three first CoE calls)[17] is 19,2%. This is higher than the share of female applicants for all CoE calls (14,2%). In comparison, FRIPRO targets both professors and associate professors (in principle), and the average share of women among professors and associate professors in the years 2005-2015 is 29 %. This is also the average share of female applicants for FRIPRO. On average, therefore, it appears that women under-apply for CoE, but apply in line with their share in the pool of potential applicants for FRIPRO. This is in line with my first and second hypotheses, and as discussed in the previous paragraph, could suggest that a seemingly gender neutral organisational stimuli, as excellence, might trigger different responses in male and female professors, resulting in few female proposed centre leaders in CoE, compared to FRIPRO.

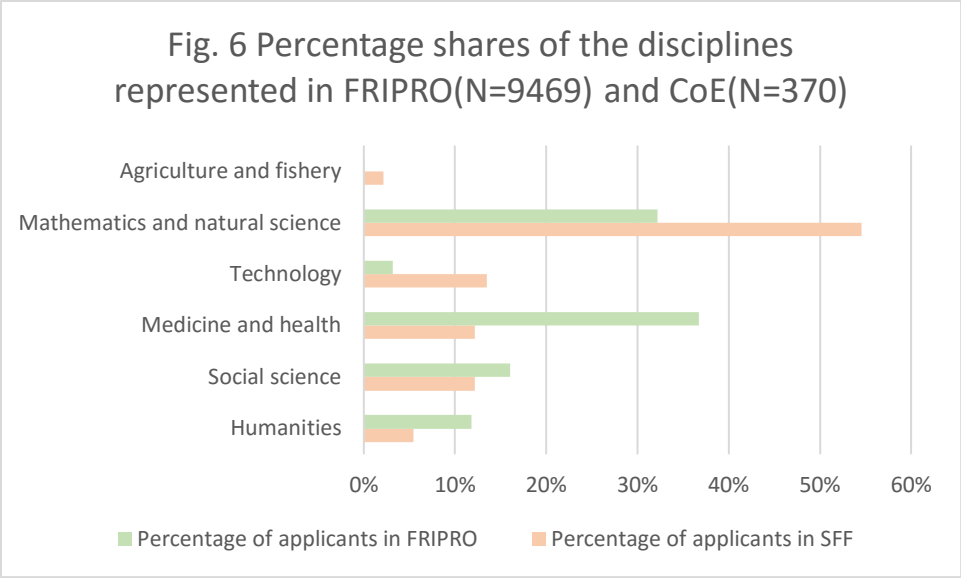
Interestingly, the picture changes somewhat when looking separately into specific years/calls. In the years of CoE-calls (2001, 2005 and 2011), the share of female professors was respectively: 13,3%, 16,9%, and 22,9%. The share of female applicants in these same years was 4,7%, 14,3% and 23,6%. Hence, the difference between potential applicants (measured by share of female professors) and actual applicants is substantial in the first year, but gradually disappears over time. This also holds true when dividing the number of applicants

[17] Data on 2002, 2004 and 2006 are missing from NIFU.

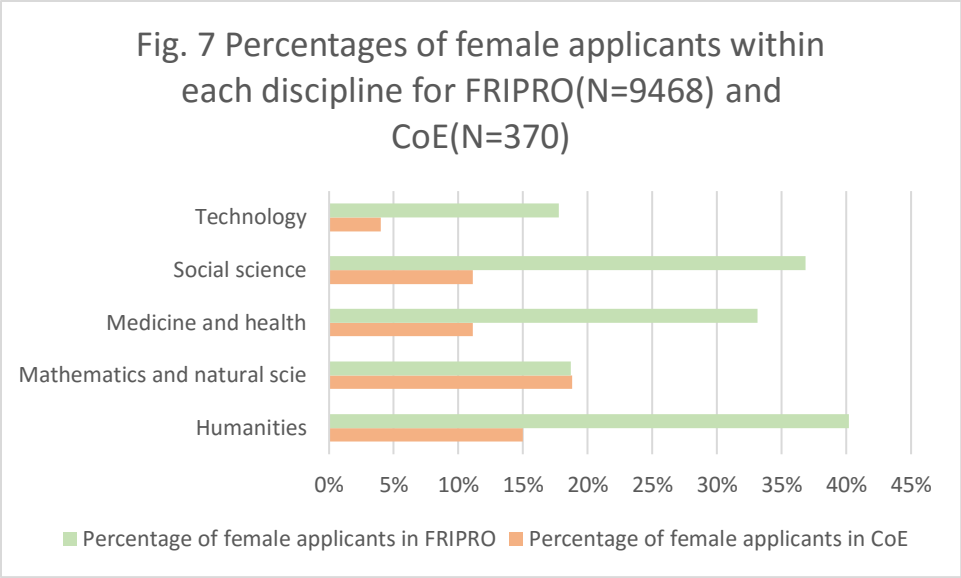
by the number of professors. For the first call, 6,14% of male professors applied for CoE, while only 1,97% of female professors did the same. In the second CoE call, the numbers were more similar with 3,8% for male professors and 3,1% for female professors. In the third call, 4,3% of both male and female professors applied for CoE. For FRIPRO, a bigger share of the pool of professors and associate professors apply for the scheme: on average 11,26% of women and 11,69% of men. Further, the average difference between men and women's application rates (i.e. number of applicants divided by number of professors/associate professors) for all years was only 0,07 percentage points.

In conclusion, even though on an aggregated level there are differences between male and female researcher's application behaviour in CoE, which is in line with hypothesis 1 and 2, it appears that men and women in more recent calls behave relatively similar when taking into account the pool of potential applicants for each call. This could mean that there was an "excellence-effect" in the first call of CoE, but that it diminished over time. This development is also true for FRIPRO. When comparing the two, the biggest difference is that a smaller pool of the potential applicants (both men and women) apply for CoE, compared with FRIPRO. This suggest that there are no gendered responses to excellence as an element of organisation structure. However, in line with hypothesis 4, there still could be gender differences when comparing within fields of science.

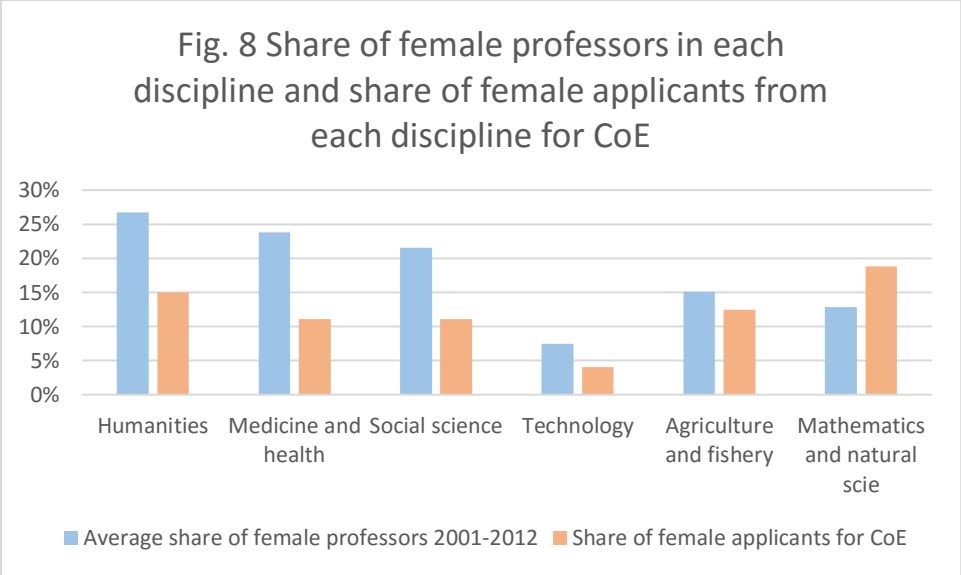
In this paragraph, I study possible gendered application behaviour by analysing which fields of science are represented in the two programmes – and assessing the share of men and women in each field. This is done in figure 4. For FRIPRO, the biggest share of applicants stems from medicine and health (37%). Then, 32% of the applications stems from mathematics and natural science, followed by 12% and 16% from the humanities and social sciences, respectively. Technology and agriculture and fisheries only constitute about 3 % of the applications. In the CoE, however, over half of the applications (55%) stem from mathematics and natural science. Applications with an origin in research on technology make up the second largest group with 14%. Medicine and health and social sciences provide the same share of applicants (12%), followed by the humanities (5%) and agriculture and fishery (2%).



From this figure, we can see that subjects considered as "exact sciences" are dominant in both programmes. However, it seems that the CoE-scheme attracts mathematics and natural science and technology even more, which is consistent with the findings of Henningsen & Liestøl (2013). The disciplines that could be considered "soft sciences" both drop several percentage points in CoE compared with FRIPRO. Since women are more often found in "soft sciences" (EC 2015), it becomes interesting to see whether female applicants are more represented among the applicants in some fields of science than others (see figure 7). In FRIPRO, women make up 40% of the applications from the humanities, followed closely by social science with a share of 37% female applicants. The disciplines with the lowest share of women among applicants within the discipline is mathematics and natural science at 19% and technology at 18%. In sharp contrast, the share of female applicants within mathematics and natural science is the highest of all subjects in the CoE-programme. All the other fields of science have a lower share of female applicants for CoE than for FRIPRO.



This indicates, in line with hypothesis 1, that for most disciplines, fewer women apply for CoE than FRIPRO. This is, however, not true for mathematics and natural science. Clearly, these observations could again be affected by the share of women among potential applicants. In the figure below, I have therefore calculated the average share of women in each discipline for the years 2001-2012 (using data from NIFU) and compared it to the share of female applicants within each field.



From this figure, we see that for most fields of science the share of women applying within each field is lower than the share of female professors that in theory could apply, which is in line with hypothesis 2. However, it is very interesting that for mathematics and natural science, the opposite relation materializes.

Further, I found the average number of female professors for the same years (NIFU 2017) and divided it by the number of female applicants to show the share of female professors that did in fact apply as centre leaders. This was then compared to the numbers of male professors/applicants. The numbers showed that for humanities, 2% of female professors[18] applied, whereas 4% of male professors did the same. In social sciences, 3% of female and 7% of male professors applied. Further, 4% of female professors and 11% of male professors within medicine and health sciences applied. In technology, 14% of male professors applied, whereas 7% of female professors did the same. In sum, for all mentioned disciplines, a larger percentage of men apply, compared to women. However, in mathematics and natural science, 32% of male professors apply as centre leader, and 50% of female professors do the same. Because there is reason to believe that there are large differences over the years (i.e. the share of female professors within this subject was increasing since 2001), I separated the numbers into each call for CoE for mathematics and natural science. This showed that for the first two calls the share of applicants among the professors were quite similar (around 5-7% for both genders), however, in the third call, 19,64% of male professors applied as centre leaders, and 32% of female professors did the same. This suggest as before, that the stress on excellence seem to attract researchers from mathematics and natural science, however, for the third call in 2011, this effect seem to be particularly strong. [19]

Overall, my analysis thus far indicates that there are differences in application behaviour between women and men on an aggregated level in the CoE-programme, which is consistent with the findings of Bornmann et al. (2009). However, when separated into years, we find that these differences disappear after the first call when compared with the pool of potential applicants. Still, when we look at the differences within each field of science, there seems to be a gender effect[20] For most disciplines, the share of female professors is much higher than the share of women that apply. This indicates that more women than men might be reluctant to apply for CoE, which is in line with my general research hypotheses. However, for mathematics and natural science, the opposite is the case. It thus appears that women are over-represented in terms of applications to excellence schemes in disciplines where they are

[18] Again, as measured by the average number of professors, and due to that there is a development over time (i.e. the number of professors changes) this could be misleading as per the discussion about the application rate mentioned above. This issue consider both genders.
[19] The numbers can be found in full in the appendix.
[20] This also holds true when removing the data from the first call, that, in light of the previously mentioned analysis, might have had a particularly strong gender bias.

under-represented (and vice versa). Due to the quantitative nature of my data, it is difficult to explain why this is so, but one could suggest that, following the argument of Henningsen & Liestøl (2013), the excellence criteria appeals so much to the hard sciences that "everybody" applies. In this way, the potential negative effect of excellence on gender is outweighed by the positive effect on the discipline. This could suggest that the "framing" of excellence activate various groups differently. From an organisational perspective, it could mean that the cumulative learning and logic of appropriateness of the organisation differ between disciplines, which in turn lead to different responses to stimulus. Thus, the possible effect excellence has on gender is through the effects of excellence on disciplines.

5.1.2 Regression analysis of applied amount

In this section, I present my findings from a regression analysis on the amount applied for under the two funding programmes. This intends to formulate an answer the third hypothesis: i.e. the gender of the proposed centre leader/principal investigator affects the amount the applicants apply for, controlling for other variables. The results are summarized in table 8(for CoE) and compared with FRIPRO in table 9.[21]

Table 8. Regression results for CoE[a] N=353

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	124,130	7,983		15,548	,000
	Gender, where female=0, male=1	2,511	8,510	,015	,295	,768
	Technology	1,332	9,183	,008	,145	,885
	Medicine and health sciences	-51,671	9,623	-,285	-5,370	,000
	Social sciences	-19,509	9,262	-,111	-2,106	,036
	Humanities	-35,998	13,313	-,142	-2,704	,007
	Granted	33,613	10,910	,160	3,081	,002

a. Dependent Variable: Applied amount, adjusted for outliers

[21] The complete SPSS-outputs are available in the appendix

From this table, we first of all learn that the constant is 124,13. This means that when all the variables are equal zero (i.e. the proposed centre leader is female, from mathematics and natural science, and is not granted), the application requests 124 million NOK. Further, the regression coefficient b_1(B in the table) expresses how much the requested amount is changed by a shift from 0 to 1 in the gender variable, controlled for discipline and being granted or not. The regression coefficient indicates that male centre leaders on average apply for 2,5 million NOK more than female centre leaders (all else equal). This is, however, not a significant finding given that the p-value is 0,7. The analysis thus does not support the hypothesis that gender affects the amount applied for. Hence, in contrast to previous research (EC 2009), my analysis cannot confirm that female applicants apply for less money compared to male applicants in CoE.

Because the discipline variable is categorical, I have used dummy variables for each discipline, whereby mathematics and natural science is defined as the reference category. In this sense, the interpretation of the regression coefficients for the discipline-dummy variables show the difference in Y caused by the 'shift' from mathematics and natural science to the discipline in question. In other words, it shows how applicants from a given science apply differently from applicants in mathematics and natural sciences. In my analysis, the only significant finding at a 5% significance level is for applicants from medicine and health. On average, this analysis show that applications stemming from mathematics and natural science appear to request more than applications from medicine and health sciences, controlling for gender and being granted or not.

Regarding the granted-variable, this is also significant and shows that granted applications apply for more funding than non-granted applications, controlling for the effect of gender and discipline.

The R square of the model is 0,081 and the adjusted R square is 0,068, which means that the model explains approximately 7% to 8% of the total variance in applied amount. This is reasonable since, as mentioned before, there are likely to be other variables that affect the amount requested by applications (for instance merit).

When looking at FRIPRO, we see that the picture is somewhat different. For the sake of comparison, I illustrated the regression coefficients from the analysis of the two programmes in one table, where the significant findings is marked with an ** for p-values <0.001 and * for p-values <0,005 which indicates that the results are significant on respectively a 99% and 95% level.

Table 9. Regression coefficients for the two programmes

Variable	Regression coefficient CoE	Regression coefficient FRIPRO
Gender	2,511	-0,331**
Technology	1,332	0,891**
Medicine and health sciences	-51,671**	-0,009
Social sciences	-19,509	-0,021
Humanities	-35,998	0,787**
Granted	33,613*	-0,327*

This table show that the effect from the gender variable, although not significant in CoE, is negative in FRIPRO. The effect is also much smaller, but this could reflect that the applied amount is a lot smaller in FRIPRO, as shown in table 7. The interpretation of the regression coefficient for FRIPRO is thus that applications with female centre leaders request 331 000 NOK more than applications with male centre leaders, all other factors equal. This is significant on a 99% level suggesting that there might be an effect of gender on the applied amount, however, it is not as hypothesised that male applicants request larger amounts than female applicants.

Regarding the disciplines, the regression coefficients show somewhat surprisingly that applications from the humanities apply for almost 800 000 NOK more compared to applications stemming from mathematics and natural sciences. It is also unexpected that the

effect of being granted, compared to being not granted, is negative in FRIPRO, when the opposite appears in CoE (according to this regression analysis).

In sum, I did not find support of my hypothesis that male applicants apply for a larger amount of funding, compared to female applicants, controlling for other variables, which earlier research have found (EC 2009), in these datasets. On the contrary, in FRIPRO applications with female applicants applied for more than male applicants. As discussed earlier, it is impossible to say anything about the reason for this, given my data. However, if requested amount were to be related to self-perception, this analysis suggests that women do not perceive themselves to be less qualified for applying for FRIPRO, as in the case of Fox & Lawless (2010) in studying the decision to run for office.

5.2 Successfulness in obtaining research funding

5.2.1. Success rates

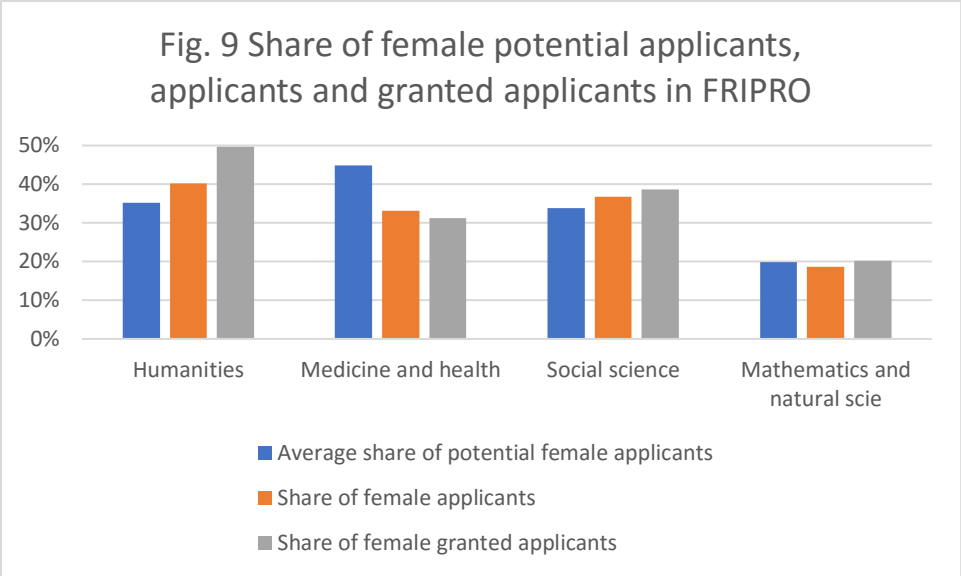
To assess my third hypothesis on gender differences in success rates, as a first approach I will compare the share of men and women among applicants and the share of men and women among granted applicants for both programmes. As mentioned earlier, in CoE 14,6% of the applications proposed a female centre leader. Among the 34 granted applications, the female centre leaders (20,6%) constitute a greater share than among the applicants. The same cannot be seen in FRIPRO, where there is only a 0,12% increase between the share of female applicants and the share of female granted applicants. This indicates that the success rates of female applicants might be higher than for men in CoE – conditional on having applied for the funding. Looking more directly at these gendered success rates (i.e. dividing the number of granted applicants by the number of applicants for each gender) confirms this. For all three calls and disciplines represented in CoE, the success rate of women is 12,96% compared to a success rate for men of 8,54%. In comparison, female and male applicants have an almost identical success rate across all years and disciplines in FRIPRO: respectively 11,84% for females and 11,79% for males.

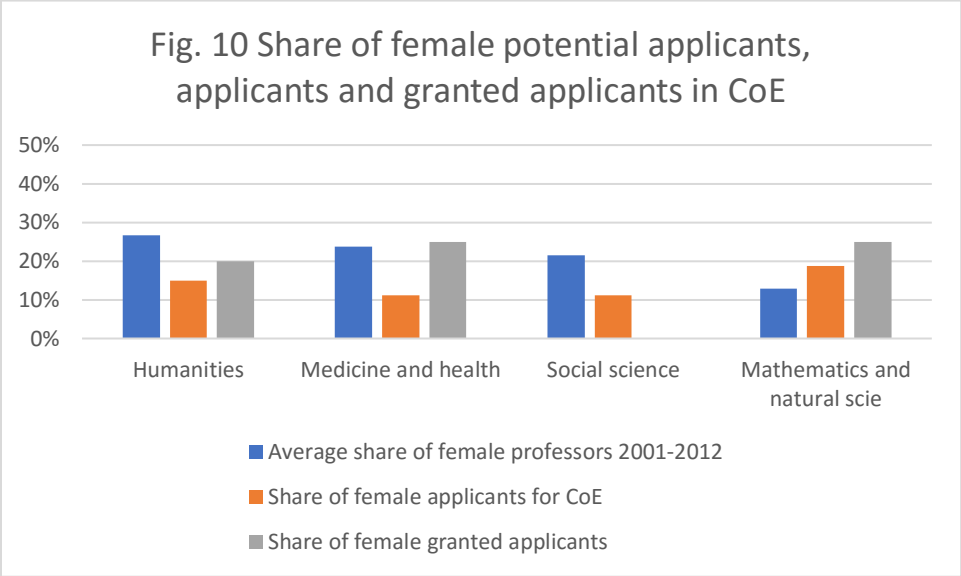
While the success rates of women in FRIPRO resonates with the findings of Blake & La Valle (2000) and Brouns (2000) that there are only small differences between male and female researchers, for CoE the picture is different. As shown in earlier research (EC 2009), the success rates of women in CoE is higher than for men, measured by the number of applicants from each gender. Related to the theoretical discussions in chapter 2 and 3, this could suggest

that there is a self-selection effect at play when implementing an excellence-frame on research funding. In this sense, female professors might refrain from applying as proposed centre leaders in the CoE schemes unless they are specifically qualified. This could be an example of the cumulative effect of organisational learning. Deriving from the literature discussed before, there might be that because female professors have experienced a disadvantage before (for instance as Fox & Lawless (2010) study that show that women are less likely to be recruited than men in similar positions), their perception of their own eligibility for applying for excellence-funding might be lower, and thus they ensure that they are more than qualified before they actually apply. Thus, by framing and organisational element "excellent", and thus setting the bar higher for obtaining funding, in addition to increasing the uncertainty in assessing it (Langfeldt 2006), it may produce stronger effects resulting in distinct preferences for behaviour (Druckman 2011).

However, as on the subject of application behaviour, there might be differences over time and between disciplines, so to firmly establish whether my findings might suggest such effects, it is necessary to have a closer look at mentioned factors. When dividing the data across calls and/or disciplines, the numbers for CoE become very small. While this complicates a comparison of success rates (e.g., there are no granted applications from female researchers of social science or technology), I chose to compare the share of female potential applicants, applicants and granted applicants for each discipline[22] in the two schemes.

[22] Data from technology and agriculture and fishery is left out due to small numbers among both applicants and granted applicants.





It is difficult to make out a clear pattern from the figures above, however it seems as though for medicine and health and the humanities the hypothesises are correct. Firstly, there is a drop from potential applicants to actual applicants, and further the share of granted female applicants are higher than the share of female applicants. This suggest support for the third hypothesis, that female researchers do not apply if they are not especially well qualified. This is also true for mathematics and natural science, even though the pattern is different regarding potential applicants/applicants. This would suggest that there are very many extraordinary talented female researchers from mathematics and natural science, however this could also be explained by a tendency in excellence schemes to valuate harder sciences more often than softer sciences, as discussed before.

In sum, the statistical analysis show support of the fourth hypothesis, that women are more successful in funding schemes explicitly stressing research 'excellence' compared to other funding programmes. However, there might be limitations to this approach, so to get deeper insights in this issue I conducted logistic regression, as discussed in the next section.

5.2.2. Logistic regression

As a second approach moving beyond the descriptive statistics presented as so far, I also estimated a number of logistic regression models. The model contains three independent variables; gender and the main independent variable, and discipline and requested amount (adjusted for outliers) as control variables. To measure the 'goodness of fit' of the model (i.e. give an indication on how well the model performs), one can use the omnibus test of model coefficients. The full model (N=354) containing all predictors has a chi square χ^2 value of 22,43 with 6 degrees of freedom and a p value of 0,001. This means that the model is statistically significant, which indicates that the model is able to distinguish between applicants that was granted or rejected based on the included independent variables (Pallant 2010). In addition, we can find how useful the model is in predicting the value of the dependent variable by looking the Cox & Snell R square and Nagelkerke R squared. The values of these measures provide an indication of the amount of variation explained by the model from a minimum value of 0 to a maximum of approximately 1 (ibid). From the results of my analysis, the model as a whole explained between 6,1% (Cox and Snell R square) and 13,9 % (Nagelkerke R squared) of the variance in the dependent variable. Due to the fact there were very few cases of granted applications, the analysis programme SPSS estimated that no applicants would be granted, before any independent variables were entered into the model, i.e. it only correctly classified 91,5% of the cases. However, when the variables were included in the analysis, the model correctly classified 91,8 % of the cases.

The regression results are summarized in table 10. In my model, gender and all the disciplines have a negative B-value, which indicates that an increase in the independent variable will result in a decreased probability of the dependent variable being 1. This means that a proposed male centre leader, compared to a female one, is less likely to be granted – all other factors constant and conditional upon having applied. For the discipline-variables, this means that an application from any of disciplines included in the model (technology, medicine and health, social sciences and humanities) is less likely to be granted compared to an application stemming from mathematics and natural sciences. However, the effects of gender and most

disciplines are not statistically significant at 95% confidence, with the sole exception being the dummy for the technology discipline. This indicates that my findings cannot confirm that there is a relationship between gender and the likelihood of being granted in the CoE-programme.

Overall, only two of the independent variables made a unique statistically significant contribution of the model: i.e. requested amount and technology. In terms of effects size of these two variables, an odds ratio of 0,097 means that the odds of being granted is 90,3% lower for applicants from technology (i.e. (0,097–1)*100 = 90,3), compared to applicants from mathematics and natural science, all factors being equal. The statistically strongest predictor of being granted is the requested amount of funding, which confirms my supposition above that this variable is closely linked to (self-perceived) quality of the applicant and application. The odds ratio indicates that when an applicant applies for one additional unit of funding (expressed in million in my dataset), the odds of being granted is 1,2% higher (i.e. (1,012 – 1)*100 = 1,2), all factors being equal.

Table 10. Logistic regression results for CoE, N=354

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Gender, where female=0, male=1	-,364	,551	,436	1	,509	,695
	Reference group (Math.&Nat.sci)			17,887	4	,001	
	Technology	-2,338	,656	12,700	1	,000	,097
	Medicine and health sciences	-1,451	,744	3,809	1	,051	,234
	Social sciences	-,417	,692	,362	1	,547	,659
	Humanities	-1,715	,810	4,479	1	,034	,180
	Applied amount, adjusted for outliers	,012	,004	8,696	1	,003	1,012
	Constant	-2,086	,825	6,399	1	,011	,124

As can be seen in table 11, the main findings show a very similar tendency for FRIPRO, although the size of the available dataset here makes that more of the coefficients reach statistical significance at conventional level (i.e. 90%, 95% or 99%). …

Table 11. Logistic regression results for FRIPRO, N=9414

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a	Gender where female=0, male=1	-,111	,072	2,368	1	,124	,895
	Reference group (Math&nat.sci)			70,983	4	,000	
	Technology	,381	,110	12,091	1	,001	1,464
	Medicine and health sciences	,343	,192	3,214	1	,073	1,410
	Social sciences	-,225	,113	3,967	1	,046	,799
	Humanities	-,154	,129	1,426	1	,232	,857
	Applied amount adjusted to remove outliers	-,036	,011	11,198	1	,001	,964
	Constant	-1,743	,134	168,136	1	,000	,175

Comparing the results in tables 10 and 11, we find that the gender coefficient remains statistically insignificant in both cases. Nonetheless, its size is more than three times bigger in the CoE results relative to the FRIPRO results. Naturally, this should be interpreted with caution given the lack of statistical significance. Even so, assuming unbiased estimation of the coefficient estimates this finding suggests that gender appears more important in the programme stressing excellence more explicitly. More specifically, it suggests that women are somewhat more likely to receive funding in CoE than FRIPRO (relative to men) – conditional on having applied for the funding. This direction of my findings across both programmes is at least in line with the idea – expressed in the theoretical section – that there is a stronger tendency towards self-selection of higher-quality women when excellence is stressed more extensively. However, one cannot conclude that my fourth hypothesis is true.

Regarding my fifth hypothesis on differences between disciplines, there seem to be no significant covariation of discipline of the applicant and being granted or not. Even though there is a difference between mathematics and natural science and technology, this does not support the last hypothesis.

5.3. Analysis of qualitative interview data

In this section I complement my quantitative findings previously discussed with additional information obtained from the interview conducted. In the interviews, three main subjects were brought forward (see methodology section). In this section, I particularly focus on the interview information regarding the share of female applicants (hypothesis 1), the pool of potential applicants (hypothesis 2) and the share of granted female applicants (hypothesis 4). Further, I attempted to shed light on the potential driving forces behind, or explanations of, gender differences among applicants and granted applicants, as well as other factors that emerged in the interviews, and thus supply to the theoretical discussion.

When asked about *potential driving forces behind the low number of female applicants,* one of the respondents from the CoE-committee answered that this was a subject discussed in the Board of Executives of the NFR, but not in the committee. The CoE-administrator (Interview no. 1) said that the fact that there are few female applicants is due to the fact that the pool of applicants is limited, referring to the share of female professors in Norway. Furthermore, because only the best professors are eligible for CoE-funding, there were "fewer women that were so good that they fit" (as centre leaders). Similarly, the respondent from FRIPRO said that the biggest problem (of gender equality among granted applicants) is that there are no applications to choose from (Interview no. 2). The respondent continued with saying that they cannot utilise the moderate quotation if the scientific quality of the female applicants is not at the same level as the male applicants.

This view was somewhat challenged by one of the respondents from the CoE-committee (Interview no. 4). The respondent speculated that the role of the individual as centre leader could be exaggerated. If the length of an applicant's CV was to be considered the most important (for being granted or not), this takes the pool of applicants to an age segment where there are less female researchers. He admitted that this was a risk for the applicants, but that maybe it should be the best leader - and not the most merited researcher - that should be chosen as proposed centre leaders. This point was also touched upon by the CoE-administrators. However, they said that if the proposed centre were not to choose the best

researcher as centre leader in an application, you "in a way loose a centre" [23]. The respondent also said that, since research environments could be "tough" and require one to be "on top" in all discussions on a daily basis, one can only gain authority as leader from how scientifically qualified the person is.

The respondents thus touched upon my second hypothesis, but there were disparate opinions in whether this could explain the low share of female applicants and granted centre leaders in the CoE-scheme.

The respondent from FRIPRO was the only one to put forward organisations as possible driving forces behind low female application rates (Interview no. 2). The respondent said that they (in FRIPRO) encourage institutions to support more female applicants. This is connected to the fact that it is officially the institutions that apply for funding, because the (host)institution have to approve an application before it is sent from their organisation. The respondent said that "there is work to do for the universities in trying to get women to apply". This could be argued to add on to the relevance of organisations in explaining the relationship between gender and excellence. In the same line of thinking, there is room for the host-institutions to gain knowledge about possible gendered practices that might affect the opportunity structure for female researchers (Fox & Lawless 2005).

The respondents have different ways of *suggesting solutions* to the problem (without being asked to present such solutions). The respondent from FRIPRO say that it is important that NFR does what it can to make sure that women are able to obtain funding in the early stages of their careers. The way the respondent frames it is that "if you do not get a position early in the career then you do not get to the Researcher-project-level, and definitively not to the CoE-level". The respondent also talks about the uncertainty inherent in a career in research, and that it can take many years before one is tenured. One of the respondents from the CoE-committee suggests a solution in the way of mentorship-programmes. The universities should choose to support the 'young and talented', because "it is not enough to let them (women) compete until they are 50, as they often are when establishing a centre", because there are many ways to "fall out" before that.

[23] This was said somewhat unclearly, in several short sentences, so it could be that I misunderstood the respondent's meaning.

This could be seen as a way of discussing the organisational learning that individuals experience, which in turn affects behaviour through potential different responses to organisational stimuli. Further, that this process has "gone too far" at the level of researchers targeted by the two schemes of this study. However, this could have implications for the perceived importance of gender equality measures at the CoE and FRIPRO-stage.

The *definition of excellence* was only discussed explicitly in the interviews with the respondents from the CoE-committee. The discussion was very brief with one of the respondents (Interview no. 3), who stated that "in short, the scale is the potential to conduct research that can be published in top international journals". The other respondent, however, said that the committee was confident in the disciplinary panel's assessment of excellence, and further that excellence was evaluated by scientific excellence. However, when asked to elaborate, the respondent said that even though evaluators obtained guidelines, an evaluation will always be a matter of interpretation and a weighing (of different criteria). The respondent said that evaluators have a demanding task of choosing from "fantastically good applications", i.e. equally high scientific quality, and that then "other things often (…) what do you then emphasise?".

As discussed in section 2.2. this could be said to reflect the discussion on the inherent uncertainty in assessing excellence (Langfeldt 2006; Langfeldt et al. 2016; O'Connor & O'Hagan 2016). Further this could also be seen as a consequences of "framing" (Druckman 2011) the scheme with the gender-neutral element 'excellence', without taking into consideration the possible differentiated effects of the framing. The first respondent appears to have a relatively instrumental view on the definition, and thus the criteria, of excellence. As discussed by Langfeldt et al. 2016, broad criteria, as the "ground-breaking" feature of the CoE scheme (see section 4.3.2.1), may be difficult to measure in an evaluation.

The respondent from FRIPRO said that, as one measure they recently had taken to *ensure gender equality* in the application process, was giving a presentation of potential gender biases in evaluating research to the panels before they assess applications. These presentations among other things include that adjectives are used differently on men and women, and that "women are less confident" in their way of writing an application, in addition to that people have "a basic, cultural, perception of women belonging in the home instead of in the worklife". The respondent also emphasises there are also cultural differences between

countries, and that the evaluators they use in their panels are from all over Europe. The respondent also noted that the panels showed "relatively big interest" in discussing these subjects.

One of the respondents from the CoE-committee also mentioned reading literature saying that if one focuses very much on excellence, unconscious bias can play in for men and women. However, not directed at the respondent's experiences of the CoE-programme, it poses an important question for my research question. This was the only explicit time where the potential trade-off between gender and excellence were brought up in the interviews, which is interesting, as both gender equality and excellence is two important focus points, and goals, of the NFR, as discussed earlier.

In conclusion, information from the interviews have firstly shown that most of respondents view the lack of eligible female applicants as the main problem, related to my second hypothesis. Given this focus, it appears as though the respondents believe that the largest effort to deal with lack of gender balance should be directed at organisations/institutions that deal with researchers earlier in their career. There seem to be no perceived trade-off between gender equality concerns and excellence, however, most of the respondents view the lack of gender balance as a problem, and emphasise that they implement measures to correct this.

6. Concluding remarks and future research

To conclude, there is persistent gender imbalance in the higher echelons of academia. By investigating an element of academic career advancement, research funding, I have attempted to further develop our understanding of the sources behind the imbalance. Although research fairly recently has begun to attract the attention of researchers, the European Commission stands forward as a main communicator of the possible trade-off between gender equality and excellence in research (EC 2000; 2004; 2009). The tradition of gender equality is strong in the Nordic countries, and has been so for a longer time compared to other European countries (Bergman & Rustad 2013). The Nordic countries have also presented evidence of the possible damaging effects of an increased stress on excellence on gender balance in academia (Sandström et al. 2010). Researchers thus call for increased understanding of how the constructions of excellence can be connected to the reproduction of gender inequality in academia (Van den Brink & Benschop 2011). Thus started my contribution to this understanding, by investigating whether stressing excellence in research funding schemes

affect the gender balance in applications and funding. Mainly taking form as a descriptive investigation, I attempt to reveal broad-based patterns in the researcher population in Norway. Further, by investigating the Centre of Excellence programme in Norway, and by comparing it to another equally competitive scheme, I study whether application behaviour and successfulness in obtaining funding differs between men and women, and whether these effects are stronger in the excellence initiative.

The excellence initiatives in Europe have gained importance and legitimacy as important tools for increasing the quality of national and international research. This is also the case in Norway, which implemented the excellence funding programme Centres of Excellence in 2001. Norway have strong traditions of gender equality, maintained in laws as well as the society, with anchorage in ideals of democracy and fairness (Bergman & Rustad 2013). However, as my case description shows, there seem to be less discussion on the potential trade-offs between gender equality and excellence in research funding. However, as mentioned in the interviews, gender equality is an important concern for the Norwegian Research Council.

My main findings are that are that on an aggregated level, there seem to be differences between the application behaviour of men and women in the CoE, compared to the FRIPRO. This could suggest, as insights from organisational and psychological theory presume, that the implementation of excellence could result in different responses for men and women. Further, this could be connected to differences in self-perception among the genders, which in turn could be explained by organisational learning over time, resulting in different behaviour. Another element of application behaviour is the amount requested by the applicants. My findings showed no support for my hypothesis, that men apply for more funding than women, possibly reflecting a difference in perception of own qualifications for applying to any of the programmes. This also holds for rank, but there are differences in years and among disciplines. Mainly, as Liestøl and Hennigsen discussed, there seem to be an particular link to the framing of funding as ‘excellent’ and the hard sciences, especially mathematics and natural science.

Seondly, my main findings on successfulness in obtaining research funding showed that from statistical analysis it would appear that women have higher success rates, relative to by the number of female applicants, in CoE than in FRIPRO. This would suggest that there is a self-

selection effect at play where women only apply when they are especially qualified, for instance given the theoretical discussion mentioned above. However, when running a logistic regression analysis, there seemed to be no significant correlation between gender and being granted or not in CoE.

In summary, there seem to be some different responses to the organisational stimuli of excellence, however this is not clearly shown in this data. The most interesting find of this thesis is that the effect of excellence on mathematics and natural science appear to be so strong that it nullifies the possible negative effect on gender, resulting in very high percentage of both male and female applicants from this discipline in CoE, compared to FRIPRO. Thus it might suggest that the effect excellence has on gender might be an indirect one, thorugh the discipline. However, there were little covariation between gender and discipline in my logistical regression analysis.

My analysis thus calls for further research. A main fault of this thesis is the lack of qualitative data on potential applicants, to be able to determine what are the main driving forces behind a low percentage of female applicant in excellence-schemes. Further, to be able to test the hypothesis that there might be a self-selection effect at play, one would need CV-data. I believe that with this additional information one could obtain important information about the relationship between gender and excellence, which would be useful for both the NFR, the applicants, the organisations the applicants are embedded in, as well as for the society as a whole. As discussed earlier the gender imbalance in academia might represent a poor use of talent among the population, as well as presenting an inequality in the society, where it would seem that female researcher might not have the same access to excelling in an academic career.

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8. Appendix

Appendix A Correlations output

I. Correlations for variables in CoE-dataset

		Granted	Applied amount, adjusted for outliers	Call for Coe, I, II or III	Gender, where female=0, male=1	Score, ranged from 0-4, where 0=3 and so on.	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing
Granted	Pearson Correlation	1	,109*	-,016	-,054	,383**	,131**
	Sig. (1-tailed)		,019	,379	,150	,000	,006
	N	370	362	370	370	139	362
Applied amount, adjusted for outliers	Pearson Correlation	,109*	1	,083	-,003	,080	-,204**
	Sig. (1-tailed)	,019		,057	,476	,175	,000
	N	362	362	362	362	138	354
Call for Coe, I, II or III	Pearson Correlation	-,016	,083	1	-,229**	.c	-,442**
	Sig. (1-tailed)	,379	,057		,000	,000	,000
	N	370	362	370	370	139	362
Gender, where female=0, male=1	Pearson Correlation	-,054	-,003	-,229**	1	,071	,078
	Sig. (1-tailed)	,150	,476	,000		,202	,069
	N	370	362	370	370	139	362
Score, ranged from 0-4, where 0=3 and so on.	Pearson Correlation	,383**	,080	.c	,071	1	,304**
	Sig. (1-tailed)	,000	,175	,000	,202		,000
	N	139	138	139	139	139	139
Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing	Pearson Correlation	,131**	-,204**	-,442**	,078	,304**	1
	Sig. (1-tailed)	,006	,000	,000	,069	,000	
	N	362	354	362	362	139	362

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

c. Cannot be computed because at least one of the variables is constant.

II. Correlations for variables in FRIPRO-dataset

		Granted	Applied amount adjusted to remove outliers	Year	Gender where female=0, male=1	Score from 1-7	Disciplines represented ed as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing
Granted	Pearson Correlation	1	-,035**	-,076**	-,001	,472**	-,067**
	Sig. (2-tailed)		,001	,000	,943	,000	,000
	N	9470	9425	9470	9468	4322	9461
Applied amount adjusted to remove outliers	Pearson Correlation	-,035**	1	,340**	-,054**	,147**	,056**
	Sig. (2-tailed)	,001		,000	,000	,000	,000
	N	9425	9425	9425	9423	4320	9416
Year	Pearson Correlation	-,076**	,340**	1	-,056**	-,006	,064**
	Sig. (2-tailed)	,000	,000		,000	,694	,000
	N	9470	9425	9470	9468	4322	9461
Gender where female=0, male=1	Pearson Correlation	-,001	-,054**	-,056**	1	,020	-,177**
	Sig. (2-tailed)	,943	,000	,000		,185	,000
	N	9468	9423	9468	9468	4322	9459
Score from 1-7	Pearson Correlation	,472**	,147**	-,006	,020	1	-,087**
	Sig. (2-tailed)	,000	,000	,694	,185		,000
	N	4322	4320	4322	4322	4322	4320
Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing	Pearson Correlation	-,067**	,056**	,064**	-,177**	-,087**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	9461	9416	9461	9459	4320	9461

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

Appendix B Regression output

I. Regression output for the CoE-dataset

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,325[a]	,105	,090	55,97425

a. Predictors: (Constant), Granted, Gender, where female=0, male=1, Social Sciences, Humanities, Medicine and health sciences, Technology

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	128211,008	6	21368,501	6,820	,000[b]
	Residual	1087191,53	347	3133,117		
	Total	1215402,54	353			

a. Dependent Variable: Applied amount, adjusted for outliers

b. Predictors: (Constant), Granted, Gender, where female=0, male=1, Social Sciences, Humanities, Medicine and health sciences, Technology

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	124,130	7,983		15,548	,000
	Gender, where female=0, male=1	2,511	8,510	,015	,295	,768
	Technology	1,332	9,183	,008	,145	,885
	Medicine and health sciences	-51,671	9,623	-,285	-5,370	,000
	Social Sciences	-19,509	9,262	-,111	-2,106	,036
	Humanities	-35,998	13,313	-,142	-2,704	,007
	Granted	33,613	10,910	,160	3,081	,002

a. Dependent Variable: Applied amount, adjusted for outliers

II. Regression output for the FRIPRO-dataset

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,116[a]	,013	,013	3,01704

a. Predictors: (Constant), Granted, Gender where female=0, male=1, Technology, Humanities, Social sciences, Medicine and health

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1160,404	6	193,401	21,247	,000[b]
	Residual	85627,339	9407	9,103		
	Total	86787,744	9413			

a. Dependent Variable: Applied amount adjusted to remove outliers

b. Predictors: (Constant), Granted, Gender where female=0, male=1, Technology, Humanities, Social sciences, Medicine and health

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7,255	,080		90,473	,000
	Gender where female=0, male=1	-,331	,069	-,050	-4,777	,000
	Technology	,891	,184	,051	4,842	,000
	Medicine and health	-,009	,076	-,001	-,122	,903
	Social sciences	-,021	,096	-,003	-,216	,829
	Humanities	,787	,107	,084	7,372	,000
	Granted	-,327	,097	-,035	-3,372	,001

a. Dependent Variable: Applied amount adjusted to remove outliers

APPENDIX C Logistic regression-output

I. Logistic regression-output for the CoE-dataset

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	354	95,7
	Missing Cases	16	4,3
	Total	370	100,0
Unselected Cases		0	,0
Total		370	100,0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
,00	0
1,00	1

Categorical Variables Codings

			Parameter coding			
		Frequency	(1)	(2)	(3)	(4)
Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing	,00	200	1,000	,000	,000	,000
	1,00	47	,000	1,000	,000	,000
	2,00	42	,000	,000	1,000	,000
	3,00	45	,000	,000	,000	1,000
	4,00	20	,000	,000	,000	,000

Block 0: Beginning Block

Classification Table[a,b]

			Predicted		
			Granted		Percentage Correct
	Observed		,00	1,00	
Step 0	Granted	,00	324	0	100,0
		1,00	30	0	,0
	Overall Percentage				91,5

a. Constant is included in the model.

b. The cut value is ,500

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Gender, where female=0, male=1	,102	1	,749
		Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing	14,262	4	,007
		Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(1)	7,156	1	,007
		Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(2)	,327	1	,567
		Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(3)	4,123	1	,042
		Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(4)	,217	1	,641
		Applied amount, adjusted for outliers	4,371	1	,037
	Overall Statistics		23,683	6	,001

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	22,431	6	,001
	Block	22,431	6	,001
	Model	22,431	6	,001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	183,038[a]	,061	,139

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.

Classification Table[a]

			Predicted		
			Granted		Percentage Correct
	Observed		,00	1,00	
Step 1	Granted	,00	324	0	100,0
		1,00	29	1	3,3
	Overall Percentage				91,8

a. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender, where female=0, male=1	-,364	,551	,436	1	,509	,695
	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing			17,887	4	,001	
	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(1)	-2,338	,656	12,700	1	,000	,097
	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(2)	-1,451	,744	3,809	1	,051	,234
	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(3)	-,417	,692	,362	1	,547	,659
	Disciplines represented with numbers, where 0=Mat./Nat., 1=Tech, 2=Med/Hel, 3=Soc. sci., 4=Hum. Agr missing(4)	-1,715	,810	4,479	1	,034	,180
	Applied amount, adjusted for outliers	,012	,004	8,696	1	,003	1,012
	Constant	-2,086	,825	6,399	1	,011	,124

II. Logistic regression-output for FRIPRO-dataset

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	9414	99,4
	Missing Cases	56	,6
	Total	9470	100,0
Unselected Cases		0	,0
Total		9470	100,0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
,00	0
1,00	1

Categorical Variables Codings

			Parameter coding			
		Frequency	(1)	(2)	(3)	(4)
Disciplines represenseded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing	,00	3032	1,000	,000	,000	,000
	1,00	295	,000	1,000	,000	,000
	2,00	3458	,000	,000	1,000	,000
	3,00	1514	,000	,000	,000	1,000
	4,00	1115	,000	,000	,000	,000

Block 0: Beginning Block

Classification Table[a,b]

			Predicted		
			Granted		Percentage Correct
	Observed		,00	1,00	
Step 0	Granted	,00	8312	0	100,0
		1,00	1102	0	,0
	Overall Percentage				88,3

a. Constant is included in the model.

b. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2,021	,032	3972,485	1	,000	,133

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Gender where female=0, male=1	,002	1	,966
		Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing	70,536	4	,000
		Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(1)	61,253	1	,000
		Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(2)	2,428	1	,119
		Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(3)	33,313	1	,000
		Disciplines representeded as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(4)	6,068	1	,014
		Applied amount adjusted to remove outliers	11,117	1	,001
	Overall Statistics		83,603	6	,000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	82,011	6	,000
	Block	82,011	6	,000
	Model	82,011	6	,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6715,375[a]	,009	,017

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than ,001.

Classification Table[a]

			Predicted		
			Granted		Percentage Correct
	Observed		,00	1,00	
Step 1	Granted	,00	8312	0	100,0
		1,00	1102	0	,0
	Overall Percentage				88,3

a. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender where female=0, male=1	-,111	,072	2,368	1	,124	,895
	Disciplines represented as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing			70,983	4	,000	
	Disciplines represented as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(1)	,381	,110	12,091	1	,001	1,464
	Disciplines represented as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(2)	,343	,192	3,214	1	,073	1,410
	Disciplines represented as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(3)	-,225	,113	3,967	1	,046	,799
	Disciplines represented as numbers where 0=matnat, 1=tech, 2=med, 3=socsci, 4=hum. Agrfi missing(4)	-,154	,129	1,426	1	,232	,857
	Applied amount adjusted to remove outliers	-,036	,011	11,198	1	,001	,964
	Constant	-1,743	,134	168,136	1	,000	,175