Household Production in an Egalitarian Society

Yuko Onozaka, *University of Stavanger*
Kamran Hafzi, *UiS Business School*

Norwegian national policies strongly incentivize double-earner households and gender equality, but various gender gaps persist both at work and at home. In these seemingly contradictory situations, what are the mechanisms under which Norwegian households allocate their market and domestic labor? Drawing on both a large set of administrative data and a representative survey, this question is examined from two perspectives. First, we focus on the micro-economic processes and investigate if Norwegian households act according to economic rationality or if they still follow the gender norm "A man should earn more than his wife." Second, we focus on how Norway's contextual factors may influence the household experiences when a wife has better market productivity. We find that a wife with better market productivity, who is thereby facing the risk of outearning her husband, works more hours and earns more than her husband, while doing less chores—behavior consistent with economic rationality. Further analyses show that women's "higher" relative market productivity is mainly a consequence of having low-income husbands, and "higher" and "lower" market productivity women are surprisingly similar in other sociodemographic aspects. Norwegian redistribution policies, through progressive taxation and benefit transfers, seem to mitigate the income differences and promote gender neutrality in a sense that if couples wish to pursue an untraditional division, by preference or by necessity, they seem to be able to do so without being held back by the traditional gender expectations or being very poor.

Norway is known as one of the most gender-equal countries in the world. Leading indexes such as Global Gender Gap Report by World Economic Forum (http://reports.weforum.org/) and United Nations Gender Inequality Index (http://hdr.undp.org/en/content/gender-inequality-index-gii) consistently place Norway as one of the highest-ranked nations. Norway has generous labor and family policies that support egalitarian division of labor, aimed at pushing women into the labor market while pulling men toward household work (Kitterød and Lappegård 2012). Even in this highly egalitarian society, the gender segregation in the labor market is one of the largest among European

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countries (Rønsen and Kitterød 2010), with the majority of women employed in the public sector and a large proportion working part-time (Statistics Norway 2016b). The persisting gendered behavior is suggestive of traditional gender role norms still affecting individual and household decisions, but how and to what extent is unclear.

In this paper, we aim to investigate the underlying mechanisms through which Norwegian households operate to allocate their market and domestic labor. We examine this from two perspectives. First, we focus on the micro-economic processes and investigate if Norwegian households act according to economic rationality or if they follow the traditional gender norm "A man should earn more than his wife" against economic rationality. Then, in the second perspective, we explore how Norway's contextual factors may shape the household experiences when a wife has better market productivity. For the first part, the empirical strategy of Bertrand, Kamenica, and Pan (2015) is employed to test the rationality of division schemes by examining wives' potential market productivities compared to their husbands'. Based on economic rationality, *specialization* theory (Becker 1991) postulates that a spouse with better market productivity will specialize in market work while the other spouse does the domestic work. Then, *bargaining/ relative resource* arguments posit that the wife's increased economic resources put her in a better position in negotiating for a reduced chore burden (Blair and Lichter 1991; Cook et al. 2013; Greenstein 2000; Manster and Brown 1980; McElroy and Horney 1981). Therefore, economic rationality predicts that a wife with a better market prospect than her husband will be the main breadwinner while doing less chores. In *gender* perspectives, however, individuals follow the normative behavior expected of each gender, that is, the male breadwinner and female homemaker model (Bittman et al. 2003; Brines 1994; Evertsson and Nermo 2004; Greenstein 2000). When one's behavior is not consistent with the norm, s/he may engage in behavior that can neutralize the deviance (Greenstein 2000) or compensate for the depleted identity (Akerlof and Kranton 2000). Accordingly, the gender perspectives predict that either a higher market productivity wife distorts her labor supply so as not to outearn her husband, or the breadwinner wife does more chores than her husband. We empirically test which theoretical predictions fit better with the Norwegian households.

For the second part, we provide a descriptive analysis to explore the roles of social policies in shaping Norwegian households' experiences. The importance of the macro-level "national" context in affecting household behavior has been pronounced in the literature (Davis and Greenstein 2004; Fuwa 2004; Geist 2005; Hook 2006; Knudsen and Wærness 2008; Ono and Lee 2013); households' decisions are made within the wider context, including welfare regimes, policy configurations, and social/cultural norms. Thus, households with the same micro-economic characteristics might make very different decisions in a different context (Hook 2006), and their experiences from a certain division can vary (Lee and Ono 2008; Ono and Lee 2016; Treas, van der Lippe, and Tai 2011). We explore implications of Norway's redistribution policies on individual and household income, which can influence how couples experience division schemes.

This paper contributes to the literature in several ways. First, the existing literature mostly focuses on the division of household work while the market labor allocation is taken as given (e.g., Bernhardt, Noack, and Lyngstad 2008; Breen 2005; Brines 1994; Evertsson and Nermo 2004; Greenstein 2000; Gupta 2007). The division of both paid and unpaid labor between partners is rarely investigated, in particular, with a representative sample (Kitterød and Lappegård 2012). However, the leading theories that depict the division of household labor make explicit linkages between the allocation of market and domestic work, indicating that they should be considered together. A methodological challenge arises, as it is necessary to assess the relative market productivities of spouses in order to evaluate the economic rationality of the current division scheme. But the relative market productivities, typically assessed from respective earnings or wage rates, are partially determined by the current division scheme. We address this identification issue by deriving the *potential* income measures based on the population income distributions by basic human resource characteristics, following Bertrand, Kamenica, and Pan (2015).

Second, our analysis provides interesting comparisons to women in the United States, who are found to distort their labor supply to avoid outearning their husbands, and when wives do outearn their husbands, they engage in more chores (Bertrand, Kamenica, and Pan 2015). Given the contextual differences between the United States and Norway, it is of interest to see if similar behavior is found among Norwegian households.

Third, we provide insights into what can be the underlying mechanism in determining household production in an "egalitarian" society. The multi-equilibrium framework (Esping-Andersen et al. 2013; Esping-Andersen 2009) argues for dynamic paths, where social, political, and economic forces pull countries into either the traditional or the egalitarian equilibrium. As the egalitarian equilibrium is newer and perhaps still being constructed (Esping-Andersen 2009), what drives household production in practicality (rather than in ideology) is unclear. Studying Norway can provide an interesting case, where evidence is mixed in the degree of gender equality and the role of traditional gender role norms.

Background

The Norwegian Context

One of the central goals of the Norwegian government has been to implement policies that advocate the dual-earner household model and promote gender equality in both paid and unpaid work (Kitterød and Lappegård 2012; Rønsen and Kitterød 2010). Norway was one of the first countries to implement paternal quota in its parental leave policy, and the first to mandate both private and public organizations to keep gender balance among board members. Female labor force participation is one of the highest among the OECD countries (OECD 2012). Parents in Norway are entitled to 49 weeks of parental leave at 100 percent coverage (or 59 weeks at 80 percent coverage) with full job security,

10 weeks of which are reserved for fathers. The continuous female labor force participation is supported by the provision of high-quality and affordable day care. In 2015, the enrollment rate in childcare was over 90 percent (Statistics Norway 2016a).

In 1998, a cash-for-care program was implemented, whereby parents who choose to stay at home (mostly mothers) with their young children become eligible for a tax-free lump-sum allowance if they do not use publicly subsidized kindergartens. The program has been criticized as inconsistent with other policies that promote gender equality and is found to reduce mothers' labor market attachment (Drange 2015; Drange and Rege 2013; Rønsen 2009), as well as inducing a more traditional division of labor (Rønsen 2001). In 2015, fathers' quota was shortened from 14 weeks to 10 weeks after the change of the leading political party. These policies send mixed signals to couples, and are perhaps reflective of mixed emotions among Norwegians regarding the progressively egalitarian society. As one potential indication, the Norwegian labor market remains highly gender segregated, with over one-third of women working part-time, which is twice as much as men (Statistics Norway 2016b), and disproportionally more women (over 70 percent) working in the public sector compared to men (about 30 percent) (Statistics Norway 2016b). Although more women than men obtain university degrees, women are more likely to pursue degrees in education, health, and social work (Statistics Norway 2016c), all of which are strongly linked to public sector careers. Consequently, the average gross income is substantially lower for women than men: NOK 530,100 for men and NOK 354,000 for women in 2015 (Statistics Norway 2016d).

Share of unpaid labor among Norwegian couples is relatively more equitable than for other countries, but that is attributed mainly to women spending less time doing chores (Kitterød and Lappegård 2012) while men's share increased only slightly over time (Kitterød and Rønsen 2013c). Norwegians hold more egalitarian gender role views, but actual behavior is not necessarily consistent with the egalitarian ideal, even among young Norwegian couples (Bernhardt, Noack, and Lyngstad 2008). In over half of Norwegian households, husbands are the main earners who work more and earn more, while wives shoulder more household tasks (Kitterød and Lappegård 2012). The same study also finds that the untraditional division (e.g., the female breadwinner model) is uncommon even in Norway.

Theories of the Division of Market Labor

According to specialization theory (Becker 1991), a spouse with better market productivity, *regardless of gender*, would specialize in market work, while the other spouse specializes in domestic tasks. By specializing, a spouse can effectively accumulate the useful human capital for the respective task. Specialization is considered one of the leading causes of men's marriage and fatherhood premium in the United States (Chun and Lee 2001; Killewald and Gough 2013). The increased market opportunities for women raise the opportunity cost too high for them to be an exclusive homemaker (Esping-Andersen et al. 2013). The

fact that most women work outside the home indicates that complete specialization (a breadwinner husband and a homemaker wife) as predicted by Becker's model may not make sense today. Even so, many households put husbands as the *main* breadwinners, while wives work as secondary earners (Cha 2010). Even a highly educated wife seems to prioritize the husband's career over her own (Bertrand, Goldin, and Katz 2010). Given the persisting gender wage gaps, this may well be consistent with economic rationality. Some households with high economic resources may choose to outsource daily tasks (Datta Gupta, Smith, and Verner 2006). Either way, such behavior is consistent with economic logic.

However, a recent study finds that a wife tends to distort labor supply when she has a high chance of outearning her husband (Bertrand, Kamenica, and Pan 2015), a behavior that goes against economic rationality. This can be viewed from the *doing gender* perspective (West and Zimmerman 1987), wherein market labor and household work are not just economic activities but also social processes that generate masculinity and femininity. Non-normative roles, such as a breadwinner wife or an economically dependent husband, can pose great psychological stress to both husband and wife (Atkinson and Boles 1984; Pierce, Dahl, and Nielsen 2013). Accordingly, couples may avoid such situations by adjusting wives' labor supply even if it is not economically optimal.

The Division of Domestic Chores

The time-use studies find that women do more housework than men, but the gap has narrowed over the past decades (Bianchi et al. 2000). Some studies attribute the reduced chore burdens among women to their increased economic resources. The relative resource or bargaining models view the household division of labor as an exchange of income and housework between spouses, each with his/her own preference (Blair and Lichter 1991; Cook et al. 2013; Greenstein 2000; Manster and Brown 1980; McElroy and Horney 1981). The currency of the bargain is the economic resources that each brings into the household (e.g., labor income) and they negotiate over the allocation of housework. Thus, an increase in the wife's relative economic resources puts her in a better position to negotiate more favorable terms with regard to the chore division (Bittman et al. 2003; Brines 1994; Greenstein 2000). On the contrary, the gender models predict that an individual who violates the norm would compensate for the deviation by over-complying in other activities, behavior described as deviance neutralization (Greenstein 2000), or compensating for the depleted gender identity (Akerlof and Kranton 2000). The prime example is a breadwinner wife who engages in more household chores, while a husband who is outearned by his wife does not contribute more or does even less chores (e.g., Bittman et al. 2003). Such behavior is clearly inconsistent with economic rationality.

In recent studies, however, validity of the gender models is put into question. It is argued that the key findings are due to model misspecifications, bias in survey instruments, and the use of older data (Gupta 2007; Sullivan 2011). Gupta (2006, 2007) and Sullivan (2011) also criticize relative resource perspectives,

indicating that it is women's absolute income, not relative to their husbands', that determines the chore burden. On the other hand, some new studies still find empirical support for gender models, after controlling for the absolute levels of husband and wife's income (Baxter and Hewitt 2013; Bertrand, Kamenica, and Pan 2015). Thus, which theoretical models explain the household behavior better is still a debated issue.

National Context

There has been an emerging interest in the importance of macro-level "national" context affecting households (Davis and Greenstein 2004; Fuwa 2004; Geist 2005; Hook 2006; Knudsen and Wærness 2008). National context is broadly understood as welfare regimes, policy configurations, and social/cultural norms, altogether influencing both the available economic resources as well as normative sets of expectations (Hook 2010). For example, the United States is characterized as a liberal (market-oriented) regime of the welfare system, with a minimal level of government interventions (Esping-Andersen 1990). The resources that people in the United States have access to (e.g., disability benefits, childcare facilities, etc.) are not only vastly different from what Norwegians can expect, but also highly heterogeneous. Norway, on the other hand, operates as a social-democratic welfare state that promotes social equality through universalism policies (Sümer 2009). All residents in Norway receive governmental supports spanning across all aspects of their lives (e.g., universal childcare/ education and healthcare coverages). This costly system is supported by the high (but progressive) tax rates, also working as an egalitarian redistribution mechanism. As a result, Norway's after-tax Gini coefficient is 0.25, one of the lowest (i.e., most equal) among the OECD countries (that of the United States is 0.39) (OECD 2015). The welfare state government also serves as an employer of a massive number of workers in the public sector, employing 35 percent of the total workers, much higher than the OECD average of 21 percent (OECD 2015). This creates a large amount of employment among women (e.g., teachers and nurses), but ironically also facilitates gender gaps in the labor market, as government jobs tend to be lower paid than the private sector jobs.

Hypotheses and Approach

Do Norwegian Households Act According to Economic Rationality?

With egalitarian incentives implemented as national policies, it is expected that traditional gender norms have smaller effects in Norway. Studies show that complete specialization is rare in Norway due to the egalitarian policies (Kitterød and Rønsen 2013b), but one can still hypothesize that a spouse with better market productivity will be the "main" breadwinner by earning more than half of the household income, regardless of gender. However, if the wife has better market productivity and becomes the main breadwinner, it contests the male breadwinner norm, which can cause disutility and emotional strain to

both husband and wife (Akerlof and Kranton 2000; Bertrand, Kamenica, and Pan 2015; Booth and van Ours 2009; Pierce, Dahl, and Nielsen 2013). Therefore, we formulate our first hypothesis: H1: A wife with better market productivity than her husband has higher labor market attachment. Support for this hypothesis implies economic rationality, while non-support implies the gender perspectives.

The gender models predict that higher-earning women disproportionately undertake more housework, whereas men who are being outearned by their spouses either do not contribute more to the chores or do even less housework (Akerlof and Kranton 2000; Bertrand, Kamenica, and Pan 2015; Bittman et al. 2003; Booth and van Ours 2009; Brines 1994; Hochschild and Machung 1989; West and Zimmerman 1987). If a household follows economic rationality, a wife who earns more than her husband would do less housework (Brines 1994; Evertsson and Nermo 2004; Kan 2008a). Thus, our second hypothesis states: H2: A wife's chore burden decreases with her income contribution. Support for this hypothesis implies economic rationality, while non-support implies the gender perspectives.

What Might Be the Roles of Social Policies in Shaping Households' Experiences?

We, then, explore how Norwegian contexts may influence household experiences, especially when women are likely to outearn their husbands. The existing literature provides two different interpretations of women with high earnings relative to their husbands: a high-skilled, high-earning woman who is burdened with the "second shift" at home (Hochschild and Machung 1989), and a woman with a low-income husband where she herself has lower income than other women (Gupta 2006, 2007; Sullivan 2011). To see which picture illustrates Norwegian households better, we compare the income distributions of wives as well as husbands. Due to the egalitarian redistribution policies, we expect income shifts from high to low earners. Such redistributions can reduce income gaps *within* a household (i.e., between a wife and a husband) and *between* households (i.e., between households with high- and low-productivity wives). The former narrows the income difference between husband and wife, which can reduce the tension, if any, due to the untraditional division and equalize the spousal relative bargaining power. The latter can reduce the risk for female breadwinner households to fall into poverty, if they are indeed the lower-income households. Our aim in this part of the analysis is explorative, so we refrain from stating a formal hypothesis.

Data and Method

We utilize two sets of data: the Life Course, Generation and Gender (LOGG) survey and the Social Security 20 percent Selection (SS20, hereafter). The LOGG is the main dataset we use to analyze the household division of labor, while the

SS20 is used as a supplementary dataset to construct the measures of relative economic productivities between spouses.

The Life Course, Generation and Gender (LOGG) survey is composed of the Norwegian Panel Study on Life Course, Ageing and Generation (NorLAG), and the Generations and Gender Survey (GGS), and includes a representative sample of the Norwegian population between the ages of 18 and 81. The survey was conducted in collaboration between Statistics Norway and Norwegian Social Research (NOVA) between 2007 and 2008. A total of 14,884 respondents participated in this survey, with an overall survey response rate of 61 percent. The data were collected through phone interviews as well as questionnaires. A unique feature of this dataset is that the survey was later augmented with information from the national registry data, so that some of the key information (e.g., individual income) is based on administrative information rather than self-reported. Further, this dataset provides information about households' work-life arrangements. We have only considered couples who are in a formal relationship (married or in partnership), between the ages of 21 and 64, and whose husbands are in paid labor, resulting in the analytic sample of 4,746 couples.

The SS20 was provided by the Norwegian Center for Research Data (NSD), and is composed of a 20 percent cross-sectional drawing of the population. We utilize the drawings from the year 2007 to be consistent with the LOGG data. The dataset contains the labor income, age, education attainment (education fields are not available), and region of residence. Information on demographics and education is gathered from Statistics Norway, while information on income is provided by the Norwegian Tax Administration. We include observations with non-missing information and between the ages of 18 and 70, resulting in 126,978 observations.

Variables

Dependent Variables

The variable *WifeWorksMoreHrs* is an indicator variable that takes a value of 1 if the wife's share of working hours exceeds half of the total weekly working hours of husband and wife combined. Total work hours by husband and wife are reported as continuous variables. *WifeEarnsMoreActual* is also an indicator variable that takes a value of 1 if the wife's employment income contribution exceeds half of the total household labor income, and 0 otherwise. Both wife and husband's employment income are reported in brackets of categories in NOK 5,000 (approx. USD 840) increments starting at NOK 5,000. Thus, the income variable is treated as a continuous variable. Respondents also answer who does the chores (cooking, doing dishes, doing laundry, grocery shopping, and cleaning) in six frequency categories (1 = always you, 2 = usually you, 3 = you and the partner, 4 = usually the partner, 5 = always the partner, 6 = always or usually other person [specify]). *HouseworkWife$_k$* takes the value 1 if the wife always or usually undertakes the chore k, $k = 1, ..., 5$, in the household.

Independent Variables

WifeEarnsMorePotential is the measure of the wife's market productivity compared to her husband's, and is the probability that the wife's potential income exceeds the husband's income. The potential income for the wife is derived from the income distribution composed from the SS20 data, with similar individuals based on human capital indicators (gender, age, education attainment, and region of residence), whereas the details of this process are given in the next section. It represents a probability that a woman earns more than her husband, if the income of this woman is a random draw from the economy-wide distribution of income of women with similar backgrounds. Thus, it captures the wife's market worth, *independent of the current household division of labor*. *RelativeIncomeWife* is the share of the wife's labor income to the combined household labor income.

Control Variables

Education attainment is obtained through the categorical variable holding five categories: elementary school, upper secondary basic, upper secondary finished, three-year college education, and five or more years of college education. The partner's education is obtained through the categorical variable containing the categories of primary education, lower secondary education, upper secondary basic, upper secondary final, postsecondary non-tertiary, first stage of tertiary undergraduate level, first stage of tertiary graduate level, and second stage of tertiary postgraduate. We converted the education category of both the respondent and his or her partner into a categorical variable with four categories: compulsory, high school, three-year college, and five or more years of college. A binary variable *College* for both wife and husband equals to 1 if one has a three-year college degree or higher and 0 otherwise. *Region of residence* is a categorical variable containing the following regions: Akershus and Oslo, Hedmark and Oppland, Østlandet, Agder and Rogaland, Vestlandet, Trøndelag, and Northern Norway. *Age* is a continuous variable, and *age category* is a categorical age variable with five-year intervals starting from 18 years for both husband and wife. We also include dummy variables for working in the private sector for both husband and wife. In order to account for any health problems, we construct an indicator variable *ChronicIllness* for reported long-standing/chronic illnesses for both husband and wife. *Children* is coded into a binary variable of having underage children less than age 16 (own, stepchildren, or foster children) in the household full- or part-time.

Redistribution Variables

Benefits is a variable that measures the total amount of benefit transfers from social security, including health care and parental leave compensations, child benefits, disability benefits, and so on. This amount is taken directly from the national registry database. *AfterTaxIncome* is the amount of income after tax is subtracted, also procured from the national registry database. Then, *IncomeAfterRedistribution* is obtained by adding *benefits* to *AfterTaxIncome*.

Analytical Strategy

Our strategy of identification is to first assess the comparative market productivities between spouses, and identify households in which a wife has better market productivity than her husband. In these households, it is more efficient for a wife to be the main breadwinner, which would also challenge the male breadwinner gender norm. Thus, where wives with better market productivities are the main breadwinners, it indicates that the household is not bounded by the male breadwinner gender norm, at least in terms of the market work division.

Construction of Probability That the Wife Earns More

The basis for the comparison is the potential income, constructed from the SS20 data. While actual income is the earnings couples receive from employed work in the market, potential income is the income an individual would likely earn based on his/her human capital indicators, and is not related to the current household division. An individual's potential income is obtained in the following way. First, an individual in the SS20 dataset is assigned into one of 288 demographic groups based on gender (male and female), age (five-year intervals from 18 to 64), education (less than high school, high school, college three years, college five years or more), and region of residence (North, Central, West, and South). We note that seven regions are aggregated into four region categories to maintain a sufficient number of observations in each demographic group. Then, the distribution of potential income for each demographic group is summarized by the nth percentile of the annual salary earnings, $n \in \{5, 10, ..., 95\}$, of employed individuals in that demographic group. The derived percentiles of potential income distributions are then augmented into individuals in the LOGG survey, who are assigned into one of the demographic groups using the same categorization. Within a household j, consisting of individuals $i = m, f$ (the index m stands for male, f stands for female), the probability that a wife ($i = f$) in household j who belongs to the demographic group d earns more than her husband is computed by comparing the husband's actual income (w_{jm}) to the wife's potential income distribution percentiles where $n \in \{5, 10, ..., 95\}$:

$$WifeEarnsMorePotential_j = \frac{1}{19} \sum_n 1_{\{w_{ifd}^n > w_{jm}\}}. \tag{1}$$

We consider percentiles from 5th to 95th with a 5 percent increment, which results in 19 percentile categories. Thus, a distribution is estimated in each percentile category and averaged over.

Past research suggests that women distort their labor supply to avoid a situation where a wife outearns her husband. The fact that Norwegian women in general are working fewer hours and disproportionally in the public sector could be a manifestation of labor supply distortion due to the gender consideration. Using potential income based on the economy-wide income distributions of similar individuals, including both women in the private sector as well as unmarried women, should mitigate these issues to some degree.

Wife's Labor Supply

Using the wife's potential income measure derived in the previous step, we would like to estimate a model that predicts the probability that the wife works more hours than her husband as a function of the likelihood of the wife earning more than her husband. We also include a quadratic term of *WifeEarnsMorePotential* to account for a potential curvilinear relationship:

$$\Pr(WifeWorksMoreHrs) = \Lambda(\beta_0 + \beta_1 WifeEarnsMorePotential$$
$$+ \beta_2 WifeEarnsMorePotential^2 + \gamma'\mathbf{Z}), \quad (2)$$

where $\Lambda(.)$ represents the logit probability formula and $\mathbf{Z}$ is a matrix of sociodemographic controls. It is particularly important to include husband and wife's absolute levels of income, given the critique by Gupta (2006, 2007) and Sullivan (2011). Both β_1 and β_2 are of interest; $\beta_1 > 0$ and $\beta_2 = 0$ implies that the higher market ability wife monotonically increases her labor supply; $\beta_1 > 0$ and $\beta_2 < 0$ imply the positive effect of the wife's market ability on her labor supply but at a diminishing rate. In such cases, the location of the peak where the behavioral shift occurs is also of interest, which can be obtained by plotting the predicted probabilities over a range of *WifeEarnsMorePotential*, while fixing the control variables at certain values (Cameron and Trivedi 2005, 501).

Next, we wish to test if the wife with higher productivity in market work would be the "main" breadwinner by earning more than half of the household income. Similar to the previous model, we will assess the curvilinear relationship in the specification:

$$\Pr(WifeEarnsMoreActual) = \Lambda(\beta_0 + \beta_1 WifeEarnsMorePotential$$
$$+ \beta_2 WifeEarnsMorePotential^2 + \gamma'Z). \quad (3)$$

Chore Division

We are then concerned how the domestic tasks are divided. We formulate the empirical specification that predicts the probability that the wife usually or always does chores as a function of the wife's relative earnings:

$$Pr(HouseworkWife_k) = \Lambda(\beta_0 + \beta_1 WifeRelativeEarning$$
$$+ \beta_2 WifeRelativeEarning^2 + \gamma'Z), \quad k = 1,\ldots,5 \quad (4)$$

where $HouseworkWife_k$ is an indicator that takes 1 if the wife always or usually does each of the five chores ($k = 1, \ldots ,5$): cooking, doing dishes, doing laundry, grocery shopping, and cleaning. $\beta_1 < 0$ suggests the specialization or bargaining model, while $\beta_1 > 0$ implies gender model. If $\beta_1 < 0$ and $\beta_2 > 0$, it implies a behavioral shift from specialization/bargaining up to a certain point and the gender model beyond that point.

Households with Higher Market Productivity Wives

As discussed earlier, this section is largely explorative. The *high* market productivity wives relative to their husbands are defined as those who have more than a 50-50 chance of outearning their husbands (*WifeEarnsMorePotential* > 0.5). Then, we divide households into *high* and *low* groups and compare the two groups by plotting income distributions, so that we can compare across all income levels, not just by conditional means (as in regression analysis). The "differences" in distributions are assessed with two tests of equality of distributions (the Kolmogorov-Smirnov [KS] test and the Epps-Singleton [ES] test, see, e.g., Goerg and Kaiser [2009]; Wilcox [1997]) for added robustness. If one group has lower income than the other group, their income distribution should have more mass toward the left along the income spectrum, and we should reject the null hypothesis that the two distributions are equivalent. We will compare income distributions between (1) *high* and *low* wives; (2) *high* and *low* wives' husbands; and *high* and *low* households (3) before and (4) after redistributions.

Results

Sample Characteristics

Table 1 provides the basic characteristics of the sample, as well as the summary of the key variables. The average age of men and women in our sample is approximately 41 years for the SS20, but is somewhat higher for the LOGG, as we only include individuals in a formal partnership in the analytic sample. More women than men have completed university education, but they earn less than men, on average. Men on average allocate more hours per week to market work, 43 hours for men and 34 hours for women, and a higher percentage of men (55 percent) work in the private sector than women (34 percent). In our sample, the average probability that a wife has better market productivity is 0.19, while the proportion of women who earn more than their husbands in actual terms is 0.22. About 25 percent of the wives work more hours than their husbands. As for the chore sharing, the proportion of women usually or always doing cooking, dishes, laundry, grocery shopping, and cleaning is 0.57, 0.32, 0.77, 0.39, and 0.40, respectively. The average levels of benefit transfers are NOK 7,679 and NOK 11,144 for husband and wife. The higher levels of benefits for wives may partially reflect that child benefits are usually transferred to mothers. The average after-tax income is NOK 398,990 and NOK 258,028 for men and women. The substantial reduction compared to the before-tax income is illustrative of the generally high tax rate in Norway.

Wife's Labor Supply

The key results from the binary logit model in equation (2) are shown in table 2, model 1 (full results in Appendix 1). The key variable *PrWifeEarnsMorePotential* shows significant and *positive* effects, indicating that higher earning-potential wives are *more* likely to take on higher shares in market work hours than their

Table 1. Summary Statistics

	Social security 20%		LOGG	
	Men	**Women**	**Husband**	**Wife**
Age	41.7 (14.18)	41.3 (13.91)	47.36 (9.23)	44.95 (9.26)
College (0/1)	0.29 (0.45)	0.35 (0.48)	0.39 (0.49)	0.46 (0.50)
Annual salary (NOK)	336,166 (197,655)	241,142 (151,610)	514,560 (344,136)	304,332 (175,704)
Work hours (per week)			42.74 (10.47)	33.87 (10.10)
WifeEarnsMorePotential				0.19 (0.28)
WifeEarnsMoreActual				0.22 (0.41)
WifeWorksMoreHrs				0.25 (0.43)
Wife always or usually does…				
cooking				0.57 (0.50)
dishes				0.32 (0.47)
laundry				0.77 (0.42)
shopping				0.39 (0.49)
cleaning				0.40 (0.50)
Works in the private sector (0/1)			0.55 (0.50)	0.34 (0.47)
Government benefit transfers (NOK)			7,679 (35,951)	11,144 (37,336)
After-tax income (NOK)			398,990	258,028
N	64,994	61,984	4,746 (couples)	

Note: *WifeEarnsMorePotential* is the probability that the wife's potential income exceeds the husband's income. *WifeEarnsMoreActual* is an indicator that the wife's actual income exceeds that of the husband's. *WifeWorksMoreHrs* is an indicator that the wife's weekly working hours exceed those of the husband's.

Table 2. Wife's Labor Supply

	Model 1	Model 2
	Dependent variable	
	An indicator that a wife works more hours	*An indicator that a wife earns more*
WifeEarnsMorePotential	1.932***	7.535***
	(0.399)	(0.621)
WifeEarnsMorePotential^2	−1.068**	−3.714**
	(0.465)	(0.684)
Controls	Yes	Yes
N	4,716	4,716
Pseudo R^2	0.061	0.411

Note: Model 1 estimates the probability that the wife's working hours exceed those of the husband's. Model 2 estimates the probability that the wife's actual earnings exceed those of the husband's. Logit model coefficients are reported. Control variables include husband and wife's age, squared age, college degree dummies, dummies for having chronic illnesses, dummies for working in the private sector, dummy for having underage children in the household, and regional dummies. Model 1 also contains log of wife's income as a control, but not in model 2, in which the dependent variable is too highly correlated to the wife's actual income. Robust standard errors in parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

husbands. The quadratic term is also highly significant with a negative sign, indicating that the effect of *WifeEarnsMorePotential* is increasing at a diminishing rate. To assess the potential behavioral shift, we compute the predicted probability of *WifeWorksMoreHrs* over the range of values for *WifeEarnsMorePotential* from 0 to 1 with an increment of 0.01, that is, $p = \in \{0, 0.01, 0.02, ... , 0.99, 1\}$, with all the variables set at the sample mean to capture the "average" household. The predicted probabilities are plotted in figure 1, panel A. The solid line depicts the estimated probability, while the two dotted lines show the 95 percent confidence bounds. The predicted probabilities are increasing at a diminishing rate, but do not decrease at any relevant ranges, indicating that as a wife's relative market productivity increases, it is more likely for the wife to work more hours than her husband.

The binary logit estimation on probability that the wife earns more in actual terms in equation (3) is estimated and the results are shown in table 2, model 2. Again, the coefficient for *WifeEarnsMorePotential* is positive and significant while that of the quadratic term is negative and significant, indicating the positive effect with a diminishing rate. The predicted probability is plotted in figure 1, panel B, showing that the probability does not go down (but increases at a diminishing rate) for higher-productivity wives. Our analysis so far, then, indicates that among Norwegian households, a wife with better market productivity compared to her husband works more and earns more than her husband. Thus, H1:

Figure 1. Estimated probabilities of wife's labor market attachment. Panel A. Estimated probability that the wife works more hours. Panel B. Estimated probability that the wife earns more than the husband. Panel A shows the estimated probability that a wife works more hours than her husband for an "average" household (using the sample means for the simulation) based on the coefficients from table 2, model 1. Panel B shows the estimated probability that a wife earns more than her husband for an "average" household based on table 2, model 2. The dotted lines indicate the 95 percent confidence bounds.
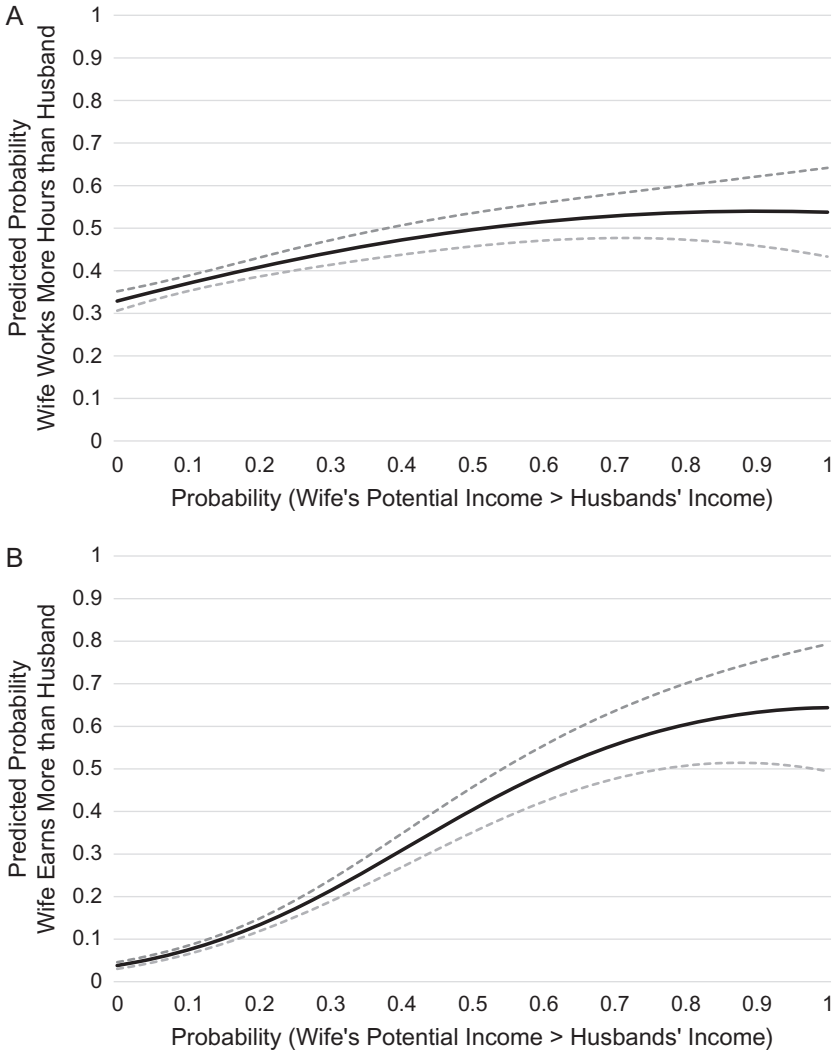
A higher market productivity wife relative to her husband has a higher labor market attachment, is supported. These results make a clear contrast with what was found among the US households in Bertrand, Kamenica, and Pan (2015).

The Chore Division

Now we investigate the chore division between spouses. The dependent variables are indicators for the wife always or usually doing each chore, while the key independent variable is the actual relative earnings (level and quadratic). Each chore indicator is used as a dependent variable in binary logit. Since men tend to overreport their contributions to chores while women's accounts are found to be more accurate (Kan 2008b), we only use women's observations to estimate the models. The key estimation results are presented in table 3 (full results in Appendix 2). The coefficients for the relative income are negative and significant for all the chores except laundry, and quadratic terms are only significant for laundry. Unlike previous models, the actual relative income is used in this model. Since we are plotting along the different relative income configurations, it does not make sense to hold both husband and wife's income levels fixed at the mean. Instead, we re-estimate the models, while controlling for household income (but not husband and wife's income), to compute the predicted probabilities (figure 2, panel A). All the lines exhibit decreasing trends as the wife's income contribution increases. However, the decline is steeper for lower relative income wives than higher relative income wives. In fact, the probability is almost flat or even slightly increasing in some of the chores, a pattern consistent with deviance neutralization. Following Gupta (2007) and Sullivan (2011), we wish to investigate the possible compositional effects among wives with high relative earnings before we conclude on the gendered behavior. This is done in the next section.

Comparing High- and Low-Productivity Wives and Their Households

As stated earlier, we categorize households into *high* and *low* groups, depending on women's chances of outearning their husbands. Table 4 shows the group summary. In our sample, over 80 percent of the households are in the *low* group, likely reflecting the generally higher earnings of men. The most striking difference between the two is the husband's average income—almost three times higher among the *low* group than that of the *high* group. Wives in these two groups have the same level of average income, although more *high* group wives have college degrees (56 percent vs. 44 percent), but fewer of them work in the private sector (26 percent vs. 35 percent). High proportions of both groups have under-age children in the household, but it seems to have a small effect on women's employment, possibly due to the generous family policies.

Figure 3, panel A, shows the density plots of income of the *high* and *low* wives, while panel B shows those of the husbands. For women (panel A), the two densities appear quite similar, and they are not significantly different (KS p-value = 0.070; ES p-value = 0.213). On the other hand, income density plots of husbands are noticeably different, and the KS and ES tests both strongly reject the equivalence of the two distributions (KS p-value = 0.000; ES p-value = 0.000). Thus, wives' income distributions are quite similar between groups, while *high* market productivity wives have husbands with substantially lower income than other men. This is closer to the views of the gender perspective critiques, but our results are driven by husbands' income, not by wives'.

Table 3. Wife's Chore Contributions

	Cooking	Dishes	Laundry	Shopping	Cleaning
	Dependent variable: An indicator that a wife always or usually does the respective chore				
WifeRelativeEarning	−5.430***	−2.180***	0.793	−2.320***	−3.926***
	(1.353)	(1.241)	(1.618)	(1.238)	(1.271)
WifeRelativeEarning2	1.421	1.039	−3.536**	1.112	0.610
	(1.092)	(1.009)	(1.262)	(1.004)	(1.039)
Controls	Yes	Yes	Yes	Yes	Yes
N	2,429	2,429	2,429	2,429	2,429
Pseudo R2	0.038	0.021	0.063	0.015	0.026

Note: Models estimate the probability that a wife always or usually does the respective chore. Only women's observations are used, as women's chore accounts tend to be more accurate (Kan 2008b). Logit model coefficients are reported. Control variables include husband and wife's age, squared age, college degree dummies, dummies for having chronic illnesses, dummies for working in the private sector, dummy for having underage children in the household, regional dummies, and log of husband and wife's income. Robust standard errors in parentheses. *$p < 0.10$ **$p < 0.05$ ***$p < 0.01$.

Figure 2. Estimated probabilities of chore shares. Panel A. Pooled model. Panel B. Separate estimation by the wife's relative income contribution. Panel A shows the estimated probability that a wife always or usually does the respective chore for an "average" household based on the coefficients from table 3. Panel B shows the same probability, estimated separately for *high* and *low* market productivity wives relative to husbands.
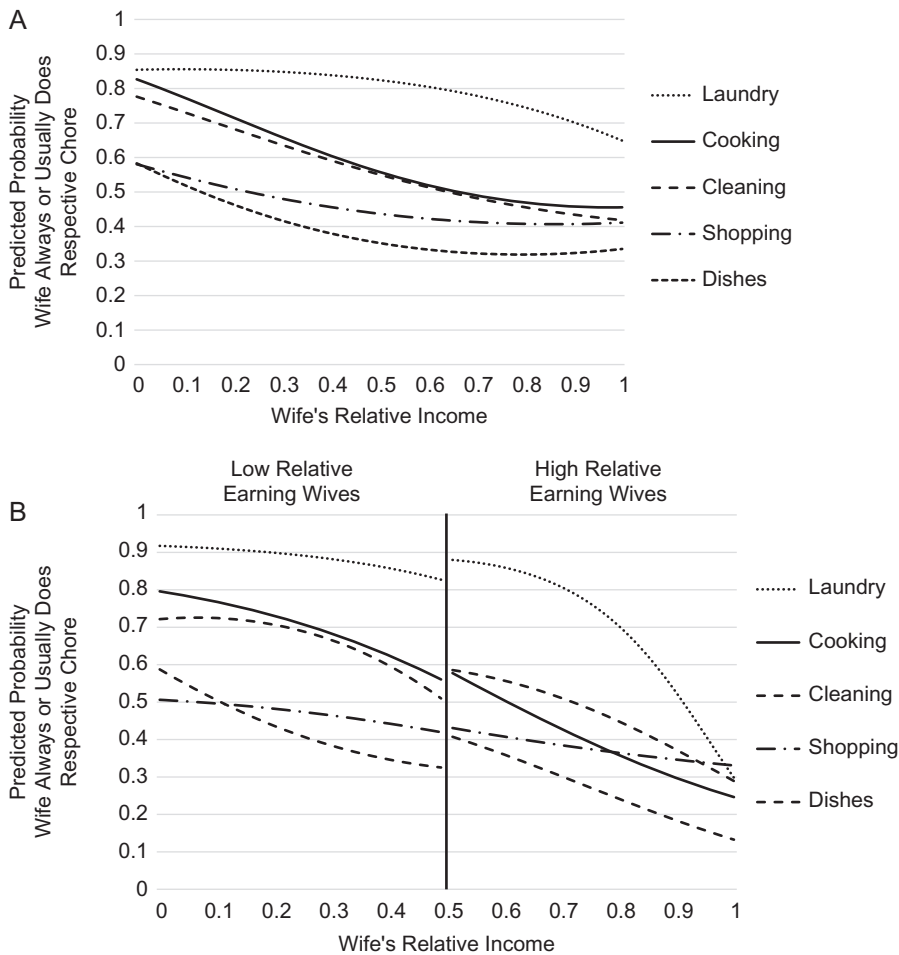
Next, we wish to examine to what degree income gaps are mitigated by the egalitarian income redistribution, by comparing before and after redistribution of household income. Table 4 shows some descriptive statistics, showing that husbands in the *high* group, on average, receive substantially larger government benefits (NOK 44,000, approx. USD 5,600) than the *low* group (about USD 130), perhaps due (at least partially) to the high proportion having chronic illnesses among the *high* group husbands. The husbands in the *low* group also pay steeper tax, resulting in substantially lower after-tax income. Figure 4 shows the density plots for income of the *high* and *low* households before (panel A) and

Table 4. Summary Statistics: *Low* vs. *High* Households

	Low households		*High* households	
	Mean	S.D.	Mean	S.D.
Income W (NOK)	304,375	(176,742)	304,100	(170,084)
Income H (NOK)[†]	572,209	(341,330)	201,975	(114,662)
Age W[†]	44.50	(9.178)	47.40	(9.310)
Age H[†]	46.86	(9.061)	50.10	(9.641)
Underage children in household (0/1)[†]	0.73	(0.443)	0.62	(0.485)
College H (0/1)[†]	0.40	(0.490)	0.34	(0.474)
College W (0/1)[†]	0.44	(0.496)	0.56	(0.497)
Private sector W (0/1)[†]	0.35	(0.477)	0.26	(0.440)
Private sector H (0/1)[†]	0.58	(0.494)	0.38	(0.487)
Chronic illness H (0/1)[†]	0.13	(0.341)	0.28	(0.452)
Chronic illness W (0/1)	0.20	(0.396)	0.20	(0.400)
Benefit transfer H (NOK)[†]	959.6	(105,07.4)	44,113.7	(78,335.0)
Benefit transfer W (NOK)	10,945.8	(373,14.1)	12,219.2	(374,62.9)
After-tax income H (NOK)[†]	430,252	(326,866)	229,479	(109,223)
After-tax income W (NOK)	257,145	(112,619)	262,814	(121,777)
N	4,157		739	

Note: *Low* and *high* households based on the lower or higher than a 50-50 chance for a wife to outearn her husband based on their relative market productivities. W and H stand for wife and husband. Standard deviations are in parentheses.
[†] indicates the significant difference (*p*-value < 0.05) between groups (*high* and *low*) by Welch independent sample *t*-test.

after (panel B) redistribution. These two panels clearly show that the two distributions are recognizably closer together after redistribution, although these distributions are not equivalent (before redistribution: KS *p*-value = 0.000, ES *p*-value = 0.000; after redistribution: KS *p*-value = 0.000, ES *p*-value = 0.000). Overall, our results exhibit a descriptive evidence that high-productivity wives tend to be in relatively lower-income households but income differences are mitigated to some degree by redistribution policies.

Back to Chore Division

In light of these compositional differences, we re-estimate the chore division model with two separate scenarios: a low-earning wife (relative earnings ≤ 0.5) with a high-earning husband (the average earnings of the *low* husbands) who works in the private sector; and a high-earning wife (relative earnings > 0.5) with a low-earning husband (the average earnings of the *high* husbands) who

Figure 3. Income of *high* vs. *low* households. Panel A. Wife's income. Panel B. Husband's income. Gross income distributions by *high* and *low* wives (panel A) and their husbands (panel B). Trimmed over NOK 2 million. Wives' income distributions are not significantly different, while those of husbands are significantly different by both the KS and ES tests.

kernel = epanechnikov, bandwidth = 21.6233

kernel = epanechnikov, bandwidth = 27.9831
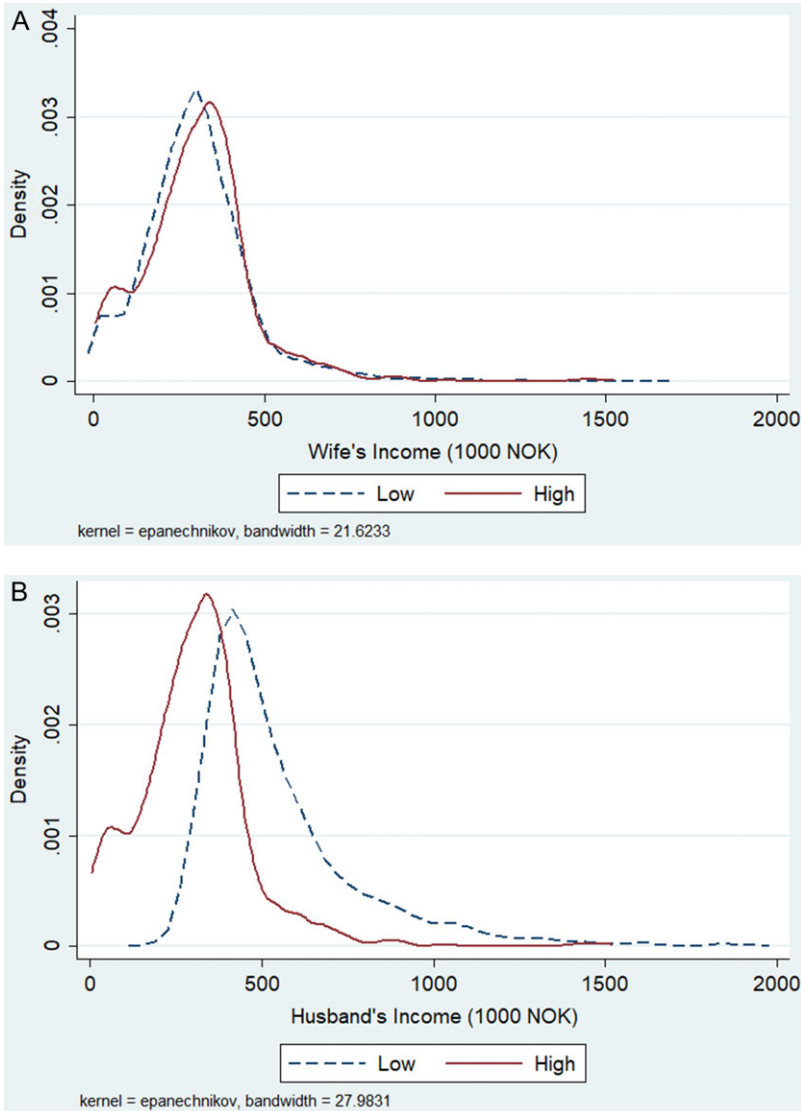
works in the public sector. The results are plotted in figure 2, panel B, clearly showing the decreasing trends in a wife's chore division in both *high* and *low* groups. Based on these, we find support for H2: A wife's chore burden decreases with her income contribution. A comparison of panels A and B in figure 2 illustrates the importance of taking the compositional differences of the groups into

Figure 4. Household income before and after redistribution. Panel A. Before redistribution. Panel B. After redistribution. Panel A shows gross household income, while panel B shows household income after redistribution (tax subtracted and government benefit transfers added) for *low* and *high* households. Trimmed over NOK 3 million. In both plots, two distributions are significantly different (by the KS and ES tests).
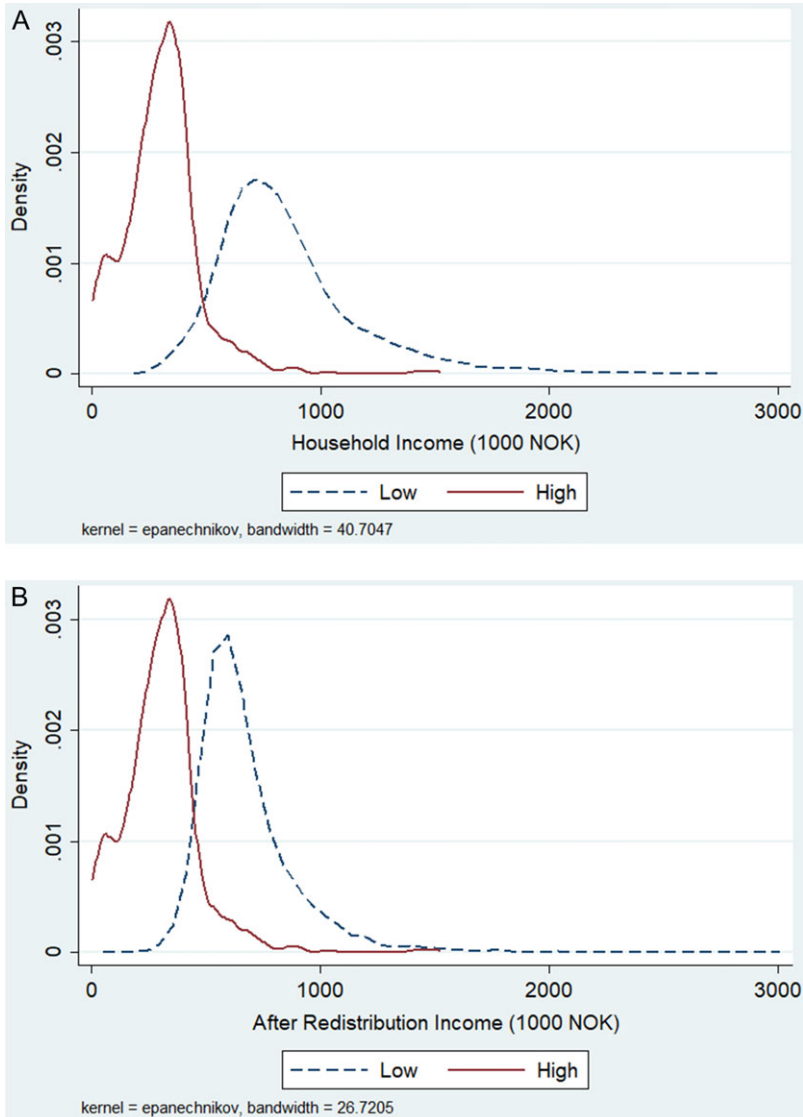
account. When using the average by pooling two groups (panel A), the results weakly exhibit deviance neutralization behavior. When the compositional differences are reflected (panel B), we no longer see the same pattern. We repeat the

same re-estimations for the two panels in figure 1, resulting in no qualitative differences (figures available from authors upon request).

Robustness Checks

We have re-estimated our models with different specifications. (1) Excluding those with low labor market attachment (workers younger than age 25, who may still be in education, and those who work less than 20 hours a week). (2) Using alternative variables to account for the presence of children (number of underage children, age of the youngest child, and an indicator for having preschool-aged children). These alternative specifications did not alter our main results (Appendices 3–6).

Discussion and Conclusion

By analyzing couples in Norway, this paper aims to provide a better understanding of the underlying mechanisms through which households operate to allocate their market and domestic labor in a country with strong egalitarian ambitions, but may still be reconciling the old (traditional) and new (egalitarian) gender norms. We set out to investigate two specific questions: (1) Do Norwegian households act according to economic rationality or do they still follow the traditional gender norm "A man should earn more than his wife" and (2) What might be the roles of social policies in shaping households' experiences when a wife has better market productivity?

Using a representative survey and potential income measures derived from a large administrative dataset to answer the first question, we find that Norwegian couples' household production follows economic rationality. Norwegian wives with better market productivities than their husbands, thereby facing the risk of challenging the male breadwinner gender norm by outearning their husbands, do work more and earn more than their husbands, while doing less chores. Our results make striking comparisons to the previously found behavior in the United States (Bertrand, Kamenica, and Pan 2015). The substantial institutional and societal differences may explain the deviation in our findings, reinforcing the importance of national contexts in shaping households' behavior.

Our analysis of the second question explores how the Norwegian contexts may influence household experiences. We find that households where wives have relatively high (potential) earnings are also relatively poorer due to husbands' low income. Although it is similar to the findings of the gender model critiques, the experiences of these households seem distinct from the female-main-breadwinner households in the United States. The low-income husbands in Norway receive a substantial amount of government benefit transfers (USD 5,600 on average), while high-income husbands pay a steep income tax (USD 18,000 on average). The redistribution policy, therefore, mitigates the income differences among these households. In addition, the high- and low-productivity women (compared to husbands) have almost identical income distributions.

This is likely due to the fact that a majority of Norwegian women work in the public sector, where income levels are highly condensed and regulated.

Our results are indicative of several mechanisms through which Norwegian egalitarian contexts promote gender equality. The egalitarian income redistribution decreases both within- and between-household income gaps. The smaller between-household income differences can reduce the risk of lower-income female breadwinner households falling into poverty, while smaller income differences between spouses can lower tensions, if any, between couples when a wife earns more than her husband. Narrower spousal income gaps can also equalize the bargaining power between spouses, which can induce more egalitarian division. Admittedly, our analysis is largely descriptive, and more rigorous investigation of the interrelation among income equality, economic rationality, and gender would be beneficial.

It is also interesting to note that the descriptive comparisons of "high" and "low" households are suggestive of the marriage pattern such that high-income men are *not* necessarily paired with high-income women. On the contrary, positive assortative mating in income is found to have a significant effect on the growing income inequalities in the United States (Schwartz 2010).

We also note the importance of considering any compositional differences along women's relative income spectrum. As earlier studies emphasized (e.g., Gupta 2006, 2007; Sullivan 2011), women on the high end of the relative income scale are more likely to be those with low-income husbands. Although we initially find a weak indication of deviance neutralization behavior in chore divisions, these effects go away when the compositional differences are taken into account.

Our analysis is limited in a way that we take the market ability as given. This is because our data do not permit analysis of dynamic human capital investment decisions or marriage market behavior, both of which can be affected by gender norms. A "traditional" woman anticipating to become the secondary earner in the household, or a non-traditional woman anticipating a higher burden in domestic tasks in the future, may choose to select the lower level of human capital investment or gear toward having a career in the public sector. It is also possible that "traditional" women choose to marry men in the private sector, as their skills may be considered more complementary. All these cases can increase the likelihood of women having lower market productivity than men due to gender considerations that cannot be captured by our analysis. For future research, it would be insightful to have a richer model that endogenizes the human resource investment decisions as well as the marriage formation to fully understand the role of gender norms.

Our measure of chore contribution is also quite limited. The data we utilize only provide a crude measure that the specific chore is always or usually done by the wife, rather than the actual time spent on each chore. However, our results indicate that the majority of women (80 percent of the sample) have lower market productivity than their husbands, and they do perform more chores, which is consistent with reported patterns from the time-use surveys (Kitterød and Rønsen 2013a). We also leave out an important aspect of household production—childrearing.

However, women's time spent on routine household work has dropped to almost half from 1980 to 2010, while that on direct childcare has been relatively stable (Kitterød and Rønsen 2013c). A similar trend has been found in the United States (Bianchi 2000). These results may be implying that women's increased economic resources are directed toward negotiating over the time spent on routine chore work, which we have investigated.

For Norway, achieving gender equality at work and at home, even with its egalitarian policies, may still pose a great challenge. As our analysis indicates, men still have better market productivities in the majority of households, which will continue incentivizing couples to prioritize men's market labor, which will also induce women to take on larger shares in housework. However, our study shows that if couples wish to pursue an untraditional division, either by preference or by necessity, they seem to be able to do so without being held back by traditional gender expectations or being very poor.

Supplementary Material

Supplementary material is available at *Social Forces* online.

About the Authors

Yuko Onozaka is a professor in the UiS Business School at the University of Stavanger. She is an economist whose research areas include environmental economics and marketing, choice modeling, labor and family economics, and economics of innovation. Her current work examines a potential role of gender in collective decision-making processes such as in committees and boards.

Kamran Hafzi is a former student in the UiS Business School at the University of Stavanger and currently an associate auditor at Deloitte AS.

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