Does Outsourcing of Domestic Work Reduce Gender Inequality in Labor Force Participation within Households? - A Couple-Level Panel Analysis

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Introduction

According to the OECD (2019), in 2018, the gender gap in average labor force participation rates in OECD countries was 18 percentage points, so that among men and women aged 25-64 average labor force participation rates were 87.4 percent and 69.1 percent, respectively. At the extensive margins, the gender gap in working hours in OECD countries was six hours, with men working on average 40 hours and women working 34 hours per week. Accordingly, average part-time employment rates were higher among women than among men in OECD countries (25 and 9 percent, respectively). Gender gaps in participation levels, working hours, and wages, observed in the labor market, were found to be associated with, among other things, micro-level factors related to family roles and to the penalties paid by mothers compared to fathers and relative to women without children. Previous research has demonstrated that women's labor supply is affected by their unpaid work, and women pay penalties in the labor market for their family activities (e.g., Blau and Kahn 2017; Ferrant, Pesando, and Nowacka 2014). Moreover, cultural expectations related to gender roles, and governmental policy, may influence the size of these penalties (Drobnic, Blossfeld, and Rohwer 1999; Gornick, Meyers, and Ross 1998; Mandel and Semyonov 2005, 2006). The "motherhood penalty" and "marriage penalty" for women include wage penalties (Budig and England 2001; Budig and Hodges 2010; Gangl and Ziefle 2009; Harkness 2016; Muller, Hiekel, and Liefbroer 2020; Staff and Mortimer 2012) as well as long-term occupational and employment penalties (Abendroth et al. 2014; Härkönen et al. 2016; Okun et al. 2007; Stier

and Yaish 2008). In contrast, some research has suggested that men enjoy a "fatherhood premium" and a "marriage premium" in terms of their labor market activity and wages (Glauber 2008, 2018; Killewald 2013; Killewald and Gough 2013), although other research doubts that there is a real marriage premium and suggest that married men earn more because the selection into marriage operates not only on wage levels but also on wage growth (Ludwig and Brüderl 2018). These differential mechanisms generate employment gaps between the parents within households.

One factor leading to these penalties is the unequal share of unpaid work that creates a more significant burden for women in the domestic sphere (Hersch 2009; Powers 2003; Stratton 2001). Because the time use of families and households is divided between paid work, unpaid work, and leisure (Becker 1965; Gronau 1977), the unequal division of unpaid work between partners leads to more severe penalties for women relative to men, both in terms of time devoted to paid work (Carlson and Lynch 2017; Deding and Lausten 2006) and in terms of the time devoted to leisure (Craig and Mullan 2013; Mattingly and Blanchi 2003).

An increase in men's contribution to domestic work and greater gender equality in the domestic sphere are perceived in the literature as mechanisms to improve work-family conflict for women (e.g., Cooke 2008; Goldscheider et al. 2015; McDonald 2000; Torr and Short 2004). However, as Okun and Raz-Yurovich (2019) suggest, men who contribute more to domestic labor may themselves feel the pinch of role-incompatibility and may therefore experience penalties in the labor market if work hours' regimes and labor market expectations remain unchanged. Because the division of time between paid work, unpaid work, and leisure is done at the couple and family level (Mincer 1962), dual-earner couples who combine work and family life may need another solution to alleviate the burden experienced by both partners. One such solution is outsourcing domestic work (Van der Lippe et al. 2004; De Ruijter et al. 2005; Raz-Yurovich 2014). The

outsourcing of domestic labor can be used by household members to reduce the time devoted to unpaid work, and to increase the time devoted to paid work or to leisure (Raz-Yurovich 2022). The current study aims at analysing the effect of the outsourcing of domestic labor on paid work characteristics of male and female partners within couples.

As will be reviewed below, there is a large body of literature analyzing whether the ability to outsource domestic labor affects labor participation of men and women at the extensive and/or at the intensive margins, in both developed countries (e.g. Barone and Mocetti 2011; Cortes and Tessada 2011; Farré et al. 2011; Raz-Yurovich and Marx 2018, 2019) and in newly industrialized societies (Chan 2006; Cortes and Pan 2013; He and Wu 2019; Yeoh et al. 1999). However, these studies mostly relate to the macro-level, demonstrating differential effects of outsourcing domestic labor by gender and by educational level. In the current research, we are able, for the first time, to conduct a couple-level panel analysis and to not only measure how the outsourcing of domestic labor affects the labor force participation and the working hours of each partner after vs. before employing a domestic worker, but also to measure whether the change in labor force characteristics of each partner that is due to outsourcing translates into reduced gender inequality in labor force participation and in work hours *within* households. This will be done by using an analytic sample of 85,282 married heterosexual Jewish couples aged 25-64 from the harmonized panel database of the Israeli Labor Force Survey for the years 2000-2017, produced by the Central Bureau of Statistics of Israel (ICBS 2000-2017), and by employing an instrumental variable approach, using Fixed-Effects Two-Stage Least Squares models that better address the endogeneity between outsourcing and employment decisions.

Outsourcing of Domestic Work and Men's and Women's Employment

Due to gender inequalities in the domestic sphere and inequality of opportunities in the labor force, previous studies have argued that women will benefit from outsourcing domestic work in terms of labor force participation more than men (Cortes and Tessada 2011; Raz-Yurovich and Marx 2019). Moreover, among women, a differential effect of outsourcing by educational level is expected, so that highly-educated women will benefit from outsourcing more than women with lower educational levels because highly-educated women have lower monetary constraints and higher opportunity costs of time (Cortes and Tessada 2011; Hazan and Zoabi 2015; Craig et al. 2016; Raz-Yurovich 2014). Using a variety of identification methods, previous studies that analyzed the causal relationships between the outsourcing of unpaid work and labor force participation in developed countries indeed found that the outsourcing of childcare and housework mainly affects the employment rates of highly-skilled women, but not those of men or medium-skilled or low-skilled women (Barone and Mocetti 2011; Cortes and Tessada 2011; Farré et al. 2011; Raz-Yurovich and Marx 2019). These studies use diverse data types and various methodological approaches to measure outsourcing. Most of the studies that used macro-level indicators to measure outsourcing have used data on flows of low-skilled migrants and their regional concentration to measure changes in the availability of domestic workers who work in jobs that are close substitutes to domestic production (e.g., Barone and Mocetti 2011; Cortes and Tessada 2011; Cortes and Pan 2013; Farré et al. 2011; Forlani et al. 2015). For example, Barone and Mocetti (2011) find that when the number of immigrants who provide household services is higher, highly-skilled native Italian working women invest more time in paid work but highly-skilled native Italian women not in the labor force do not experience an increase in the likelihood of getting a job. Similar effects have been found for highly-skilled women in the United States (Cortes

and Tessada 2011). In Spain, a positive relationship between the increase in the proportion of immigrant women and the increase in the labor supply (extensive margin) of skilled Spanish women has been found, especially in households with care responsibilities for young children or elderly parents (Farré et al. 2011).

More recent studies measure outsourcing by policy measures of schemes that incentivize households to outsource domestic work. These measures capture, for example, the extent of government service provision or the change in take-up rates (Dujardin et al. 2018; Raz-Yurovich and Marx 2018, 2019). Most studies of this kind analyze the role of the outsourcing of childcare, driven by growing availability or affordability of formal childcare facilities, on women's employment rates (see a comprehensive review of such studies in Dujardin et al. (2018)). Studies that examined the impact of childcare policies on maternal employment rates found mixed results, sometimes due to a crowding-out effect or due to diverging impacts according to the family status of the mother or according to the age of the child (e.g., Dujardin et al. 2018; Goux and Maurin 2010; Haeck et al. 2015; Havnes and Mogstad 2011; Lefebvre and Merrigan 2008). The few studies that analyzed the effect of policies that subsidize the outsourcing of housework found an effect on the labor force participation rates (extensive margin) of highly-skilled women in Belgium (Raz-Yurovich and Marx 2018, 2019) and an effect on Swedish women's time in paid work (intensive margin) (Halldén and Stenberg 2014).

Identifying the impact of outsourcing on employment through policy changes is also used in studies based on micro-level data. For example, using register data for 2000-2010, Halldén and Stenberg (2014) analyzed whether a Swedish tax discount reform that reduced the prices of outsourced domestic services by 50 percent had affected married women's annual earnings. They conclude that married women devote 60 percent of the time freed due to outsourcing to paid work.

Moreover, Shimizutani et al. (2008) find that the Japanese government's supply of governmental elderly-care services has positively affected the labor supply of young women, who are expected to be the primary carers of the elderly in their families according to Japanese tradition. Unlike studies that rely on macro-level data, studies that use panel micro-level data can directly identify the households that outsource domestic services and their members' labor market characteristics, and thus are better able to identify a causal relationship between outsourcing and labor supply. However, in some cases, micro-level studies do not have direct measures of either the outsourcing behavior or the employment characteristics or both. For example, Halldén and Stenberg (2014) use the annual change in the household's tax discounts to approximate the change in the number of hours of outsourced domestic services. Moreover, they use the annual change in household members' log annual earnings as a proxy for labor supply decisions. Studies that rely on cross-sectional micro-level data to examine the relationships between outsourcing and labor force participation (Aassve et al. 2012; He and Wu 2019) do not enjoy the merits of panel data. Despite their efforts to treat the endogeneity between the decision to outsource and the decision to join the labor force, they are unable to control for unobserved heterogeneity.

The current study uses Israeli micro-level panel data for the years 2000-2017, which is based on the Israeli Labor Force Survey, to analyze two main research questions among the non-Haredi Jewish population[1]: 1. Does the outsourcing of domestic labor affect the employment of male and female married partners? 2. Does employment changes among partners, caused by the outsourcing of domestic labor, translate into reduced gender inequality in labor force participation *within* households? The merits of this database for investigating the relationship between

[1] Haredi (Ultra-Orthodox) Jewish men and women, as well as other non-Jewish groups in Israeli society (e.g. Muslims, Christians, and Druze) are not included in our analysis because their labor force characteristics, as well as other economic, cultural, and demographic characteristics, differ profoundly from those of the Jewish majority, non-Haredic group (Dahan 2007; Okun 2013; Taub Center 2019).

outsourcing and employment are numerous. First, in each wave, households report whether or not they employ a domestic worker and for how many hours, thus the outsourcing measurement is straightforward. Second, the database allows the identification of married couples so the analyses can be done both at the individual and the couple level. Third, the database contains longitudinal information on both the employment status and the working hours of individuals, thus it enables the analysis of change in employment both at the extensive and at the intensive margins over the life-course. Lastly, using panel micro-level data enables us to better control for observable and unobservable characteristics of individuals, and treat the endogeneity between outsourcing and employment. Apart from these methodological contributions, to the best knowledge of the authors, the current study is the first to analyze whether the purchase of domestic services reduces gender inequality in employment characteristics between partners, *within* households.

Research Context

Studying the relationships between the outsourcing of domestic labor and men's and women's employment among the non-Haredi Jewish population in Israel is interesting for two main reasons. On the one hand, fertility rates and labor force participation rates of women in this society are higher than those of their counterparts in other developed countries, which make the work-family balance more difficult to achieve. On the other hand, unlike diverse European countries (e.g., France, Belgium, Austria, and Sweden) that offer governmental incentives to households to employ domestic workers, in the Israeli context, there is a policy vacuum in this regard. Despite the high need among families, no governmental support is being offered, and similar to other OECD countries, the employment of domestic workers by households is primarily done in the shadow economy (OECD 2021).

According to the Taub Center (2019), in 2018, the employment rate of non-Haredi Jewish men aged 25-64 was 88 percent, relative to an average of 83 percent in the OECD. Moreover, employment rates of non-Haredi Jewish women (82 percent) exceeded women's employment rates in all OECD countries (averaging 66 percent), except for Iceland. Despite these high participation rates among women, non-Haredi Jewish men's labor force participation rates are traditionally higher than those of non-Haredi women. Gender gaps also exist in paid work hours. In 2014-2015, non-Haredi Jewish women aged 25-64 worked 37 hours per week on average, relative to 47 hours among their male counterparts. While non-Haredi Jewish men's work hours were ranked 5th among OECD countries, non-Haredi Jewish women's work hours were ranked 11th in these years (Taub Center 2019). In addition, in 2017, the gender gap in work hours between mothers and fathers was 13 hours, with non-Haredi Jewish mothers working on average 27 hours per week, relative to 40 hours among fathers.

Fertility rates in Israel are also higher among non-Haredi Jewish women relative to the average fertility rates in OECD countries. According to Okun (2013), completed fertility among the cohort of non-Haredi Jewish women born in 1968-1970 was 2.75 in 2009, compared to a maximum completed fertility level of 2.1 among European cohorts of 1960 and 1965.

As for the prevalence of hiring domestic workers in Israel, Figure 1 presents the percent of non-Haredi Jewish households employing a domestic worker in 2002-2020, based on our calculations using weighted data from the harmonized Israeli Social Survey (ICBS 2002-2021), a periodical survey that represents the adult population in Israel.

[Figure 1 here]

As the figure shows, in 2002, 23 percent of these households employed a domestic worker. In 2019, a year before the COVID-19 pandemic, these rates fell by four percentage points, to 19 percent of the households. In 2020, perhaps due to the pandemic, there was a further decline, so that 14 percent of the households employed a domestic worker. Overall, from 2002 until the end of our research window in 2017, employing rates averaged 20 percent, i.e., one in five households used the services of a domestic worker. To put these numbers into perspective, in Belgium, where there is one of the most generous and successful schemes in developed countries that gives incentives to households to employ domestic workers, also one in five Belgian households employed a domestic worker under the scheme, at least once, in 2012 (Marx and Vandelannoote, 2015). Thus, the proportion of Israeli households employing a domestic worker is high, even though no governmental support is provided to the employing households, as will be discussed below.

Long weekly work hours are less prevalent in developed countries, where many domestic workers are employed on an hourly, part-time basis (ILO 2103: 58). Figure 2 demonstrates that among the non-Haredi Jewish population in Israel, domestic workers are employed on an hourly basis. Our calculations based on the Israeli Social Survey for 2007-2020[2] demonstrate that in the great majority of employing households, domestic workers work up to 5 hours per week (66 percent of total households and 73 percent of working-age households). Moreover, as is presented in Figure 2, the great majority of the households employ domestic workers to do only housework, such as cleaning and cooking (77 percent and 85 percent of total households and of working-age households, respectively). Only about 10 percent of the households employ a domestic worker to perform only care work (e.g., childcare, elderly care, or care of disabled family members). Among

[2] The questions measuring the number of weekly hours worked by the domestic worker, the type of work he/she performs, and whether the household pays his/her salary were only asked starting in 2007.

[Figure 2 here]

non-Haredi Jewish households of working age who have children aged 0-5 in the home, 14 percent employ a domestic worker to perform only care work and an additional six percent to perform both housework and care work.

Further calculations based on the Harmonized Israeli Social Survey (ICBS 2002-2020) demonstrate that in 2007-2020, an average of 83 percent of all non-Haredi Jewish households and 93 percent of non-Haredi Jewish households of working ages reported paying domestic workers by themselves. Twenty percent and eight percent of these households, respectively, reported that a public organization, such as the Ministry of Welfare and Social Affairs or the National Insurance Institute, pays for their domestic worker. Thus, domestic workers in the great majority of Non-Haredi Jewish households in general, and among households of working ages in particular, are being hired on an hourly basis to do the cleaning work and are being paid directly by the household members.

A key policy enacted by the Israeli government to support the reconciliation of work and family life is the childcare policy. According to the Israeli Statistical Bureau (ICBS 2018), in 2016-2017, 55 percent of all children aged 0-2 (including Haredi and Arab children) and 95 percent of all children aged 3-5 were in pre-primary education. Among the enrolled children, 33 percent of the children aged 0-2 and 94 percent of children aged 3-5 were in a municipal or a public kindergarten or daycare center. These numbers far exceed the level set by the Barcelona Summit of 2002 (European Commission 2009). The Israeli government had enacted a Free Compulsory Education Law for children aged three and above in 1984. As for younger children aged 0-2, only parents who meet various criteria may be eligible for a subsidy for daycare.

Unlike diverse European countries that provide different reconciliation policy tools to support households' demand for domestic workers in general, and the need for domestic workers who provide housework services in particular (Carbonnier and Morel 2015), in Israel, there is a policy vacuum in this regard, and a governmental subsidy for employing a domestic worker is only provided for populations eligible for assistance from the Israeli National Insurance Institute. As part of this assistance, seniors and people with disabilities may be eligible for domestic help with cleaning, cooking, shopping, and more. In these cases, outsourcing is designed to help a population with a disability that usually does not participate in the labor market. As is demonstrated above, despite this lack of governmental support, a large share of non-Haredi Jewish households employs domestic workers despite the high cost of these services -- a domestic worker for cleaning services costs about 50-60 Israeli Shekels (i.e., 16-19 US Dollars or 14-17 Euro) per hour (not including transportation and pension expenses). In comparison, for Belgian households who employ a domestic worker under the Service Voucher scheme, the actual consumer cost per voucher (i.e., per hour) is 6.3 Euro for the first 400 vouchers and 7 Euro for each additional voucher (Marx and Vandelannoote, 2015).

Empirical Strategy

The current study aims to analyze whether the reduction in time devoted to unpaid work in the domestic sphere by using the services of a domestic worker is used to increase labor market involvement, both at the extensive and the intensive margins, among non-Haredi Jewish married partners in Israel. Moreover, we ask whether the change in labor market involvement translates into reduced employment gaps between partners within households.

The panel structure of the Israeli Labor Force Survey allows us to take a "within" approach, using fixed-effects models (Allison 2009), and analyze whether married man and women of working age (18-64) had increased their labor force participation at times when they employed a domestic worker relative to times when they had not hired a domestic worker. These models control for unmeasured characteristics, which might correlate with economic activity and outsourcing. Therefore, they rule out time-constant unobserved heterogeneity between individuals and measure only the changes within individuals. Such a "within" approach will also allow us to examine whether, for example, educational differentials in the effect of the outsourcing of domestic labor on employment characteristics among women, that were found in previous research, are fully due to individual heterogeneity or whether outsourcing indeed affect labor supply differently, either because women of different educational levels prefer to substitute their money for different time uses (e.g. paid work vs. leisure) or because they purchase services for reasons that are not related to time use.

The fixed-effects model takes the general form:

$$Emp_{i,t} - \overline{Emp_i} = \beta_0 + \beta_1\left(OS_{i,t} - \overline{OS_i}\right) + \beta_2\left(X_{i,t} - \bar{X}_i\right) + (e_{i,t} - \bar{e}_i) \quad (1)$$

To analyze each partner's employment status and the usual weekly work hours, we use the Fixed Effects Two-Stage Least Squares (2SLS) model, using the *xtivreg* command in STATA[3]. These models will be run separately by gender and level of education. Hausman test has confirmed that the fixed-effects rather than the random-effects model better fits our panel data ($p<.001$).

[3] In the case of the dichotomous variable "employment status", the advantage of using the linear model over the logit-type model is in its simple interpretation of the effect of employing a domestic worker as the percentage point change in the probability of working vs. not working. The linear fixed-effects models are also computationally simpler.

Moreover, sample sizes of events of transitions in hiring a domestic worker and in employment, both among men and among women, are relatively large and are suitable for our analytical strategy. Overall, 9 percent of the sample of couples (N=23,939) made transitions in hiring a domestic worker (4 percent from not-hiring to hiring and 5 percent from hiring to not-hiring). Of them, in 7 percent of the couples (N=1,771) the female-partner is low-educated, in 30 percent (N=7,174) she is medium-educated, and in 63 percent (14,994) she is highly-educated. In addition, about 7 percent of the sample of female-partners (N=19,959) made transitions in employment status (with an equal share in each direction of change). Of them, 21 percent (N=4,130) are low-educated, 41 percent (N=8,146) are medium-educated, and 38 percent (7,683) are highly-educated. As for the male-partners, about 5 percent of them (N=13,007) made transitions in employment status (with an equal share in each direction of change). Of them, 29 percent (N=3,738) are low-educated, 36 percent (N=4,747) are medium-educated, and 35 percent (4,522) are highly-educated.

Employment-related decisions and the decision to employ a domestic worker are endogenous (i.e., employment-related choices can affect the decision to hire a domestic worker in anticipation of a change in work status) and can also be made simultaneously. In a relatively short panel, using lagged measures of the outsourcing variable may not solve the endogeneity problem and thus harm our ability to make causal inferences. Therefore, we employ an instrumental variable approach to tackle the empirical challenge, by using an instrumental variable (Bollen 2012; Bowden and Turkington 1990) in the Fixed Effects 2SLS models mentioned above. This econometric method isolates the causal effect of an endogenous variable on the dependent variable by using an instrumental variable (IV). In this method, two regression equations are estimated one after the other. In the first stage, a regression of the endogenous, outsourcing variable is estimated as a function of the instrumental variable (Z) and the other independent variables from the original

model (Equation 2). In the second stage (Equation 3), the primary regression predicting employment characteristics is estimated, with the endogenous, outsourcing variable replaced with the predicted variable estimated in the first-stage regression ($\widehat{OS}$). Thus, only the exogenous part of the instrumental variable is found in the estimate of the final equation.

$$OS_{i,t} = \delta_0 + \delta_1 Z_{i,t} + \delta_2 X_{i,t} + v_i \quad (2)$$

$$Emp_{i,t} = \beta_0 + \beta_1 \widehat{OS}_{i,t} + \beta_2 X_{i,t} + e_i \quad (3)$$

The instrumental variable must meet two necessary conditions to solve the endogeneity problem. One condition is that the instrumental variable has a common variance with the endogenous variable [cov (Z, OS) ≠ 0]. The second condition is that the instrumental variable must not have a common variance with the residual [cov (Z, e) = 0]. That is, the correlation of the instrumental variable with the dependent variable ($Emp_{i,t}$) should be only through its correlation with the endogenous, outsourcing variable (OS), without affecting it in any other way. We can examine the first condition empirically by estimating equation 2 (the first-stage equation). If δ_1 is significantly different from 0, then there is a common variance between the instrumental and the endogenous variables. In contrast, the second condition cannot be examined empirically, and a logical argument must justify its existence. In the current study, we use an instrumental variable that captures the volume of domestic work in each annual quarter and district. For each annual quarter, this instrumental variable is calculated by multiplying the number of households that employ a domestic worker by the number of hours worked by

domestic workers, divided by the total number of households in the district (7 districts overall)[4]. We consider this instrumental variable as a proxy for the availability of labor *supply* to households. The assumption underlying this choice is that the supply of labor to households affects the decision to outsource domestic work in a given household but does not directly affect the employment decisions of the (highly-educated) household members. This is a reasonable assumption in the Israeli context, because a large share of domestic workers are not local residents but rather undocumented migrants that arrive in Israel due to pushing forces in their home country. These workers are forced to work in the shadow economy, within households, due to the restrictive rules of the Israeli government directed towards non-Jewish migration, and because of their low professional and language skills (Raijman et al. 2003). Estimating the current number of undocumented migrant workers who live and work in Israel is almost impossible due to lack of valid data (Kemp et al. 2000). However, a recent publication of Israel Central Bureau of Statistics (ICBS 2020) estimates that 30.1 thousand foreign citizens who entered Israel on tourist visas starting from 2008 remained in Israel after their licenses expired through the end of 2020, 77 percent of them are in working ages (20-64). Thus, despite the strict regulations of the Israeli government, foreign workers in general and undocumented foreign workers, in particular, constitute a significant share of the Israeli labor force. According to Raijman et al. (2003), in 2003 foreign workers constituted 10 percent of the Israeli labor force, about 60 percent of them without work permit.

Computing an instrumental variable for the endogenous, outsourcing variable using aggregated measures of the variable itself in different cuts (location and time cuts in this case) is a

[4] We have also tried using an instrument that captures the share of households employing a domestic worker (by district and quarter) for the analyses of employment at the extensive margins, and an instrumental variable that captures the average number of hours worked by domestic workers (by district and quarter) for the analyses of employment at the intensive margins (results not presented) and the results were substantially similar.

well-known practice for dealing with the endogeneity problem (Batistatou and McNamee 2008; Craig et al. 2016). Moreover, the decision to examine the availability of labor supply to households divided into residential districts stems from the assumption that this labor supply is local. That is, work offered by domestic workers in one geographical area will not be provided by them in another district because the costs involved in commuting (in terms of money and time) between different geographical districts make it unprofitable for the domestic workers. Beyond that, it is likely that domestic workers will have demand for their work in the immediate area, so the incentive for them to move to another location is small. Self-calculations based on data from the Labor Force Survey support this theoretical assumption and show that in 2012-2017 about 90 percent of those employed in households work in or close to their locality of residence, compared with only 60 percent of the total workers in the labor force.

As mentioned earlier, the first condition required in the 2SLS model, the existence of a common variance of the instrumental variable and the endogenous variable, can be empirically examined using the significance of the regression coefficient of the instrumental variable in the first-stage regression. According to these regression coefficients (Tables A-1 to A-5 in the Appendix), the instrumental variables are positively and significantly correlated with the outsourcing variables in most models, in both types of analyses (extensive margin and intensive margin). These results demonstrate that the higher the supply of labor to households, the more likely that households will outsource domestic work by employing a domestic worker. On the other hand, the low availability of domestic workers reduces households' possibility to outsource, even if they wish to do so. Moreover, a limited supply of domestic workers increases the monetary cost and other transaction costs of finding a reliable and competent worker for the work required, so the likelihood of outsourcing declines.

The confirmation of the second condition, that there is no direct effect of the labor supply of domestic workers to households on the labor supply of the household members, cannot be examined empirically. However, we suggest that the second condition is confirmed because there could have been a direct effect of labor supply for households on employment variables if there had been a significant overlap between the general labor supply of workers and the labor supply of domestic workers. However, our calculations based on the Labor Force Survey show that only 1.3 percent of all employed persons aged 18–64 in 2000–2017 were employed as domestic workers. Concerning employed persons with higher education, the rate drops to 0.4 percent of employed persons. In addition, in cases where domestic workers are foreign workers, this labor supply is almost completely exogenous because only foreign workers who live in Israel for at least one year are included in the survey population and their response rate is small. It seems that the overlap between the supply of labor to households and general employment is minimal, especially among those with higher education. In light of the above, it appears that the second condition for selecting a valid instrumental variable also exists and that there is no direct effect of the instrumental variables on the dependent variables. It is important to note that the fixed-effects 2SLS model also requires the instrumental variable to be time-varying, otherwise it will be cancelled out in the model. Our instrumental variable also meets this requirement.

Because of the gender disparities and the educational gradient in labor force participation, in the first stage of our analyses we will run separate models by gender and level of education, controlling for the partner's characteristics. In the models where the dependent variable is "employment status" (working vs. not working), the explanatory variable capturing the outsourcing of domestic work will be "employing a domestic worker" (yes vs. no). In the models where the dependent variable is "usual weekly work hours," the explanatory variable capturing

the outsourcing of domestic work will be "number of weekly hours worked by the domestic worker." Similar to previous studies (e.g., Aassve et al. 2012), we do not include in our analyses the person-years in which either the female partner or the male partner was on parental leave (overall 8,406 couple-years).

In the second stage of analysis, we analyze the employment characteristics of both partners together so that the same individual partners that were included in the first analysis comprise the couples in the second stage of the analysis. This is in order to examine whether changes in employment characteristics of each partner, caused by employing a domestic worker, translate into reduced employment gaps between partners. These analyses enable us to answer our second research question asking whether outsourcing domestic work reduces gender inequality in employment within households. At the extensive margin, we analyze whether neither of the partners work, only one is working, or both work. In this model, the explanatory variable capturing the outsourcing of domestic work will be "employing a domestic worker" (yes vs. no). At the intensive margin, the dependent variable is the difference between the paid weekly hours worked by the male partner and by the female partner. The explanatory variable capturing the outsourcing of domestic work will be the "number of weekly hours worked by the domestic worker." We will run these models separately for each of the nine combinations of educational levels of the partners.

Data and Analytic Samples

This study uses the Public Use File of the Israeli Labor Force Survey, conducted by the Israeli Central Bureau of Statistics. The annual sample of the survey includes about 35,000 households and nearly 80,000 individuals aged 15 and over, and represents the Israeli population at these ages.

The survey is structured as a panel, with approximately 9,000 new households surveyed each month. Households surveyed up to 2011 were sampled up to four times, and households surveyed starting in 2012 were sampled up to eight times. Until 2012, the survey was conducted quarterly, and households were surveyed in two consecutive quarters, followed by an 8-month break and then two additional surveys in the two consecutive quarters that followed. Also, the annual samples of the surveys before 2012 were significantly smaller, about a third of the annual sample of the survey today. Since 2012, each household has been surveyed eight times over 16 months from the moment of entering the sample: first, four consecutive monthly waves, followed by an 8-month break, and finally an additional four monthly waves.

For the current research, we use a sample of non-Haredi married heterosexual Jewish households, using the harmonized data file of the Labor Force Survey for 2000-2017. The sampling unit in the Labor Force Survey is households, and all persons aged 15 and above in the household are being surveyed. Because married partners can be matched in the survey, we can conduct both individual-level and couple-level analyses. We focus on married couples because marriage is still an almost universal institution in Israel (Weinreb 2022). As Manor and Okun (2016) demonstrate, cohabitation has become more socially acceptable among secular Jews but it is still a prelude and not an alternative to marriage.

Building a couple file requires identifying and matching married couples. The survey identifies one head for each household. To match married partners in the survey years 2000-2011, we used a variable that unambiguously represents the ID number of the partner. In the years 2012–2017, this variable does not exist, and there are no other variables that unequivocally define who the partner is. However, there are two variables in which there is information concerning the partner: the labor market characteristics and the occupation of the spouse. In addition, the marital

status and duration of marriage are known for each individual in the household. Thus, in the years 2012–2017, a spouse was adjusted to each household head whose marital status is "married," according to several conditions: the individual's marital status is "married," his/her marital duration is the same as the household head's, and the labor force characteristics and occupation reported by the partner match those reported by the head of the household as characterizing their partner. Applying the matching process of couples used for the years 2012-2017 to identify couples in the survey years 2000-2011, in order to test its reliability, yields a 96.68 percent match to the matching process that is based on the ID of the partner (i.e. the original matching for the years 2000-2011).

Overall, our analytic sample included 85,282 unique non-Haredi married couples aged 18-64 who were surveyed more than once, with each couple surveyed on average 3.2 times in 2000-2011, and 5.4 times in 2012-2017. These observations amount to 355,503 couple-observations in total. As was mentioned earlier, Haredi, Ultra-Orthodox households are not included in our analyses. Because most of the survey years of the Labor Force Survey does not have a question on the level of religiosity[5], to identify Haredi households, we use one of the standard methods of identification of the Haredi population that is based on the reports on the last educational institution of the surveyed person (Friedman et al. 2011). Household is defined as "Haredi" if the last school in which at least one of the household members studied is a "*yeshiva gedola*."

[5] Such a question is only available in the survey years 2014-2017.

Variables

Dependent Variables

Employment status (t) - A dichotomous variable defining whether the individual is working or not. The variable receives the value 1 (i.e., working) if the individual reported working or working at least one hour in the last week. Individuals who reported not working at all in the previous week but that they have a job from which they were absent last week are also defined as working. The variable receives the value 0 otherwise.

Usual actual weekly work hours (t) - A Continuous variable capturing the total weekly work hours usually worked. For individuals who reported that this number is not fixed, we use the total number of actual work hours worked in the previous week in all workplaces.

Independent Variables

Employing a domestic worker (t) - A dichotomous variable receiving the value 1 if the household employs a domestic worker and 0 if it does not.

The number of weekly hours worked by the domestic worker (t) - A Continuous variable capturing the total number of weekly work hours worked by the domestic worker in the week before the interview. Households that do not employ a domestic worker receive the value 0. For households reporting hiring a domestic worker but who have not employed them in the week preceding the interview (overall three percent of the couple-years), we use the value "4" working hours (the common value in this variable). The variable is top-coded at 48 hours (the common value of hours among households reporting more than 10 hours per week).

Instrumental Variable

The volume of domestic work by annual quarter and district (in 1,000) - Based on the entire sample of the Labor Force Survey (including Arab and Haredi populations), we have calculated the volume of domestic work by multiplying the number of households employing a domestic worker by the number of hours worked by domestic workers, divided by the total number of households in the district. This calculation is done for each of the 7 districts of Israel, in each annual quarter, and divided by 1,000. This variable roughly captures the supply of domestic workers available to households. The value of the instrumental variable was updated for each couple-quarter (until 2011) or couple-month (from 2012 onwards), according to the annual quarter and the district reported for the household.

Control Variables

Employment status of the spouse (t) - A dichotomous variable defining whether the spouse is working or not. The variable receives the value 1 (i.e., working) if the individual reported working or working at least one hour in the previous week. Individuals who reported not working at all but that they have a job from which they were absent last week are also defined as working. The variable receives the value 0 otherwise.

Work hours of the spouse (t) - A Continuous variable capturing the total number of weekly work hours usually worked by the spouse. For individuals who reported that this number is not fixed, we impute the total number of actual work hours worked in the previous week in all workplaces.

Number of children (t) - The number of children aged 17 and below who live in the household. This variable is top-coded at 13 children.

Children aged 0-4 (t) - A dichotomous variable receiving the value 1 if children aged 0-4 live in the household and the value 0 otherwise.

As will be detailed below, because we use fixed-effects models in our analyses, characteristics of the household or of the household members which are time-constant cannot be included in the models. Thus, our models do not include variables such as ethnic origin, number of rooms in the household, and district. Moreover, because our panel data is only 1.5-2 years long for each household, variables such as age group, enrolment in education, and disability status, which are time-constant among more than 90 percent of the sample in the 1.5-2 years period, are also left out of the model. For the same reason, the survey year is also not controlled for in the fixed-effects model. However, because, as discussed above, previous studies find an educational gradient and gender differences both in labor force participation and in households' decision to outsource domestic work, we run separate regression models by *educational level* and *gender* (see further details below). We define three levels of education according to the highest diploma achieved: (1) *Low* - Has finished high school without a diploma (i.e., without matriculation) or has a lower level of education; (2) *Medium* - Has finished high school with a diploma (i.e., matriculation) or non-tertiary academic degrees; (3) *High* - Tertiary-level degrees (i.e., BA, MA, or Ph.D.).

Results

Table 1 presents summary statistics, across couple-years, of the analytic sample of working-age, married, non-Haredi Jewish couples, by the educational level of the partners. As shown in the table, both employment rates and the extent of outsourcing differ across couple types, so that there is an educational gradient in employment status and work hours of the partners, the higher the educational level of the partners. An educational gradient is also found with respect to the prevalence and intensity of outsourcing.

[Table 1 here]

Before presenting the regression analyses, we show in Figure 3 the trend in the mean number of employed partners and the trend in the mean gender gap (male-female) in weekly work hours between partners among the couples included in our analytic sample. As shown in the figure, the gender gap between partners in employment characteristics narrowed between 2000 and 2017. The mean number of employed partners increased between 2000 and 2017, from 1.60 to 1.79. Moreover, the mean gender gap in weekly work hours declined by 4.3 hours, from a gap of 16.2 hours in 2000 to a gap of 11.9 hours in 2017. The following analyses will help us identify whether the ability to outsource domestic work and the number of hours outsourced can explain the decline in the gender gap in employment levels between partners at both the extensive and intensive margins.

[Figure 3 here]

Tables 2-6 present the results of the second stage regressions of the fixed effects 2SLS models (see Tables A-2 to A-6, of the first-stage regressions, in the Appendix). We will first present the results of the regressions analyzing the effect of outsourcing on the employment status (working vs. not working), and on the number of weekly hours usually worked, for each partner separately, by

gender and by level of education. Later, we present the couple-level analyses of the effect of outsourcing on the number of employed partners and on the gap in weekly work hours between partners, separately by couple-type, defined by the educational level of both partners.

The effect of employing a domestic worker on the employment status (works vs. not) of each partner is presented in Table 2. The results of these models indicate that, controlling for the partner's employment status, for the number of children in the household, and for whether or not there is a child aged 0-4 in the household, highly educated women's likelihood to work increases by 37.9 percentage points when the household employs a domestic worker, relative to times when the household does not employ a domestic worker ($p<.01$). Employing a domestic worker does not seem to affect the employment status of medium- and low-educated women, nor the employment status of men. As mentioned earlier, one of the conditions for using the 2SLS regression model is a strong correlation of the instrumental variable (IV) with the endogenous-outsourcing variable. The instrumental variable was found to be significantly correlated with the outsourcing variable in all the regressions for female and male partners, at all levels of education (see Table A-2 in the appendix). Moreover, the F-test in the first-stage regression of the 2SLS model makes it possible to estimate the strength of the instrumental variable (F-test values are also presented at the bottom of Tables 2-6). When corrected standard errors are used and are found in a single endogenous variable model, as in the models in the current study, the appropriate F-test is the Kleibergen-Paap test (Kleibergen and Paap 2006). Regression coefficients of the endogenous variable, which are considered reliable in terms of consistency and lack of bias, are obtained for statistical F-values greater than 10, according to Staiger and Stock (1997), and greater than 16.38, according to Stock and Yogo (2005). In the first stage regressions of the models presented in Table 2, the instrumental variable was found to be strong among the middle-educated ($F = 41.87$ for women, $F = 24.05$ for

[Table 2 here]

men) and the highly-educated (F = 50.60 for women, F = 61.01 for men). These findings suggest that the quality of the instrumental variable increases as the level of education increases. For those with low education, the instrumental variable is weak for women (F = 5.15) and stronger for men (F = 10.67).

Table 3 presents the fixed effects 2SLS models analyzing the effect of the number of hours worked by the domestic worker on the number of weekly hours usually worked by the partners, by gender and level of education. The results indicate that every hour of work provided by the domestic worker significantly increases the number of weekly hours worked by highly-educated female partners by 2.976 hours. This result is highly significant ($p < 0.01$). However, no such effect is found for female partners with lower educational levels or for male partners. As shown in the table, the F value in the first-stage regression is high for highly-educated female and male partners (F = 21.04 and F = 30.18, respectively), as well as for medium-educated female partners (F=15.26). That is, the regression coefficients in models (2), (3), and (6), have high reliability in terms of the power of the instrumental variable. The reliability of the coefficients in the other models in Table 3 is low, despite the positive and significant effect of the instrumental variable in all models (see Table A-3 in the Appendix).

We further note the parenthood penalty experienced by female partners, but not by male partners, as is indicated in the negative effects of the number of children and of having a young child in the household on both the employment status (Table 2) and the weekly work hours of female partners (Table 3). The motherhood penalty increases with the level of education of female partners, so that the highly-educated female partners experience the highest penalty. For example, the negative marginal effect of having another child in the household is found to be significant

[Table 3 here]

among medium- and highly-educated female partners, so that, controlling for outsourcing, each additional child reduces the weekly work hours of medium-educated female partners by 1.480 hours ($p<.001$) and of highly-educated female partners by 3.595 hours ($p<.001$). Moreover, the penalty in terms of work hours, caused by having a young child aged 0-4 in the household, is found to be significant only among highly-educated female partners, controlling for the other covariates. The results indicate that the weekly work hours of highly-educated female partners are 3.255 hours lower relative to times when they do not have a young child in the household ($p<.001$).

Table 4 presents couple-level models analyzing the effect of employing a domestic worker on the number of employed partners, based on fixed effects 2SLS regressions. The table shows nine separate regression models, according to combinations of the educational levels of the partners. The results demonstrate that employing a domestic worker has a positive and significant effect on the number of employed partners only among couples in which both partners are highly educated. The instrumental variable is found to be strong mainly when both partners are highly-educated (Model 9, $F=47.34$) and to a lesser extent when the two partners are medium-educated (Model 5, $F=18.94$) or when she has a medium educational level and he is highly educated (Model 6, $F=15.55$).

[Table 4 here]

Table 5 presents models analyzing the effect of the number of hours outsourced to a domestic worker on the gender gap in work hours between partners (male partner's minus female partner's weekly work hours), by educational couple-type. The effect of this variable is negative and significant ($p<.05$) only among couples in which both partners are highly educated (Model 9),

so that ever additional hour worked by the domestic worker reduces the gender gap in work hours between the partners by 1.77 hours. The instrumental variable is found to be strong only when both partners are highly-educated (Model 9, F = 25.41). With regard to the motherhood penalty, the results in Table 5 show that, controlling for outsourcing and for the other covariates, each additional child significantly increases the gender gap in work hours by 3.655 hours ($p<.001$) among households in which both partners are highly educated (Model 9). The gender gap among couples in which both partners are medium-educated increases by 2.216 hours ($p<.001$) with each additional child (Model 5). The results further show that having a child aged 0-4 in the household significantly increases the gender gap in work hours by 3.186 hours among couples in which both partners are highly educated ($p<.001$).

[Table 5 here]

Because, as discussed above, previous literature finds that highly-educated women's employment characteristics are affected by the outsourcing of domestic work, in Table 6 we run the same analysis as in Table 5, but this time we separate the couples according to the following categories: Both partners are highly-educated (similar to model 9 in Table 5); the female partner is highly-educated (the male partner can be low-, medium-, or highly-educated); the male partner is highly-educated (the female partner can be low-, medium-, or highly-educated). As can be seen from Model 2 in Table 6, each additional hour of domestic work outsourced to a domestic worker significantly reduces the gender gap in work hours by 2.735 hours in households in which the female partner is highly educated ($p<.01$), no matter the level of education of the male partner. No significant effect is found among couples in which the male partner is highly-educated, no matter

the educational level of the female partner. In all the models in Table 6 the instrumental variable is found to be strong.

[Table 6 here]

Discussion and conclusions

In this article we answer two main research questions: 1) does outsourcing domestic labor, by employing a domestic worker, help female and male partners increase their labor force participation at the extensive and at the intensive margins, relative to times when they were not employing a domestic worker? 2) Does the change in partners' employment, occurring due to the outsourcing of domestic labor, translate into reduced gender inequality in labor force participation within households? With regard to the first research question, we find that men's employment status and work hours are not affected by the hiring of a domestic worker's services, nor by the number of hours worked by the domestic worker. Among women, outsourcing affects employment both at the extensive and at the intensive margins, but these effects are found to be significant only among highly-educated women, but not among medium- or low-educated women. These results are in line with previous research that found gender differences (e.g. Barone and Mocetti 2011; Cortes and Tessada 2011) and educational differentials (e.g. Cortes and Tessada 2011; Craig et al. 2016; Hazan and Zoabi 2015) in the effects of outsourcing on employment characteristics. A possible explanation to the lack of effect among men and among less educated women is that the time purchased via the outsourcing of domestic work is devoted to leisure rather than to paid work. Moreover, it is possible that among less skilled women, outsourcing of domestic work does not affect time allocation within households. With regard to the second research question, we find that the increase in highly-educated women's work hours due to outsourcing is translated into a reduced

gender gap both in actual participation and in work hours vis-à-vis their partner, no matter their partner's level of education.

The gender differentials in the effect of outsourcing on employment is consistent with a reduction in the workload that would have been performed by the female partner due to gender inequality in the division of unpaid work between partners, within households. The fact that mostly highly-educated women enjoy the benefits of outsourcing in terms of transition into the labor force and in terms of increased work hours can be explained by the lower monetary constraints highly-educated women have when considering the purchase of domestic services, as well as by their higher opportunity cost of time. In line with previous research that uses data for the US (England et al. 2016), our results further show that the motherhood "penalty" is highest among highly-educated women, in comparison to men and in comparison to less educated women, even after controlling for the outsourcing of domestic labor. Thus, the role of outsourcing as a mechanism to reduce work-family conflict, and as a mechanism to allow women to reach their full employment potential in the knowledge economy, is particularly important for this group of women. The fact that in our research, across educational levels, men do not experience a fatherhood penalty is in line with previous research that shows that men's labor supply is inflexible (Blau and Kahn 2007; Evers et al. 2008), and is not negatively affected by the need to allocate time to household work and child care.

Our findings that the purchase of domestic services by employing a domestic worker reduces the gender gap in work hours between partners within households points to the role of unpaid work in preserving women's marginality in the labor market, relative to men in general and relative to their own intimate partner, in particular. It is possible that as long as labor market regimes and expectations for men in the labor market remain unchanged, men will not be able to

contribute significantly to domestic work without experiencing penalties in the labor market. However, the current research demonstrates that households, as an economic unit, can decide to buy time for women in the labor market by purchasing domestic services. Future research can benefit from analyzing whether households' decision to outsource domestic work is a result of a consensus between partners, or a result of a bargaining process between them, where different types of capital held by each partner play a role in the decision to outsource domestic work or not. Moreover, future research can benefit from analyzing whether gender role attitudes held by the female partner and by the male partner affect this decision.

Alongside the merits of the Israeli Labor Force Survey used in the current research, there are several limitations caused by lacunae in the data in this survey. First, the database does not contain information on the division of unpaid work between partners in terms of the number of hours each partner invests in housework and childcare. Because outsourcing is most probably a complementary strategy to a more equal division of unpaid work, we cannot measure the effect of investment in unpaid work on employment, controlling for outsourcing. In addition, because the database does not contain information on leisure time, we cannot analyze whether in groups for which we cannot identify a significant effect of outsourcing on time devoted to paid work, it is due real lack of effect or because the time purchased by outsourcing was devoted to leisure rather than to paid work. Moreover, the information on who pays for the domestic worker (the household, governmental institute, or other person) is not available in this database. However, as we demonstrated earlier, according to the Israeli Social Survey, in the great majority of cases, Israeli households pay the salary of the domestic worker by themselves. Lastly, it is possible that our outsourcing measure of the extent of employing domestic workers underestimates the prevalence of this phenomenon because households that employ undeclared workers are afraid to report it in

the Labor Force Survey, which is a governmental survey. However, this concern does not affect our conclusions concerning the significant effect of outsourcing on highly-skilled women's employment characteristics and on the gender gap in these characteristics vis-à-vis their partner.

Despite the described limitations, our results have important implications for policy makers in multiple respects. First, reconciliation policies, such as the Belgian Service Voucher Scheme, as well as other European schemes that give incentives to households to outsource domestic work by subsidizing the purchase of these services (see a review in Morel 2015), may remove monetary constraints and allow more women, both highly-educated and less educated women, to reach their full employment potential by employing a domestic worker. This is especially true for countries with a great need for domestic services among households, and which already have high demand for domestic services, that cannot be fully realized due to monetary constraints as well as other constraints (e.g., the limited availability of domestic workers, bureaucratic barriers, etc.). However, this move towards more 'social investment', i.e., the desire to respond to the new social needs of the highly-skilled and sustain the knowledge-based economy, which relies on a skilled and flexible labor force (Morel et al. 2012), should at the same time benefit lower-skilled people by reducing labor market exclusion and poverty among them (Morel et al. 2012; Nolan 2013). Because in the Israeli setting, as well as in other developed countries, the labor of domestic workers, most of them are low-skilled, is mostly done in the shadow economy (OECD 2021), such reconciliation schemes should also bring domestic workers into the regular sector and ensure proper social protections for them. Thus, if the growing demand for domestic workers among households is addressed, regulated, and receives governmental support, the economy will benefit in multiple respects: there will be an increase in the supply of jobs for low-skilled workers; labor

force participation rates of highly-educated women and of low-skilled workers will increase; and activity in the shadow economy will be reduced.

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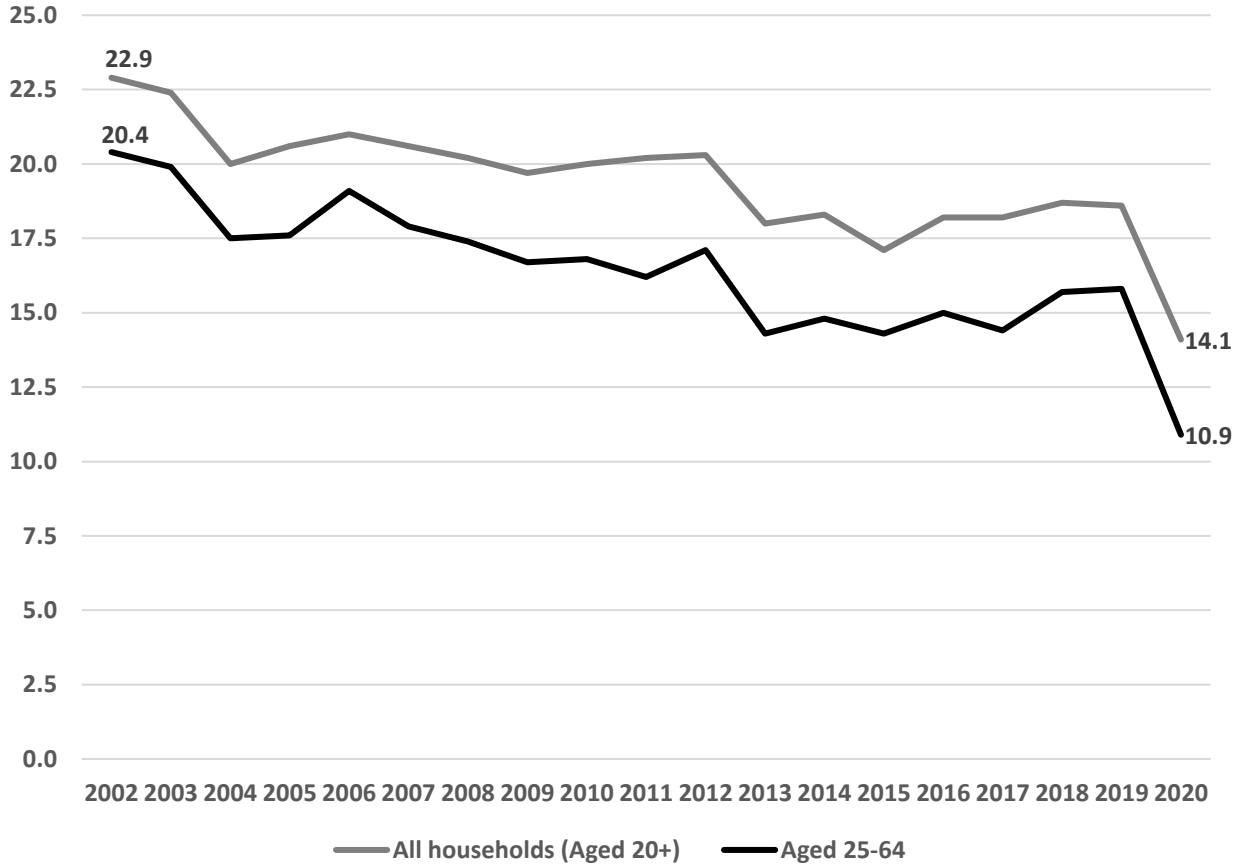
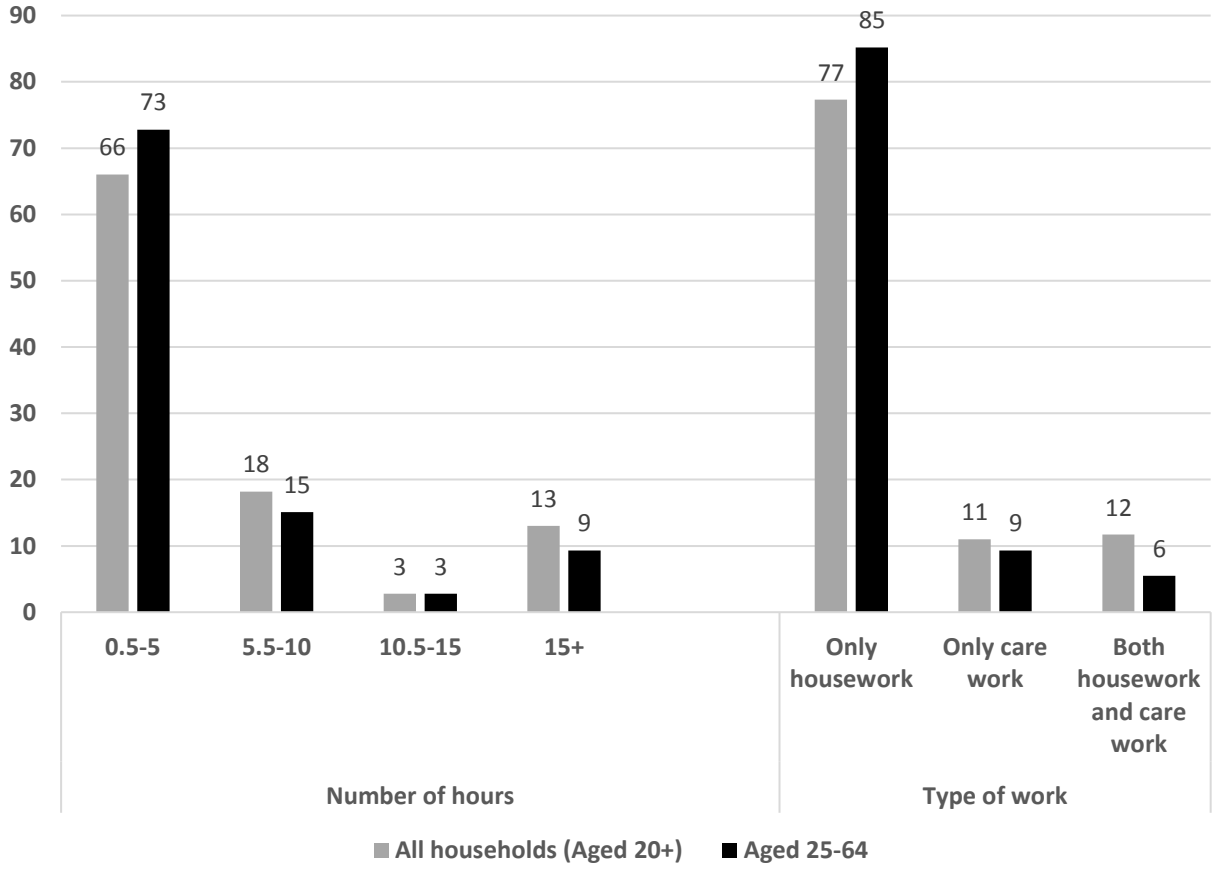
Figure 1. Percent of Non-Haredi Jewish Households Employing a Domestic Worker (2002-2020)



Source: Own calculations, Israeli Social Survey 2002-2020.

Figure 2. Percent of non-Haredi Jewish households employing a domestic worker, by number of weekly hours worked by the domestic worker and the type of work done (an average across the years 2007-2020)



Source: Own calculations, Israeli Social Survey 2007-2020.

Figure 3. Trend over time in the Mean Number of Employed Partners and in the Gap in Partners' Work Hours, among Non-Haredi Jewish Married Couples (2000-2017)

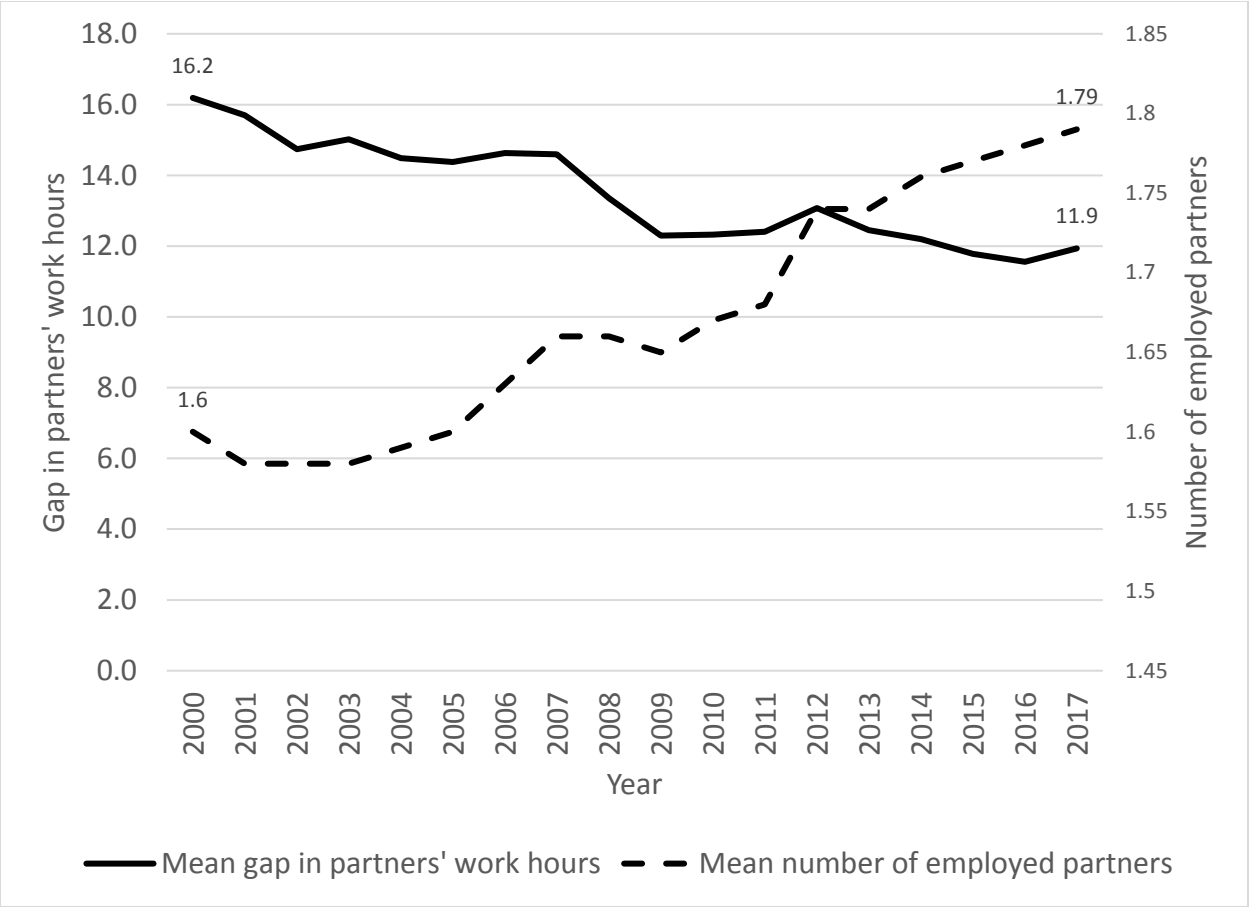


Table 1. Summary statistics across couple-years of the dependent variables, independent variables, and instrumental variables, by educational couple-type.

	Low-educ. woman and man		Low-educ. woman, medium-educ. man		Low-educ. woman, highly-educ. man		Medium-educ. woman, low-educ. man		Medium-educ. woman and man		Medium-educ. woman, highly-educ. man		Highly-educ. woman, low-educ. man		Highly-educ. woman, medium-educ. man		Highly-educ. woman and man	
Variables	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Dependent variables																		
Female partner's Employment status (1=works)	0.64	0.48	0.67	0.47	0.70	0.46	0.78	0.42	0.80	0.40	0.78	0.42	0.87	0.34	0.88	0.33	0.86	0.34
Male partner's Employment status (1=works)	0.82	0.39	0.86	0.35	0.87	0.33	0.87	0.33	0.90	0.31	0.90	0.30	0.89	0.31	0.91	0.28	0.93	0.25
Female partner's Work hours	20.12	19.17	22.31	19.47	23.08	19.48	26.64	18.92	27.96	18.86	26.35	19.08	29.03	18.50	30.07	18.43	29.96	18.81
Male partner's Work hours	35.53	22.21	38.21	20.91	38.34	21.02	39.56	21.23	40.99	19.97	40.67	19.90	40.81	20.81	41.57	19.28	42.33	18.63
Number of employed partners per household	1.45	0.64	1.53	0.60	1.58	0.59	1.65	0.55	1.69	0.52	1.68	0.53	1.76	0.48	1.79	0.44	1.80	0.45
Partners' work hours difference (Man - Woman)	15.41	27.66	15.90	26.93	15.25	27.07	12.92	26.81	13.03	25.65	14.33	25.76	11.78	26.30	11.50	24.88	12.37	23.97
Independent variables																		
Employs a domestic worker (1=yes)	0.04	0.19	0.05	0.22	0.12	0.32	0.07	0.26	0.09	0.28	0.17	0.38	0.14	0.34	0.16	0.37	0.29	0.45
Number of hours worked by the domestic worker	0.29	2.60	0.38	2.71	0.69	3.03	0.53	3.25	0.60	3.27	1.14	4.19	0.95	3.91	1.06	4.00	2.15	5.79

Child aged 0-4 in the household	0.22	0.42	0.25	0.44	0.25	0.44	0.30	0.46	0.30	0.46	0.28	0.45	0.34	0.47	0.36	0.48	0.38	0.48
Number of children	1.43	1.50	1.48	1.48	1.43	1.42	1.61	1.42	1.48	1.39	1.45	1.41	1.53	1.30	1.54	1.33	1.59	1.39
Instrumental variable																		
The volume of domestic work (in 1,000)	21.30	15.69	19.86	15.53	21.70	15.91	21.27	15.83	20.79	15.65	21.74	15.63	20.83	16.01	21.37	15.91	24.09	15.70
N (couple-years)	41,121		15,228		3,118		33,980		67,848		30,837		10,282		42,728		110,361	
N (couples)	10,857		3,845		775		8,375		16,435		7,439		2,450		9,883		25,223	

Table 2. Results of the Fixed effects 2SLS analyses estimating the effect of employing a domestic worker on the employment status (extensive margin) of each partner, by gender and level of education.

	Partners' employment status (1=works, 0=does not work)					
	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	Low-educ.	Medium-educ.	Highly-educ.	Low-educ.	Medium-educ.	Highly-educ.
Employs a domestic worker (1=yes)	1.026	0.190	0.379**	0.548	0.073	0.061
	(0.896)	(0.168)	(0.128)	(0.369)	(0.173)	(0.081)
Partner's employment status (1=works)	-0.003	0.011+	0.001	-0.003	0.006	0.007
	(0.010)	(0.006)	(0.007)	(0.006)	(0.005)	(0.004)
Number of children	-0.018**	-0.024***	-0.041***	0.007+	0.001	0.002
	(0.007)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)
Child aged 0-4 in the household	-0.024+	-0.015*	-0.039***	0.005	-0.000	-0.003
	(0.013)	(0.007)	(0.007)	(0.008)	(0.006)	(0.005)
Constant	0.635***	0.799***	0.852***	0.804***	0.884***	0.900***
	(0.038)	(0.016)	(0.026)	(0.022)	(0.016)	(0.017)
N (Obs.)	59,467	132,665	163,371	85,383	125,804	144,316
N (Individuals)	15,477	32,249	37,556	21,682	30,163	33,437
First-stage F stat (Cragg-Donald)	5.68	62.91	67.95	15.49	34.70	79.48
First-stage F stat (Kleibergen-Paap)	5.15	41.87	50.60	10.67	24.05	61.01

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table 3. Results of the Fixed effects 2SLS analyses estimating the effect of outsourcing hours on the partners' weekly work hours (intensive margin), by gender and educational level.

	Partners' weekly work hours					
	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	Low-educ.	Medium-educ.	Highly-educ.	Low-educ.	Medium-educ.	Highly-educ.
Hours worked by domestic worker	1.580	1.909	2.976**	-1.945	3.077	0.339
	(2.614)	(1.181)	(0.916)	(2.595)	(2.732)	(0.575)
Partner's work hours	0.104***	0.138***	0.189***	0.178***	0.190***	0.263***
	(0.006)	(0.005)	(0.006)	(0.009)	(0.010)	(0.007)
Number of children	-0.446+	-1.480***	-3.595***	0.356	0.279	0.379
	(0.255)	(0.256)	(0.579)	(0.271)	(0.424)	(0.425)
Child aged 0-4 in the household	-0.631	-0.590+	-3.255***	0.902+	-0.294	0.248
	(0.516)	(0.349)	(0.586)	(0.516)	(0.554)	(0.454)
Constant	17.31***	22.72***	23.52***	33.65***	32.95***	32.93***
	(0.962)	(0.604)	(0.717)	(1.031)	(1.211)	(0.465)
N (Obs.)	59,467	132,665	163,371	85,383	125,804	144,316
N (Individuals)	15,477	32,249	37,556	21,682	30,163	33,437
First-stage F stat (Cragg-Donald)	6.48	24.30	37.05	8.33	6.67	50.89
First-stage F stat (Kleibergen-Paap)	5.28	15.26	21.04	5.45	4.01	30.18

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table 4. Results of the Fixed effects 2SLS analyses estimating the effect of employing a domestic worker on the number of employed partners (extensive margin), by partners' educational level.

	Number of employed partners								
	(1) Low-educ. woman and man	(2) Low-educ. woman, medium-educ. man	(3) Low-educ. woman, highly-educ. man	(4) Medium-educ. woman, low-educ. man	(5) Medium-educ. woman and man	(6) Medium-educ. woman, highly-educ. man	(7) Highly-educ. woman, low-educ. man	(8) Highly-educ. woman, medium-educ. man	(9) Highly-educ. woman and man
Employs a domestic worker (1=yes)	2.541	-0.280	-19.810	0.575	0.620+	0.029	0.522	0.559	0.356*
	(1.821)	(1.362)	(418.8)	(0.608)	(0.354)	(0.297)	(1.527)	(0.560)	(0.161)
Number of children	-0.004	-0.038*	0.216	-0.004	-0.034***	-0.024+	-0.015	-0.029**	-0.041***
	(0.012)	(0.015)	(4.540)	(0.012)	(0.009)	(0.013)	(0.023)	(0.011)	(0.007)
Child aged 0-4 in the household	-0.039+	-0.002	0.328	-0.015	-0.009	-0.011	0.021	-0.048**	-0.045***
	(0.023)	(0.034)	(6.982)	(0.017)	(0.013)	(0.017)	(0.038)	(0.017)	(0.011)
Constant	1.373***	1.604***	3.497	1.620***	1.692***	1.709***	1.704***	1.765***	1.773***
	(0.068)	(0.081)	(40.70)	(0.049)	(0.029)	(0.042)	(0.204)	(0.081)	(0.040)
N (couple-years)	41,121	15,228	3,118	33,980	67,848	30,837	10,282	42,728	110,361
N (couples)	10,857	3,845	775	8,375	16,435	7,439	2,450	9,883	25,223
First-stage F stat (Cragg-Donald)	4.10	2.46	0.003	12.03	29.31	21.70	1.04	6.79	60.66
First-stage F stat (Kleibergen-Paap)	3.60	2.46	0.002	7.68	18.94	15.55	0.56	4.82	47.34

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table 5. Results of the Fixed effects 2SLS analyses estimating the effect of number of hours outsourced on the gender gap in work hours between partners (male-female), by partners' educational level.

	Gap in weekly work hours between partners (Man - Woman)								
	(1) Low-educ. woman and man	(2) Low-educ. woman, medium-educ. man	(3) Low-educ. woman, highly-educ. man	(4) Medium-educ. woman, low-educ. man	(5) Medium-educ. woman and man	(6) Medium-educ. woman, highly-educ. man	(7) Highly-educ. woman, low-educ. man	(8) Highly-educ. woman, medium-educ. man	(9) Highly-educ. woman and man
Hours worked by the domestic worker	-7.092	33.370	-56.830	1.581	-0.141	1.796	-36.630	38.290	-1.770*
	(4.629)	(57.82)	(447.4)	(4.896)	(2.108)	(2.320)	(148.9)	(183.4)	(0.805)
Number of children	0.638	2.054	2.769	0.709	2.216***	0.376	13.910	-5.216	3.655***
	(0.513)	(3.987)	(25.92)	(0.488)	(0.476)	(0.985)	(53.91)	(33.06)	(0.694)
Child aged 0-4 in the household	2.026+	0.537	8.412	0.689	0.644	-1.012	-8.478	-11.05	3.186***
	(1.155)	(3.373)	(27.79)	(0.991)	(0.648)	(1.113)	(53.74)	(56.45)	(0.714)
Constant	16.12***	0.18	48.58	10.73***	9.64***	12.02***	28.24	-17.15	9.15***
	(1.495)	(26.85)	(267.5)	(2.611)	(1.031)	(1.622)	(78.37)	(123.8)	(0.877)
N (couple-years)	41,121	15,228	3,118	33,980	67,848	30,837	10,282	42,728	110,361
N (couples)	10,857	3,845	775	8,375	16,435	7,439	2,450	9,883	25,223
First-stage F stat (Cragg-Donald)	7.18	0.38	0.03	2.90	14.20	8.06	0.11	0.07	44.30
First-stage F stat (Kleibergen-Paap)	5.75	0.36	0.02	1.70	7.75	6.95	0.06	0.04	25.41

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table 6. Results of the Fixed effects 2SLS analyses estimating the effect of number of hours worked by the domestic worker on the gender gap in work hours between partners (male-female), by partners' educational level (which partner is highly educated).

Gap in weekly work hours between partners (Man – Woman)			
	(1) Highly-educ. woman and man	(2) Highly-educ. woman	(3) Highly-educ. man
Number of hours worked by the domestic worker	-1.770*	-2.735**	-1.189
	(0.805)	(1.061)	(0.733)
Number of children	3.655***	3.615***	2.739***
	(0.694)	(0.670)	(0.543)
Child aged 0-4 in the household	3.186***	3.128***	2.277***
	(0.714)	(0.675)	(0.581)
Constant	9.147***	10.14***	10.03***
	(0.877)	(0.959)	(0.723)
N (couple-years)	110,361	163,371	144,316
N (couples)	25,223	37,556	33,437
First-stage F stat (Cragg-Donald)	44.30	37.14	52.58
First-stage F stat (Kleibergen-Paap)	25.41	21.09	31.15

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Appendix

Table A-2. First-stage regression results of the Fixed effects 2SLS analyses instrumenting the volume of domestic work to estimate the effect of outsourcing on employment status (extensive margin) by gender and educational level, Non-Haredi Jews

	Outsourcing – Employing a domestic worker (1=yes)					
	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	Low-educ.	Medium-educ.	Highly-educ.	Low-educ.	Medium-educ.	Highly-educ.
Volume of domestic work (in 1,000s)	0.0006*	0.0016***	0.0019***	0.0008**	0.0013***	0.0022***
	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Partner's employment status	0.0054	0.0122***	0.0203***	0.0095**	0.0150***	0.0254***
	(0.0038)	(0.0036)	(0.0055)	(0.0030)	(0.0034)	(0.0047)
Number of children	0.0010	0.0092**	0.0206***	0.0009	0.0079*	0.0266***
	(0.0030)	(0.0028)	(0.0038)	(0.0029)	(0.0031)	(0.0040)
Child aged 0-4 in the household	-0.0018	0.0018	0.0181**	-0.0017	0.0040	0.0216**
	(0.0055)	(0.0049)	(0.0066)	(0.0053)	(0.0057)	(0.0071)
N (Obs.)	59,467	132,665	163,371	85,383	125,804	144,316
N (Individuals)	15,477	32,249	37,556	21,682	30,163	33,437
First-stage F stat (Cragg-Donald)	5.68	62.91	67.95	15.49	34.70	79.48
First-stage F stat (Kleibergen-Paap)	5.15	41.87	50.60	10.67	24.05	61.01

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table A-3. First-stage regression results of the Fixed effects 2SLS analyses instrumenting the volume of domestic work to estimate the effect of the number of hours worked by the domestic worker on the partners' work hours (intensive margin) by gender and educational level, Non-Haredi Jews

	Outsourcing – Number of hours worked by the domestic worker					
	Women			Men		
	(1) Low-educ.	(2) Medium-educ.	(3) Highly-educ.	(4) Low-educ.	(5) Medium-educ.	(6) Highly-educ.
Volume of domestic work (in 1,000s)	0.0071*	0.0123***	0.0194***	0.0078*	0.0069*	0.0241***
	(0.0031)	(0.0032)	(0.0042)	(0.0034)	(0.0034)	(0.0044)
Partner's work hours	0.0004	0.0016**	0.0048***	0.0018*	0.0029***	0.0079***
	(0.0007)	(0.0005)	(0.0008)	(0.0008)	(0.0008)	(0.0010)
Number of children	-0.0142	0.1360***	0.5510***	0.0318	0.1240***	0.6380***
	(0.0314)	(0.0312)	(0.0677)	(0.0338)	(0.0332)	(0.0753)
Child aged 0-4 in the household	0.0592	0.0765	0.4480***	0.0373	0.1330*	0.5160***
	(0.0647)	(0.0614)	(0.0966)	(0.0655)	(0.0654)	(0.1100)
N (Obs.)	59,467	132,665	163,371	85,383	125,804	144,316
N (Individuals)	15,477	32,249	37,556	21,682	30,163	33,437
First-stage F stat (Cragg-Donald)	6.48	24.30	37.05	8.33	6.67	50.89
First-stage F stat (Kleibergen-Paap)	5.28	15.26	21.04	5.45	4.01	30.18

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table A-4. First-stage regression results of the Fixed effects 2SLS analyses instrumenting the volume of domestic work to estimate the effect of outsourcing on the number of employed partners (extensive margin) by partners' educational level, Non-Haredi Jews

	Outsourcing – Employing a domestic worker								
	(1) Low-educ. woman and man	(2) Low-educ. woman, medium-educ. man	(3) Low-educ. woman, highly-educ. man	(4) Medium-educ. woman, low-educ. man	(5) Medium-educ. woman and man	(6) Medium-educ. woman, highly-educ. man	(7) Highly-educ. woman, low-educ. man	(8) Highly-educ. woman, medium-educ. man	(9) Highly-educ. woman and man
Volume of domestic work (in 1,000s)	0.0005+	0.0008	-6.63e-05	0.0012**	0.0015***	0.0023***	0.0009	0.0011*	0.0022***
	(0.0003)	(0.0005)	(0.0014)	(0.0004)	(0.0004)	(0.0006)	(0.0012)	(0.0005)	(0.0003)
Number of children	0.0006	-1.52e-06	0.0109	-0.0013	0.0080*	0.0258***	0.0083	0.0099	0.0263***
	(0.0034)	(0.0069)	(0.0146)	(0.0046)	(0.0040)	(0.0069)	(0.0144)	(0.0063)	(0.0049)
Child aged 0-4 in the household	0.0016	-0.0137	0.0168	-0.0011	0.0011	0.0097	-0.0184	0.0125	0.0237**
	(0.0056)	(0.0137)	(0.0318)	(0.0087)	(0.0063)	(0.0134)	(0.0227)	(0.0120)	(0.0083)
N (Obs.)	41,121	15,228	3,118	33,980	67,848	30,837	10,282	42,728	110,361
N (Individuals)	10,857	3,845	775	8,375	16,435	7,439	2,450	9,883	25,223
First-stage F stat (Cragg-Donald)	4.10	2.46	0.003	12.03	29.31	21.70	1.04	6.79	60.66
First-stage F stat (Kleibergen-Paap)	3.60	2.46	0.002	7.68	18.94	15.55	0.56	4.82	47.34

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table A-5. First-stage regression results of the Fixed effects 2SLS analyses instrumenting the volume of domestic work to estimate the effect of the number of hours worked by the domestic worker on the gender gap in work hours between partners (male-female), by partners' educational level, Non-Haredi Jews

	Outsourcing - Number of hours worked by the domestic worker								
	(1) Low-educ. woman and man	(2) Low-educ. woman, medium-educ. man	(3) Low-educ. woman, highly-educ. man	(4) Medium-educ. woman, low-educ. man	(5) Medium-educ. woman and man	(6) Medium-educ. woman, highly-educ. man	(7) Highly-educ. woman, low-educ. man	(8) Highly-educ. woman, medium-educ. man	(9) Highly-educ. woman and man
Volume of domestic work (in 1,000s)	0.0091*	0.0034	-0.0018	0.0078	0.0127**	0.0165**	0.0032	-0.0014	0.0272***
	(0.0038)	(0.0057)	(0.0143)	(0.0060)	(0.0046)	(0.0063)	(0.0130)	(0.0067)	(0.0054)
Number of children	-0.0063	-0.0560	0.0578	-0.0061	0.1280**	0.3450***	0.3550*	0.1820*	0.7230***
	(0.0377)	(0.0672)	(0.0667)	(0.0567)	(0.0398)	(0.0831)	(0.1660)	(0.0719)	(0.0969)
Child aged 0-4 in the household	0.0810	0.0054	0.0587	0.0960	0.0335	0.1880	-0.3540	0.3100*	0.5820***
	(0.0874)	(0.0898)	(0.1580)	(0.1010)	(0.0802)	(0.1760)	(0.2420)	(0.1340)	(0.1330)
N (Obs.)	41,121	15,228	3,118	33,980	67,848	30,837	10,282	42,728	110,361
N (Individuals)	10,857	3,845	775	8,375	16,435	7,439	2,450	9,883	25,223
First-stage F stat (Cragg-Donald)	7.18	0.38	0.03	2.90	14.20	8.06	0.11	0.07	44.30
First-stage F stat (Kleibergen-Paap)	5.75	0.36	0.02	1.70	7.75	6.95	0.06	0.04	25.41

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table A-6. First-stage regression results of the Fixed effects 2SLS analyses instrumenting the volume of domestic work to estimate the effect of the number of hours worked by the domestic worker on the gender gap in work hours between partners (male-female), by partners' educational level (which partner is highly educated) - Non-Haredi Jews

Gap in weekly work hours between partners (Man-Woman)			
	(1) Highly-educ. woman and man	(2) Highly-educ. woman	(3) Highly-educ. man
Volume of domestic work (in 1,000s)	0.0272***	0.0194***	0.0246***
	(0.0054)	(0.0042)	(0.0044)
Number of children	0.7230***	0.5520***	0.6220***
	(0.0969)	(0.0677)	(0.0750)
Child aged 0-4 in the household	0.5820***	0.4480***	0.5030***
	(0.1330)	(0.0966)	(0.1100)
N (Obs.)	110,361	163,371	144,316
N (Individuals)	25,223	37,556	33,437
First-stage F stat (Cragg-Donald)	44.30	37.14	52.58
First-stage F stat (Kleibergen-Paap)	25.41	21.09	31.15