Gender Bias in Public Long-term Care? A Survey Experiment among Care Managers[☆]

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Abstract

Daughters of elderly women are more likely to provide informal care than sons. If care managers take this into account and view informal care as a substitute for formal care, they will statistically discriminate against the mothers of daughters. Using a survey experiment among professional needs assessors for long-term care services in Norway, we find that, if a woman with a daughter had a son instead, she would receive 34 percent more formal care. On the other hand, daughters do not provide more care for fathers. Correspondingly, we find no effect of child gender for fathers in the experiment.

Keywords: Care rationing, Gender bias, Public care, Survey experiment

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1. Introduction

In most OECD countries, long-term care (LTC) services are predominantly publicly financed and rationed according to health needs (Francesca et al., 2011). At the same time, daughters are more likely than sons to provide informal care for their elderly parents, (Francesca et al., 2011; Haberkern and Szydlik, 2010; Schmid et al., 2012) and children are more likely to provide informal care for a parent of the same gender (Lee et al., 1993; Leopold et al., 2014). The gender gap is remarkably robust across European countries (Haberkern and Szydlik, 2010; Schmid et al., 2012), even though there are large differences in eldercare policies and in gendered norms of family care (Kotsadam, 2011). If care managers who are responsible for matching public service provision to needs take into account the likely availability of informal care when rationing care, there will be a relationship between the sex of children and access to formal care. Supply side health care disparities arise if providers base treatment decisions on demographic characteristics that are not justified by the underlying individual health needs (Balsa and McGuire, 2003; McGuire et al., 2008). A potent explanation for such disparities is statistical discrimination, whereby decision-makers use easily observable characteristics to infer unobservable characteristics (Balsa and McGuire, 2001; Balsa et al., 2005; Fang and Moro, 2010; McGuire et al., 2008). We test this using a survey experiment among care managers in Norway, where the allocation of formal care should explicitly be independent of family situation (Karlsson et al., 2012).

Health inequality and discrimination in the provision of public services are important public policy issues (Lutfey et al., 2009), but identifying discrimination is difficult without clear predictions. We derive the result that health-maximizing care managers who view informal care as a substitute for formal care will condition the level of formal care provided on the likely availability of informal care. Analyzing recent Norwegian data, we find that daughters provide more informal care for mothers than for fathers, and more informal care than sons provide, while there is no statistically significant difference for the other caregiving pairs. Our prediction is therefore that statistical discrimination should lead to less formal care being allocated to needy elderly women with daughters.

It is difficult to identify discrimination using observational data. Instead, we constructed hypothetical (but realistic) case descriptions of persons in need of care, and randomly assigned the cases to care managers. The only characteristics varying across cases are the gender of the potential client and the gender of the client's child. After reading the case descriptions, the care managers were told to carry out a needs assessment and decide the number of minutes of home care services to provide per week. We find evidence of discrimination in Norwegian LTC in that there is tighter rationing of care for elderly women with daughters. In particular, we find that, if a woman with a daughter had a son instead, she would on average receive 167 minutes (34 percent) more formal care per week. These results are especially striking since Norwegian care managers are explicitly instructed not to consider the family situation of the persons needing care and since Norway is regarded as one of the most gender-equal countries in the world (Anxo and Fagan, 2005; Kotsadam, 2011).

Our results are relevant to several academic literatures. We add to the literature on health economics and discrimination by investigating the rationing of public services and by showing discrimination in long-term care; we contribute to the study of family economics by linking public services and unpaid work; and we shed light on the relationship between formal and informal care. To the best of our knowledge, it is the first study to investigate discrimination in long-term care by means of a credible design for causal inference. As with all statistical discrimination, the resulting allocation becomes unjust in the sense that it affects elderly women who happen to have a daughter as well as daughters with frail elderly parents, irrespective of their relationship quality, preferences for a different care mix and life situation, including employment. The results uncover a norm within public provision that may be self-reinforcing, since it puts pressure on daughters to care more for their elderly mothers, which, in turn, strengthens the signal to the care managers. On the other hand, it can be argued that the care managers are doing the right thing as they try to maximize the total amount of care (formal plus informal) provided. As mothers with daughters get a higher expected amount of informal care, they can in one sense be deemed to have less need of formal care. Hence, the normative conclusion will rest on how these principles are weighted.

2. Detecting discrimination in health care

Previous empirical work on discrimination in access to health services is scarce and most existing studies are based on observational data. Several recent studies examine the relationship between waiting times and socioeconomic status (Carlsen and Kaarbøe, 2012; Kaarbøe and Carlsen, 2014; Johar et al., 2013; Siciliani and Verzulli, 2009). All of these studies find higher income and education to be associated with lower waiting times for public health services. Controlling for socioeconomic and health status, the residual variation is taken as evidence of discrimination. Although definitely compatible with statistical discrimination, the results may be confounded by, for instance, the ability to signal needs. With respect to discrimination in diagnoses and actual expenditure, observational studies suffer from similar problems.[1] Whether the results from these studies are evidence of discrimination is questionable, since the results could be due to other factors. For instance, people with higher education may be better able to communicate their needs, they may perceive their needs as greater, or they may have greater trust in the health system. In brief, there is an abundance of potential explanations other than discrimination.

The literature on discrimination in the marketplace is extensive (Pager, 2007; Riach and Rich, 2002; Yinger, 1998). Field experiments show that individuals who are identical except for a group characteristic (gender, race, etc.) are treated differently in the housing market (Andersson et al., 2012; Carlsson and Eriksson, 2014; Ewens et al., 2014) and in the labor market (Bertrand and Mullainathan, 2004; Carlsson and Rooth, 2007). A critique of field studies made by Heckman (1998) is that they are often carried out among randomly selected employers or landlords and not where ethnic minorities or women live or are employed. This probably means that the measured discrimination is exaggerated, since selection is not random in the real world. Our paper extends the experimental literature on discrimination into markets for public welfare services. In these markets, services are often uni-

[1] Balsa et al. (2005) use a cross-section of black and white patients, and find that the probability of being diagnosed with depression and mental health problems is reduced for black patients relative to white patients. After controlling for socioeconomic status and measures of patients' health status, the result is taken as evidence of statistical discrimination based on miscommunication between white doctors and black patients. Using panel data, McGuire et al. (2008) find that the increase in expenditure in response to an increase in the severity of depression is twice as large for white patients as for minority patients.

versally provided and market power is often concentrated. Any measured discrimination is therefore more likely to reflect actual discrimination.[2]

There are a few recent studies in the medical literature that use experiments to identify discrimination in health care. Lutfey et al. (2009) used videotaped vignettes and found that physicians were less certain when diagnosing heart disease among black patients and young women, but found no difference as regards diagnosing depression. Maserejian et al. (2009) also used video vignettes of symptoms of heart disease. They found that physicians were less certain of the diagnosis for female patients. Barnhart and Wassertheil-Smoller (2006) used a written vignette to evaluate treatment responses to a patient in need of coronary revascularization. They found that the race and sex of the patient did not affect treatment preferences. Interestingly, however, they found that more male physicians than female physicians recommended revascularization for patients who were categorized as having heavy family demands. They conclude that social circumstances may be more important than the sex or race of the patient and urge researchers to investigate the impact of sociocultural factors.

The previous experimental studies are exclusively from the US or the UK, and none of them test for discrimination in LTC. More importantly, the studies only test for discrimination based on patient characteristics. The question of statistical discrimination therefore concerns whether physicians base diagnose and treatment decisions on prevalence data (Maserejian et al., 2009). In our case, on the other hand, the need is the same, and so are the prevalence rates, since, for the parents, the only variation is in the sex of their children. The only plausible difference between the cases with a son or a daughter is the degree of expected provision of informal care.

3. Care in Norway

Norway belongs to the Nordic social democratic, universalist system of eldercare with extensive service provision and universal citizen rights (Anxo

[2]Grytten et al. (2011) is the only study that tests for statistical discrimination in a universal health care system. Using Norwegian registry data, they find that patients with medical training are more able than non-experts to affect the type of treatment received, which they interpret as evidence of statistical discrimination. While statistical discrimination may be one explanation, it is impossible to rule out other explanations, such as knowledge about alternatives and rights.

and Fagan, 2005; Øien et al., 2012). Public eldercare is assigned according to need and mainly financed through general taxation. Norway spends more than 2 percent of its GDP on eldercare services. Among OECD countries, only Sweden and the Netherlands spend more (Francesca et al., 2011). The public share of LTC spending is over 90 percent. Public opinion supports the predominant role of the public sector in this context (Daatland and Herlofson, 2003). The public care services also seem to be a substitute for informal care (Jakobsson et al., 2013; Kotsadam, 2011, 2012). The dominance of public LTC funding is shared by the majority of OECD countries. In the OECD, public spending accounts for an average share of 75 percent of LTC spending. The proportion is even higher if we disregard Switzerland, where private expenditure is by far the largest (Francesca et al., 2011). Several OECD countries also have some form of needs assessment for rationing public LTC services to the target population (Francesca et al., 2011).

In Norway, the municipalities (and the districts of Oslo, the capital) are responsible for rationing long-term care (LTC) services among eligible residents. Residents are not entitled to specific services. Their rights are defined by need, and anyone in need has a right to necessary health care. Municipalities decide which service, and the scope of the service, is necessary to meet the corresponding individual needs of their residents (Øien, 2014). They are, however, restricted to allocating services according to need and independently of demographic characteristics and socioeconomic status (Karlsson et al., 2012). Individuals, or any person acting on behalf of an individual, must submit an application to the municipality to receive LTC services.

4. Conceptual framework

This section develops an illustrative model of LTC rationing. The model is inspired by Balsa and McGuire (2001), who introduced the theory of statistical discrimination in labor markets, originating from Phelps (1972); Aigner and Cain (1977), in the health care context. It serves to clarify the institutional context and gives a concise description of the mechanisms that could lead service provision to be dependent on gender.

4.1. A model of statistical discrimination in public LTC provision

We consider a care manager (CM) who is responsible for rationing X units of care among a large group of patients $N = \{1, \ldots, n\}$. The patients have a functional disability and may need care to maintain daily life. Let z_i

be a measure of patient i's severity level. To focus on the trade-off between public and informal care, we will not consider a private care market – care is either provided by the public sector or informally within the family. Care output provided to patient i is produced with x_i units of public care and y_i units of informal care according to the following care production function

$$v_{z_i}(q_i) = v_{z_i}(x_i + y_i), \tag{1}$$

where q_i is the total number of units of care provided to patient i. Thus, we assume that public and informal care are perfect substitutes. The care technology has the usual properties, $v' > 0$ and $v'' < 0$, and

$$\forall q > 0, \bar{z} > z : v'_{\bar{z}}(q) > v'_z(q), \tag{2}$$

q is more productive when severity is higher.[3] The utility of patients is linear in care output. Public care is provided free of charge to patients, and the CM (and the patient) does not take into account any potential costs faced by the patients' caregiving family members. Therefore, (1) is identical to patient i's utility.[4] In contrast to Balsa and McGuire (2001, 2003), the CM observes z_i after conducting costless needs assessments of patients. The information problem in this model arises from unobservable informal care supply. The CM does not observe informal caregiving of family members, and therefore uses easily observable and known correlates of informal care supply to predict its availability. The CM is benevolent in allocating formal care services in the sense of maximizing the sum of patients' expected utility functions:

$$\max_{x_i} \sum_i E[v_{z_i}(q_i)], \tag{3}$$

subject to the resource constraint

$$\sum_i x_i = X. \tag{4}$$

[3]The same care technology assumptions are made in Kuhn and Nuscheler (2011).

[4]This can be true if CMs regard informal care as a free resource, because, as long as informal care is provided, the benefit of doing so outweighs the cost, or if the CMs are only concerned about the health of patients.

The structure of the problem can be considered as follows[5]:

1. Inquiry: Patients $N = \{1, \ldots, n\}$ with severity levels $Z_n = \{1, \ldots, z_n\}$ send costless applications to receive public LTC services.
2. Screening: The CM conducts n costless needs assessments that reveal Z_n, and observes group characteristics $G_n = \{g_1, \ldots, g_n\}$ known to be correlated with informal care[6].
3. CM's decision: The CM forms predictions of informal care supply $\hat{Y}_n = \{\hat{y}_1(x_1), \ldots, \hat{y}_n(x_n)\}$ using Z_n and other observable covariates of informal care supply, and then chooses $X_n = \{x_1, \ldots, x_n\}$ by maximizing (3) subject to (4).
4. Families' decisions: The families choose Y_n after observing X_n.

Using λ as the Lagrange multiplicator for the constraint and assuming an interior solution, the FOCs become

$$\frac{\partial E[v_{z_i}(q_i)]}{\partial q_i} = \lambda, \forall i. \tag{5}$$

For the sake of simplicity, assume that the utility function of patients is exponential[7]

$$v_{z_i}(q_i) = a_{z_i} - b_{z_i} e^{-c_{z_i} q_i}, \quad b_{z_i}, c_{z_i} > 0, \tag{6}$$

hence

$$E[v_{zi}(q_i)] = a_{zi} - b_{zi} e^{-c_{z_i} E[q_i] + \frac{c_{zi}^2}{2} V(q_i)}, \tag{7}$$

where $E[q_i] = E[x_i + y_i] = x_i + E[y_i]$ and $V(q_i) = V(y_i) = \sigma_y^2$. Conditioning on observables, the FOC becomes

$$\frac{\partial E[v_{z_i}(q_i)]}{\partial q_i} = c_{z_i} b_{z_i} e^{(\cdots i)} \left[1 + \frac{\partial E[y_i | x_i, z_i, g]}{\partial x_i}\right] = \lambda, \quad \forall i, \tag{8}$$

[5]This closely follows the four-stage process of matching tenants to apartments in Ewens et al. (2014)

[6]As will be made clear later, we are considering four groups defined by the gender of the patient and gender of the patient's child, i.e., $g_i \in \{FatherSon, FatherDaughter, MotherSon, MotherDaughter\}$.

[7]Phelps (1972) assumes the same utility function for employers hiring workers with unobservable quality.

where g_i is some group characteristic that is a covariate of informal care supply. Evaluating the FOC for patients j and i with $z_i = z_j = \bar{z}$ (and dropping subscript $\bar{z}$ for notational convenience), we get

$$e^{(\dots i)}\left[1 + \frac{\partial E[y_i|x_i, g_i]}{\partial x_i}\right] = e^{(\dots j)}\left[1 + \frac{\partial E[y_j|x_j, g_j]}{\partial x_j}\right] \tag{9}$$

Consider the case in which the CM has experimented with past LTC allocations and observed the availability of informal care, from which she/he has identified the conditional expectation function (CEF)

$$E[y_i|x_i, g_i] = \alpha_{g_i} + \beta x_i, \quad -1 < \beta < 0, \tag{10}$$

where α_{g_i} is the average informal care supply for individuals in group g_i when the formal care supply is set to zero and β is the average decrease in informal care supply caused by a one-hour increase in formal care supply. Hence, we assume that, on average, the decrease in informal care supply caused by a one-hour increase in informal care is between one and zero hours. Plugging the CEF into (9) and assuming homogeneity of variance (i.e., $V(y_i|g_i, x_i) = \sigma^2, \forall i.$), we get:

$$x_i + \alpha_{g_i} + \beta x_i = x_j + \alpha_{g_j} + \beta x_j, \forall i, j \text{ and } \bar{z}\ (z_i = z_j = \bar{z}), \tag{11}$$

that is, in optimum, the CM sets formal care so that the expected value of total care hours is equal for individuals with the same severity level. Rearranging (11) and considering the case in which $\mu_{g_j} > \mu_{g_i}$, that is on average g_j patients receive more informal care for any level of formal care, we get

$$x_i - x_j = \frac{1}{1+\beta}(\alpha_{gj} - \alpha_{gi}) > 0. \tag{12}$$

This result leads to the following hypothesis:

> *The CM will allocate more public care to patients expected to receive less informal care than otherwise similar (i.e., equal health needs) patients.*

The result can be interpreted as the expected health-maximizing discrimination outcome. Patients with equal needs belonging to different family groups will receive different amounts of formal care. Legally, this is regarded as discrimination. The outcome is not necessarily inequitable nor inefficient,

however, since it implies that patients with equal needs are expected to receive the same amount of total care. However, the outcome implies individual discrimination of family caregivers. Caregivers belonging to a group with a higher average informal care supply will, all else being equal, supply more informal care because their dependent family members receive less formal care. For example, if daughters on average provide more informal care for dependent parents than sons, they will provide (weakly[8]) more informal care than identical sons, because their parents receive less formal care. In this regard, the outcome is self-fulfilling. Everything else being equal, daughters provide more informal care, because their parents receive less formal care.

To identify the effect of family groups on formal care allocations, we need to compare patients with equal needs (holding z_i constant) belonging to different family groups, and randomly assign the cases to care managers. In the empirical section, we consider four groups, defined by the gender of the patient and gender of the patient's child, known from empirical observations to be correlated with informal care availability (Francesca et al., 2011; Haberkern and Szydlik, 2010; Lee et al., 1993; Leopold et al., 2014; Schmid et al., 2012). In the next subsection, we use a representative Norwegian sample to evaluate the difference in mean informal care among the four groups in order to make predictions about the direction of formal care supply.

4.1.1. Empirical predictions

We use estimates of the mean informal care supply in the four cases (i.e., the α_g's) obtained from a Norwegian representative sample of 25 937 persons aged 18–84 years, which includes information on informal care supply.[9] Informal caregivers are identified as sons or daughters with parents older than 67 years answering the following question in the affirmative:

> "Over the last 12 months, have you given anyone regular help with personal care such as eating, getting up in the morning, getting dressed, bathing, or using the toilet? Do not include the care you may have given to small children."

[8]Non-altruistic daughters will still supply the same amount of informal care as non-altruistic sons: zero hours.

[9]The data is from the LOGG study, which includes a Norwegian version of the UN-anchored Generations and Gender Survey (GGS), see Kotsadam (2012) for more information.

Table 1: Mean of informal care supply by sons and daughters to elderly parents (age> 67).

Gender of patient	*Gender of child*	*Obs*	$\hat{\mu}_y$
Man	Son	4601	0.073
Man	Daughter	4755	0.063
Women	Son	4263	0.097
Women	Daughter	4335	0.255

$\hat{\mu}_y$ is the average of how many times a month informal care is provided by column 2 to column 1.

The respondents were further asked to whom the care was provided, and we calculated how many times a month a son or a daughter provided informal care for a father or a mother. The results are shown in Table (1). We see that a daughter provides informal care to a mother more than twice as often as in the other cases. Using (12), we expect that a woman with a daughter will receive the least amount of public care compared to the other groups, and, since there are no statistically significant differences between the other groups, they should receive similar amounts. We explore this prediction in the empirical analysis. We chose to use age as a proxy for need of informal care because the respondents' assessments of the care needs of the parents is probably endogenous to the caring decision. To check whether the prediction is robust in relation to other specifications, we run regressions of informal caregiving provided to mothers and fathers on the gender of children, whether parents are assessed as being of poor health, whether parents live alone, and parents' age. The prediction that daughters provide significantly more informal care to mothers is robust to controlling for these variables (see Appendix Table A.5).

5. Survey experiment design and data

5.1. The survey experiment

To detect whether there is gender discrimination in access to public LTC, we conducted a survey experiment. In survey experiments different types of information are randomly allocated to respondents before they answer an identical questionnaire. If the randomization is done correctly, the setup will identify the average treatment effect of information on answers. The method

has been used to identify the effect of biased perceptions on preferences for redistribution policies (Cruces et al., 2013), the effect of propaganda on beliefs about the benefits of privatization of public utilities (Di Tella et al., 2012), attitudes toward high- and low skilled immigration (Hainmueller and Hiscox, 2010), and the effects of information on pension plans (Finseraas and Jakobsson, 2013). An often used method to identify discrimination in labor markets is field experiments (Pager, 2007). In field experiments, actors playing job seekers (audit studies) or written job applications (correspondence studies), set by the researcher to have identical qualifications except for a group characteristic such as gender, race etc., are used to apply for (real) available jobs. Correspondence studies often have better internal validity as it is easier to hold all else equal than in audit studies (Heckman, 1998). There are important ethical concerns of deceiving respondents in field experiments (Riach and Rich, 2004). The advantage is that you observe *real* behavior. In our setting, a field experiment would not have been ethically justifiable and would have been too costly.[10] In survey experiments the respondents know they are being studied and may change their behaviour accordingly. This could compromise the generalizability of the survey experiment. However, if a change in behavior is not dependent on the treatment the results should reflect the direction of real-world effects.

In our experiment, we constructed hypothetical case descriptions of persons in need of care (hereafter called patients), and we randomly assigned cases to municipal employees working on needs assessment, hereafter called care managers (CMs). The only characteristics varying among cases are the name of the patient (signaling gender) and the gender of the applicant's child. Thus, we have four treatments: FatherSon; MotherSon; FatherDaughter; and MotherDaughter. The person in need of care is identified by name (Bjørg or Kjell) and the gender of the child was explicitly stated. The names are

[10] A correspondence study is not possible because applicants for public LTC are often interviewed in their private homes by a representative of the public LTC sector. To conduct an audit study, we would have had to create fake public identities (social security numbers), and all register information that can be accessed with this number, which must be stated in the application), and provide housing for our fictitious applicants in case of house visits. The ethical justification for deceiving subjects in field experiments is that the value of detecting discrimination outweighs the costs faced by the subjects (Riach and Rich, 2004). In our setting, the needs assessment procedure is resource-demanding, which means that every fake need assessment conducted would divert a non-trivial amount of resources away from real patients.

gender specific, and to minimize any name effects we chose the most common names among the studied age group.[11] Each CM read only one of the case descriptions and, after reading it, the CMs answered an identical questionnaire. To conceal the purpose of the survey experiment, it was incorporated into a study of regional variation in LTC allocations. The reason for this was to hinder strategic behavior by respondents when responding to the case. Keeping other observable characteristics constant and randomizing the cases should ensure that any differential treatment of the cases is attributed to the patient-child gender mix (Carlsson and Eriksson, 2014; Carlsson and Rooth, 2012; Eriksson and Rooth, 2014). In the next two subsections, we discuss the construction of the survey experiment and its sampling.

5.1.1. Construction of case description and questionnaire

Individuals who want to receive public long-term care services must submit an application stating their needs to their municipality of residence. The content of the application forms is fairly standardized across municipalities, but the specific set up varies somewhat. In constructing our case, we assessed application forms from different municipalities and included the central information as revealed in those application forms in our case description. For instance, most of the application included what type of services the individual would like, the background to why they need these services, and information about their living situation, i.e., whether they live alone, with a partner or with children. Further, the care managers have access to the individual's medical history from the general practitioner. To make sure that our case description included most of the information observed in real-world cases, we conferred with six home health nurses who previously worked on needs assessment, and we were allowed to examine four actual, but anonymous applications. From this, we gathered that applications and home visits also reveal information about social life, contact with family, and living conditions. We therefore included leisure activities and the social life of the applicant in the case description. The case description is given below:

> "X is 80 years old and single, and lives in a modern three-room apartment centrally in the municipality. Before retiring, X worked as a teacher. X used to smoke regularly, but quit ten years ago. Six weeks ago, X experienced a wrist fracture after a fall

[11] Statistics Norway's name register: `www.ssb.no/en/befolkning/statistikker/navn`

in her/his home, the medical treatment for which has been completed. She/he has no previous experience of falling. X has no known medical conditions except for a moderate form of chronic obstructive disease (COPD). She/he is supposed to use an Oxis Turbuhaler (9 micrograms/inhalation) every morning and night. She/he says that she/he often remembers to take the medication, but not always. X has not previously received home-based services, but she/he has now applied for help. She/he is back in her/his apartment after a hospital stay and has agreed to a home visit. X has no problem moving around, but feels weak. During the home visit, you notice that she/he is not well nourished and does not take care of her/his personal hygiene. The apartment does not seem to have been cleaned for a while. X does not have a lot interests, but likes to solve crossword puzzles and watch television. You understand that she/he lives an isolated life. During the home visit, X tells you that it would have been nice if someone came every day to cook dinner, and cleaned the apartment once in a while. Further, she/he tells you that she/he can take care of her-/himself. A Y lives in the same municipality, and a few neighbors drop by a couple of times a week."

X = Bjørg, Kjell (the most common female and male names in the studied age group)

Y = daughter, son

In constructing the case, we tried to be specific and yet general, and we therefore applied general information about elderly Norwegians. Examples include the prevalence of current and former smoking, common types of illnesses, common types and dosages of medication, etc. Smoking used to be very common in Norway among both men and women, but it is slowly declining (Lund et al., 2009). As a consequence, lung-related illnesses are the third most common cause of death in Norway.[12] Around 80 percent of COPD patients are treated in primary care settings, and these patients are thus also a substantial group within the home health care services (Hviding, Krystyna and Reinar, Liv Merete and Mørland, Berit and Buntz, Elisabeth, 2004; The

[12] `http://www.ssb.no/en/helse/statistikker/dodsarsak`, accessed September 19, 2014.

Norwegian Directorate of Health, 2007).

Once the case description was drafted, it was piloted on our six informants who formerly worked as home health care nurses. It was modified and revised in line with their feedback. The informants stated that the case description corresponds well with a typical patient. This was also reflected in the answers from the survey participants: 87% of the respondents stated that the case was typical and similar to cases they normally consider.[13] From this perspective, assessments of discrimination in eldercare allocation in our study are likely to represent potential actual discrimination in Norwegian municipalities.

Once applications have been processed in the municipalities, individuals receive a decision letter. We were allowed to use four anonymous decisions letters when constructing our questionnaire. The nature of the decision letters varied between municipalities. Whereas some municipalities granted broad services (e.g., "home health nursing services for various needs as stated in the application for 45 minutes per week"), others specify the services to be provided in great detail (e.g., "home health nursing including but limited to wound care 3×8 minutes per week and medication assistance 7×3 minutes per week"). To simplify coding, we chose to use examples of detailed decision letters in the questionnaire. The questionnaire consisted of thirteen questions regarding the type and amount of services to be offered and some background characteristics of the respondent. The questionnaire was identical for the four case descriptions, see section (Appendix C) for a copy of the questionnaire. A detailed description of the data produced from the questionnaire is provided in the data section.

5.1.2. Sampling

The survey experiment was carried out during the period April to December 2013. At the outset, the plan was to visit LTC needs assessment departments in large municipalities in Eastern Norway, to randomly assign the four case descriptions to CMs, and to have them complete the questionnaire on site.[14] In this way, we would have complete control of external factors

[13]The majority of respondents who stated that the case was atypical indicated that they primarily work with younger clients, such as substance abuse and psychiatric clients. This is in line with findings on changes in resource distribution between older and younger users in Norway and their needs background (Gautun and Grødem, 2012).

[14]Initially, we restricted the sample to large eastern municipalities because of time and cost constraints of visiting each municipality.

that could affect the responses. However, this turned out to be logistically impossible. The respondents were rarely present at the same time – they all had work obligations outside the main office, and the majority of managers were negative to holding a general meeting to answer a survey. In nearly all cases, we therefore mailed the survey to the respondents and explicitly asked them to answer independently of each other.[15] The main advantage of using mail is that it allowed us to expand the sample to all 428 municipalities instead of just a small subset of municipalities. The disadvantage is that this creates two well-known problems in conducting survey experiments: nonresponse and noncompliance (Horiuchi et al., 2007). Some may choose not to respond or not to answer all the questions asked, and others may not follow instructions and thereby contaminate the treatment. There may be a bias if the respondents answering by mail discussed the cases and colluded in order to appear to give more equal amounts of care, or if the respondents have an intrinsic motivation to prove that access to care is dependent on gender. We strongly believe that a bias resulting from noncompliance would drive the differences in care hours among the four cases towards zero. Any incentive to prove the existence of gender discrimination will be overshadowed by the fact that allocating care according to gender is illegal and the respondents know that the results of the study will be published.

We contacted managers of departments of LTC needs assessment in 428 municipalities by e-mail and a telephone follow-up, of these, 16 municipalities did not want to participate, and 54 municipalities did not answer the invitation, leaving a sample of 358 municipalities.[16] We sent 1 420 questionnaires to the sampled municipalities, corresponding to the approximate number of employees working on needs assessment in each municipality. We received 804 questionnaires from 261 municipalities and 11 districts of Oslo, yielding a response rate of just below 57 percent. In Appendix Table B.6, we compare demographic characteristics, fiscal information, and LTC coverage rates of the municipalities that choose not to participate with the municipalities that participated. The averages for the sampled and non-sampled municipalities are very similar, except for population size. The sampled municipalities

[15] 96 percent of the sample responded by mail. This proportion is too large for relevant robustness analysis between observations from respondents who responded by mail and those who were visited directly.

[16] To secure a sufficient sample size, all municipalities were reminded several times of the invitation to participate in the study by e-mail and telephone.

have a higher population size because the three largest municipalities are in the sample and Norwegian municipalities are generally small.[17] The other municipal characteristics indicate that the sample is representative of the municipalities. The observations that had missing values were dropped from the sample. To check whether missing observations are related to the CM's background characteristics or treatment status we regressed an indicator of missing information on these variables. As is seen in Appendix Table B.7, none of the background characteristics nor the treatment status are related to the observation being missing.

5.2. Data

The final sample consisted of 563 responses across 219 municipalities and 11 districts of Oslo. On average, the randomization process should ensure that there are no systematic differences among the four treatment groups. To test whether the randomization was successful, we conducted F-tests across groups for equality in means of background characteristics of CMs. As we see in Table 2, the differences across groups are not large and the large p-values in Column (5) indicate that we cannot reject the null hypothesis of equality of means. This indicates that there are no systematic differences across the four groups.

In the questionnaire, the respondents indicated whether they would offer 14 specific services at the intensive and extensive margin (yes=1, no=0; min/week). The services include help with domestic tasks, personal care tasks, taking medication, rehabilitation, and social engagement. In addition, they were asked to indicate which other services they would like to offer. In Figure 1, we show the total distribution of the number of care minutes provided. We note that there are two observations that appear to be extreme outliers. They are more than five standard deviations away from the mean, and they have been left out of the main analysis. We also present results including the outliers and the conclusions remain the same. In Table 3, we present the means and standard deviations of the services offered in units of minutes per week across treatment groups.

[17]The three largest municipalities Oslo, Bergen and Trondheim have population sizes of 179,692, 267,950, and 623,966 respectively, while 95 percent of the municipalities have population sizes of less than 35 753.

Table 2: Comparison of background characteristics of care managers across groups.

	Son		Daughter		
	Man	Woman	Man	Woman	Joint P-value
Gender of care manager (male = 1)	0.0629	0.0606	0.0411	0.0493	0.8316
Age of care of manager	47.11	46.55	46.22	47.54	0.6102
>5 years of experience	0.881	0.803	0.842	0.852	0.3535
Educated nurse	0.825	0.773	0.795	0.754	0.4953
Other health education	0.133	0.144	0.130	0.155	0.9288

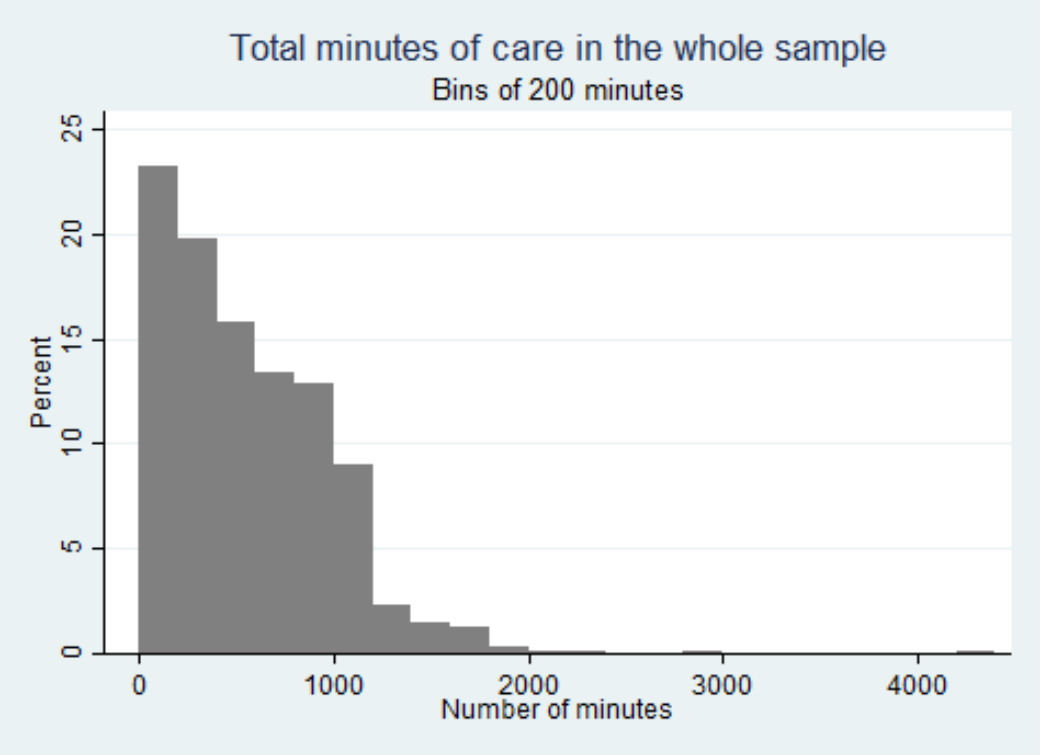
Columns (1) to (4) show means of background characteristics of CMs by treatment.
Column (5) shows the P-value for the F-test of equality of means across the four groups

Table 3: Total minutes of care by treatment

	Son		Daughter		
	Man	Woman	Man	Woman	Total
Total minutes	565.6	612.0	574.8	491.6	560.2
	(409.1)	(449.3)	(401.6)	(375.1)	(410.0)
Observations	143	132	146	142	563

The table shows means of the services by treatment of Complete cases.
Units are in minutes per week. Standard deviations in parentheses.

Figure 1: Histogram of care minutes



6. Empirical strategy and results

We are interested in the effect of the parent-child gender mix, assumed to be a proxy of CMs' beliefs of the likely availability of informal care, on the minutes of publicly provided care. We estimate the following equation

$$y_{ijs} = \alpha_j + \beta_1 FatherSon_i + \beta_2 MotherSon_i + \beta_3 FatherDaughter_i + X_s'\gamma + \epsilon_{ijs}, \tag{13}$$

where y_{ijs} is minutes per week awarded to case description i at municipality j by care manager s, α_j are municipality fixed effects, the variables $FatherSon_i$, $MotherSon_i$ and $FatherDaughter_i$ are dummy variables indicating whether the person in need of care is a man or a woman and has a son or daughter, X_s' is a vector of background variables of CMs, and ϵ_{ijs} is an error term.

The coefficients of interest are β_1, β_2 and β_3. They measure the average change in minutes per week provided if we manipulate the gender of the person in need of care and/or the gender of that person's child relative to the case in which the patient is a woman who has a daughter. For instance, β_2 is the average change in minutes per week if the woman in need had a son instead of a daughter. We have included municipality fixed effects, since the randomization is done within municipalities and there may be level effects among municipalities, then, conditional on the fixed effects, the study design should ensure that the estimates of the coefficients of interest are unbiased. It is not necessary to include the vector of CMs' background variables in order to ensure unbiasedness, but it allows us to pin down some of the unexplained variation if these background characteristics predict minutes of care, which will give us a more efficient estimation of the coefficients of interest.

In Table 4, we present the regression results, where being a woman and having a son is the baseline category. In Column 1, only including the treatment variables, we see that, as compared to being a woman and having a daughter, if the woman had a son, she would receive 120 more minutes of formal care (24.5 percent). This difference is statistically significant at the 1 percent level. If the woman were a man, she would on average receive 83 more minutes (16.9 percent, significant at the 5 percent level), and, if we change the gender of both the patient and the patient's child, 74 more minutes (15.0 percent) of care would be provided on average (significant at the 10 percent level). In Column 2, we add controls for the age, gender, tenure,

and education of the care manager. The background characteristics of CMs are not significant predictors of minutes of care per week and the R-squared increases only slightly. We add municipality fixed effects in Column 3 and now see that, if the woman had a son instead of a daughter, she would on average receive 167 more minutes per week of formal care (33.9 percent), although the increase is not statistically significant. As robustness checks, we redo the analyses including the two outliers in Column 4, and in Column 5 we try a different functional form by taking the logarithm of the dependent variable. None of the specifications alter the main results.

Table 4: Regression results, total minutes of care

	(1)	(2)	(3)	(4)	(5)
	Baseline	Controls	Municipality	Total sample	Ln minutes
FatherSon	73.94*	70.08	97.43**	81.37	0.303**
	(43.61)	(43.65)	(47.05)	(50.45)	(0.137)
MotherSon	120.4***	117.7***	166.7***	149.1***	0.371***
	(45.47)	(45.30)	(46.29)	(53.93)	(0.130)
FatherDaughter	83.22**	79.37*	103.6**	85.26	0.227
	(42.06)	(42.84)	(48.65)	(54.59)	(0.197)
Gender of CM		-34.73	-4.718	-151.0	-0.126
		(77.25)	(95.33)	(171.0)	(0.420)
Age of CM		-0.552	0.276	0.491	-0.00306
		(1.922)	(1.875)	(2.242)	(0.00623)
>5 years of exp.		-26.40	-5.912	2.662	-0.0427
		(60.90)	(53.56)	(55.44)	(0.158)
CM nurse edu.		72.99	-36.19	-36.23	0.109
		(86.42)	(79.64)	(82.84)	(0.334)
Other health edu.		16.36	-81.61	-87.90	0.165
		(79.47)	(75.32)	(76.64)	(0.295)
Constant	491.6***	484.5***	501.7***	516.9***	5.754***
	(31.81)	(116.8)	(115.5)	(133.1)	(0.416)
Fixed effects	No	No	Yes	Yes	Yes
N	563	563	563	565	563

Robust standard errors clustered at the municipality level in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7. Concluding remarks

Do care managers take the family situation of the care recipient into account when allocating care? Further, do they treat female informal care as a substitute for formal care more than they treat male informal care as such? Our results suggest an affirmative answer to both of these questions. When asked, the decision-makers take the family situation into account and we find a treatment effect in our experiment. In particular, if a woman had a daughter instead of a son, she would on average receive about 34 percent less formal care per week.

Our findings are important and in contrast with the ideal type of the Scandinavian welfare model, where care is allocated universally according to needs, and without considering the family situation of the elderly person (Anxo and Fagan, 2005; Kotsadam, 2011). It also shows implicit biases in terms of differentiating between elderly persons with sons or daughters. As such, the pattern shows gender discrimination even in one of the most gender-equal countries in the world with a long tradition for de-familialized care policies. Normatively, one may think that the care managers are right to allocate less formal care to individuals with a higher probability of receiving informal care. Nonetheless, there is a discrepancy between what the policymakers want and how the care managers act. The Norwegian welfare state is often described as "women friendly" following the work of the political scientist Hernes (1987), and policymakers actively try to reduce gender inequalities in opportunities as well as in outcomes. Anttonen and Sipilä (1996) show that this line of thought is also reflected in the eldercare policies of the Scandinavian countries. With an ageing population, such a conflict between policy aims and the behavior of care managers is likely to increase, and policymakers should either change the law or put more effort into enforcement in order to ensure congruence of aims and results.

The research design employed in this study has strong internal validity. We also took precautionary steps to try to increase the external validity of the results. The most important threat to external validity in our setting is that care managers would behave differently in a real case than when faced with a written vignette. We devoted considerable effort to ensuring that the case description was realistic and typical. In particular, we consulted experts and read real anonymous applications before we distributed the vignette. The fact that 87 percent of the respondents answered that the case resembled a case they usually assess makes us confident that we succeeded in this. We

urge future studies to replicate our study in other contexts. In particular, it would be interesting to conduct the same experiment in a setting with much stronger norms for family care and an even more gender-biased division of informal care.

Appendix A. Informal care regressions

Table (A.5) shows the results of linear regressions of parental care on whether the caregiver is a daughter (female = 1), controlling for factors in the case description. This is to check whether the prediction that daughters provide more care for mothers is robust when including variables that are kept constant in the case description across the four cases. In Column (1), the dependent variable (Father) is an indicator of whether a father is receiving informal care from children, and in Column (2), the dependent variable is how many times a month care is given to a father. Female (=1 if the care is provided by a daughter) is not a significant predictor of father care when controlling for Father poor health (=1 if father is assessed as being of poor health), Father single (=1 if the father lives alone), and Age of father. In Columns (3) and (4), the dependent variables are indicators of whether a mother receives informal care and how many times a month care is given to a mother, respectively. Here, a daughter provided significantly more care than sons, when controlling for the health, age, and living situation of the mother.

Table A.5: Regression results on receiving informal care

	(1) Father	(2) Father times	(3) Mother	(4) Mother times
Female	-0.00245	-0.106	0.0295***	0.195***
	(0.00611)	(0.0685)	(0.00648)	(0.0730)
Father bad health	0.0323***	0.199***		
	(0.00754)	(0.0769)		
Father single	0.0165***	0.0897*		
	(0.00516)	(0.0477)		
Age of father	0.00108***	0.00629***		
	(0.000276)	(0.00225)		
Mother bad health			0.0498***	0.399***
			(0.00633)	(0.0680)
Mother single			0.00518	0.0871
			(0.00699)	(0.0659)
Age of mother			0.00169***	0.0126***
			(0.000268)	(0.00344)
Constant	-0.0728***	-0.381***	-0.126***	-0.993***
	(0.0178)	(0.132)	(0.0173)	(0.225)
N	1729	1726	3462	3460
R^2	0.040	0.016	0.041	0.020

Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix B. Sample representativeness

Table B.6: Descriptive statistics for non-sampled and sampled municipalities

	Non-sampled	Sampled	All
Population	6123.9	15433.4	11801.0
	(7844.3)	(45523.8)	(36145.3)
Share of population 67+	0.161	0.160	0.160
	(0.0346)	(0.0321)	(0.0331)
Share of population 80+	0.0544	0.0537	0.0540
	(0.0152)	(0.0144)	(0.0147)
Coverage rate home-based care for 67+	0.461	0.443	0.450
	(0.0840)	(0.0764)	(0.0798)
Coverage rate home-based care for 80+	0.372	0.362	0.366
	(0.0640)	(0.0600)	(0.0617)
Coverage rate nursing home care for 67+	0.0555	0.0514	0.0530
	(0.0227)	(0.0166)	(0.0192)
Coverage rate nursing home care for 80+	0.742	0.729	0.734
	(0.0990)	(0.0967)	(0.0977)
Centrality index	1.503	1.558	1.536
	(1.260)	(1.304)	(1.286)
Municipal revenue per capita	54961.6	51568.2	52888.7
	(12240.0)	(9135.7)	(10570.4)
Observations	167	261	428

The table shows averages and standard deviations in parantheses of descriptive statistics for non-sampled, sampled, and all municipalities. The centrality index is a classification of municipalities into four levels of centrality (0-3), in which level 0 is the least central.

Table B.7: Ability of CMs' characteristics and treatment status to predict whether the observation is missing

Variable	Coefficient	P-value
Gender of care manager	0.047	0.507
Age of care manager	-0.002	0.333
>5 years of experience	0.0307	0.493
Educated nurse	-0.012	0.753
Other health education	0.020	0.654
Treatment:		
FatherSon	0.023	0.613
MotherSon	-0.043	0.356
FatherDaughter	0.009	0.838

The table shows, the coefficient and p-value from the regression of the form, $missing = \beta_0 + \beta_1 Covariate + \epsilon$ where missing is an indicator for whether the observation is missing and Covariate is listed in column (2).

Appendix C. Questionnaire

Below you will find a brief description of a fictional older person. Imagine that you have formed a picture of the help needs of this person based on assessments performed by the unit of home care services and some phone calls that you have had with the elderly person. You are to assess the help need and which services you would assign by answering some questions. You are to pretend the person is a real person. Consider what you normally consider when evaluating and assigning services. At the end of the questionnaire you will have the opportunity to specify what essential information you wished you had access to that was not available in the description.

Questionnaire

Municipality: _____

1. Which services would you assign this elderly person? In the left column you can tick off all the options you think the person is eligible for and should receive. If you have chosen options that may vary in magnitude, please specify the extent you think the service should have.

Floor cleaning in rooms in daily use	☐	_____	min./week
Vacuuming in rooms in daily use	☐	_____	min./week
Cleaning of kitchen	☐	_____	min./week
Laundry	☐	_____	min./week
Cleaning of sanitary equipment	☐	_____	min./week
Linen change	☐	_____	min./week
Grocery shopping	☐	_____	min./week
Other practical assistance in the home (specify):			
_____	☐	_____	min./week
Personal hygiene (incl. showe/bath)	☐	_____	min./week
Facilitation and preparation of meals	☐	_____	min./week
Retrieving medication at pharmacy	☐	_____	min./week
Provide/give medication	☐	_____	min./week
Other nursing services in the home (specify):			
_____	☐	_____	min./week
Safety alarm	☐		
Day center/activity center (incl. transportation)	☐	_____	hours/week
Day rehabilitation/rehabilitation in the home	☐	_____	hours/week
Institution (relieve, rehabilitation, short or long term)	☐	_____	days (total)
No services	☐		

2. On what do you base your decision? You can tick off several options. The decision is based on the persons

Age ☐ **History of falling** ☐ **Practical help needs** ☐ **Living situation** ☐

Social status ☐ **Need for medical assistance** ☐ **Family situation** ☐

Financial/personnel limits ☐ **Signals from top management** ☐

Other ☐ **If you checked for other, please specify:** _____

_____

3. What additional information about the person described do you wish you had access to in order to make up a reasonable opinion about needs and suggested care provision?

_____

_____

_____

_____

4. Are you a man or a woman? **Man** ☐ **Woman** ☐

5. How old are you? _____ **years old**

6. Which type of education do you have?

Auxiliary ☐ **Nurse without further education** ☐ **Nurse with further education** ☐
Other health/care education ☐ **Administrative education** ☐

Other ☐ **Please describe:** _____

7. What work experience do you have? You can tick off several options.

< 5 years in home care services ☐ **5+ years in home care services** ☐

< 5 years nursing home experience ☐ **5+ years nursing home experience** ☐

< 5 years hospital experience ☐ **5+ years hospital experience** ☐

8. For how long have you been employed in the municipality where you currently work?_____ **years**

9. What is your current job title? _____

10. Specify, in % of full time, the share of your work that consists of

Type of tasks	**Percentage**
Assessment/evaluation	
Consultation/advice/treatment	
Administration of services in the unit	
General administration (documentation, planning, etc.)	
Other tasks, please specify:	
SUM	**100%**

11. When evaluating help needs, you normally undertake the evaluation

Alone ☐ **In cooperation with a superior** ☐ **In cooperation with colleagues** ☐

In cooperation with employees in the home care service unit ☐

Other ☐ **Please specify:** _____

12. When evaluating applicants' situation, do you use aids?

No, I do not use a structured working tool ☐ **Yes, the municipality's form** ☐

Yes, I use a standarized working tool ☐ **Please specify:** _____

13. Does the person described remind you of a case you normally evaluate?

Yes ☐ No ☐

Thank you for your help!

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