Gender gaps in time use and labor market outcomes: What's norms got to do with it?

Nan L. Maxwell
Corresponding Author
Mathematica Policy Research
505 14th Street, Suite 800
Oakland, CA 94612
Phone: 510-830-3726
nmaxwell@mathematica-mpr.com

and

Nathan Wozny
U.S. Air Force Academy
2354 Fairchild Drive
USAF Academy, CO 80840
Phone: 719-333-2086
nathan.wozny@usafa.edu

October 25, 2017

JEL: J29, J21,J08

This research was inspired by work performed by Mathematica Policy Research under contract to the U.S. Department of Labor (DOL), Office of the Assistant Secretary for Policy, Chief Evaluation Office. The views expressed are those of the authors and should not be attributed to Mathematica, DOL, the United States Air Force Academy, the Air Force, the Department of Defense, or any part of the U.S. Government, nor does any mention of trade names, commercial products, or organizations imply the endorsement of same by the U.S. Government. The authors would like to acknowledge the outstanding research assistance of Alex Lu, discussions with and comments from Paul Burkander, Ronald D'Amico, Jed DeVaro, Dana Rotz, and seminar participants at the Colorado School of Mines, Mathematica Policy Research, and California State University, East Bay.

Abstract

Although researchers have suggested that norms might influence gender gaps in labor market outcomes, no study has attempted to quantify how much they contribute. This research takes a first step toward quantifying the influence of norms. It uses data from the American Community Survey and American Time Use Survey to estimate of the influence of norms on gender differences in time use and labor market outcomes using four groups of demographically matched individuals with relatively homogeneous within-group need for production. Results suggest that norms might explain a majority of the gap in work, household production, and earnings, and over 40 percent of the gap in employment. Although estimates are not precise, they do suggest that norms might be a fruitful avenue for future research and provide a lens by which to consider policies designed to reduce the gender gaps in time use and in labor market outcomes.

Keywords: norms, earnings, employment, time use, gender differentials, gender disparities

Gaps in both labor market outcomes and time use between women and men are well established. Among full-time, full-year workers, women's wages stood about 80 percent of men's (unadjusted) in 2010, (Blau and Kahn 2017) and women 15 or older spent about 44 percent more hours per caring for and helping others in their household and about 10 percent less time working than men in 2015 (Bureau of Labor Statistics, no date). Such differences could reflect societal views about parenting and other household activities, especially as they relate to employment. About half of the respondents to a 2013 Pew Research Center survey said children are better off if a mother is home and does not hold a job, whereas 8 percent said that about a father (Wang, Parker, and Taylor 2013). A plurality of adults (42 percent) said in 2012 that having a mother who works part time is ideal for young children, whereas 33 percent said that having a mother who does not work outside the home is ideal (Parker and Wang 2014). In contrast, 75 percent of fathers who have children younger than 18 said they believe working full time is ideal. About half of the respondents said in 2013 that the trend in women working for pay makes it harder for a marriage to succeed (Wang, Parker, and Taylor 2013).

Researchers are increasingly implying that prescribed gender roles, which we call norms, could be an important factor in explaining gaps in labor market outcomes between females and males. Blau and Kahn (2017, page 846), for example, state that "explorations of gender norms and identity by economists would be fruitful in understanding the gender wage gap and other gender differences in outcomes." However, economists have paid relatively little attention to gender-based norms and attitudes in general, and we are not aware of any research that has attempted to quantify the relative importance of norms in contributing to observed gender gaps.

This study takes a first step in estimating the influence of norms on gender differences in time use and labor market outcomes. We used data from the American Community Survey (ACS) and the American Time Use Survey (ATUS) to construct and compare time use and labor

market outcomes between four household types, each of which contains individuals with similar household production needs: singles without children, single parents, married couples without children, and married parents. The relative within-group similarity in production needs allows us to estimate the influence of norms on time use and labor market outcomes. The outcomes we consider are time spent on work and on household production; employment, both any employment and full-time, full-year employment; and hourly wage conditional on being employed; and annual earnings conditional on full-time, full-year employment. Our estimates, although approximate, suggest that norms explain a majority of the gap in time devoted to work, household production, and earnings, and over 40 percent of the gap in employment, which suggests that norms might be an important factor in explaining gender disparities and a fruitful avenue for research to pursue in explaining them. Their importance also suggests that policies such as universal access to quality child care—even if they have other merits—may be ineffective or even counterproductive in reducing disparities, as they could perpetuate norms if they reduce men's household responsibilities more than women's, a potential we also discuss in this paper.

I. FRAMEWORK

The concept of norms, as we use it in this paper, refers to how society thinks that individuals in a group should or should not behave (Michaeli and Spiro 2017). Stated another way, norms prescribe the implicit and explicit rules and expectations that govern behavior and underlie economic outcomes (Akerlof and Kranton 2000, 2010). Deviating from them comes at a cost to individuals in the form of discomfort and anxiety about oneself and creates discomfort in others because someone is not behaving as others expect them to behave (Akerlof and Kranton 2000, 2010). The cost to individuals of violating norms, or to individuals who bear the resulting

discomfort, leads individuals to behave in ways that are consistent with societal views and expectations (Brines 1994; South and Spitze 1994).

Norms about work and home would make women the primary producer in the home and men the primary producer in the labor market. Such norms would lead employers to favor men when hiring workers (Goldin and Rouse 2000; Neumark, Bank, and Van Nort 1996) and use occupational segregation to construct an efficient wage structure by lowering earnings of women (Goldin 1986). Employers would also create labor contract structures for women with lower earnings and effort than for men (Albanechsi and Olivetti 2009) and that produce a large gender gap in earnings in jobs that require long hours (Cortes and Pan 2016; Goldin 2014; Cha and Weeden 2014; Gicheva 2013). Norms would also lead male workers to exhibit a weak prejudice against working with females (Pan 2015), women workers to select more flexible jobs that facilitate child raising (Goldin 2014) at the cost of lower earnings (Albrecht et al. 1999) and the glass ceiling (Albrecht, Bjorklund, and Vroman 2003), and create a persistent gender gap in earnings over time (Blau and Kahn 2017; Cha and Weeden 2014). In addition, norms would explain a persistent drop in women's earnings after they become parents (Waldfogel 1998) and gender differences in time use in household production, with women doing routine chores like cooking and cleaning, and men doing nonroutine chores like home repairs (Lachance-Grzela and Bou 2010).

Norms might also create a feedback loop between work and household production. Female youth expect a future in which they engage heavily in household production, which leads them to invest in human capital leading to jobs that enable the level of household production to fluctuate over their life cycle (Goldin and Mitchell 2017). Employers who expect women to devote more time to household production than do men not only offer women and men different labor

contracts (Albanesi and Olivetti 2009); they also create a flexible workplace for women but at a cost of lower earnings (Goldin 2014; Goldin and Katz 2010, 2011).

While some of these studies acknowledge the potential role of norms in determining behaviors and outcomes, none attempt to quantify the relative importance of norms in determining gender gaps, in part, because it is difficult to empirically separate them from efficiencies in household production. Households, particularly married couple households, make gains from efficiency from jointly allocating time to work and to household production. The (generally) lower earnings of wives leads them to specialize in home production, while their higher earning husbands specialize in market production (Becker 1965), which we call work. These gains from efficiency occur even when both a husband and a wife work, and they increase in the presence of a child when household production increases (Angelov, Johansson, and Lindahl 2016).

Although these gains from efficiency have been documented both theoretically and empirically, recent research documents behaviors that contradict behavioral predictions from efficiencies and support behaviors governed by norms. For example, Bursztyn, Fujiwara, and Pallais (2017) show that single women reduced labor market investments when observed by potential male partners, and Bertrand, Pan, and Kamenica (2015) show that households deviating from norms by having wives earn more than their husbands were less likely to form than more gender-typical households. If such households form, they are less likely to remain intact and, if they remain intact, they compensate by having men engaging *less* in household production (Bittman et al. 2003), and women spend *more* time on housework than in more typical households with similarly employed women (Greenstein 2000). All behaviors are either

inconsistent with or cannot be explained by efficiency in household production but are consistent with norms governing behaviors.[1]

This paper takes a step towards quantifying the influence of norms on time use and labor market outcomes by comparing gender gaps across household types. We attribute gender gaps among single-adult households primarily to norms because women would pay a cost for deviating from social expectations about (for example) keeping a clean house, preparing food, and caring for children while men would pay a cost for deviating from social expectations about working and providing for children financially. Although this attribution implicitly assumes that any gender differences in such households are difficult to explain by efficiency gains, given that such gains would require using contracted household services, efficiency gains may affect gender gaps if (for example) single men use market earnings to substitute household tasks with contracted services such as restaurant meals more than single women. We believe these efficiency gains to be relatively small in single adult households, however. Upon marriage, efficiency gains are more readily attained through specialization in household or labor market production, and those gains are likely to further increase when children are present in the household. Accordingly, we attribute any increases in gender gaps upon marriage primarily to efficiency gains. However, we recognize that norms may be partly responsible for any increase in gender gaps following marriage to the extent that social expectations of traditional gender roles intensify in married couples. Although these combinations of the influences of norms and gains from efficiency prevent us from isolating each influence precisely, comparing individuals across household types provides insights into the relative influence of norms.

[1] We note that our study focuses on the *relative* level of production (household and work) and not the absolute level. When income increases (for example) the absolute level of household production might decrease as the household substitutes market services for household production (Baxter and Rotz 2009) and when a woman's earnings increases her time in household production might decrease (Gupta and Ash 2008). Because our focus on relative levels of production implicitly addresses absolute influences empirically through matching, we do not discuss them in the framework.

Comparing gender gaps across household types presents an empirical difficulty of differences in other characteristics across household types. Other research has addressed selection into marriage and parenthood, (Juhn and McCue 2017; Neuman and Oaxaca 2004; Manski 1989) with particular concern in earnings outcomes that are conditional on employment. Selection effects are especially strong for married mothers because full-time employment among married mothers is correlated with factors not readily captured by observable demographic differences (Heckman 1976, 1979). Our study uses a matching approach to adjust for the selection of individuals into different household types and the differing production needs of households to estimate the relative influence of norms on gender differences in time use and labor market outcomes.

II. MODELING THE INFLUENCE OF NORMS ON GENDER GAPS

Our formal model defines two measures of norms and two measures of efficiency gains by comparing gender gaps in time use and labor market outcomes across household types. We assume that gender gaps (γ) among those who are single with no children (sn) are primarily due to the influence of norms about work and home (N_{wh}). We recognize that small levels of gains from efficiency (E_a) exist because women's lower average earnings as discussed in the last section. Given that we consider these efficiency gains to be small compared to the gender-based views about work and home, we define the measured influence of norms about work and home N'_{wh} to be the observed gender gap among singles with no children, so that $\gamma_{sn} = N'_{wh} = N_{wh} + E_a$. Labeling this gap as we do reflects our argument that efficiency gains E_a in these households are difficult to attain and thus are small relative to the influence of norms N_{wh}.

We define the measured gap due to norms about parenting N'_p to be the additional gap among single parents (sp) relative to single adults with no children. The measured parenting

norms reflect primarily the influence of norms about parenting (N_p) but also any additional gains from efficiency when children are present (E_c) that result from lower wages of females, so that $\gamma_{sp} - \gamma_{sn} = N'_p = N_p + E_c$.

We define the measured gap from efficiency gains due to marriage E'_m as the additional gap among married couples with no children (mn) relative to single adults with no children. We consider these measured gains to be an upper bound on the actual effect of efficiency gains due to specialization in production among adults after marriage E_m since norms that dictate how one should act once married N_m may also play a substantial role in determining gender gaps in our outcomes among married couples. Other research implicitly supports that our comparison would understate the influence of norms (Bertrand Pan, and Kamenica 2015, Bittman et al. 2003, Greenstein 2000). For example, in married couple households in which the wives earn more than husbands, women do more housework and men do less housework, which are gender-typical behaviors inconsistent with gains from efficiency. Accordingly, our measure $\gamma_{mn} - \gamma_{sn} = E'_m = E_m + N_m$ is likely to overstate the influence of efficiency gains.

Finally, we define the measured gap from additional efficiency gains due to marriage in the presence of children E'_{cm} to be the remaining gap (after removal of the above influences) for married parents (mp). This quantity is likely to overstate the additional efficiency gains a married couple can attain when children are introduced (E_{cm}) because gender-based expectations about married couples might also intensity in the presence of children, leading to an additional gender norms influence (N_{pm}). That is, $\gamma_{mp} - \left(N'_{wh} + N'_p + E'_m\right) = E'_{cm} = E_{cm} + N_{pm}$.

Equation (1) summarizes our two measures of norms and two measures of efficiency gains. Each definition compares gender gaps across household types in such a way that the difference is most readily attributed to norms (equations 1a and 1b) or efficiency gains due to specialization

(equations 1c and 1d). In each case the measured quantities reflect a combination of influences from norms and efficiency gains. We argue that E'_m and E'_{cm} are most likely to overstate efficiency gains due to empirical evidence that gender norms influence married households, while N'_{wh} and N'_p only slightly overestimate the influence of norms due to the relatively limited means that single adults have to achieve efficiency gains through household services. Accordingly, these measures overall are likely to place an upper bound on the relative influence of efficiency gains and a lower bound on the relative influence of norms.

(1a) $N'_{wh} = \gamma_{sn}$

(1b) $N'_p = \gamma_{sp} - \gamma_{sn}$

(1c) $E'_m = \gamma_{mn} - \gamma_{sn}$

(1d) $E'_{cm} = \gamma_{mp} - N'_{wh} - N'_p - E'_m$.

When we define norms and efficiency gains as we do in equation (1), we can attribute gaps in each type of households to specific combinations of these influences:

(2a) $\gamma_{sn} = N'_{wh}$

(2b) $\gamma_{sp} = N'_{wh} + N'_p$

(2c) $\gamma_{mn} = N'_{wh} + E'_m$

(2d) $\gamma_{mp} = N'_{wh} + N'_p + E'_m + E'_{cm}$

We reiterate that estimates based on these equations only approximate the influences. As noted above, our estimates of norms are overstated because $N'_{wh} > N_{wh}$ and $N'_p > N_p$ and they are understated because E'_m and E'_{cm} both include norms.[2] Still, the estimates from equation (1)

[2] We cannot improve estimates by restricting the sample to same-sex couples. Although individuals in same-sex marriages face the same broad influences from N_{wh} and, if applicable, from N_p, norms that prescribe behavior within marriage, both N_m and N_{pm}, are based on heterosexual marriages and do not apply to same-sex couples. Furthermore, although both heterosexual and same sex couples benefit from specialization in production, the resulting gains from efficiency do not affect gender gaps for same-sex couples because production decisions are made with a partner of the same sex. Half of all women (men) will, for example, reduce household production, and half will increase it. As

can provide a sense of whether norms play a role in gender differences and can approximate the strength of norms in gap, which research to date has not done.

Adjusting for demographic differences through matching

Gender gaps in time use and labor market outcomes likely reflect differences in norms or efficiencies as specified by equation (1) as well as differences in characteristics that also affect our outcomes (for example, education, age, or race/ethnicity). Such characteristics are different for women and men *within a household type* and between individuals who self-select into a household type, that is, *across household* types. For example, within all household types, women in all race-ethnic categories are more likely than men to have a bachelor's degree (Ryan and Bauman 2016). Cross-household differences exist for three reasons: (1) a higher percentage of women than men marry over the course of their lives (Aughinbaugh, Robles, and Sun 2013); (2) women marry when they are younger (Aughinbaugh, Robles, and Sun 2013); and (3) a higher proportion (73 percent) of married couples with children are white (non-Hispanic), compared with single mothers (44 percent) and single fathers (61 percent) (Vespa et al. 2013).

Such differences require us to control for differences in demographic characteristics when estimating gender gaps using equation (1). We use a matching technique that identifies a group of women or men in a given household type who are demographically comparable to the overall sample (that is, women and men in all household types). As a result, gender differences in any matched household type have netted out the differences in observable characteristics. Specifically, we adopted a reweighting technique that matches individuals exactly within each of three key characteristics: three categories of age at the time of the survey (24–29, 30–39, or 40–50); three categories of the highest level of educational achievement (no college, some college, or a bachelor's degree or higher); and four categories of race (white, black, Asian including

a result, gender gaps in time use or labor market outcomes are not changed. Because N_m, N_{pm}, E_m, and E_{cm} do not affect gender gaps in same sex households, we excluded such households from our estimations.

Hawaiian/Pacific Islander, and other). A series of robustness checks ensured that our results were not driven by the categories of the matching weights used (see the online appendix).[3]

Our reweighting is analogous to that of DiNardo, Fortin, and Lemieux (1996) except that we matched exactly on demographic groups. We separated individuals into eight mutually exclusive matching groups, g, defined by gender and household type. Separately, we divided individuals into 36 mutually exclusive demographic groups d defined by membership in one of the age, education, and race categories. Within each demographic group, we matched the individuals to all observably identical individuals in the overall sample by scaling their weights. Given sampling weights w_{igd} for each individual i in matching group g and demographic group d, we calculated the analytic weight as:

$$(3)\ \tilde{w}_{igd} = w_{igd} \cdot \frac{\sum_{i\prime g\prime} w_{i\prime g\prime d}}{\sum_{i\prime} w_{i\prime gd}} \cdot \frac{\sum_{i\prime d\prime} w_{i\prime gd\prime}}{\sum_{i\prime g\prime d\prime} w_{i\prime g\prime d\prime}}.$$

The technique ensures that the analytic weights have three properties. First, they are proportional to the survey sampling weights within each demographic group. Second, the sum of the analytic weights for any demographic group and a matching group is proportional to the sum of the sampling weights of that same demographic group in the overall sample. Accordingly, the weighted average of any demographic characteristic is identical across matching groups (and equal to the weighted average for the overall sample). Finally, the sum of the analytic weights across individuals in a matching group is equal to the sum of the sampling weights of that same group. Accordingly, the proportions of individuals in each matching group are identical when applying sampling weights or analytic weights.

We applied the analytic weights to the comparisons in equation (1). If the demographic variables used in the matching technique capture the relevant differences in characteristics across

[3] Alternatives include regression adjustment or Blinder-Oaxaca decompositions (Blinder 1973; Oaxaca 1973). Matching techniques allow the estimated gaps to vary across household types while controlling for observable characteristics in gender differences without imposing a functional form assumption.

gender and household type, equation (1) can estimate the influence of norms and gains from efficiency as defined above. Like any matching method, our reweighting strategy has limitations. First, matching only guarantees that groups are identical on the specific categories included in the matching process. Even after the analytic weights are applied, the matched groups may differ in observable or unobservable characteristics not included in the matching process. Second, matching requires demographic groups to overlap across matching groups. For example, if a specific demographic group is not represented in all eight matching groups, then the individuals in this group are removed from analysis so that any matching group can be rescaled to match the remaining population. The online appendix presents evidence that matching on more observable characteristics would reduce the support of the match with little effect on its quality. Nonetheless, we recognize that disentangling selection into household type is especially challenging for outcomes that are conditional on employment. Accordingly, we consider our analysis of earnings outcomes to be exploratory.

Adjusting influences by decomposing gender gaps

The influences identified in equation (1) only apply to specific household types. Equation (1a) identifies the influence of work and household norms on gender gaps in time use and labor market outcomes for the overall sample because norms about work and household production affect all individuals and equations (1b) through (1d) also include norms that apply only to specific household types. For example, equation (1b) identifies the influence of norms about parenting on gender gaps, but these norms affect only individuals who are parents. The demographically adjusted gender gap for the overall sample therefore depends not only on the influence of norms, but also on the proportion of the sample for whom any given norm applies.

We used a modified Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973) to split each demographically adjusted gender gap into the influences identified in equation (1).

Although the Blinder-Oaxaca decomposition is frequently used to account for differences in observable characteristics, we used it to estimate the effects of norms and gains from efficiency, which vary across household type, after adjusting for observable characteristics through the matching technique.

We began by applying the decomposition to each gap, using household type as the only objective characteristic, so each gap has within-household type components and across-household type components. Let $\overline{Y}_f$ and $\overline{Y}_m$ be the demographically adjusted average of an outcome Y for females and males, respectively, and let $\overline{Y}_{fh}$ and $\overline{Y}_{mh}$ be these same averages for household type h. Let s_{fh} and s_{mh} be the proportion of females and males, respectively, in household type h. The Blinder-Oaxaca decomposition is:

(4) $\overline{Y}_f - \overline{Y}_m = \sum_h (\overline{Y}_{fh} - \overline{Y}_{mh}) s_{fh} + \sum_h \overline{Y}_{mh} (s_{fh} - s_{mh})$.

We note that each within-household gender gap $\overline{Y}_{fh} - \overline{Y}_{mh}$ is identical to the corresponding gap γ from equation (2), the first summation in equation (4) can be rewritten:

(5) $\overline{Y}_f - \overline{Y}_m = \left[\gamma_{sn} s_{f,sn} + \gamma_{sp} s_{f,sp} + \gamma_{mn} s_{f,mn} + \gamma_{mp} s_{f,mp}\right] + \sum_h \overline{Y}_{mh} (s_{fh} - s_{mh})$.

Substituting each gender gap in equation (5) with the sum of the appropriate influences from equation (2) yields the following, after simplifying and noting that the four household type proportions sum to one:

(6) $\overline{Y}_f - \overline{Y}_m = \left[N'_{wh} + N'_p (s_{f,sp} + s_{f,mp}) + E'_m (s_{f,mn} + s_{f,mp}) + E'_{cm} s_{f,mp}\right] + \sum_h \overline{Y}_{mh} (s_{fh} - s_{mh})$

The sum in brackets in equation (6) reflects the need to scale each influence to reflect that not all household types are subject to each gap. For example, parenting norms, N'_p, is multiplied by the share of women in households that have a single parent and that have married parents because parenting norms, as we have defined them, affect only these household types.[4] The final

[4] The Blinder-Oaxaca decomposition could alternatively use the proportion of males in each household type, but then the final summation would depend on the average outcome of females in each household type.

summation reflects that gender differences in the distribution of the sample in each household type also affect the overall gender gap.

III. DATA

We used the Bureau of Labor Statistics 2003 to 2014 ATUS to compute the influence of norms on gender gaps in time devoted to work and household production.[5] The 12 years of information ensures a sufficient sample in each of the four household types. Each year, the ATUS randomly selects a group of individuals from a subset of households that have completed their eighth and final month of interviews for the Current Population Survey to provide nationally representative estimates of how people spend their time. These respondents are interviewed one time to gather detailed information about how they spent their time on the previous day. We used the data to estimate the minutes per day devoted to three uses of time (1) *household management,* defined as time spent caring for and helping household members who are not children; caring for and helping people who are not members of the household; making consumer purchases and providing household and government services, including travel related to these activities; [6] (2) parenting, defined as time spent caring for and helping children in the household, activities related to the education or health of children in the household, and travel related to these activities);[7] and (3) work, defined as all work and work-related activities, including travel related to work.

[5] Although it has been speculated that women and men might report time use differently, evidence suggests that these differences do not differ systematically by subgroup (Carrasco and Dominguez 2015). Because our focus is on differences in gaps across subgroups, we minimize any such potential bias by reporting subgroup differences.

[6] Household services include receiving services not done by the respondent such as cleaning, meal preparation, lawn and garden care, and maintenance. Government services include obtaining licenses and paying taxes.

[7] Secondary childcare is not included in our measures. All time use outcomes are calculated using only the primary activity at a given time.

To compare time spent in work and household production, we summed the minutes per day spent in household management and parenting as a measure of total household production. The ATUS also collects demographic information for each respondent, which allowed us to construct the four household types and to match women and men within household type.

We used the 2014 ACS to compute each influence on gender gaps in employment and earnings. The ACS housing unit sample is designed to provide relatively current information on the characteristics and housing of the U.S. population by annually collecting socioeconomic data from a sample of households across the country. We used these data to construct binary variables for employment (whether employed at time of the survey) and employed full time (worked at least 35 hours per week and at least 50 weeks in the past 12 months, conditional on employment) and to construct continuous variables (conditional on employment during the past 12 months) for hourly earnings in 2013 dollars (earned income divided by the product of usual weekly hours worked and number of weeks worked, using midpoint of ranges for categorical responses); and earnings in 2013 dollars (earned income).[8] Like the ATUS, the ACS contains the demographic information needed to construct household type and to use in matching.

We limited the sample in each survey in several ways. We excluded military members and individuals under age 24 or over 50 to focus on the civilian, prime-age working population. We also excluded unmarried individuals living with a partner or a same sex partner. These restrictions are identical for ATUS and ACS, although the ATUS sampling frame excludes military member and institutionalized populations. We included only the reference person in each ACS household and that person's spouse if they were married. In both data sets, we define a married individual as one who is married to the spouse living in the household, and we defined a single individual as one who is not living with a partner regardless of whether the individual is

[8] Results for unconditional full-time employment, hourly earnings, and annual earnings lead to similar broad conclusions.

married to the partner. We defined a parent as having biological children, adopted children, or stepchildren younger than 18 and living in the same household reported in the ACS and as having their "own" child younger than 18 in the household reported in the ATUS. Even with these restrictions, our analytic samples are large (Table 1), with a minimum cell size of 1,624 (unmarried fathers in the ATUS) and a maximum of 194,854 (married mothers in the ACS).

We also used the ACS and the ATUS to construct analytic weights according to our matching strategy. For the ACS data, we constructed analytic weights for each of three samples: (1) all prime-age civilian adults (age 24 to 50) for an analysis of employment, (2) the subset of those employed, for an analysis of full-time, full-year employment and hourly earnings, and (3) the subset of those who are working full-time and full-year for an analysis of annual earnings. For the ATUS data, we constructed weights for the full sample of prime-age civilian adults. Our algorithm matched the groups with minimal excluded observations. In the ACS data, the match has full support, meaning that all demographic groups represented in each matching group were also represented in the reference group and vice versa. In the ATUS, we excluded 1,259 observations before all of our analyses (analytic sample sizes shown in Table 1) whose demographic characteristics were not represented in all combinations of household type and gender. A maximum of 2.2 percent of observations was excluded in any combination of household type and gender.

IV. FINDINGS

Our analysis of the ATUS and ACS data confirms the presence of gender gaps in time use and labor market outcomes across household types for working-age civilian adults (Table 2). Women spend 113 minutes more per day than men on household production (301 versus 188 minutes) and 97 minutes less than men in the workplace (184 versus 282 minutes). Fewer

women are employed (71 versus 89 percent) or working full time and full year if they are employed (70 versus 86 percent). Employed women earn, on average, 22 percent less than employed men per hour, $23.06 versus $29.38. Among full-time, full-year workers, women earn about 27 percent less per year, $51,124 versus $70,311. Adjusting for demographic differences between men and women does little to change the gap in time use but increases the gap in full-time employment and earnings.

Gender gaps are smallest for singles without children and largest for married parents even after adjusting for demographic differences across groups (Table 3). For example, the female-male gap in time spent on household management is 42 minutes for single adults without children and 98 minutes for married parents. Gaps and actual time use in household management are larger for married parents than for married individuals without children, perhaps suggesting that the presence of children increases complementary in household activities not explicitly related to child care. Similarly, the time spent caring for children—and its related gender gap—(Panel B) increases for married parents, compared with single parents, suggesting that specialization promotes a more efficient use of time. A similar story is told when we examine gaps in employment (Table 4) and earnings (Table 5), with gaps smallest for singles without children and largest for married parents with gaps for single parents and married couples without children falling in between.

Despite the fact that gender gaps in all outcomes are largest for married parents, we highlight the substantial gender gaps for single adults. Perhaps most striking is that the gap in hourly earnings for employed single parents ($6.82) is only slightly smaller than the gap for employed married parents ($7.55), with similar patterns for annual earnings (Table 5). These results raise the question of how much the earnings gaps for married parents can be explained by efficiency gains within marriage, given that their unmarried counterparts have comparable gaps

without some ability to specialize within the household. Although selection into employment based on unobservable characteristics, rather than norms, might explain the patterns for earnings, single adults also have notable gender gaps in time use and employment outcomes that are not conditioned on employment. For instance, the single parent gender gap in time spent on household production is more than half of the married parent gap (Table 3), while gaps in work time and employment for single parents are about 40 percent of those for married parents (Table 4). These patterns highlight the potential role of norms that was formalized in our framework.

Sources of gender gaps

Differences in gender gaps across household type allow us to identify the sources of these gaps. For example, the presence of noteworthy gaps in time use and employment among single adults suggests that gains from efficiency within marriage fail to fully explain gender gaps. In Table 6, we used the gender gaps in time use and labor market outcomes from Tables 3 to 5 to estimate the sources of gender gaps based on equation (1).

These estimates suggest that norms contribute more than gains from efficiency to the gender gap in household time (Panel A). We estimated that household and work norms contribute 44 minutes to the female-male gap in household production time, norms related to child care contribute an additional 39 minutes. The gains in efficiency contribute 25 minutes to this gap, and the presence of children contributes an additional 35 minutes.

Norms make a smaller but still sizable contribution to employment outcomes (Panel B). Of the shorter time that women spend working, our analysis attributes 36 minutes per day to norms related to household management, and norms related to child care contribute an additional 25 minutes. Gains from efficiency contribute 37 minutes to this gap; with 40 minutes additional gains from efficiency when children are present. Similarly, household and work norms make noteworthy contributions to the gap in employment (4.0 percentage points) and gap in full-time

work among employed women and men (4.7 percentage points). The influence of child care norms is larger (6.2 and 8.4 percentage points, respectively).

Identifying sources of gender gaps in earnings is more difficult. First, the sample selection issues will overstate the role of parenting norms in earnings gaps. Second, earnings gaps are likely to arise not only from present-day time constraints but also from work histories, which in turn depend on time constraints imposed by household structures in the past. Disentangling the effects of selection into employment or the history of time constraints is beyond the scope of our analysis, so we remind readers to consider applications of our framework to earnings gaps as exploratory.

Our estimates attribute a noteworthy portion of the earnings gap to norms (Panel C). We estimated that household and work norms account for $3.99 per hour of the gap in hourly wages, which is more than the estimated contributions of parenting norms ($2.83 per hour) or gains from efficiency when children are not present ($2.17 per hour). The results are similar for annual earnings of full-time workers; household, work, and child care norms contribute almost $11,081 each to the gap, compared with $6,306 for gains from efficiency that arise from specialization when children are not present. We also estimated that the presence of children slightly dilutes the influence of gains from efficiency in the gap (that closes the gap by about $4,002). We believe that this unlikely result is best explained by the selection issues that we cannot control for, also giving a sense of how much our framework may overstate the role of child care norms when applied to outcomes that are conditional on employment.

Decomposing gender gaps

The estimates in Table 6 reflect the influence of norms on gender gaps for households, but do not measure how they influence gender gaps for the overall sample. We used the decomposition described in Section II to separate the gender gap in each outcome for the overall

sample into each of the two types of norms and gains from efficiency, and into a term that reflects gender differences in the distribution of household types. In particular, each influence was multiplied by the share of women in household types to which that influence applies.

Norms make a sizable contribution to overall gender gaps in our outcomes (Table 7). Out of a demographically adjusted 111-minute overall gap in time spent in household production, we attributed 44 minutes to household and work norms—the same as in Table 6—because these norms affect all household types. We scaled the influence of parenting norms from 39 minutes (Table 6) to 24 minutes because only 61 percent of women in the sample are parents. Similarly, the influence of gains from efficiency within marriage for adults falls from 25 minutes to 18 minutes when we account for the fact that only 70 percent of women are married, and the gains from efficiency from specialization within marriage once children are present fall from 35 to 17 when we account for the fact that only 50 percent of women are married parents. The adjustment for differences across household types is generally small.

Table 8 presents this same decomposition expressed as a percentage of the adjusted gaps. Norms about work and household production are estimated to be the strongest influence on gender gaps in time spent in household production (40 percent) and work (37 percent), wages (59 percent), and earnings (55 percent). For employment and full-time employment (conditional on being employed), household and work norms are a less dominant, but still sizable, influence (22 and 29 percent, respectively). After we adjusted for demographic differences, gender differences in the proportion of individuals in each household type account for no more than 7 percent of the overall gap for any outcome.

V. DISCUSSION

This study takes a first step towards quantifying the impact of norms on gender gaps in time use and labor market outcomes. By comparing gender gaps across demographically matched groups of individuals who face different household constraints, we estimate the relative importance of norms in determining those gender gaps. We acknowledge significant empirical challenges in isolating causes of the gender gaps. In particular, our estimates of the influence of norms may include efficiencies from women devoting more hours than men to household production even if they are not married. We argue that our overstatement of their influence is at least offset by the fact that our estimates of the influence of gains from efficiency include norms about marriage and parenthood within marriage. Still, because of this noise, we urge readers to be cautious in attributing exactness to our results. In addition, because our analysis may not account for factors—unobservable and observable—that underlie the decision to work or to work full time, we encourage readers to interpret the estimates of the influences on gaps for working individuals (full-time employment and hourly or annual earnings) as exploratory and in need of an investigation into how the decision to work (or to work full time) might affect estimates.

Our findings broadly support the conclusion that norms play an important role in gender gaps. Due to the empirical challenges of isolating causes of the gender gap, we argue that our analysis most likely identifies a lower bound for the influence of norms on gender gaps, with norms explaining a substantial portion of observed gender gaps in time use and employment outcomes. Nonetheless, the large estimated influence of norms—around household and work as well as parenting—on gender gaps in time use and labor market outcomes suggests that the recent work of Akerlof and Kranton (2010, 2000) on norms should be integrated into research that examines gender gaps.

Subsequent research has the potential to further isolate the effect of norms in gender gaps. One line of research might explore the validity of our assumption that gender gaps in time use and labor market outcomes for single adults are not well-explained by efficiency gains. Another line might examine the extent to which differences in gender gaps between married and unmarried households – which we have attributed to efficiency gains – are in fact driven by norms. Research showing that work behaviors (Bertrand Pan, and Kamenica 2015) and household time allocations (Bittman et al. 2003, Greenstein 2000) are inconsistent with specialization and gains in efficiency in married couple households supports our contention that our estimates of the influence of norms might not be overstated. However, this research could be extended to quantify the influence of norms on gender gaps. For instance, wives who earn more than their husbands would decrease market work and increase nonmarket work only to the extent that norms more than compensate for the efficiency gains that the opposite intra-household specialization would have generated.

The potential importance of norms in influencing economic outcomes also has important implications in developing policies aimed at narrowing gender gaps. Some policies, for example, are aimed at incentivizing women to work by removing barriers introduced by gains from efficiency within a married household. Yet the notable gender gaps in outcomes for unmarried individuals with and without children suggest limits to such policies. Furthermore, policies designed to be gender-neutral may in fact have differential effects on women and men to the extent that norms drive behavior. Research that improves precision of the influence of norms has the potential to isolate the effects of these policies on gender gaps.

Without such precision, we can only apply the lens of gender norms to consider potential consequences of three types of policy proposals intended to narrow gender gaps: (1) policies that allow workers to more easily shift time from household production to work, (2) structural

changes in institutions that affect time use, and (3) policies that break down gender-based views of work and household production. We note that although each of the policies discussed might afford benefits other than narrowing gender gaps, our discussion does not include these benefits.

First, norms-driven choices might increase gender disparities as a result of policies that allow workers to shift time from household production to work. For example, making high-quality, subsidized child care universally available might reduce the efficiency gains from women specializing in household production, thus producing incentives to participate (or participate more) in the labor force. However, to the extent that norms and not specialization of labor inhibited the transition to work, women may be reluctant to use such services fully, and in fact single fathers may benefit more than single mothers to the extent that norms impose differential costs to using child care.

Second, norms could work with structural changes in institutions to narrow gender gaps. For example, school hours that coincide with work hours could reduce the conflict parents experience between work and child care, and the parenting norms suggest that women experience higher costs in this area than men. These higher costs could cause the conflict to increase gender gaps in (full-time) employment and earnings as women structure their employment to coincide with school scheduling. A structural change that, for example, lengthens school days would reduce the efficiency gains from women replacing work with nonmarket production without affecting norms because women (primarily) would no longer have to choose between reducing household production and work. As a result, such policies might narrow gender disparities. Although such structural shifts may be viewed as similar in nature to policies that allow workers to shift time from household production to work, structural shifts do not involve choice: parents do not choose the timing of school days, but they do, for example, choose whether to use subsidized child care.

Finally, our results suggest that policies that successfully break down gender-based views of work and household production might be essential to reducing gender disparities. The sizeable gender gaps among single individuals with and without children are indicative of the limits of any policy aimed at reducing the need for specialization within married households. The strength of norms shown in our findings suggests that narrowing gender gaps may depend on the continued change in attitudes toward women, work, and motherhood. These changes in attitude have been great: in 2012, 23 percent of married mothers and 49 percent of unmarried mothers thought that full-time work would be ideal, compared with 17 percent of married mothers and 26 percent of unmarried mothers who thought it ideal in 2007 (Parker and Wang 2014). Still, evidence suggests gender-based norms still exist.

Two sets of strategies might change attitudes. One set centers on information (Pope, Price, and Wolfers 2014) that helps individuals see beyond gender-based opportunities for work and household production. These strategies might encourage women to prepare for high-paying careers typically viewed as being "for men" (for example, police officers and architects), and they might encourage men to consider careers viewed as being "for women" (for example, make-up artists and interpreters/translators). The U.S. Department of Labor uses such a strategy in highlighting nontraditional occupations for women (https://www.dol.gov/wb/factsheets/nontra2008.htm) as does research that highlights the dearth of women in the economics profession (Bayer and Rouse 2016). Another set of strategies centers on changing behaviors (Soll, Milkman, and Payne 2014). This approach is demonstrated by Goldin and Rouse's (2000) work that shows how auditions for an orchestra that masked the gender of the applicant led to the hiring of more women. Other behaviorally based strategies might focus on reducing hostile behaviors in the workplace not only toward women who work in

nontraditional fields (Ginther and Kahn 2004) or in high-powered professions (Stone 2007), but also toward men who take paternity leave (Weisberg and Galinsky 2014).

In conclusion, findings from our research suggest that if policymakers are to better understand the barriers they confront when trying to close gender gaps in time use and labor market outcomes, they should look at this issue through the lens of social norms. This might be especially important if norms are unlikely to change, such as those that stem from biological differences (for example, child bearing) or from strong beliefs that have persisted over time. In this respect, research that shows how strongly norms influence gender disparities is akin to the research that shows the detrimental effect on achievement of blacks "acting white" (Fryer and Torelli 2010; Austen-Smith and Fryer 2005; Cook and Ludwig 1997). Both lines of research can help policymakers and program leaders to better understand behaviors and the behavior-related barriers they will face when trying to close gaps.

REFERENCES

Akerlof, George A., and Rachel E. Kranton. *Identity Economics: How Our Identities Affect Our Work, Wages, and Well-being*. Princeton, NJ: Princeton University Press, 2010.

Akerlof, George A., and Rachel E. Kranton. "Economics and Identity." *Quarterly Journal of Economics*, vol. 115, 2000, pp. 715–753.

Albanesi, Stefania, and Olivetti, Claudia. "Home Production, Market Production, and the Gender Wage Gap: Incentives and Expectations." *Review of Economic Dynamics*, vol. 12, no.1, 2009, pp. 80–107.

Albrecht, James, Anders Bjorklund, and Susan Vroman. "Is There a Glass Ceiling in Sweden?" *Journal of Labor Economics*, vol. 21, 2003, pp. 145–177.

Albrecht, James, Per-Anders Edin, Marianne Sundstrom, and Susan Vroman. "Career Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data." *Journal of Human Resources*, vol. 34, no. 2, 1999, pp. 294–311.

Angelov, Nikolay, Per Johansson, and Erica Lindahl. "Parenthood and the Gender Gap in Pay." *Journal of Labor Economics*, vol. 34, no. 3, 2016, pp. 545–579.

Aughinbaugh, Alison, Omar Robles, and Hugette Sun. "Marriage and Divorce: Patterns by Gender, Race, and Educational Attainment." *Monthly Labor Review*, October, 2013, pp. 1–19.

Austen-Smith, David, and Roland Fryer. "An economic analysis of 'acting white'." *Quarterly Journal of Economics*, vol. 102, no. 2, 2005, pp. 551–583.

Bayer, Amanda, and Cecilia Elena Rouse. "Diversity in the Economics Profession: A New Attack on an Old Problem." *Journal of Economics Perspectives*, vol. 30, no. 4, fall 2016, pp. 221–242.

Baxter, Marianne and Dana Rotz. 2009. "Detecting Household Production." Available at https://199.169.201.73/research/conferences/research-events---conferences-and-programs/~/media/files/research/events/2009_11_19/papers/Baxter_paper.pdf. Accessed March 7 2017.

Becker, Gary S. "A Theory of the Allocation of Time". *The Economic Journal*, vol. 75, no. 299, September 1965, pp. 493–517.

Bertrand, Marianne, Jessica Pan, and Emir Kamenica. "Gender Identity and Relative Income within households." *Quarterly Journal of Economics*, vol. 130, no. 2, 2015, pp. 571–614.

Bittman, Michael, Paula England, Nancy Folbre, Liana Sayer, and George Matheson. "When Does Gender Trump Money? Bargaining and Time Use in Household Work." *American Journal of Sociology*, vol. 109, no. 1, July 2003, pp. 186–214.

Blau, Francine D., and Lawrence M. Kahn. "The Gender Wage Gap: Extent, Trends, and Explanations." *Journal of Economic Literature*. Vol. 55, no. 3, September 2017, pp. 789-865 .

Blinder, Alan S. "Wage Discrimination: Reduced Form and Structural Estimates." *Journal of Human Resources,* vol. 8, no. 4, fall 1973, pp. 436–455.

Brines, Julie. "Economic Dependency, Gender, and the Division of Labor at Home." *American Journal of Sociology*, vol. 100, no. 3, November 1994, pp. 652–688.

Bureau of Labor Statistics. American Time Use Survey. Washington, DC. Tables available at http://www.bls.gov/tus/tables.htm.

Bursztyn, Leonardo, Thomas Fujiwara, and Amanda Pallais. "`Acting Wife': Marriage Market Incentives and Labor Market Investments." *American Economic Review*, vol. 107, no. 11, November 2017, pp. 3288-3319.

Carrasco, Cristina, and Marius Dominguez. "Measured Time, Perceived Time: A Gender Bias." *Time & Society*, 2013, vol. 24, no. 3, pp. 326–347.

Cha, Youngjoo, and Kim A. Wheeden. "Overwork and the Slow Convergence in the Gender Gap in Wages." *American Sociological Review*, vol. 79, no. 3, 2014, pp. 457–484.

Cook, Phillip J., and Jens Ludwig. "Weighing the 'Burden of 'Acting White': Are There Race Differences in Attitudes Toward Education?" *Journal of Policy Analysis and Management*, vol. 16, no. 2, spring 1997, pp. 256-278.

Cortex, Patricia, and Jessica Pan. "When Time Binds: Returns to Working Long Hours and the Gender Wage Hap Among the Highly Skilled." IZA discussion paper 9846. Bonn, Germany, 2016. Available at http://ftp.iza.org/dp9846.pdf. Accessed February 1, 2017.

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. "Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach." *Econometrica*, vol. 64, no. 5, 1996, pp. 1001–1044.

Fryer, Roland, and Paul Torelli. "An Economic Analysis of 'Acting White'." *Journal of Public Economics*, vol. 94, 2010, pp. 380–396.

Giacheva, Dora. "Working Long Hours and Early Career Outcomes in the high-end labor market." *Journal of Labor Economics*, vol. 31, no. 4, 2013, pp. 785–824.

Ginther, Donna K., and Shulamit Kahn. "Women in Economics: Moving Up or Falling Off the Academic Career Ladder?" *Journal of Economics Perspectives*, vol. 18, no. 3, summer 2004, pp. 193–214.

Goldin, Claudia. "A Grand Gender Convergence: Its Last Chapter." *American Economic Review*, vol. 104, no. 4, 2014, pp. 1091–1119.

Goldin, Claudia. "Monitoring Costs and Occupational Segregation by Sex: A Historical Analysis." *Journal of Labor Economics,* 1986. vol. 4, pp. 1–7.

Goldin, Claudia, and Lawrence F. Katz. "The Cost of Workplace Flexibility for High-Powered Professionals." *The Annals of the American Academy of Political and Social Science,* vol. 638, no. 1, November 2011, pp. 45–67.

Goldin, Claudia, and Lawrence F. Katz. "The Career Cost of Family." Prepared for the Sloan Conference Focus on Flexibility. Washington, DC: November 29–30, 2010. Available at http://workplaceflexibility.org/images/uploads/program_papers/goldin_-_the_career_cost_of_family.pdf. Accessed April 15, 2015.

Goldin, Claudia, and Joshua Mitchell. "The New Life Cycle of Women's Employment: Disappearing Humps, Sagging Middles, Expanding Tops." *Journal of Economic Perspectives,* vol. 31, no. 4, winter 2017, pp. 161–182.

Goldin, Claudia, and Cecilia Rouse. "Orchestrating Impartiality: The Impact of 'Blind' Auditions on Female Musicians." *American Economic Review,* vol. 90, no. 4, September 2000, pp. 715–741.

Greenstein, Theodore. "Economic Dependence, Gender, and the Division of Labor in the Home: A Replication and Extension. *Journal of Marriage and the Family,* vol. 62, no. 2, 2000, pp. 322–335.

Gupta, Sanjiv, and Michael Ash. "Whose Money, Whose Time? A Nonparametric Approach to Modeling the Time Spent on Housework in the United States." *Feminist Economics,* vol. 14, no. 1, January 2008, pp. 95–120.

Heckman, James J. "Sample Selection Bias as a Specification Error." *Econometrica,* vol. 47, no. 1, 1979, pp. 153–161.

Heckman, James J. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement,* vol. 5, no. 4, 1976, pp. 475–492.

Juhn, Chinhui, and Kristin McCue. 2017. "Specialization Then and Now: Marriage, Children, and the Gender Earnings Gap Across Cohorts." *Journal of Economic Perspectives,* vol. 31, no. 4, winter, pp. 183-204.

Lachance-Grzelam, Mylène, and Geneviève Bouchard. 2010. "Why Do Women Do the Lion's Share of Housework? A Decade of Research." *Sex Roles,* vol. 63, pp. 767–780.

Manski, Charles. "Anatomy of the Selection Problem." *Journal of Human Resources,* vol. 24, 1989, pp. 343-360.

Michaeli, Moti, and Daniel Spiro. "From Peer Pressure to Biased Norms." *American Economic Journal: Microeconomics,* vol. 9, no. 1, February 2017, pp. 152–216.

Neuman, Shoshana, and Ronald Oaxaca. "Wage Decompositions with Selectivity-Corrected Wage Equations: A Methodological Not." *Journal of Economic Inequality*, vol. 2, no.1, April 2004, pp. 3–10.

Neumark, David, Roy Bank, and Kyle D. Van Nort. "Sex Discrimination in Restaurant Hiring: An Audit Study." *Quarterly Journal of Economics*, vol. 111, no. 3, August 1996, pp. 915–941.

Olivetti, Claudia, and Barbara Petrongolo. "The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries." *Journal of Economic Perspectives*, vol. 31, no. 1, winter 2017, pp. 205-230.

Oaxaca, Ronald. "Male-female Differentials in Urban Labor Markets." *International Economic Review*, vol. 14, no. 3, October 1973, pp. 693–709.

Pan, Jessica. "Gender Segregation in Occupations: The Role of Tipping and Social Interactions." *Journal of Labor Economics*, April 2015, vol. 33, no. 2, pp. 365–408.

Parker, Kim, and Wendy Wang. "Modern Parenthood*."* Washington DC: Pew Research Center, March 14, 2014. Available at http://www.pewsocialtrends.org/files/2013/03/FINAL_modern_parenthood_03-2013.pdf. Accessed July 26, 2016.

Pope, Devin G., Joseph Price, and Justin Wolfers. 2014. "Awareness Reduces Racial Bias." Brookings Economics Studies Working Paper Series. Washington, DC: Brookings Institution, February 2014. Available at https://www.brookings.edu/wp-content/uploads/2016/06/awareness_reduces_racial_bias_wolfers.pdf. Accessed October 29, 2016.

Ryan, Camille L., and Kurt Bauman. "Educational Attainment in the United States: 2015." *Current Population Reports*, P20-578. Washington, DC: U.S. Bureau of the Census, 2016. Available at http://www.census.gov/content/dam/Census/library/publications/2016/demo/p20-578.pdf. Accessed October 22, 2016.

Soll, Jack B., Katherine L. Milkman, and John W. Payne. "A User's Guide to Debiasing." In *Handbook of Judgement and Decision Making*, volume 2, chapter 33, edited by Gideon Keren and George Wu. Hoboken, NJ: Wiley-Blackwell, 2014.

South, Scott, and Glenna Spitze. "Housework in Marital and Nonmarital Households." *American Sociological Review*, vol. 59, no. 3, June 1994, pp. 327–347.

Stone, Pamela. *Opting Out? Why Women Really Quit Careers and Head Home*. Berkeley, CA: University of California Press, 2008.

Vespa, Jonathan, Jamie M. Lewis, and Rose M. Kreider. "American's Families and Living Arrangements: 2012." *Population Characteristics*, P20–S70. August 2013. Available at https://www.census.gov/prod/2013pubs/p20-570.pdf. Accessed November 9, 2016.

Waldfogel, Jane. "Understanding the 'Family Gap' in Pay for Women with Children." *The Journal of Economic Perspectives*, vol. 12, no. 1, winter 1998, pp. 137–156.

Wang, Wendy, Kim Parker, and Paul Taylor. *Breadwinner Moms*. Washington DC: Pew Research Center, May 29, 2013. Available at http://www.pewsocialtrends.org/2013/05/29/breadwinner-moms/. Accessed July 26, 2016.

Weisberg, Anne, and Ellen Galinsky. "Changing Families, Changing Work." In *A Paper Series Celebrating the 50th Anniversary of American Women: Report of the President's Commission on the Status of Women*, Chapter 4. Washington DC: U.S. Department of Labor, 2014, pp. 56–87. https://www.dol.gov/wb/resources/american_women_paper_series.pdf. Accessed October 30, 2016.

Table 1. Sample sizes

	ACS			ATUS		
	Total	Female	Male	Total	Female	Male
Total	699,753	380,051	319,702	75,106	42,019	33,087
Single, no children	123,857	57,470	66,387	16,887	7,383	9,504
Single parents	58,046	48,054	9,992	9,958	8,334	1,624
Married, no children	145,962	79,673	66,289	8,342	4,646	3,696
Married parents	371,888	194,854	177,034	39,919	21,656	18,263

ACS = American Community Survey; ATUS =American Time Use Survey

Table 2. Estimated gender gaps in time, employment, and earnings

	Values		Gaps	
	Female	Male	Raw	Adjusted
Panel A: Household production				
All (minutes/day)	301	188	113	111
Panel B: Employment				
Work (minutes/day)	184	282	-97	-96
Employed	71%	89%	-18%	-18%
Full time (if employed)	70%	86%	-16%	-16%
Panel C: Earnings				
Hourly earnings (if employed)	$23.06	$29.38	-$6.32	-$6.77
Annual earnings (if full time)	$51,124	$70,311	-$19,187	-$20,060

Sources: Panel A and Panel B (work outcome only): American Time Use Survey, 2003-2014; Panel B (employed and full time only); and Panel C: American Community Survey, 2014

Notes: The sample consists of civilians age 24 to 50, excluding both the 2.5 percent of women and men whose partner is in the household but to whom they are not married and the less than one percent of individuals in a same-sex marriage. The adjusted gap uses the reweighting technique described in the text to ensure demographic similarity between females and males.

Table 3. Household time use by gender and household type (minutes/day)

	Unadjusted			Adjusted across composition of households		
	Female	Male	Raw gap	Female	Male	Adjusted gap
Panel A: Household management						
Single, no children	181	137	44	187	144	42
Single parents	213	169	44	221	167	54
Married, no children	238	165	73	230	162	68
Married parents	253	155	97	252	154	98
Panel B: Child care						
Single, no children	3	1	2	3	1	2
Single parents	86	54	32	88	59	29
Married, no children	2	1	1	2	1	1
Married parents	116	67	49	112	67	45
Panel C: All household production (management and child care)						
Single, no children	184	139	45	190	146	44
Single parents	299	223	76	309	226	83
Married, no children	241	166	75	232	163	69
Married parents	368	222	146	364	221	143

Source: American Time Use Survey, 2003–2014

Notes: The sample consists of civilians age 24 to 50, excluding unmarried partners and the less than one percent of individuals in a same-sex marriage. Children are “own” children under age 18 who live in the household. Adjusted values use a reweighting technique described in the text to create groups that are demographically similar to the full sample.

Table 4. Employment by gender and household type

	Unadjusted			Adjusted across composition		
Household type	Female	Male	Raw gap	Female	Male	Adjusted gap
Panel A: Work (minutes per day)						
Single, no children	229	259	-30	228	263	-36
Single parents	193	261	-68	202	262	-60
Married, no children	215	293	-79	218	291	-73
Married parents	154	293	-139	154	291	-137
Panel B: Employed						
Single, no children	80.3%	83.1%	-2.7%	79.6%	83.7%	-4.0%
Single parents	73.2%	85.6%	-12.4%	76.7%	86.9%	-10.2%
Married, no children	76.3%	89.0%	-12.7%	76.0%	89.2%	-13.2%
Married parents	64.6%	91.5%	-26.9%	63.7%	91.1%	-27.4%
Panel C: Full-time, if employed						
Single, no children	78.2%	81.6%	-3.4%	77.6%	82.3%	-4.7%
Single parents	69.1%	84.2%	-15.2%	70.7%	83.8%	-13.1%
Married, no children	75.7%	86.4%	-10.7%	75.0%	86.1%	-11.1%
Married parents	65.1%	88.3%	-23.2%	64.5%	88.0%	-23.5%

Sources: Panel A: American Time Use Survey, 2003–2014; Panel B and Panel C: American Community Survey, 2014

Notes: The sample consists of civilians age 24–50, excluding unmarried partners and the less than one percent of individuals in a same-sex marriages. Children are “own” children under age 18 who live in the household. Adjusted values use a reweighting technique described in the text to create groups that are demographically similar to the full sample.

Table 5. Earnings by gender and household type

	Unadjusted			Adjusted across composition		
	Female	Male	Raw gap	Female	Male	Adjusted gap
Panel A: Hourly earnings (if employed)						
Single, no children	$22.37	$24.48	-$2.11	$21.76	$25.75	-$3.99
Single parents	$18.17	$25.41	-$7.23	$20.31	$27.14	-$6.82
Married, no children	$22.66	$27.96	-$5.30	$21.88	$28.04	-$6.16
Married parents	$25.22	$32.09	-$6.87	$22.98	$30.53	-$7.55
Panel B: Annual earnings (if full time)						
Single, no children	$51,083	$57,602	-$6,519	$49,733	$60,815	-$11,081
Single parents	$40,446	$60,035	-$19,590	$44,901	$65,663	-$20,762
Married, no children	$50,558	$65,604	-$15,047	$48,685	$66,072	-$17,387
Married parents	$55,360	$77,239	-$21,879	$50,199	$73,265	-$23,066

Source: American Community Survey, 2014.

Notes: Sample consists of civilians age 24–50, excluding unmarried partners and the less than one percent of individuals in a same-sex marriage. Children are "own" children under age 18 who are living in the household. Adjusted values use a reweighting technique described in the text to create groups that are demographically similar to the full sample.

Table 6. Sources of gender gaps estimated within household types

	Norms		Efficiencies with marriage	
	Household and work norms	Parenting norms	Adult	Child
Panel A: Household production				
All (minutes/day)	44	39	25	35
Panel B: Employment				
Work (minutes/day)	-36	-25	-37	-40
Employed	-4.0%	-6.2%	-9.2%	-8.0%
Full time (if employed)	-4.7%	-8.4%	-9.2%	-5.1%
Panel C: Earnings				
Hourly earnings (if employed)	-$3.99	-$2.83	-$2.17	$1.44
Annual earnings (if full time)	-$11,081	-$9,681	-$6,306	$4,002

Note: Numbers were computed from the adjusted gender gaps shown in Tables 3 to 5 and using equation (1) in the text. They reflect gaps estimated within a household type.

Table 7. Decomposing gender gaps

	Total gap	Norms		Efficiencies with marriage due to		Across household type gap
		Household and work norms	Parenting norms	Adult	Child	
Panel A: Household production						
All (minutes/day)	111	44	24	18	17	8
Panel B: Employment						
Work (minutes/day)	-96	-36	-15	-26	-20	0
Employed	-18%	-4.0%	-4.0%	-6.3%	-3.9%	0.0%
Full time (if employed)	-16%	-4.7%	-5.1%	-4.2%	-1.8%	-0.4%
Panel C: Earnings						
Hourly earnings (if employed)	-$6.77	-$3.99	-$1.71	-$1.43	$0.65	-$0.29
Annual earnings (if full time)	-$20,060	-$11,081	-$5,483	-$4,035	$1,659	-$1,121

Notes: Numbers for norms and gains from efficiency were computed by adjusting the sources of the gaps shown in Table 7 by the proportion of the sample in each household type that is affected by the influence. The across-household-type gap shows the gap created by the differences in gender distributions across households.

Table 8. Percentage of adjusted gender gaps explained by each influence

:	Norms		Efficiencies with marriage		
	Household and work norms	Parenting norms	Adult	Child	Across household type gap
Panel A: Household production					
All (minutes/day)	40%	22%	16%	16%	7%
Panel B: Employment					
Work in minutes per day	37%	16%	27%	20%	0%
Employed	22%	22%	35%	22%	0%
Full time (if employed)	29%	31%	26%	11%	2%
Panel C: Earnings					
Hourly earnings (if employed)	59%	25%	21%	-10%	4%
Annual earnings (if full time)	55%	27%	20%	-8%	6%

Note: Numbers are the percentage of the adjusted gap shown, which is explained by the average influence of each source (Table 8).

ONLINE APPENDIX. ROBUSTNESS CHECKS

We checked the robustness of our results against alternative methods of adjusting for demographic differences across household types. First, we considered alternative sets of demographic variables on which to match. Second, we used regression adjustments as an alternative to the matching algorithm. Both alternatives produced results that do not differ substantively from our primary specification. We discuss each in turn.

Alternate matching variables. We analyzed gender gaps in outcomes by using alternative weights based on different matching variables. We found that matching on finer categories of demographic variables had limited effect but sharply reduced the support of the match. For the four outcomes from the American Community Survey (ACS) data, we considered five alternative matching specifications. Our base specification had three education categories (no college, some college, and bachelor's degree), three age categories (24–29, 30–39, and 40–50), and four race categories (white, black, Asian, and other). Alternative specifications include six education categories (less than high school, high school diploma, some college, associate's degree, bachelor's degree, and advanced degree), five age categories (24–29, 30–34, 35–39, 40–44, and 45-50), and either five race categories (white, black, Asian, American Indian/Alaska Native, and other) or six race/ethnicity categories (Hispanic or non-Hispanic and one of the above five races). We also added four region categories (Northeast, Midwest, South, and West) in one alternative specification. The alternative matching specifications were:

1. Education (6 categories), age (3 categories), and race (4 categories)
2. Education (6 categories), age (5 categories), and race (4 categories)
3. Education (6 categories), age (5 categories), and race (5 categories)
4. Education (6 categories), age (5 categories), and race/ethnicity (6 categories)
5. Education (3 categories), age (3 categories), race (4 categories), and region (4 categories)

We measured the adjusted gender gap for each of the four ACS outcomes, four household types, and five sets of weights based on each of the alternative matching specification. The estimated gap differed from the base specification by no more than 7.2 percent in magnitude across any of these 80 comparisons. These differences translate into changes in the relative share of each influence (from Table 8) of no more than 2.9 percentage points. In contrast to our base specification, every alternative matching specification resulted in some sample members being excluded because of a lack of support.

For the two primary outcomes in the American Time Use Survey (ATUS) data, minutes per day on household production and working, we considered eight alternative matching specifications. Our base specification included the same education, age, and race categories as the ACS, and we considered the same alternative demographic groups. We also examined alternative specifications that match on year or on groups of years but otherwise use the base specification. The alternative matching specifications were:

1. Education (6 categories), age (3 categories), and race (4 categories)

2. Education (6 categories), age (5 categories), and race (4 categories)
3. Education (6 categories), age (5 categories), and race (5 categories)
4. Education (6 categories), age (5 categories), and race/ethnicity (6 categories)
5. Education (3 categories), age (3 categories), race (4 categories), and region (4 categories)
6. Education (3 categories), age (3 categories), race (4 categories), and year (4 categories: 2003–2005, 2006–2008, 2009–2011, 2012–2014)
7. Education (3 categories), age (3 categories), race (4 categories), and year (6 categories: 20032004, 2005–2006, 2007–2008, 2009–2010, 2011–2012, 2013–2014)
8. Education (3 categories), age (3 categories), race (4 categories), and year (12 individual years, 2003–2014)

We measured the adjusted gender gap for each of the two primary ATUS outcomes, four household types, and seven sets of weights based on each of the alternative matching specification. These alternative specifications substantially reduced the sample size with support in the matching algorithm. Accordingly, we compared each of the adjusted gender gaps in the 64 alternative specifications with the adjusted gender gap by using our base specification estimated on the same sample. The estimated gap differed from the base specification by no more than 9.9 percent in magnitude across any of the 64 comparisons, with the largest differences in specifications with alternative demographic categories rather than matching on year. These differences translate into changes in the relative share of each influence (from Table 8) of no more than 5.5 percentage points.

Regression adjustment as an alternative to matching. We used regression adjustment as an alternative to matching for adjusting for demographic differences across household types. Our method adjusts the outcomes for demographic differences between each combination of household type and gender, and the overall sample. We used a regression model that allows the relationships between each outcome and demographic characteristics to vary with the household type and gender. We estimated the regression model:

$$Y_{ij} = \alpha_j + \gamma_j F_{ij} + (\beta_j + \delta_j F_{ij}) X_{ij} + u_{ij},$$

where Y_{ij} is the outcome of individual i in household type j, F_{ij} equals 1 if the individual is female, and X_{ij} is a vector of characteristics. Similar to a Blinder-Oaxaca decomposition, the average gender gap for household type j can be written as:

$$\bar{Y}_{j,f} - \bar{Y}_{j,m} = \hat{\gamma}_j + \hat{\beta}_j(\bar{X}_{j,f} - \bar{X}_{j,m}) + \hat{\delta}_j \bar{X}_{j,f},$$

where the j,f and j,m subscripts indicate female and male averages, respectively, in household type j. Our matching strategy adjusts for differences in characteristics by assigning all groups the demographic characteristics of the overall sample. Similarly, replacing each set of average characteristics with those of the overall sample yields an adjusted gap of $\hat{\gamma}_j + \hat{\delta}_j \bar{X}$.

We compared the regression-adjusted gap for each outcome and each household type with the analogous adjusted gap by using our baseline weighting specification. We used the same set

of characteristics in the regression adjustment as in the baseline weighting specification. Across the six primary outcomes and four household types, the regression-adjusted gap differed from the gap estimated with our baseline weights by up to 14.5 percent. The largest differences between the matching and regression techniques were in hourly earnings and earned income, with the next largest discrepancy being 9.7 percent. These differences translate into changes in the relative share of each influence (from Table 8) of no more than 7.2 percentage points, or 3.9 percentage points if the two earnings outcomes are excluded. We hypothesized that the larger discrepancies for earnings outcomes are a result of the selection of women into employment. Although neither weighting nor regression adjustment fully addressed the selection problem, we are inclined to believe that the weighting method is superior to regression adjustment because it does not require the linearity assumption, which may over- or under-adjust outcomes for each group.