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Gender Identity and Labor Division In Norwegian Households

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Abstract

We investigate if gender identity has any effect on the division of household labor among Norwegian couples. By deriving the potential income distribution of the Norwegian population, we compare couples' comparative advantage in market work. Our results indicate that women who have higher potential income than their spouse are more likely to increase their labor supply and work full-time, rather than reduce their hours allocated to market work in order to preserve gender identity. Contrary to specialization theory however, couples' division of housework is not found to be affected by comparative advantage in our findings. Moreover, we find that the egalitarian division of household labor is dominated by the unstable division of labor, as Norwegian men are found to under-contribute to housework. In addition, our analysis indicates that women's relative income has a diminishing effect on their happiness once their income exceeds the husband's. We argue that this effect could be explained by the gender identity model.

Keywords: division of labor, gender identity, comparative advantage, potential income, happiness.

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1. Introduction

The aim of this thesis is to analyze the division of household labor in Norway, and determine if gender identity affects couples' division of market and non-market work. We believe that providing insight to Norwegian couples' labor division patterns could potentially be useful when considering implementing policies and programs that affect households, especially if they're aimed at promoting a more gender equal division of labor, or change the relative income of couples. For example, we believe that greater knowledge of how Norwegian couples specialize in market and non-market work could have affected the implementation of policies such as the Cash for Care Act in Norway. Do Norwegian women with high potential income reduce their labor supply in order to avoid breaking gender identities? Do women who out-earn their husband undertake more housework in order to preserve the men's identity as the breadwinner? Do men avoid doing housework in order to preserve their gender identity? Are women who out-earn their husbands less happy? We aim to answer these questions by forming and testing the following four hypotheses based on our theoretical framework:

H1: Couples specialize in market work according to their comparative advantage.
H2: Women don't reduce their labor supply in order to preserve gender identities.
H3: Women will undertake more housework than expected, while men will undertake less housework than expected when women out-earn their husband.
H4: Women and men become less happy once the wife becomes the main earner in the household.

The rest of this thesis is organized in the following way. In section 2, we provide some background information on the Norwegian labor market and discuss some of the policies that are unique to Norway, and how they affect women's labor supply and potential earnings. In section 3, we review past literature that relate to our topic. In section 4, we present the

theoretical framework of this thesis. In section 5, we provide descriptive analysis as well as construct the potential income distribution for the Norwegian population, in addition to presenting our regression analysis. Section 6 includes the discussion portion of our thesis, and lastly section 7 concludes.

2. Background

One of the most pressing concerns of the Norwegian government has been to implement policies that advocate the dual-earner household model and promote gender equality in households (Kitterød and Lappegård, 2012; Rønsen and Kitterød, 2012). It comes as no surprise then, that with a female labor force participation rate of 67.9 percent, only marginally behind the 73.6 percent of men's (Statistics Norway, 2016a), Norway has one of the highest female labor force participation rates among OECD countries (OECD, 2016a). Some of the important policy measures that have contributed to enhancing dual-earner households have been providing affordable and high quality child care, as well as attractive parental leave policies (Rønsen and Sundstørm, 1996).

Parents in Norway are entitled to either 49 weeks of parental leave at 100 percent coverage, or 59 weeks at 80 percent coverage with full job security. After subtracting for the 10 weeks of father's quota and the 10 weeks of maternity leave, the rest of the period can be shared between couples however they choose[1] (NAV, 2013), making it one of the most generous parental leave policies among OECD countries (OECD, 2016b). The government also incentives continuous female labor force participation by providing highly affordable and attractive subsidized day care. In 2015, the enrollment rate in child care was over 90 percent among 1 to 5 year olds (Statistics Norway, 2016b). Both public and private child care centers are subsidized, resulting in much smaller costs levied on parents. Moreover, there's a price ceiling on the own share that child care institutions can charge parents, which in 2015 was

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[1] Three of the weeks in the parental leave period are reserved for the mother and must be used prior to the birth of the child (NAV, 2013).

set to 2 580 NOK per month (Utdanningsdirektoratet, 2016). In addition, municipalities must also offer a minimum of 30 percent sibling discount for the second child, and 50 percent for the third and any additional child beyond. They're also required to provide progressive daycare rates to parents, adjusted after total household income. This is especially beneficial to low income households (Utdanningsdirektoratet, 2016).

However, an important political goal alongside promoting an egalitarian household division, has been to give parents the option of spending more time with their children, especially when they are at a young age. Thus, the government implemented the Cash for Care Act in 1998. The act provides parents who choose to stay home with their young children a tax free lump sum allowance if they don't use publicly subsidized kindergartens. The program has three main goals. To incentivize parents to be more involved in the early stages of their children's lives, to give parents better flexibility and freedom in their choice between labor participation and raising children, and finally to fairly distribute the public transfers between parents who use publicly subsidized day care and those who don't (Kontantstøtteloven § 1, 1998).

However, the Cash for Care program has been found to distort women's labor force supply. The program gives mothers an incentive to reduce their labor supply, leading to decrease in full-time employment among mothers with young children, at least in the short run (Rønsen, 2009). What's more surprising is that there is still a significant number of women who still haven't returned to full-time employment after the end of the subsidy eligibility, as it's been estimated that mothers' labor force participation has decreased by four percentage points (Drange, 2012). This negative effect is found to be persistent even for women with children of five years of age, and has especially affected mothers without higher education and lower income potential (Drange and Rege, 2013). Another consequence of the Cash for Care program is its effect on household productivity. In households where mothers reduce their labor supply, household tasks are divided less equally, while they are found to be divided more equally the longer mothers work outside the home (Rønsen, 2001). Further, fathers are less involved in housework and child rearing if mothers reduce their full-time work or drop

out of the labor force. There is however no evidence that fathers have increased hours allocated to the labor market in order to compensate for the drop in mother's labor supply (Drange, 2012).

While Norway is considered one of the most gender equal countries in the world, ranked only behind Iceland according to the Global Gender Gap Index (World Economic Forum, 2015), the Norwegian labor market is quite segregated. There's disproportionately more women in part-time employment than men, as over one third of women work part-time, which is twice as much as men (Statistics Norway, 2016c). There's also disproportionally more women working in the public sector. Over 70 percent of women were employed in the public sector in 2014, compared to only 30 percent of men (Statistics Norway, 2016c). Interestingly, there are more women who spend more time in education than men, as approximately 60 percent of women have higher level education, compared to 40 percent of men, and are more likely to work in fields like education, health and social work, and sales and service occupations (Statistics Norway, 2016d).

3.   Literature Review

An important determinant of women's labor supply are children, as previous studies have established that having children is associated with a reduction in women's labor supply (Angrist and Evans, 1996). Interestingly, children have been found to have little effect on men's labor supply in terms of change in market work behavior (Gibb, Fergusson, Horwood, and Boden, 2014; Angrist and Evans, 1996). Moreover, the effect of number of children on men's share of housework is found to be U-shaped, where men do the largest share of housework when there are no children in the house or when there are five or more (Kamo, 1991). This may indicate that women are the one who are most responsible for child rearing in households. However, if women leave the labor force due to family reasons, they could be penalized with persistent lower wages due to skill deterioration, and loss of seniority, as they are invested less in by their employers (Jacobsen and Levin, 1995). The burden of this wage

penalty varies with education attainment for women, as college graduated mothers have the largest wage penalty compared to mothers with lower or no degrees (Anderson, Binder and Krause, 2002). Studies have also associated children with lower levels of marital satisfaction for women, both in the U.S and Japan (Lee and Ono, 2006). This may further suggest that most of the burden of childrearing falls on mothers and poses far more restrictions on them than men. Changes in mother's workhours also influence parent's time spent with children less than changes in the father's workhours (Hallberg and Klevmarken, 2003), which suggests that households are more dependent on father's income than mother's. It's thus apparent that parenthood has a much more negative effect on women's labor supply than men's.

What may lessen the negative effect of having children in regards to women's labor supply and wage rates, is greater childcare availability. There's compelling evidence that subsidized and universally accessible child care has significantly increased mother's labor supply and labor force participation rate, resulting in a large positive effect on their earnings (Lefebvre and Merrigan, 2008). In addition, greater access to child care facilities have been associated with greater job stability and lowered labor force exits for mothers. (Hofferth and Collins, 2000). One of the reasons for the high female labor force participation rate in Norway is due to the attractive maternity leave policies that are provided. Maternity leave policies have been found to lessen the consequence of childrearing for women, particularly paid maternity leave with job security is found to significantly speed up mothers' return to work (Rønsen and Sundstørm, 1996). However, long parental leave programs could also have unintended negative effects. Previous research suggests that parents may end up paying for lengthy parental leave programs with lower hourly wages (Ruhm, 1996). Long leave entitlements, particularly those provided in Scandinavia, may also lead to unequal household division of labor and may prolong women's career breaks (Rønsen and Sundstørm, 2002). In general, industrialized countries that provide mothers with attractive public child care and parental leave policies successfully allow women to combine employment and motherhood without having them leave the labor force altogether during the early years of their children (Gornick,

Meyers and Ross, 1998), while countries with inadequate public child care and parental leave policies have been found to reduce employment among mothers by as much as 45 percentage points (Gornick, Meyers, and Ross).

Historically, there has been disproportionately more women in part-time work than men, and it's still the case today, even in Norway[2] (Rosenfeld and Birkelund, 1995). At one hand, part-time work offers women greater flexibility in working hours, and the option to stay in the labor force, which perhaps wouldn't be the case if the choice was between full-time work or no work at all. On the other hand, many have argued that the downside of part-time work is the underutilization of educated women. Studies have found that a significant proportion of women moving from full- to part-time work have transitioned to lower level jobs that they're too qualified for (Connolly and Gregory, 2008). These findings provide evidence of loss of economic efficiency. However, part-time work has also been found to increase women's labor force attachment and increase their financial independency (Sundström, 1991). Moreover, evidence from the Netherlands shows that women are particularly happy in part-time work and have little desire to alter their workhours (Booth and van Ours, 2010). Similar evidence is found in Australia, where women working part-time are happier than women working full-time (Booth and van Ours, 2005). Men on the other hand have been found to be happier in full-time work (Booth and van Ours, 2005), and would prefer if their partner worked part-time (Booth and van Ours, 2010), or not at all (Lee and Ono, 2006). These findings may shed some light on some of the reasons why so many women work part-time in Norway (Statistics Norway, 2016b).

In *Treatise on the Family,* Becker (1991) argues that efficiency and utility maximization is only achieved through specialization. In households, the spouse that has the comparative advantage in the labor market should completely specialize in the labor market, while the spouse with the advantage in non-market work should completely specialize in household

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[2] In 2014, 34.7 percent of women between the ages of 20 to 66 worked part-time versus 14.2 percent of men (Statistics Norway, 2016b)

production. Becker (1991) also argues that there's a biologically induced sexual division of labor, where women invest in human capital that increases household efficiency, mainly due to the fact that they spend a large proportion of their time on domestic tasks such as childbearing and child rearing, while men allocate most of their time in the labor market. Thus, Becker's theory argues that it is the wife who predominantly specializes in household production, while the husband specializes in the labor market. These arguments reflect traditional views in regards to labor division, where men are the breadwinner, and women the caretaker of the house.

Societies with traditional gender views are often associated with low female employment rates, as anti-egalitarian attitudes have been found to have a strong negative effect on female employment and account for around one third of the gender differences in labor force participation over the past thirty years (Fortin, 2005; 2009). The long practice and persistence of traditional division of labor may not come as a surprise, given that women have historically been found to spend more time doing housework than men in average, with the gender gap being the largest among married couples (South and Spitze, 1994). Perhaps one of the biggest disadvantages of traditional labor division for women has been the negative relationship between time allocated on domestic tasks and relative wages (Hersch and Stratton, 2002). Doing daily housework tasks that take a great deal of time, such as cleaning, shopping and doing the laundry have been found to have the largest negative impact on wages. One must also consider the direct costs of housework in the form of energy spent, as doing housework takes away one's energy to perform other activities such as market work (Hersch and Stratton, 1994). This may have significant implications to women's investment in human capital. In anticipation of greater future household responsibilities, women may make different investment decisions than men, which could further increase the gender wage gap (Hersch and Stratton, 1994).

Whereas the traditional equilibrium is influenced by conservative ideology, the egalitarian equilibrium is a more symmetric division of labor, influenced by principles of gender

equality. In the egalitarian equilibrium, both spouses specialize equally in the labor market and share domestic task equally, including child rearing (Esping-Andersen, Boertien, Bonke and Gracia, 2013). While the egalitarian equilibrium is most commonly found in European countries, such as in Denmark where traditional gender roles have almost completely dissipated (Esping-Andersen et al., 2013), socioeconomic changes in the last 50 years have contributed to a shift away from the traditional equilibrium in many countries, such as the U.S, where women have been found to cut their non-market work almost in half since 1960, which indicates increased female labor supply, fewer children, and longer waiting period for marriage, while men's hours allocated to housework have doubled during the same period (Bianchi, Milkie, Sayer and Robinson, 2000). Moreover, it's predicted that due to economic changes, the dual-earner household model will significantly increase in the U.S in the future (Nock, 2001). Countries that are in transition between the traditional and egalitarian division of labor have been found to have rather ambiguous gender norms regarding societal expectations of men and women. Thus, the equilibrium where households' division of labor is in transition from the traditional to the egalitarian division, is known as the unstable equilibrium (Esping-Andersen et al., 2013). The unstable equilibrium has been found to be dominant in countries such as Spain and Britain, where traditional gender norms still seem to be persistent (Esping-Andersen et al., 2013).

While socioeconomic changes in the U.S have shifted the labor division towards a more egalitarian division, women's level of happiness is found to have declined, both in absolute and relative terms (Stevenson and Wolfers, 2009). Does this mean that women in non-traditional households are less happy than women in traditional households? The evidence on this subject is somewhat mixed. While some studies have found no clear difference between the happiness of housewives and working wives (Beja, 2014), others have found that women who are homemakers are happier than full-time workers (Treas, van der Lippe and Tai, 2011). Interestingly, college graduated women who have both a career and family are found to be sadder, more stressed, more tired and generally unhappier than women who are homemakers (Bertrand, 2013). However, traditional division of labor has also been

associated with increased work-life conflict (Crompton and Lyonette, 2006), while both men and women have been found happier when there's greater equality in society (Bjørnskov, Dreher and Fischer, 2007). In regards to Becker's (1991) theory concerning specialized households being happier than non-specialized households, past studies suggest that households with large relative wage differences benefit more from marriage than households with small relative wage differences (Stutzer and Frey, 2006). Similar results are also found among Japanese couples, where specialized couples are found to have higher level of life satisfaction than non-specialized households (Onozaka, Holloway and Nagase, 2015). On the other hand, there's also evidence that couples with little differences in education level are on average happier with their marriage, while large differences in educational attainment is associated with unhappiness (Stutzer and Frey, 2006). This suggests that people who marry partners whom they share sociodemographic similarities with attain higher levels of life satisfaction, which supports the principle of homophily (McPherson, Smith-Lovin and Cook, 2001). On the subject of marriage formations, egalitarian women have also been found to be less likely to form a household, while the opposite is true for men (Sevilla-Sanz, 2010).

Specialization theory based on comparative advantage anticipates that the division of labor is symmetric (Becker, 1991). The person who allocates more time in market work will proportionally work less in the home, while the person who allocates more time to non-market work will work less outside the home. However, data on household division of labor suggests that there is evidence of gender asymmetry in this regard. Women who work more hours in the market and out-earn their husband have been found to undertake a larger share of the housework than predicted (Bertrand, Kamenica and Pan, 2015; Bittman, England, Sayer, Folbre and Matheson, 2003) or even reduce their labor supply by working less hours, or leave the labor force entirely (Bertrand et al., 2015). Similarly, men who are dependent on the income of their wives have been found to under-contribute to household tasks, contrary to the principle of economic exchange (Brines, 1994). A proposed explanation for this asymmetric behavior is identity considerations. It's argued that the identity of men and women are based on social norms or prescriptions that dictate the behavior that is appropriate

for those who belong to the social groups "men" and "women" (Akerlof and Kranton, 2000). Thus, gender can be viewed as a social construct, where men and women change their behavior in order to comply with expected gender roles (West and Zimmerman, 1987). Couples who deviate from these gender norms or gender identities risk being judged by others. Hence, gender identity can dictate that men should out-earn their wives and avoid doing housework, while women should avoid out-earning their husbands and take care of the housework. Breadwinner wives may thus try to neutralize gender identity infractions by undertaking more housework than the predicted "fair" amount, while husbands may try to regain his gender identity by doing less housework than the predicted "fair" amount based on symmetric division of labor (Greenstein, 2000).

Lower levels of marital happiness, increase in likelihood of marital problems and increase in separation have been linked to households where the wife's income exceeds the husbands' (Bertrand et al., 2015). Similarly, evidence has been found that households regress to a more traditional division of labor when women's share of household income exceed 50 percent (Bittman et al., 2003). It seems that households are concerned with relative income, as gender identity seems to be strongly associated with wife's income relative to the husbands. Indeed, previous literature has found that both absolute and relative income are positively correlated with happiness. Interestingly, changes in relative income has much greater effect on happiness than changes in absolute income (Ball and Chernova, 2008). Hence, couples are concerned with relative income, as changes in relative income can directly affect couples' gender identity (Bertrand et al., 2015; Bittman et al., 2003). Infringing these gender identities can cause both mental and physical stress to both men and women. Men who are out-earned by their spouse are more likely to use erectile dysfunction medication, while women who are breadwinners are more likely to use insomnia and anxiety medication (Pierce and Nielsen, 2013).

4.   Theoretical Framework

Our theoretical framework is based on a household with a husband and a wife[3] who pool their income and maximize household utility by making joint decisions about the division of labor in regards to market and housework. Households' allocation of time is constrained by the total time endowment, which we equate to total available time minus leisure. Committing more time to either housework or market work will proportionally reduce total available time to allocate to other activities. In our model, the couples' decision to alter their labor supply not only depends on their absolute wage rate, but the wage rate their partner as well. If the husband has the highest earnings potential in the labor market, then he has the comparative advantage in market work. This implies that efficiency and utility maximization is achieved if he allocates more time to market work and less time to housework, while his spouse reduces her market work and allocates more time to housework (Becker, 1991). We assume that couples compare their comparative advantage in market and non-market work, and thus determine who will more likely have the highest income in the labor market before making joint decisions about the division of household labor. Our theoretical framework also incorporates the gender identity model of Akerlof and Kranton (2000) and assumes that the identity of men and women are based on social identity norms or prescriptions that dictate the appropriate behavior for both genders. We believe that violating these gender identities may cause disutility and physical strain to both genders based on previous literature (Bertrand et al., 2015; Pierce and Nielsen, 2013).

Specialization theory argues that efficiency and utility is maximized when couples specialize according to comparative advantage (Becker, 1991). This implies that the spouse who has the comparative advantage in market work will be happiest when he or she completely specializes in market work, while his or her partner will be happiest completely specializing in household production. While our theoretical model incorporates the gender identity model,

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[3] We equate couples in civil partnership (samboerskap) with married couples.

we don't expect gender identity to transcend efficiency and utility maximization when it comes to specializing in market work according to comparative advantage due to Norway's high female labor force participation rate and policies aimed at promoting gender equality (Kitterød and Lappegård, 2012). We also acknowledge that complete specialization in households is highly unlikely, given the promotion of the dual-earner household model in Norway (Rønsen and Kitterød, 2012). Rather, our framework assumes that the spouse with the comparative advantage in the labor market will allocate the most time to market work and earn more than half of the household income, even if that person is the wife. We form the hypothesis:

H1: Couples specialize in market work according to their comparative advantage.

While there's no requirement for gender specific division of labor in our framework, previous literature has argued that women are more likely to specialize in household production, while men have almost always had the comparative advantage in market work (Becker, 1991). However, it is not uncommon in countries with high gender equality such as Norway, where the female labor force participation rate is only marginally behind the rate of men, for women to have equal or more income than men (Esping-Andersen et al., 2013). Previous literature on gender identity has also argued that men are often expected to be the main breadwinner and may be expected to assume a more masculine role in the household as the provider, while women are expected to assume the role of the caretaker and act more feminine (Akerlof and Kranton, 2000; West and Zimmerman,1987). Thus, in order for us to determine if there's any evidence of gender identity distorting women's labor supply similar to the findings of Bertrand et al. (2015), we test whether women with comparative advantage in the labor market and thus most likely to be the main earner in the household reduce their labor supply by transitioning from full-time to part-time employment, or by dropping out of the labor force when they out-earn their husband. Our theoretical framework expects that gender identity will not distort women's labor supply in regards to specializing according to comparative advantage in the labor market. Based on this, we form the hypothesis:

H2: Women don't reduce their labor supply in order to preserve gender identities.

Specialization theory (Becker, 1991) argues that the person with the comparative advantage in the labor market will allocate relatively less time to non-market work. However, it's been found that households regress to a more traditional division of labor when women out-earn their husband and break gender identities, as it's been argued that in order to neutralize gender identity infractions women disproportionately undertake more housework (Bittman et al., 2003; Bertrand et al., 2015). At the same time, men who are being out-earned by their wife have been found to do even less housework in order to preserve their gender identity (Akerlof and Kranton, 2000; Brines, 1994; West and Zimmerman, 1987). While our theoretical model assumes that economic efficiency and utility maximization will urge households to specialize according to comparative advantage when it comes to market work, we expect that gender identities are tied stronger to housework and that women will disproportionately undertake more housework when they are out-earning their husband, while men will undertake even less housework when they are being out-earner by their wife. Thus, we form the hypothesis:

H3: Women will undertake more housework than expected, while men will undertake less housework than expected when women out-earn their husband.

Our model expects that while economic efficiency and utility maximization compels women not to reduce their labor supply when they are the main earner in the household, largely because of Norway's strong political objective of achieving gender equality, violating gender identities will still have an effect on their, as well as their husband's happiness (Bertrand et al, 2015; Bittman et al., 2003). Thus, we believe that women who have the comparative advantage in market work will experience lower levels of happiness once they out-earn their husband and become the main earner, and men will be less happy once their wife out-earns them and thus violate their identity as the provider. Thus we form the hypothesis:

H4: Women and men become less happy once the wife becomes the main earner in the household.

5. ANALYSIS

5.1 Data Sources

5.1.1 The Social Security 20% Dataset

Our research utilizes the Social Security 20%, a dataset provided by the Norwegian Center for Research Data (NSD). The NSD operates one of the largest data achieves in Norway, and manages the distribution of data to researchers and students. Through the approval of Statistics Norway, a larger pool of individual level information was granted for our research. The Social Security 20% dataset is composed of a twenty percent cross-sectional drawing of the population spanning from 1993 to 2013 with 5 550 929 observations. However, in order to preserve individuals' anonymity, the dataset is anonymized through assigning percentiles to each individual's income information rather than explicitly stating their salary or gross income information. The information on the median income as well as the mean, and standard deviation for each percentile is sent by the NSD separately. The dataset itself contains various individual level information, such as age, education, residency, and most importantly, annual salary income based on reported tax returns. Individual information is compiled from different agencies; information on demographics and education is gathered from Statistics Norway, while any information on income and assets is provided by the Norwegian Tax Administration. In our pursuit to construct a potential income distribution for Norwegian households, our main variable of focus was salary income or income from employment. As the main survey in our analysis, the LOGG survey, took place in 2007, we chose to construct the potential income distribution of the Norwegian population for the same years as well. Table 1 contains descriptive statistics of the Social Security 20% dataset that for the year 2007.

Table 1: Individual Characteristics Social Security 20% Dataset 2007.

	Men		Women	
Age	41.720	(14.175)	41.421	(13.911)
Compulsory (0/1)	0.241	(0.428)	0.228	(0.420)
High School (0/1)	0.474	0.499)	0.422	(0.494)
3-year University or College (0/1)	0.193	(0.395)	0.294	(0.456)
5-year University or College (0/1)	0.091	(0.288)	0.056	(0.230)
Annual Salary (in NOK)	372087.6	(257888.8)	252129.9	(169340.3)
Observations	64,994		61,984	

Standard errors in parenthesis.

As we can observe from Table 1, the average age of men and women in our sample were approximately 41 years. Around 47 percent of men have a high school degree, while the corresponding number for women is 42 percent. Furthermore, more women have a bachelor's degree than men. Around 30 percent of women have completed 3-year university or college. However, more men have a 5-year university or college degree than women. On average, women earn less than men, as the mean salary earnings of women in 2007 were 252129.9 NOK, while men made on average 372087.6 NOK. This does not come as a surprise as more women in Norway have been found to work part-time (Statistics Norway, 2016b). There are also disproportionately more women working in the public sector, which could explain the difference in salary income between genders, as most men in Norway work full-time and are more likely to work in the private sector (Statistics Norway, 2016b).

5.1.2 The LOGG Survey

One of the two surveys used in our analysis of Norwegian households is the Life Course, Generation and Gender Survey, or the LOGG survey. This 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 to 81 years old. 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 was collected through phone interviews as well as questionnaires. As we are only concerned with household information, only observations concerning married individuals or individuals in a civil partnership[4] were used in our analysis. Table 2 shows the basic individual characteristics of households that were used in our analysis.

Table 2: Individual Characteristics LOGG Survey 2007.

	Men		Women	
Age	48.977	(10.711)	46.458	(10.325)
Compulsory (0/1)	0.123	(0.329)	0.141	(0.348)
High School (0/1)	0.492	(0.500)	0.417	(0.493)
3-year University or College (0/1)	0.246	(0.431)	0.360	(0.480)
5-year University or College (0/1)	0.138	(0.345)	0.083	(0.276)
Workhours (per week)	42.253	(11.034)	33.541	(10.482)
Actual Income (in NOK)	481405.1	(350976.6)	293675.2	(178341.1)
Observations	2,618		2,613	

Standard errors in parenthesis.

As we can observe from Table 2, in the LOGG survey the average age of men and women are 49 and 46 respectively. While approximately half of all men have a high school degree, the corresponding number for women is around 42 percent. However, more women have a 3-year university or college degree than men. A higher percentage of men however, have a 5-year university or college degree than women. We can also observe that men on average allocate more hours to market work. While men average a little over 42 workhours, women average about 33,5. Not surprisingly, women make less than men on average, as the mean salary earnings for women in 2007 were 293675.2 NOK, while for men it was 481405.1 NOK.

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[4] Also known as «samboerskap» in Norwegian

5.1.3 The Family and Changing Gender Roles Survey

While the LOGG survey provided a large number of observations, it did not specify hourly allocation of non-market work in households. Hence, the Family and Changing Gender Roles (IV) survey conducted by the International Social Survey Program, is used in parts of our analysis that requires information on hours of housework in households. This survey is a product of cross-national collaboration of over 43 countries, including Norway, conducted in 2012. It provides a multitude of household data concerning employment, health, hours of market and non-market work, and an array of sociological variables. Here too, only information regarding married individuals and individuals in a civil partnership are used in our analysis. Table 3 shows the basic characteristics of individuals utilized in our paper.

Table 3: Individual Characteristics Family and Gender Roles Survey 2012.

	Men		Women	
Age	48.090	(10.084)	45.843	(10.346)
Compulsory (0/1)	0.167	(0.373)	0.157	(0.364)
High School (0/1)	0.358	(0.480)	0.328	(0.470)
University or College (0/1)	0.475	(0.500)	0.515	(0.500)
Workhours (per week)	44.266	(11.388)	39.540	(11.447)
Housework (hours per week)	6.460	(7.931)	10.769	(8.697)
Actual Income (in NOK)	566761.2	(303422.1)	450898	(519726.1)
Observations	220		182	

Standard errors in parenthesis.

The average age of men in the survey is approximately 48 years, and 46 years for women. The percentage of women with a high school degree is marginally behind men. Around 33 percent of women have attained a high school education in 2012 compared to 36 percent of men. Approximately 52 percent of women have attained a university or college degree, compared to 48 percent of men. We can observe that on average men allocate more time to market work per week than women. While men spend around 44 hours on market work, women work on average 39.5 hours per week. Not surprisingly, we observe that on average women spend more time on housework per week than men. While women allocate around

11 hours per week on domestic tasks, men spend a little under 6.5 hours. Thus, based on our sample, women in Norwegian households work on average less hours than men and do more housework per week.

5.2 KEY VARIABLES

5.2.1 Key Variables from The LOGG Survey

Independent Variables

The dependent variable $RelativeIncomeWife$ is a constructed fractional variable, taking a value between 0 and 1 and is defined as: $\dfrac{wifeIncome}{wifeIncome+husbandIncome}$. The variables $wifeIncome$ and $husbandIncome$ are continuous variables representing the employment income of men and women, constructed based on the numeric variables $ios\_yrkesinntekt\_07$ and part_$yrkesinntekt\_07$, and is classified as "employment income 2007" for the respondent and his or her partner.

Dependent Variables

We let the constructed binary variable $EarnsMore$ equal 1 for women if wife's income contribution exceeds 50 percent of total household income, and 0 otherwise. For men, $EarnsMore$ takes the value 1 if their income contribution exceeds 50 percent of total household income, and 0 otherwise. Thus the variable is defined as $\dfrac{wifeIncome}{wifeIncome+husbandIncome}$ for women and $\dfrac{husbandIncome}{wifeIncome+husbandIncome}$ for men. The constructed binary variable $wifeFulltime$ is equal to 1 if the wife works full time, and 0 otherwise. We define working full-time as working 37.5 hours or more per week as indicated by the Confederation of Norwegian Enterprise[5]. We use the numeric variables $wotimetot$ and $wopatimetot$ classified as "weekly work hours - including hours in additional job" answered by the respondent about his or her own workhours and about his or her partner's workhours. The discrete ordinal variable $Happiness$ is obtained through the

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[5] Næringslivets Hovedorganisasjon. (2014). Kort og godt om arbeidstid. Retrieved June 03, 2016, from

https://www.nho.no/veiledere/Arbeidstid/kort-og-godt-om-arbeidstid

question "Finally: On a scale from 0 to 10, where 0 means "Not satisfied at all" and 10 means "completely satisfied", how satisfied are you, on the whole, with your current life?", and is answered only by the respondent.

Control Variables

Education ─ The education of the respondent is obtained through the categorical variable *IOeduc5*, which holds five categories: *elementary school, upper secondary basic, upper secondary finished, university or college education and university or college education 5 years +*. The education of the respondent's partner is obtained through the categorical variable *parted_07,* containing the categories: *primary education, lower secondary education, upper secondary basic, upper secondary final, post-secondary non-tertiary, first stage of tertiary undergraduate level, first stage of tertiary graduate level, and second stage of tertiary postgraduate*. We divide the education category of both the respondents and his or her partner into a categorical variable with four categories: compulsory, high school, 3-year university or college, and 5-year university or college. We construct the binary variable *higherEducation* and set it equal to 1 if the respondent has a 3 or 5-year university or college degree and 0 otherwise. We do the same for the respondent's partner and use the binary variable *higherEducation* as a control for each spouse. *Region of residence* ─ The categorical variable *7-delt landsdel* contains the following regions of residency: *Akershus and Oslo, Hedmark and Oppland, Østlandet, Agder and Rogaland, Vestlandet, Trøndelag, and Nord-Norge*. We divide the regions into four groups: *North, Central, East,* and *West and South*, and hence control for 3 region cohorts, with North being the base category.

Age ─ We create 8-year interval categorical age variable starting from 18 years to 99 for both the respondent and his or her partner, giving us 5 age categories. We use the *18-26* cohort as the base category and control for 4 age cohorts for each spouse.

Health ─ We control for the respondent's health through the discrete ordinal variable *hel01* ranging on a scale from 1 to 5, where 1 means excellent and 5 means poor. We create the binary variable *health* which equals 1 when the respondent's health status is excellent or very good and 0 otherwise, and use it as a control variable.

Children — Finally, we control for any children through the binary variable *hochild,* classified as "Have children (own, stepchildren, fosterchildren) in the household full- or part-time".

5.2.2 Key Variables from The Family and Changing Gender Roles Survey

Dependent variables

We construct the fractional variable *shareHouseWork* and define it as the spouse's housework in hours divided by the total hours of housework performed in the household per week. For example, for the wife, *shareHouseWork* will be: $\frac{wifeHousework}{wifeHousework+husbandHousework}$, where *housework* is a continuous variable obtained through the numeric variables *V37* and *V39,* classified as "actual hours spent on housework and family care". The respondent answers for themselves and on the behalf of their partner.

Control variables

Education — The education of the respondent is obtained through the categorical variable *degree*, which holds five categories: *lower secondary, upper secondary, post-secondary, lower level tertiary and upper level tertiary.* The categorical variable of the respondent's partner *V65A* includes: *lower formal qualification, above lowest qualification, higher secondary completed, above higher secondary level,* and *university degree completed.* We construct the binary variable *higherEducation* and set it equal to 1 if the respondent has university or college degree and 0 otherwise. We do the same for the respondent's partner and use the binary variable *higherEducation* as a control for each spouse.

Region of residence — The categorical variable *no_reg* contains the following regions of residency: *Central East, East, South, West, Middle and North*. We divide the regions into four groups: *North, Central, East,* and *West and South*, and hence control for 3 region cohorts, with North being the base category.

Age — We create 8-year interval categorical age variable starting from 18 years to 99 for both the respondent and his or her partner, giving us 5 age categories. We use the *18-26* cohort as the base category and control for 4 age cohorts for each spouse.

Health — We control for the respondent's health through the discrete ordinal variable *V58* ranging on a scale from 1 to 5, where 1 means excellent and 5 means poor. We create the

binary variable *health* which equals 1 when the respondent's health status is excellent or very good and 0 otherwise, and use it as a control variable.

Children ─ We control for number of children through the categorical variable *hhchildr*, classified as "How many children in household: children between school age and 17 years".
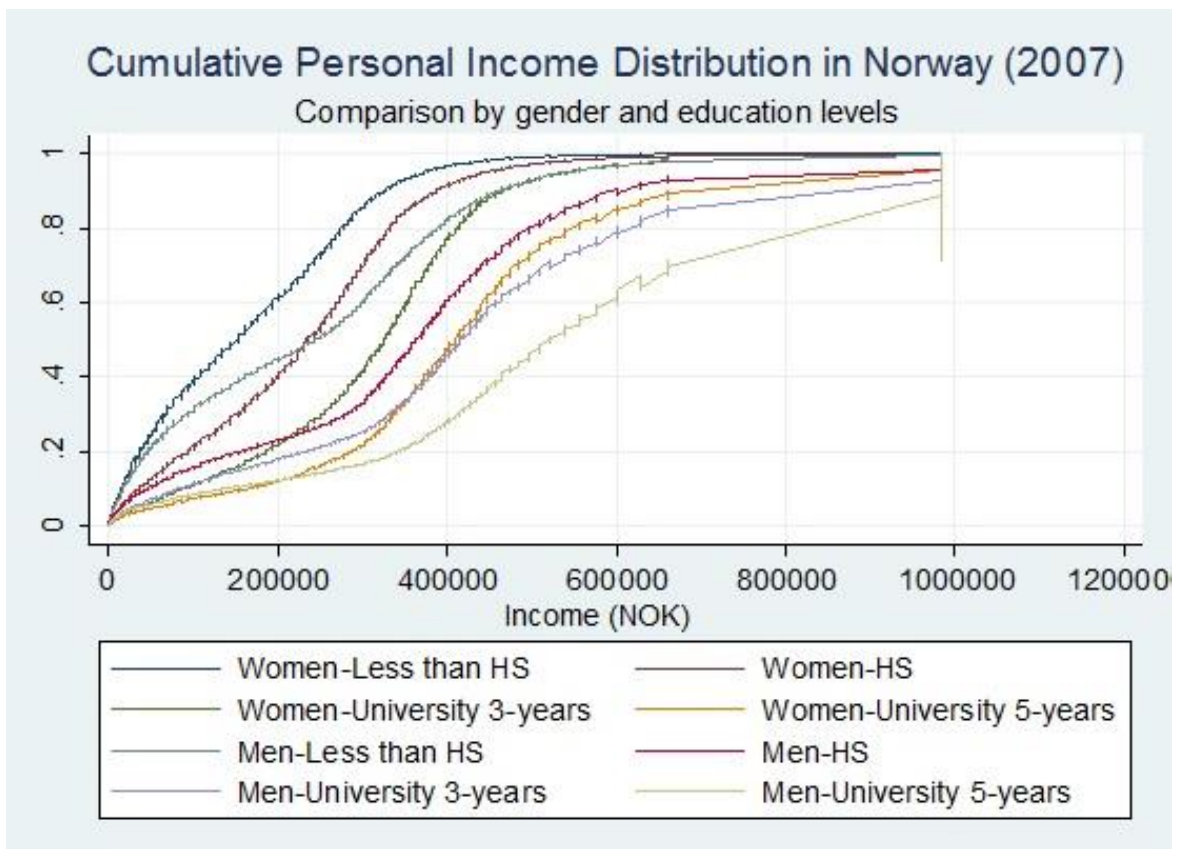
5.3 Potential Income Distribution

In order to determine the comparative advantage of couples, we utilize potential or predicted income rather than actual income. While actual income is the earnings couples receive from employed work in the market, potential income is the income couples would likely earn if they chose to join the labor force. We choose to use the potential income to determine the comparative advantage in market work because as spouses who choose to stay home have no salary earnings, but have the potential to have salary earnings if they entered the labor force. We construct the potential or predicted income of the Norwegian population based on the demographic characteristics gender, education, age and region of residency using the Social Security 20% dataset.

Figure 1 represent the cumulative potential earnings distribution by gender and education level based on 2007 data, the same year the LOGG survey was conducted. For purely descriptive purposes, we chose not to divide the earnings distribution by age or region of residence as we did in our analysis. This distribution includes only non-zero earners, as it represents individual's potential earnings in market work when they decide to enter the labor market. The horizontal axis represents personal income in NOK, while the vertical axis represents the percentile. The median income of all groups can be observed by looking at the 50th percentile on the vertical axis. For example, the median income of working women with less than a high school degree in 2007 was around 150 000 NOK, while the median income of women with a 5-year university or college degree was around 410 000 NOK. For working men with less than a high school degree on the other hand, the median income was around 240 000 NOK, while the median income of men with a 5-year university or college degree was around 522 000 NOK. Distributions that are closer to the top left side corner represent

clusters of lower wages, while distribution closer to the top right corner indicate clusters of higher wages. As we can observe, the median income for women across all education groups is considerably lower than the median income for men, as the distribution of women is always to the left of the distribution of men, which indicates that for every income level, there are more women earning that amount or less compared to men. For example, around 30 percent of 5-year university or college graduated men made around 400 000 NOK or less, while 70 percent of men in the same group made 400 000 or more. For women however, around 45 percent of 5-year university or college educated made 400 000 NOK or less, a much larger proportion, while almost 80 percent of 3-year university or college graduated made 400 000 NOK or less, while almost all of high school graduated women made less than this amount.

Figure 1: Cumulative Potential Earnings Distribution 2007.

5.3.1 Construction of The Potential Income Distribution

Each individual's potential income is attained in the following way. We allocate each person in the Social Security 20% dataset into to one of 160 groups based on the sociodemographic characteristics gender, age, education, and region of residency (2 gender categories $\times$ 3 education categories $\times$ 4 residency categories $\times$ 5 age categories). Then, the distribution of potential income for each individual is derived as the nth percentile of the annual salary earnings for employed individuals in that person's sociodemographic group, resulting in 160 percentiles as there are 160 sociodemographic groups. The predicted or potential income for each individual is thus the median of the derived percentile corresponding to their group. For example, the median income of the 50th percentile is 403493.8 NOK. Thus, every individual who is assigned to group 50 has a median potential income of 403493.8 NOK. Now that we have obtained the potential income of each individual through their group affiliation, we can thus divide couples in the LOGG and Family and Changing Gender Roles survey according to the same sociodemographic characteristics and assigning them to one of 160 groups. Then, the potential income of each individual in the LOGG and Family and Changing Gender Roles is assigned based on our calculations of the median potential income in the Social Security 20% dataset. For example, every spouse in the LOGG survey who is assigned to group 50, will have the median potential income of everyone who is assigned to group 50 in the Social Security 20% dataset; 403493.8 NOK. Hence, in our theoretical framework and analysis, couples compare their comparative advantage by assessing the difference between their median potential income. The spouse with the highest potential income has the highest probability of earning the most from market work and thus has the comparative advantage in the labor market.

The education categories in our analysis are compulsory education, high school, 3- year university or college, and 5-year university or college. However, due to fact that the Family and Changing Gender Roles survey did not provide a distinction between 3-year and 5-year university or college education for the participants' partners, we chose to recreate the potential income distribution based to 120 sociodemographic groups (compulsory, high

school and university or college) for the Family and Changing Gender Roles survey in order to obtain more accurate potential income information. The region of residency categories are north, central, west and south, and east. We divide individuals in 8-year interval age categories, starting from 18 years, which gives us 5 categories.

5.3.2 Potential Income and Household Economic Efficiency

In this section, we examine if Norwegian households' division of labor is economically efficient by determining if households' market work is allocated according to their comparative advantage. We choose to utilize the LOGG dataset in this section due to the fact that our analysis does not require information on housework, and the LOGG dataset comprises of a larger pool of observations. Similar to Esping-Andersen et al. (2013), we determine the level of symmetry between the husband's share of market labor, which we define as men's weekly workhours divided by the total sum of weekly market workhours in the household, and the husband's share of potential income, which we define as husband's potential income divided by the total potential income of the household. The optimal or efficient level of specialization requires that the husband's share of market work and share of potential income falls on a 45-degree diagonal slope. We allow for a ± 0.10 deviation from the diagonal slope and identify this area as the balanced space. Figure 2 shows a graphical display of the economic efficiency of households, where the vertical axis represents the share of men's market work contribution, while the horizontal axis represents the husband's share of potential income. Table 4 presents a quantitative description of the results.

Table 4: Share of Market Contribution According to Comparative Advantage.

	Symmetric Contribution	Over-contribute	Under-contribute
Number of couples	2,991	519	884
Fraction	68.07%	11.81%	20.12%
Observations	4,394		

Figure 2: Graphical Display of Economic Efficiency and Division of Labor.
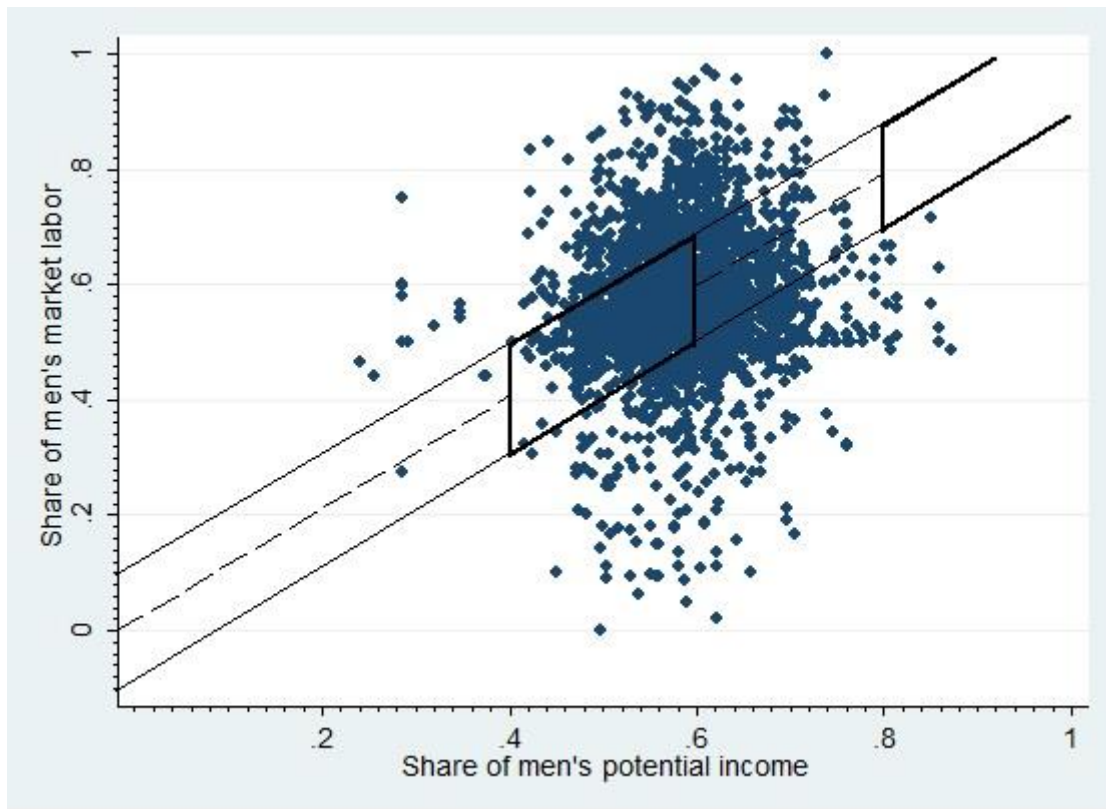
As we can observe, almost 70 percent of households specialize according to their comparative advantage. However, 20 percent of men under-contribute to market work given their comparative advantage, which suggests loss of economic efficiency, and around 12 percent of men allocate more to market work than the "balanced" amount.

5.4 Household Division of Labor

Similar to the specifications of Esping-Andersen et al. (2013), we analyse the household division of labor in Norway. Utilizing the Family and Changing Gender Roles survey, we determine the level of symmetry between the husband's share of market labor, which we define as men's weekly workhours divided by the total sum of weekly market workhours in the household, and the husband's share of housework, defined as husband's weekly non-market work divided by the total sum of weekly non-market work in the household. The

optimal or "fair" level of specialization requires that the husband's share of market and non-market work falls on a 45-degree diagonal slope. We allow for a ± 0.10 deviation from the diagonal slope and identify this area as the symmetry space. We then identify three possible equilibria outcomes; the traditional, the egalitarian, and the unstable equilibrium. Households are considered traditional if husband's share of non-market work falls inside the symmetry space and his share of market work is between 0.8 and 1. The labor division is considered egalitarian if the husband's share of housework falls within the symmetry space and his share of market work falls between 0.4 and 0.6. Lastly, the unstable equilibrium refers to all outcomes that fall outside of the symmetry space, and thus these households display a gender unequal division of labor (Esping-Andersen et al., 2013). If the division of labor falls above the symmetry space, then the husband contributes to housework more than the expected or "fair" amount with respect to his market work share, and if the division of labor falls below the symmetry space, then the husband is said to under-contribute to housework given his share of market work contribution. Figure 3 presents a graphical display of Norwegian couples' labor division, where the vertical axis represents the husband's contribution to housework, while the horizontal axis represents the husband's contribution to market work. Table 5 shows a quantitative description of the results.

Table 5: Household Equilibria and Symmetric Division of Labor.

	Traditional Equilibrium	Egalitarian Equilibrium	Unstable Equilibrium
Number of couples	1	135	242
Fraction	0.25%	33.58%	60.20%
Observations	402		

	Symmetric Couples	Over-contribute	Under-contribute
Number of couples	160	38	204
Fraction	39.80%	9.45%	50.75%
Observations	402		

Figure 3: Graphical Display of Household Equilibria.
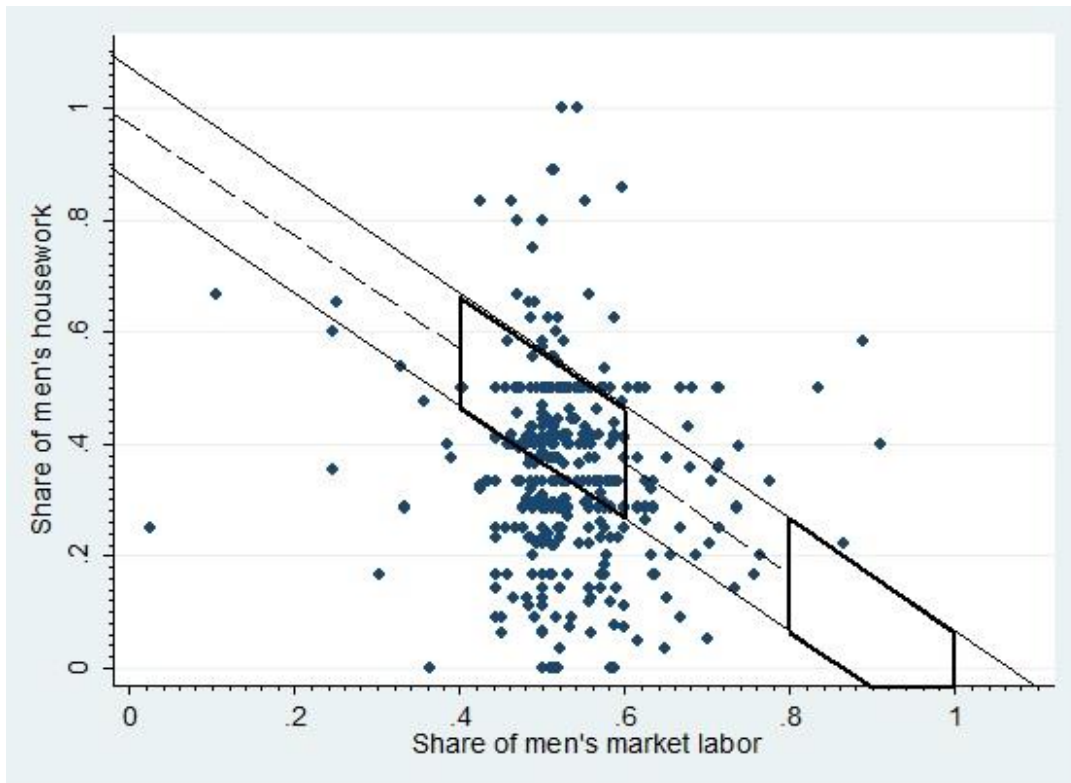
As we can observe from Figure 3, men's share of market labor falls predominantly between 0.4 and 0.6, which corresponds to the share expected from a gender equal division. However, it's apparent from the graph that men under-contribute to housework. We thus find the most dominant division type to be the unstable equilibrium, as over 60 percent of couples fall outside the symmetry space. As we can see from Table 5, surprisingly over 50 percent of men under-contribute to housework given their share of market work, while less than 10 percent of men over-contribute. This suggests that most Norwegian men don't do their "fair" share of housework as specified by Esping-Andersen et al. (2013). There is also a substantial share of egalitarian households, around 34 percent that fall within the symmetry space and the specified market work share contribution. As one would expect, the traditional equilibrium is almost non-existent in Norway.

5.5 Comparative Advantage and Specialization

Our theoretical model, which is based on specialization theory (Becker, 1999) and the gender identity model (Akerlof and Kranton, 2000), acknowledges that even though complete specialization is not likely in the Norwegian context given the country's egalitarian policies (Kitterød and Lappegård, 2012; Rønsen and Kitterød, 2012), the spouse with the comparative advantage in the labor market will still allocate the most time to market work in the household and earn more than half of the household income. If men have the comparative advantage in the labor market, we expect him to allocate the most time in market work and earn more than half the household income. Similarly, if women have the comparative advantage in the labor market, we expect them to allocate most time to market work and earn more than half the total household income, despite running the risk of violating gender identities. Thus, we test our first hypothesis (H1),

$$EarnsMore = \beta_0 + \beta_1 \times ComparativeAdvantage + \gamma Z + \varepsilon$$

where Z includes control variables. We define a dummy variable $ComparativeAdvantage,$ which takes the value of 1 for women if the wife has higher potential income than her husband, and zero otherwise. For men, the dummy variable takes the value of 1 if the husband has higher potential income than his wife, and zero otherwise. This variable thus represents the likelihood that a spouse will out-earn his or her partner. The regression results are shown in Table 6. Based on our estimated logistic regression, we fail to reject hypothesis H1, that households specialize according to comparative advantage.

Table 6: Comparative Advantage and Specialization.
Dependent variable: *EarnsMore*

	Women	Women	Men	Men
ComparativeAdvantage	1.097***	0.605***	1.07***	0.601***
	(0.108)	(0.132)	(0.107)	(0.13)
Controls		✓		✓
Observations	5,231	5,231	5,231	5,231
Pseudo R²	0.017	0.052	0.016	0.053

Standard errors in parenthesis.
Controls include each spouse's age, education, region of residency, health of respondent and if any children in household
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.6 Comparative Advantage and Full-Time Employment

While our theoretical model incorporates the gender identity model, we expect that economic efficiency and utility maximization will urge households to specialize according to comparative advantage when it comes to market work (Becker, 1991), despite running the risk of violating gender identities (Akerlof and Kranton, 2000). Thus, if the wife has the comparative advantage in the labor market, we don't expect her to reduce her labor supply by going from full-time to part-time employment, or by dropping out of the labor force, in order to preserve gender identities (Bertrand et al., 2015). Hence, we test our hypothesis (H2):

$$wifeFulltime = \beta_0 + \beta_1 \times ComparativeAdvantage + \gamma Z + \varepsilon$$

where Z includes control variables. The dummy variable *ComparativeAdvantage* here takes the value of 1 if the wife's potential income is higher than her husband, and zero otherwise. Thus, it represents the likelihood that the wife will out-earn her husband. A negative and significant coefficient here suggests that women who have higher likelihood of out-earning their husband reduce their labor supply, most likely in order to preserve gender identities. The regression results are shown in Table 7 using the LOGG survey. Based on our estimated logistic regression, we cannot reject the hypothesis (H2) that women don't reduce their labor supply in order to preserve gender identities.

Table 7: Comparative Advantage and Full-Time Employment.
Dependent variable: *wifeFulltime*

	Women	Women
ComparativeAdvantage	0.531***	0.319**
	(0.112)	(0.129)
Controls		✓
Observations	5,231	5,231
Pseudo R²	0.003	0.021

Standard errors in parenthesis.
Controls include each spouse's age, education, region of residency, health of respondent and if any children in household.
$* p < 0.10, ** p < 0.05, *** p < 0.01$

5.7 Comparative Advantage and Housework

While our theoretical model assumes that economic efficiency and utility maximization will urge households to specialize according to comparative advantage when it comes to market work (Becker, 1991), we expect that gender identities are stronger tied to housework (Bertrand et al., 2015; Bittman et al., 2003). Thus, if the wife has the comparative advantage in the labor market and hence allocates the most time to market work, we expect her to undertake more than her expected share of housework in order to compensate for breaking gender identities. Similarly, we expect the husband to undertake less than his fair share of housework when his wife has the comparative advantage in market work and is the main earner. We thus test our hypothesis (H3):

$$shareHousework = \beta_0 + \beta_1 \times ComparativeAdvantage + \gamma Z + \varepsilon$$

where Z includes control variables. The dummy variable *ComparativeAdvantage* here takes the value of 1 if the wife's potential income is higher than her husband, and zero otherwise. A positive and significant coefficient would suggest that women undertake more than the expected amount of housework when they are more likely to out-earn their spouse. A negative and significant coefficient for men would indicate that they contribute less than their expected share of housework when their wives are the main earners in the household.

The results are presented in Table 8 using the Family and Changing Gender Roles survey. Based on our estimated OLS regression, we reject hypothesis (H3) that women who are main earners have disproportionately high relative housework contribution, and men have disproportionately low contribution.

Table 8: Comparative Advantage and Housework.
Dependent variable: *shareHousework*

	Women	Women	Men	Men
ComparativeAdvantage	-0.05	-0.047	-0.05	-0.043
	(0.032)	(0.038)	(0.032)	(0.038)
Controls		✓		✓
Observations	402	402	402	402
R²	0.004	0.045	0.006	0.044

Standard errors in parenthesis.
Controls include each spouse's age, education, region of residency, health of respondent and number of children in household.
* p < 0.10, ** p < 0.05, *** p < 0.01

5.8 Relative Income and Happiness

We expect that gender identity in households may be reflected in couples' relative income, as past literature has associated relative income with happiness (Ball and Chernova, 2008). Our model expects that while economic efficiency and utility maximization compels women not to reduce their labor supply when they are the main earners given Norway's strong political objective of achieving gender equality, violating gender identities will have an effect on their as well as their husband's happiness (Bertrand et al, 2015; Bittman et al., 2003). Thus, we believe that women who have the comparative advantage in market work will experience lower levels of happiness once they out-earn their husband and become the main earner, and men will be less happy once their spouse out-earns them and thus violate their identity as the provider. We examine the effect of wives' relative income on their own and men's level of happiness, and include a quadratic function of relative income in order to capture decreasing or increasing marginal effects on happiness. We test our hypothesis (H4):

$$Happiness = \beta_0 + \beta_1 \times RelativeIncomeWife$$
$$+ \beta_2 \times RelativeIncomeWife^2 + \gamma Z + \varepsilon$$

A positive and significant coefficient of $RelativeIncomeWife$ would indicate that the relative income of women has a positive effect on women's happiness, and a negative and significant coefficient of $RelativeIncomeWife^2$ would imply that relative income has a diminishing effect on their happiness. A negative and significant coefficient of $RelativeIncomeWife$ for men would indicate that the relative income of women has a negative effect on the husband's happiness. The estimated OLS regression results are shown in Table 9 using the LOGG survey. According to the regression estimates, the return to happiness for women becomes zero when the wives' relative income is exceeds 0.45 [6]. The variable is not statistically significant for men however. Thus, we reject hypothesis (H4) that both men and women become less happy once the wife becomes the main earner in the household. Figure 4 shows the relationship between women's level of happiness and their relative income.

Figure 4: The Effect of Women's Relative Income on their level of Happiness.

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[6] The turning point or the maximum of the function is attained at the coefficient on $RelativeIncomeWife$ over twice the absolute value of the coefficient on $RelativeIncomeWife^2$: $x^* = \left|\frac{\beta_1}{2*\beta_2}\right| = \left|\frac{1.182}{2\times-1.306}\right|$

As we can observe from Figure 4, women's level of happiness starts to diminish when her relative income exceeds approximately 0.45, which is around the threshold when she starts to earn equally or more than her husband. The red tangent represents women's relative income if it didn't have a diminishing effect on happiness around the 0.45 mark.

Table 9: Relative Income and Happiness.
Dependent variable: *Happiness*

	Women	Women	Men	Men
RelativeIncomeWife	1.182**	1.308**	0.378	0.618
	(0.414)	(0.423)	(0.376)	(0.383)
RelativeIncomeWife^2	-1.306**	-1.392**	-0.521	-0.863
	(0.422)	(0.434)	(0.386)	(0.395)
Constant	8.317***	8.096***	8.362***	8.433***
	(0.095)	(0.490)	(0.085)	(0.359)
Controls		✓		✓
Observations	2,598	2,598	2,601	2,601
R²	0.004	0.008	0.001	0.012

Standard errors in parenthesis.
Controls include each spouse's age, education, region of residency, health of respondent and if any children in household.

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

6. Discussion

Our descriptive findings suggest that the traditional household division is almost non-existent in Norway, while more than one third of couples exhibit an egalitarian division of labor according to the specifications of Esping-Andersen et al. (2013). However, the most dominant equilibrium among Norwegian households is the unstable equilibrium according to our results, as we find that over 50 percent of men under-contribute to domestic tasks, which is supported by previous literature (Kitterød and Lappegård, 2012). We also find that around 70 percent of households efficiently specialize according to their comparative advantage based on our descriptive analysis. It comes as no surprise that completely

specialized households are uncommon in Norway, given the country's rigorous policies aimed at promoting dual-earner households by providing programs such as publicly subsidized and high quality child care, as well as lucrative parental leave. What's surprising however, is that our descriptive findings regarding the egalitarian and unstable equilibrium deviate from the findings of Esping-Andersen et al. (2013). The egalitarian household division is found to be unequivocally dominant in Denmark (Esping Anderson et al., 2013) while this is not the case in Norway. Given the cultural similarities as well as policy similarities among Scandinavian countries (Rønsen and Sundström, 2002), we expected the egalitarian division to be the most dominant equilibrium in in Norway as well. A possible reason for this deviation in our findings could perhaps be due to macro-economic difference between Denmark and Norway, such as Norway's high oil-wealth affecting the income dependency of households.

Our regression results regarding specialization suggests that both men and women in Norwegian households specialize in market work according to their comparative advantage, which is supported by specialization theory (Becker, 1991). We find that both men and women who have the comparative advantage in the labor market are more likely to become the main earner in the household. Similarly, we found no evidence that women reduce their labor supply when they have the comparative advantage in market work in order to preserve gender identities as suggested by gender identity theory (Akerlof and Kranton, 2000). Thus, wives who have higher potential income than their husband increase their labor supply rather than decrease it, making them more likely to work full-time. These findings deviate from the findings of Bertrand et al. (2015), who found evidence that women who out-earn their husband are more likely to reduce their labor supply by transitioning from full-time to part-time work, or by dropping out of the labor force, possibly to preserve gender identities (Bertrand et al., 2015). We find no evidence that Norwegian women decrease hours allocated to market work in order to preserve gender identities. A possible explanation for this deviation in results could be due to sociological as well as cultural differences between Norway and the U.S. While it may be less acceptable for women to be the main breadwinner

in household in the U.S, it may be more acceptable in Norway. There's also significant economical difference, as well as difference in policy between the two countries. While Norway promotes dual-earner and gender equal households through policies such as subsidized child care and paid maternity leave with full job security, these policies are found to be absent in the U.S (Datta Gupta, Smith and Verner, 2006).

Concerning our findings regarding housework in Norwegian households, we find no relationship between comparative advantage in market work and the division of housework, as suggested by specialization theory (Becker, 1999). Hence, based on our regression estimates we don't find any evidence of gender identity affecting the division of labor in Norwegian households, as suggested by the findings of Bertrand et al. (2015) and Bittman et al. (2003), who found evidence that women who out-earn their spouse undertake disproportionately more housework in order to neutralize gender identity infractions. Again, there may be many institutional differences between the countries that may explain the deviation in our findings, such as stronger societal expectations of men to be the main breadwinner and of women to be the responsible for housework in the U.S and Australia.

While we don't find any evidence of gender identity affecting couple's allocation of housework or women's labor supply, our estimation of women's relative income on their level of happiness provides some interesting results. We find that women's relative income has a positive effect on their level of happiness, but starts to diminish once her income contribution starts to equal or surpass the income of her husband (Figure 4). Unlike women, Norwegian men don't seem to be concerned with relative income, as our estimations find no significant relationship between women's relative income and men's level of happiness. This could suggest that there is perhaps some evidence of gender identity affecting women, as their level of happiness starts to diminish once their income contribution approaches 0.5, close to the mark where gender identities are breached. It's also possible that these results are caused by women with high potential income who choose to marry low earning husbands, resulting in lower levels of happiness, as household income has been found to have a positive

correlation with happiness (Ball and Chernova, 2008). However, we find some support in the works of Bertrand et al. (2015), who discovered that the share of household income earned by the wife significantly drops around the 0.5 mark, as well as Bittman et al. (2003), who found that women increased their non-market work when their relative household contribution exceeded the 0.51 mark. Perhaps while gender identity is not strong enough in the Norwegian context to distort women's labor supply as well as households' division of labor, it may still have an effect on women's level of happiness, perhaps through increased likelihood of marital conflict.

Our results may have some implications regarding economic policies in Norway. Unlike men, women seem to be concerned about relative income according to our results. Policies aimed at increasing the relative income of women may end up decreasing women's wellbeing due to gender identity. Even though we find that women don't alter their labor supply due to gender identity, their level of happiness seems to diminish after her income contribution exceeds the husbands. In addition, policies aimed at further promoting an egalitarian division of labor in Norwegian households may not affect couples' division of housework, as we find no evidence of couples' potential earnings affecting their division of housework.

This paper shares some of the same limitations as the working paper of Onozaka et al. (2015). Similarly, we only included married couples and couples that are in a civil partnership in our analysis. Women who self-select into marriage or civil partnership may have different attitudes than women who choose to be single. For example, the married women in our sample could have stronger gender identity considerations than single women who may be more career oriented. We also used a small sample of just over 400 couples in our analysis of housework and comparative advantage, which may have affected the significance level of our estimations. In addition, the two surveys that we utilized took place 5 years apart. While the LOGG survey took place between 2007 and 2008, the Family and Changing Gender Roles took place in 2012. Thus, changes in gender attitudes would not have been captured in our analysis. Lastly, we only looked at current life satisfaction as our measure of happiness. There

may be other measures of happiness that could have given different results with different implications for our analysis, such as satisfaction with family life, or satisfaction with marriage.

For future research, it would be interesting to analyze the relationship between households' potential income and their division of labor through a continuous period of time in order to capture changes in gender attitudes and societal norms.

7.   Conclusion

In conclusion, our thesis finds that gender identity does not affect Norwegian women's labor supply, and households specialize in market work according to comparative advantage. We find no correlation between comparative advantage in market work and division of housework, and thus no evidence that indicates that gender identity affects couple's division of domestic tasks. The results of our analysis indicates that women's level of happiness diminishes as her relative income approaches and exceeds the husband's income, which may perhaps be explained by gender identity violations causing women disutility. In addition, our thesis finds that the unstable equilibrium is more dominant than the egalitarian equilibrium among Norwegian households, as we find that men under-contribute to housework.

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