Educational attainment and domestic work contributions between 1991 and 2016 in Japan [1]

Ekaterina Hertog

University of Oxford

Man Yee Kan[2]

University of Oxford

Address for correspondence:
Ekaterina Hertog
Department of Sociology, University of Oxford, Manor Road Building, Manor Road, Oxford, OX1 3UQ, UK.
ekaterina.hertog@sociology.ox.ac.uk

[1] This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (awardee: Man Yee Kan; award 771736). Writing this paper would be impossible without the generous support from the Hitotsubashi University, Institute of Economic Research.

[2] Both authors contributed equally to this manuscript and are listed in alphabetical order.

Abstract

The relationship between education and domestic work contributions is well established.

Introduction

Research shows that time spent on domestic work has important consequences for individual's human capital development and earnings (Kan and Gershuny, 2009, Noonan, 2001). Time spent on housework and care work, is unlikely to result in accumulation of experiences and skills for gainful employment and spending time on unpaid work reduces time available for paid work and education. The question of how domestic division of labour evolves over time is therefore crucial for understanding persistent gender inequality. Women continue to shoulder the major share of housework and care work in East Asian and Western countries (Bianchi et al., 2000, Hook, 2010, Kan and Hertog, 2017, Kan, 2008, Kan and Gershuny, 2009, Kan and Gershuny, 2010, Sullivan, 2000, Oshio et al., 2013, Pimentel, 2006, Zhang et al., 2008, Kan et al., 2011, Altintas and Sullivan, 2017). At the same time in recent decades in European and Anglophone countries, the gender gap in unpaid labour has begun to shrink (Sullivan et al., 2018). This gender convergence has been accompanied by an expansion of educational attainment, with women achieving educational parity in the industrialised countries in 1990ies (Wils and Goujon, 1998). In most industrialised countries as many or more women than men now enrol in tertiary education (OECD, 2019a). Housework (Chesters, 2012, Gershuny and Sullivan, 2003, Altintas and Sullivan, 2016) and care contributions (England and Srivastava, 2013, Guryan et al., 2008, Cha and Song, 2017, Sani and Treas, 2016) have been shown to vary with levels of educational attainment. A large change in educational composition across different societies happening at the same time as the gender convergence in domestic work raises a question about the possible association between the two trends.

Yet, there has been very little research on the matter and our understanding of the trends over time in the associations between education and unpaid work are incomplete in a number of ways. *First*, most studies looking at the links between education and domestic division of labour over time focus on the expansion of childcare time driven by educated mothers and

fathers in recent decades (e.g. Sani and Treas, 2016). We believe that no one has yet looked at the trends in the time men and women spend on housework and how these trends may vary by their educational attainment. Suillivan, Billari, and Altinatas (2014) document the rise of at men's unpaid work time in 13 European countries between 1970 and 2010 and find that educated men are at the forefront of this increase in men's unpaid work contributions. Given the well-documented rise in childcare time and its positive link to educational attainment, a paper that lumps both childcare time and housework time together leaves the question about the association between education and housework over time open. These are important omissions given that housework is the most time-consuming type of domestic work and women continue to be responsible for the bulk of it. We would expect better-educated men and women to be at the forefront driving this change, similar to better-educated men, who drive the increases in unpaid work participation among men in European countries. However, it is also possible, that men are willing to increase their contributions to "desirable" childcare, but not to "boring" housework, or that housework is "women's" work and educational attainment makes no difference to this stereotype. This may be particularly true in such a gender unequal society, as Japan where men do barely any domestic work at all (Kan and Hertog, 2017) and all men may find unpaid work compromising for their masculinity independently of their levels of education.

Secondly, there has been no discussion as to whether it is reasonable to treat "unpaid work" as a homogeneous category and if we should expect a single theoretical framework to be able to account for the way housework and care change over time. The two components of unpaid work, housework and care, differ in perceived desirability and presence of additional beneficial outcomes. Housework is conceptualised as necessary, but undesirable activity that does not have benefits going beyond the immediate results of the work. Time spent with children (or other individuals cared for) is linked to positive outcomes for the children (Tucker-

Drob and Harden, 2012, Milkie et al., 2015, Cano et al., 2019) and can be enjoyable in its own right. Care also tends to be influenced by such factors as ideals of childhood and parenthood, which are less relevant for housework (Davis and Greenstein, 2013, Ishii-Kuntz and Coltrane, 1992). In spite of these major differences, existing research analysing the changing unpaid work trends over time mostly analyses both types of activities together, implicitly assuming that they will evolve in similar ways and can be explained with the same theoretical framework (e.g. Goldscheider et al., 2015, Sullivan et al., 2018).

Finally, all the research covering changes in domestic work over time is limited to European and Anglophone countries and we do not know if the explanatory frameworks developed in this context may behave differently outside it. The division of domestic labour in East Asia is exceptionally unequal among the industrialised countries (Shirahase, 2014 ch.5, Fuwa and Cohen, 2007, Kan and Hertog, 2017). Japan exemplifies East Asian countries characterised by intractable gender inequality while at the same time having one of the best-educated populations in the world. Thus, the association between education and division of labour at home is of particular interest in the region, but it has never been analysed so far. Japan has been described as a demographic trendsetter in East Asia (Myrskyla et al., 2013) and thus a study of Japan may give us better understanding of the region as a whole. Japan is one of the very few countries (all of which are located in East Asia) where improvements in Human Development index have been found to have a strong negative relationship with fertility rates (Myrskyla et al., 2009). Persistent gender inequality at home, against the increasing opportunities available to women in the public sphere has been argued to be a major factor contributing to Japan's inability to convert very high levels of social and economic development into individual willingness to have more children. A better understanding of the associations between educational attainment and domestic work sharing over time will offer insights about the extent of this inequality and the extent of its resistance to change.

This paper aims to address these shortcomings and offer a detailed picture of the evolution of association between education, housework and childcare time for both men and women over 25 years in Japan using six waves of the Survey of Time Use and Leisure Activities (Japanese national time diary survey) collected between 1991 and 2016.

In what follows, we first discuss theories used to explain the link between education and domestic division of labour and how this link might change over time. We will then describe the societal context within which domestic division of labour takes place in Japan. Having done that we will present our results on Japanese data. In the following discussion we will explore the possible theoretical frameworks that may explain the documented associations between education and the two types of unpaid work in Japan and see if one framework can account for both trends.

Education and changes in domestic work contributions over time

Three theoretical perspectives can be applied to make sense of the link between education and domestic work participation over time.

Education as resource over time

The first perspective views education as a proxy for individuals earning power. Three major approaches rely on this perspectives. First, the *specialisation theory* is based on the premise that households allocate their time to maximize the utility of the household (Becker, 1981). One partner, usually the man, has the relative advantage in labour market work and will specialize in this type of work. The time invested in labour market work will accumulate more human capital and economic resources and therefore the extent of specialisation will increase over time. The other partner, usually the woman, will specialise in domestic work and therefore will accumulate less human capital over time. The division of labour will therefore become more gendered over time.

Concurring with Becker's *specialization theory*, the resource bargaining argument states that husbands and wives bargain for a smaller share of housework according to their level of economic resources in order to maximize their individual utility. The partner who has fewer resources is expected to undertake more unpaid work (Blood and Wolfe, 1960; Coverman, 1985; Hook, 2004).

Furthermore, the *autonomy approach* (Gupta, 2007) argues that husbands' and wives' housework time is determined by their own level of economic resources, rather than the relative level. The variations in housework hours are determined by autonomous decision-making within the household and capability of hiring paid domestic help according to one's socio-economic standing (Killewald and Gough, 2010). In a relatively gender traditional society like Japan, we may expect to find that career women might want to resort to paid help in domestic work rather than bargaining with their husbands when they earn a high income (Estevez-Abe, 2015).

These three approaches have similar expectations about the way education is associated with domestic division of labour. The bargaining theory puts greater emphasis on the relative resources, while specialisation theory and autonomy perspectives focus more on the absolute resources, but all three approaches expect better education to be associated with less time spent on all types of domestic work. This approach predicts that:

H1: For both men and women, domestic work time is negatively associated with own education.

In Japan men's and women's educational attainment has risen over time, and women made larger educational gains relative to men (MEXT, 2017). Given the closing gap in educational attainment, we expect gender convergence in domestic work at the level of population over time.

A very different approach that also perceives education as a resource, but focuses on the link between resource acquisition through education and how that might reaffirm or challenge one's gender identity argues that domestic work is a platform to "do gender" and to bolster a compromised gender identity (Bittman et al., 2003). In this approach, education will be associated with more domestic work for those women whose education is so high that it challenges their gender identity. These women will do more unpaid work at home to mitigate the damage done by their success in public sphere. As educational attainment similar to men's becomes a norm rather than exception for women, high education will not compromise feminine identity any more.

H2: Highly educated women will do more domestic work than their less educated counterparts will as long as there is a large educational gap between men and women. As the gap in educational attainment between men and women closes, we expect this effect to disappear.

Education and gender equality over time

Resource-based explanations have been criticised for their inability to account for the role of social norms and gender ideology in the gender division of labour (Brines, 1994; Kan and Laurie, 2018; Kolpashnikova, 2017; West and Zimmerman, 1987; Ishii-Kuntz, 1992, 2009). In an alternative approach, the household is considered to be a "gender factory" where women and men not only produce "goods" or "services" but also their gender roles and identities (Berk, 1985; West and Zimmerman, 1987).

Education is not only a proxy for earning power individuals can draw on; it also plays a key role in individuals developing their gender identities through socialisation. Past research has shown that education is strongly associated with gender attitudes, and higher level of education predicts more gender egalitarian attitudes (Scott and Clery, 2013). Hence, educational attainment is not only a proxy for earning power but also a reflection of the state

of socialisation and process that individuals have gone through the educational institutions. In Japan, as in other societies, higher education is associated with more egalitarian gender attitudes (Kamano, 2013, Yamamoto and Ran, 2014).

Gender revolution framework designed to explain historic shifts in male and female participation in public and private spheres from the second half of the 20th century and to this day. It proposes two stages. In the first stage, women join men in the public sphere expanding their educational attainment and labour market participation and end up shouldering the double burden of paid and unpaid work. In the second stage that is expected to follow the first stage after some period of time, men increase their involvement in the domestic sphere taking over some of domestic tasks from women. This framework relies on education as one of the key mechanisms behind the spread of more egalitarian gender norms over time that eventually lead to a more equal division of labour at home among other outcomes (Goldscheider et al., 2015).

Viewing education as primarily a reflection of one's gender related attitudes and beliefs we expect higher education to lead to a greater equality of domestic division of labour within couples, independently of the individual earning power. Better-educated men and women have been shown to be the first to adopt more gender equal values that then spread more widely in society (Pampel, 2011). As educational attainment in Japan has expanded over time, we expect equal sharing of domestic work to become more common and spread beyond highly educated men and women with time.

Following the gender revolution framework, we expect:

H3: that over time men will spend more time on unpaid work and women will spend less time. Educated men and women will change their domestic work contributions to a greater extent than their less educated counterparts.

Empirically, time use research has recorded gender convergence in unpaid work time spanning over the past 40 years in European and Anglophone countries. This convergence affects both housework and care time, but is a result of very different processes for both. Although men's contributions to housework have increased in European and Anglophone societies over the past 50 years, equalizing trends in housework owe more to decreases in women's time than the increase in men's time, as the former has been more pronounced than the latter (Sullivan et al., 2018, Sullivan, 2010). This suggests that as gender revolution unfolds women drop some of their unpaid work (potentially in favour of paid work) starting the equalising process. Men compensate for some, but not all of the time that women stop investing into unpaid work. Analysing time use data of from 13 European countries Sullivan, Billari, and Altintas (2014) find evidence that when it comes to men highly educated individuals are at the forefront of this change and are more likely to participate in unpaid work than their less educated counterparts. Higher level of education has been associated with women spending less time on domestic tasks (Chesters, 2012, Gershuny and Sullivan, 2003, Altintas and Sullivan, 2016), but no research has yet looked at the way this link might change over time. Existing empirical findings indicate that viewing education as a proxy for more egalitarian views offers a more promising explanation for the recent changes in unpaid work trends, than treating it as a proxy for earning power. As noted above this research has been carried out only in Western cultural context where domestic division of labour is much more egalitarian than in East Asia. It is conceivable, that in more gender unequal society, like Japan, greater earning power will offer a better explanatory fit for the association between education and domestic division of labour, than egalitarian outlook.

Education and parenting investments over time

Resource and normative explanations outlined above have an important shortcoming. They pay little attention to the inherently different nature of housework and care. These

unpaid work types differ in a number of key characteristics. First housework has usually been seen as "undesirable" work, something to try to bargain away, using one's resources, for example, while childcare is broadly considered to be a "desirable" activity, so if any bargaining occurs it might be aimed at freeing time for childcare, rather than buying oneself out of this type of unpaid work (Bonke and Esping-Andersen, 2011).

Childcare, is also a means for socialisation and intergenerational transmission of cultural capital (Bourdieu, 1984; Sayer, Gauthier & Furstenberg, 2004) and one's willingness to invest is affected by one's beliefs about parenting and childrearing and these are likely to vary systematically by education. Contrary to what resource theories would have us expect, better education has been associated with more intensive parenting investment across industrialised countries, with different cultural and institutional contexts, including the United States (England and Srivastava, 2013, Guryan et al., 2008), South Korea (Cha and Song, 2017), United Kingdom, Canada, Germany, Italy, and Norway (Sayer et al., 2004) and others (Sani and Treas, 2016). This behaviour is consistent with an intensive parenting ideology that promotes heavy investment in developmentally beneficial parenting among educated parents (Lareau, 2003).

To make sense of childcare trends over time we turn to Doepke and Zilibotti's (2019) theory of *economic incentives* to parenting. This framework traces the rise of intensive parenting to growing social inequality that makes it rational for parents to invest heavily in their children's formal education and other skills. Intensive parenting is far more pronounced among highly educated men and women who have access to resources that they are able to invest in their children. Empirically, increases in parental investments, that are particularly large among better-educated men and women are well documented in European and Anglophone societies (e.g. Sani and Treas, 2016). This approach expects similarly increased

investment in children by both mothers and fathers in societies with rising inequality, as a rational response of parents who want to secure their children's future.

As social inequality increased dramatically in Japan over the past decades (OECD, 2019b) following the economic incentives theory we expect that in the observed period:

H4: Men and women will increase their contributions to care over time and higher education will be associated with larger increases in the care time for both men and women.

The context of the study: Japan

Japan is characterised by high levels of educational attainment for both men and women. Nine years of education (primary school and junior high school) became mandatory after the Second World War and more than 99% of all children have been enrolling into compulsory education from late 1940s. Educational attainment expanded dramatically beyond compulsory levels in postwar years (see Table 1). By 1975, more than 90% of boys and girls enrolled into high schools and the gender gap in enrolment into secondary education has been 2% or less since mid 1960ies.

Table 1. Educational enrolment by gender.

Year	Compulsory education		High school		Junior college		University	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*	*Men*	*Women*
1951	99%	99%	51%	40%				
1961	99%	99%	64%	60%	2%	4%	15%	3%
1971	99%	99%	84%	86%	2%	13%	30%	8%
1981	99%	99%	93%	95%	2%	21%	39%	12%
1991	99%	99%	94%	96%	2%	23%	35%	16%
2001	99%	99%	96%	98%	2%	16%	47%	33%
2011	99%	99%	98%	99%	1%	10%	56%	46%
2016	99%	99%	99%	99%	1%	9%	56%	48%

Source: (MEXT, 2017)

More women than men entered tertiary education after graduating from high school from early 1990ies. There is a persistent gender gap in enrolment into 4-year universities, but it decreased substantially over the past decades and was 8% in 2016. At the same time, gender inequality in the labour market in contemporary Japan has been much more resistant to change.

Women continue to form the bulk of precarious labour, there are few female senior managers, virtually no women on company boards, there is a gender gap in wages, and maternal employment rates remain low (for a summary of literature documenting persistent labour market inequality see Hertog, forthcoming). Consequently, married women with children continue to rely on their husbands' earnings. For women marriage and childbearing tend to be followed by heavy domestic responsibilities.

Women continue to do most of the housework and care work. In 2016, men spent 44 minutes weekly on average on housework and related activities[i], up from 24 minutes in 1996. Women's average time spent on housework and related activities only fell by 6 minutes over the same years. Women spent 3 hours and 34 minutes on this type of work in 1996 and 3 hours and 28 minutes in 2016 (Statistics Bureau, 2016). The norms of intensive maternal investment in children remain strong (Allison, 2000) and in 2015 around 70% of men and women believed that mothers rather than anyone else should take care of young children (NIPSSR, 2015).

In sum, Japan is characterised by extreme inequality between men and women in the labour market and at home against the background of growing equality in educational access (Schwab et al., 2017). Scholars routinely argue that in East Asian countries (including Japan) family trends unfold differently from other industrialised countries in part due to their shared Confucian past, which justifies gender inequality at home and at work (Raymo et al., 2015). Given this context, one could hypothesize that the strong norm for gender inequality at home will make housework and childcare time inelastic. If that were the case, then in Japan housework and care time will not be associated with individual's educational attainment and will be mostly women's responsibility across the educational spectrum.

In the next section, we will describe our data and methods. We will then continue with a detailed account of the patterns of contribution to different types of domestic work by Japanese men and women between 1991 and 2016. This description will be followed by multivariate

analysis of these patterns to establish associations between educational attainment and domestic division of labour throughout these years.

Data and Methods

Data

We analyse the data from the 4th to the 9th waves of the Survey on Time Use and Leisure Activities (*Shakai Seikatsu Kihon Chosa*) that were collected in mid-October in 1991, 1996, 2001, 2006, 2011, and 2016. The Survey on Time Use and Leisure Activities is conducted every five years from 1976 by the Statistical Bureau of Japan and has had a time diary component from 1991. Each survey has collected information from around 200,000 persons over two consecutive days.

Our analytic sample includes married[ii] women and men of working age (aged 20 to 59). We dropped everyone currently in education (0.1% of the sample) as their time use patterns are likely to be very different from those currently in the labour market. Our sample becomes smaller with every consecutive year because of the trend for delayed and forgone marriages in Japan.

The final sample consists around 836,463 observations collected for around 420,000 individuals. Over 99.5% of the respondents completed time diaries on two consecutive days. The diaries reported how the individuals were spending their time in 15-minute intervals. Survey data on time use was complemented with standard demographic and socio-economic indicators. Forty-eight percent of the respondents were male and 52% were female.

Dependent variables

We created two continuous dependent variables to measure housework and care work using recorded primary activities. *Housework* time is spent on the following activities "laundry", "cleaning", "meal preparation", and "candy-making", "shopping", "gardening", "clothes making", "house repairs", "car-related care", "small repairs", "shopping",

"housework-related travel", "using administrative services", "using commercial services", and "other housework". *Care* refers to time spent on "care for an adult family member", "helping a family member", "medical care for a baby", "looking after a baby", "playing with a baby", "spending time with a child", "helping child with studying", "accompanying child", "pet care", and "dog walking"[iii]. In our sample, time spent on various childcare activities dwarfs all the other care responsibilities. Dependent variables referring to the time spent on housework and care are the daily minute totals spent on a given activity.

In addition to analysing the factors predicting the daily minute totals individuals spent on domestic labour we also estimate models with individual share of the total time a given couple spends on housework and care work.

Independent variables

We estimated regressions separately for men and women. Our key independent variables are education and survey year. We control for household income, the respondent's own and spouse's employment statuses, age, number of own children, number of adults co-residing in the household, and whether the diary day is a weekend or a weekday. We recoded "household income" into four categories roughly reflecting household income quartiles for this analytical sample: "under 4 million yen", "between 4 and 6 million yen", "between 6 and 9 million yen", "over 9 million yen". The current data source does not allow us to measure age as a continuous variable. Age was recorded into four groups: "20-29", "30-39", "40-49", "50-59". To examine if the association between education and domestic work changes over the period, we will add interactions between survey year and education in our models. For the ease of interpretation of the results by avoid adding too many interaction terms in the models, education was recoded as a continuous variable measuring years spent in education using the standard conversion schema described in ISCED education mapping files provided by UNESCO[iv]. As expected, our sample becomes more educated over time. Employment status is

measured in three categories: working more than 35 hours on a typical week (full-time), less than 35 hours on a typical week (part-time) or did not have a job.

Table 1a. Mean (SD) of Continuous Variables Used in Regressions

	Women	Men
Years in education	12.80	12.39
	(2.42)	(1.91)
Spouse's years in education	12.46	12.72
	(1.89)	(2.45)
Number of adults	2.66	2.69
	(0.94)	(0.94)
Weighted N	392094	431215

Table 1b. Proportion of People in Demographic Groups Used in Regressions

	Women	Men
Weekdays	0.37	0.37
Weekends	0.63	0.63
Age 20-29	10.33	7.67
Age 30-39	26.97	25.69
Age 40-49	31.46	32.55
Age 50-59	31.25	34.10
Works over 35 hours per week	37.76	89.45
Works less than 35 hours a week	28.68	8.10
Not working	33.56	2.45
Spouse works over 35 hours per week	85.92	37.96
Spouse works less than 35 hours a week	9.17	28.93
Spouse is not working	4.91	33.10
Household income under 3.99 million yen	23.14	21.56
Household income 4 to 6 million yen	27.26	27.72
Household income 6 to 8.99 million yen	21.18	21.80
Household income over 9 million yen	28.41	28.92
1991	24.92	26.06
1996	20.44	20.57
2001	14.24	14.10
2006	12.84	12.64
2011	14.48	14.01
2016	13.08	12.63
Observations	392094	431215

Analytic strategy

We start by presenting means of our dependent variables separately for men and women as well as husbands' and wives' shares of overall time couples spend on domestic work in the 6 surveys we are analysing. We then estimated ordinary least squares (OLS) regressions on the

three measures of domestic work constructed separately for men and women. For the analysis, we rely on the pooled sample of all the respondents in 1991, 1996, 2001, 2006, 2011, and 2016. To test the differences in domestic work contributions over the years by individuals' levels of educational attainment we interacted the survey year variable with the years in education measure. OLS estimates allow for the interpretation of results in minutes when the dependent variables are measured in minutes and as a share of couple time when the dependent variable is a share of time.

Results

Between 1991 and 2016, Japanese men and women have changed the ways in which they allocate their time to housework and care. Housework division of labour within couples moved in the direction of grater equality. Married women reduced their housework contributions from an average of 280 minutes in 1991 to 250 minutes daily in 2016. Married men compensated for this reduction to some extent increasing their average daily contributions to housework from 27 minutes in 1991 to 43 minutes in 2016. In contrast, in case of care, both men and women spent more time on care in 2016 compared to 1991. Married women in 2016 spent on average 58 minutes daily on care, up from 41 minutes in 1991. Men reported spending 19 minutes on care in 2016, up from 7 minutes on average in 1991. The magnitude of change is small, so between 1991 and 2016 the share of housework shouldered by wives has shifted only slightly from 93% to 87%, and the share of care work went down from 88% in 1991 to 80% in 2016. Husbands increased their relative care contributions more than their relative housework time, but wives' contributions continued to dwarf men's throughout these years.

Table 2a. Average time spent on housework and care by gender

	1991		1996		2001		2006		2011		2016	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Housework	27	280	26	275	32	269	36	265	39	259	43	250
	(75)	(164)	(67)	(162)	(72)	(159)	(82)	(163)	(81)	(160)	(87)	(168)
Care	7	41	8	42	10	43	14	48	17	54	19	58
	(42)	(105)	(43)	(107)	(46)	(106)	(57)	(114)	(65)	(123)	(73)	(135)
N	103839	109138	81987	89529	56173	62368	50353	56224	55820	63402	50329	57301

Source: Surveys of Time Use and Leisure Activities 1991, 1996, 2001, 2006, 2011, 2016. Figures in parentheses are standard deviations.

Table 2b. Wife's average share of couple's time spent on housework and care

	1991	1996	2001	2006	2011	2016
Housework	0.93	0.93	0.91	0.90	0.88	0.87
Care	0.88	0.87	0.84	0.82	0.81	0.80
N	105399	86475	60665	54400	61377	54913

Source: Surveys of Time Use and Leisure Activities 1991, 1996, 2001, 2006, 2011, 2016.

To see if changes for men and women differed by their level of education, we turn to OLS regression results. Looking at men's contributions (Table 3), it is clear that own level of education plays an important role in mediating men's domestic work participation. Education is associated more strongly with care than housework. Models without interactions suggest that education is positively associated with men's contributions care work and housework. Over the years, men increasingly spend more time on both housework and care. Net of the control variables, men spent 1 more minute daily on housework in 1996, 7 more minutes in 2001, 23 more minutes in 2006, and 17 more minutes in 2011 and 2016 compared to 1991. They also spend almost 2.8 more minutes on care in 1996, 7 more minutes in 2001, 10 more minutes in 2006, 11 more minutes in 2011, and 15 more minters in 2016 compared to 1991.

.

Table 3. OLS models of men's domestic work time (minutes per day)

	Housework no interactions	Housework with interactions	Care no interactions	Care with interactions
Survey year=1991	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Survey year=1996	1.30*	-5.29*	2.83***	3.84*
	(0.51)	(2.63)	(0.35)	(1.79)
Survey year=2001	6.76***	8.21***	7.10***	-1.07
	(0.45)	(2.33)	(0.31)	(1.59)
Survey year=2006	22.86***	11.36***	9.82***	-1.50
	(0.46)	(2.41)	(0.31)	(1.64)
Survey year=2011	17.07***	8.43***	11.19***	2.64
	(0.45)	(2.37)	(0.31)	(1.61)
Survey year=2016	17.32***	-3.71	14.70***	4.98**
	(0.47)	(2.50)	(0.32)	(1.70)
Years in education	0.31***	-0.34*	0.10*	-0.47***
	(0.06)	(0.15)	(0.04)	(0.10)
Survey year=1991 # years in education		0.00		0.00
		(.)		(.)
Survey year=1996 # years in education		0.54**		-0.06
		(0.21)		(0.14)
Survey year=2001 # years in education		-0.07		0.66***
		(0.18)		(0.12)
Survey year=2006 # years in education		0.91***		0.89***
		(0.19)		(0.13)
Survey year=2011 # years in education		0.70***		0.68***
		(0.18)		(0.12)
Survey year=2016 # years in education		1.58***		0.76***
		(0.19)		(0.13)
Spouse's years in education	0.75***	0.77***	0.68***	0.70***

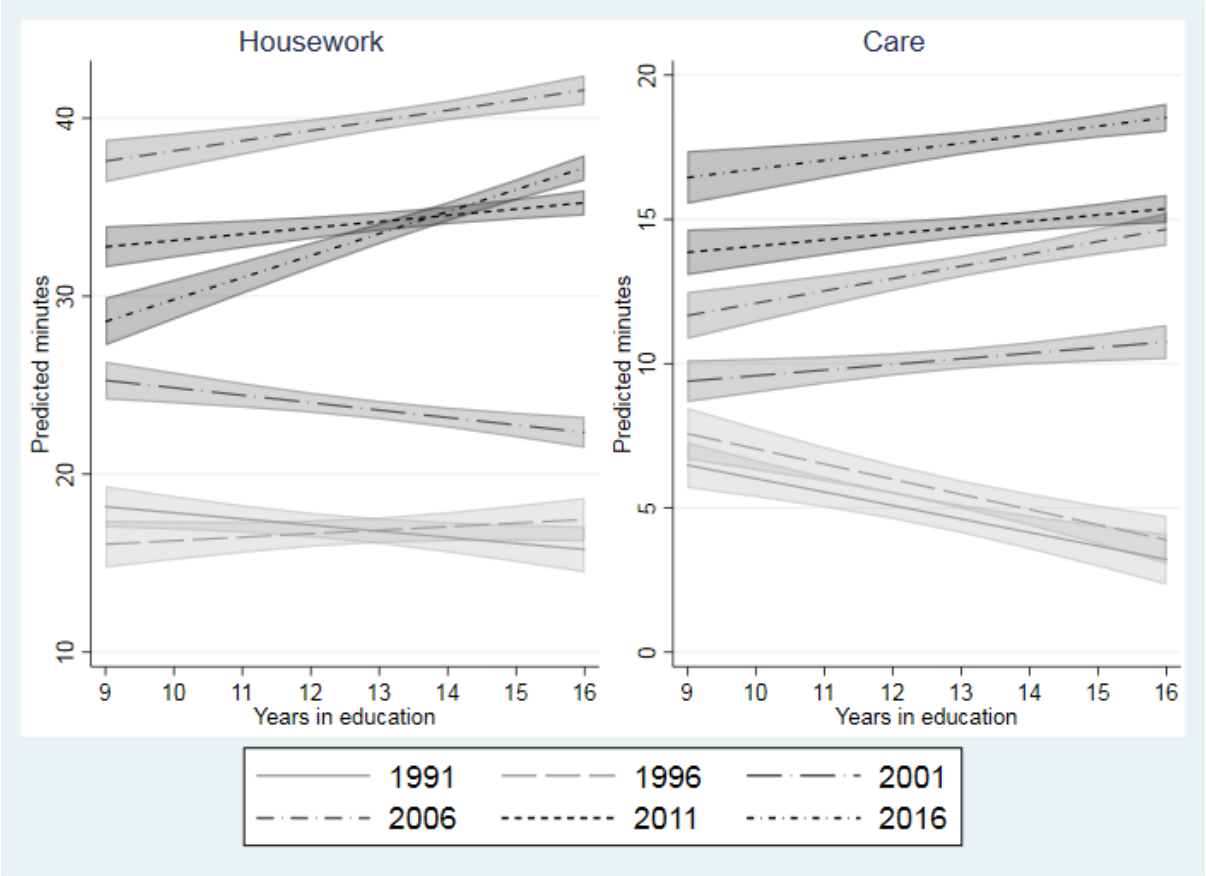
	(0.08)	(0.08)	(0.05)	(0.05)
Age 20-29	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Age 30-39	-0.25	-0.37	2.30***	2.19***
	(0.50)	(0.51)	(0.34)	(0.34)
Age 40-49	-3.20***	-3.40***	-9.87***	-10.07***
	(0.51)	(0.51)	(0.35)	(0.35)
Age 50-59	0.08	-0.22	-15.34***	-15.55***
	(0.52)	(0.52)	(0.36)	(0.36)
Weekday	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Weekend	46.59***	46.62***	15.33***	15.33***
	(0.26)	(0.26)	(0.18)	(0.18)
Works over 35 hours per week	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Works less than 35 hours a week	1.46**	1.15*	1.88***	1.72***
	(0.49)	(0.49)	(0.34)	(0.34)
Unemployed	60.81***	60.73***	9.55***	9.47***
	(0.88)	(0.88)	(0.60)	(0.60)
Spouse works over 35 hours per week	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Spouse works less than 35 hours a week	-5.53***	-5.48***	-1.94***	-1.91***
	(0.30)	(0.30)	(0.20)	(0.20)
Spouse is unemployed	-2.12***	-2.04***	4.09***	4.13***
	(0.29)	(0.29)	(0.20)	(0.20)
under 3.99 million yen	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
4 to 6 million yen	0.49	0.60	0.65**	0.67**
	(0.36)	(0.36)	(0.25)	(0.25)
6 to 8.99 million yen	4.70***	4.78***	-0.13	-0.11
	(0.39)	(0.39)	(0.27)	(0.27)
over 9 million yen	3.08***	3.17***	-0.37	-0.36

	(0.39)	(0.39)	(0.27)	(0.27)
Number of adults in the household	-2.37***	-2.35***	-0.65***	-0.62***
	(0.15)	(0.15)	(0.10)	(0.10)
Constant	-3.91***	3.75	-2.97***	3.80**
	(1.17)	(2.01)	(0.79)	(1.37)
Observations	378298	378298	378298	378298
R^2	0.1021	0.1024	0.0547	0.0550

Standard errors in parentheses
Source: Survey of Time Use and Leisure Activities 1991, 1996, 2001, 2006, 2011, 2016
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our main research interest is to examine how education is associated with domestic work participation, and whether this association varies over time. First, the models without interactions indicate that education is positively associated with housework time and care time for men (the coefficients are 0.31 and 0.10 respectively). The set of models with interactions suggest that the way education is associated with domestic work contributions has changed over time. As seen in the models, compared to 1991, education predicts additional increases in men's housework time in all the following years except 1996 (the coefficients are positive). The Wald test and Figure 1 show that education predicts a significant additional increase in men's housework time in 2016 compared to 2011. The overall predicted results are illustrated in Figure 1, where variables other than education and survey year are taken as the mean value.

Figure 1. Predicted time men spend on domestic work per day by years in education and survey year based on models with interactions in Table 1.



In sum, all men spend very little time on housework before 2006 and better education is associated with less housework investment by men in 1991 and 2001 and lower care time in 1991 and 1996. These choices are consistent with education being a resource that enables men to "buy themselves out of" housework and care work. From 2001 for care work and from 2006 for housework the educational gradient for men turns positive. This new association contradicts education as a resource argument[5] and is in line with education as a reflection of more egalitarian gender attitudes. Overall shift in housework and care time for men towards longer time and positive educational gradient is consistent with a transition into a 2nd stage of gender revolution with educated Japanese men being at the forefront of this transition, similarly to educated men in European countries (Sullivan et al., 2014). Men's increased time spent on care between 2001 and 2016 is also consistent with economic incentives hypothesis, which expects highly educated parents to invest time in their children in societies where social inequality is on the rise.

Turning to women (Table 4) we see that patterns of associations between education and domestic work over time are very different for women compared to men. In models without interaction effects women spend less time on housework, and more time on care work in all years compared to 1991 and the size of the coefficient increases with each survey. Furthermore, education is positively associated with housework time and care time for women. The coefficient is much bigger for care time (3.45), than for housework time (0.92). Models with interactions suggest that the association between education and unpaid work has changed over time for women. As seen in the models, compared to 1991, education predicts additional reductions in women's housework time in all the following years. The Wald test and Figure 2 show that education predicts significant additional decreases in women's housework time in every subsequent year between 1991 and 2006. Additional effect of education in 2011 compared to 2006 is small, but positive, but in 2016 additional effect of education becomes

negative and significant again compared to 2011[6]. The overall predicted results are illustrated in Figure 2, where variables other than education and survey year are taken as the mean value.

For care, the pattern of association between education and time is the opposite of that of housework. In the 1990ies, the association between education time and care time is very small and negative. From 2001 onwards, it becomes positive and larger in size in every new survey. A series of Wald tests[7] (not shown) confirm that in models with interactions, education is associated with additional positive and significant increases in time women spend on care work in every subsequent year, the combined effects are best illustrated in Figure 2.

Table 4. OLS models of women's domestic work time (minutes per day)

	Housework no interactions	Housework with interactions	Care no interactions	Care with interactions
Survey year=1991	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Survey year=1996	-20.01***	14.46*	15.70***	3.08
	(1.01)	(6.28)	(0.72)	(4.50)
Survey year=2001	-4.32***	61.44***	23.27***	-23.78***
	(0.88)	(5.58)	(0.63)	(3.99)
Survey year=2006	-5.94***	97.85***	31.64***	-49.98***
	(0.92)	(5.83)	(0.66)	(4.17)
Survey year=2011	-23.81***	63.11***	38.63***	-39.95***
	(0.90)	(5.79)	(0.65)	(4.15)
Survey year=2016	-36.65***	72.54***	52.63***	-50.95***
	(0.93)	(5.99)	(0.67)	(4.29)
Years in education	0.92***	7.11***	3.45***	-1.63***
	(0.16)	(0.38)	(0.11)	(0.27)
Survey year=1991 # Years in education		0.00		0.00
		(.)		(.)
Survey year=1996 # Years in education		-3.06***		1.22**
		(0.52)		(0.37)
Survey year=2001 # Years in education		-5.65***		4.08***
		(0.46)		(0.33)
Survey year=2006 # Years in education		-8.61***		6.79***
		(0.47)		(0.34)
Survey year=2011 # Years in education		-7.27***		6.51***
		(0.46)		(0.33)
Survey year=2016 # Years in education		-8.89***		8.32***
		(0.47)		(0.34)
Spouse's years in education	1.62***	1.48***	0.16	0.31***
	(0.12)	(0.12)	(0.09)	(0.09)

Age 20-29	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Age 30-39	37.83***	39.66***	-32.37***	-33.96***
	(0.88)	(0.88)	(0.63)	(0.63)
Age 40-49	80.63***	82.87***	-99.56***	-101.51***
	(0.90)	(0.91)	(0.65)	(0.65)
Age 50-59	69.72***	71.91***	-118.98***	-121.02***
	(0.93)	(0.93)	(0.67)	(0.67)
Weekday	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Weekend	10.80***	10.82***	-9.46***	-9.47***
	(0.52)	(0.52)	(0.37)	(0.37)
Works over 35 hours per week	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Works less than 35 hours a week	83.71***	83.28***	8.17***	8.62***
	(0.59)	(0.59)	(0.42)	(0.42)
Unemployed	166.42***	166.08***	59.98***	60.36***
	(0.58)	(0.58)	(0.41)	(0.41)
Spouse works over 35 hours per week	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
Spouse works less than 35 hours a week	-22.13***	-21.28***	-0.87	-1.70**
	(0.91)	(0.91)	(0.65)	(0.65)
Spouse is unemployed	-48.66***	-48.15***	-8.85***	-9.28***
	(1.23)	(1.23)	(0.88)	(0.88)
under 3.99 million yen	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
4 to 6 million yen	3.43***	3.04***	-0.23	0.16
	(0.70)	(0.70)	(0.50)	(0.50)
6 to 8.99 million yen	7.89***	7.57***	-6.46***	-6.12***
	(0.76)	(0.76)	(0.55)	(0.55)
over 9 million yen	5.90***	5.62***	-10.01***	-9.68***
	(0.76)	(0.76)	(0.54)	(0.54)

Number of adults in the household	6.56***	6.37***	1.63***	1.80***
	(0.29)	(0.29)	(0.21)	(0.21)
Constant	97.73***	26.14***	39.04***	97.49***
	(2.22)	(4.57)	(1.59)	(3.27)
Observations	416198	416198	416198	416198
R^2	0.1843	0.1854	0.2217	0.2234

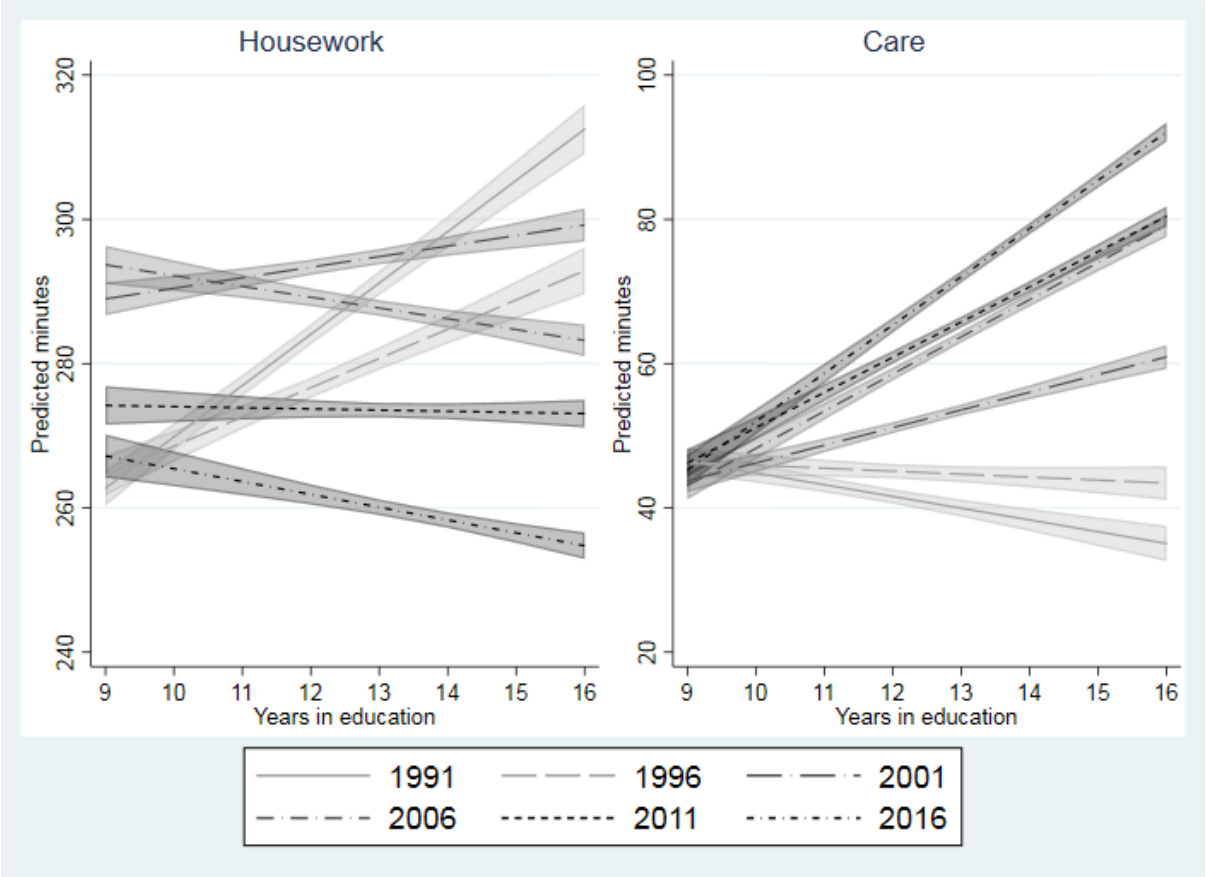
Standard errors in parentheses

Source: Survey of Time Use and Leisure Activities 1991, 1996, 2001, 2006, 2011, 2016

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

All women irrespective of their educational attainment contribute much more time to housework and care than men in all the years under investigation. The combined effects are clear in Figure 2.

Figure 2. Predicted time women spend on domestic work per day by years in education and survey year



Similarly to models with interactions describing men's behaviors (see Figure 1) in Figure 2 we observe a paradigmitic shift in women's behaviors around 2001 and 2006. The positive association between education and time spent on housework in 1991, 1996, and 2001 is consistent with "gender display" perspective for women. From 2006 education is associated with less time spent on housework which is consistent with the resource perspctives as well as with education as a reflection of more gender equal attitudes hypothesis. Over time the change in the association between education and housework time is consistent with the expectations of the shift from the 1st to the 2nd stage of the gender revolution in which women reduce their

domestic work contributions and better educated women appear to be at the forefront of this change from 2006. For care the associations evolve in the opposite direction. In 1991 and 1996 education has a small negative association with care time, consistent with the resource perspective. From 2001 the association between education and care work becomes positive and it strengthens with each survey year consistently with care work been seen as an investment that better educated women are more able to make. The period change in care for women as well is for men is consistent with they theory of economic insentives to parenting.

Preceding sections looked at the time all married men and women invest into unpaid domestic labour irrespectively of how much their spouses were contributing. Yet, different families may have different ideas about how much time should be spent on housework and might be prone to engage in more or less intensive parenting as a couple. It is instructive to analyse the patterns of sharing domestic work within couples (see Table 5). In models without interactions, in 1996, 2001, 2006, 2011, and 2016 wives' shares of housework time and care time are smaller than in 1991 and the size of the effect increases with each survey year. Longer time spent in education is associated with a reduced share of housework performed by wives and an increased share of care. In models with interactions, education is associated with additional reductions in time spent on housework in every survey year compared to 1991. The pattern of association between education and time spent on the way care time is shared over time is less clear and is best seen in Figure 3.

Table 5. Wives' share of housework and care contributions

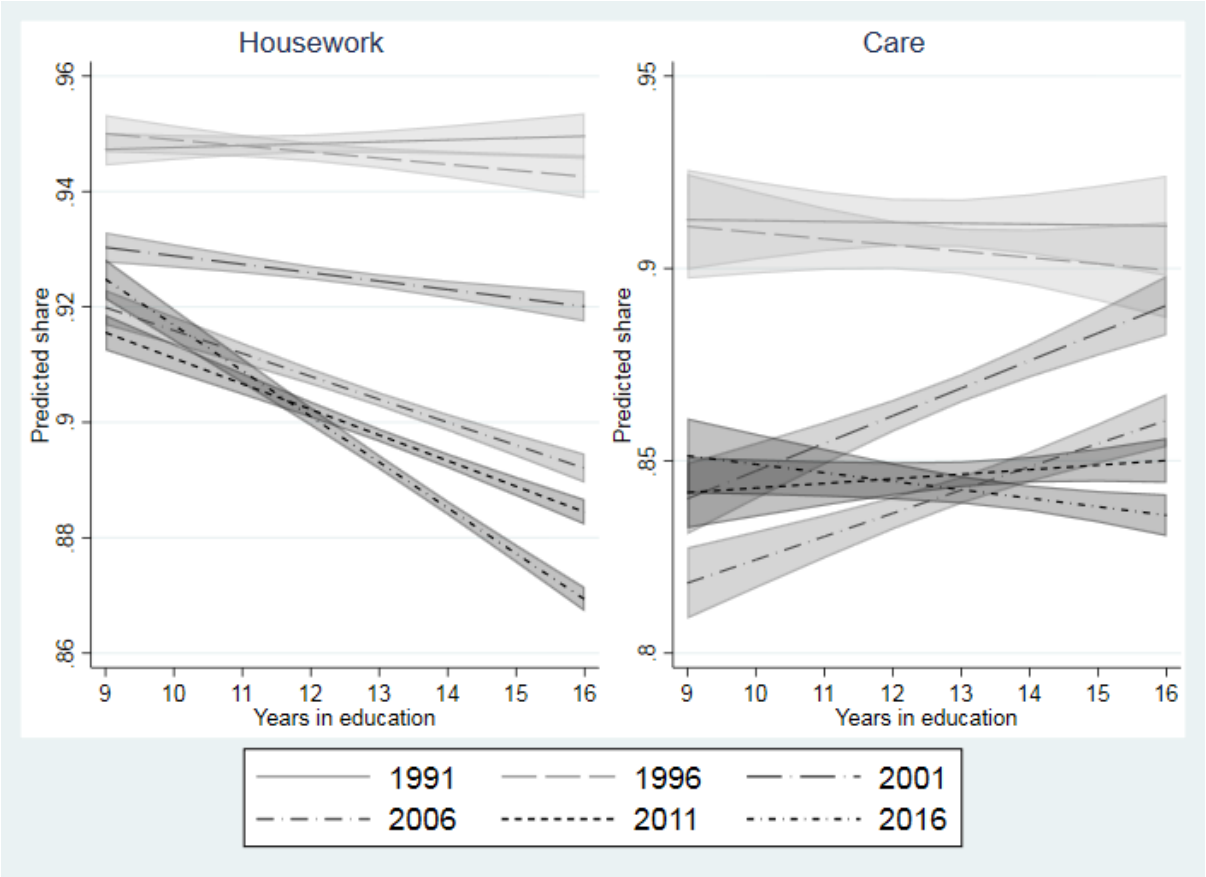
	Housework no interactions	Housework with interactions	Care no interactions	Care with interactions
Survey year=1991	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Survey year=1996	-0.009***	0.006	-0.016***	0.003
	(0.001)	(0.007)	(0.004)	(0.030)
Survey year=2001	-0.026***	-0.006	-0.048***	-0.142***
	(0.001)	(0.006)	(0.004)	(0.025)
Survey year=2006	-0.046***	0.005	-0.066***	-0.146***
	(0.001)	(0.007)	(0.004)	(0.025)
Survey year=2011	-0.051***	0.006	-0.065***	-0.082***
	(0.001)	(0.007)	(0.004)	(0.025)
Survey year=2016	-0.060***	0.045***	-0.068***	-0.037
	(0.001)	(0.007)	(0.004)	(0.025)
Years in education	-0.004***	0.000	0.002***	-0.000
	(0.000)	(0.000)	(0.001)	(0.002)
Survey year=1991 # Years in education		0.000		0.000
		(.)		(.)
Survey year=1996 # Years in education		-0.001*		-0.001
		(0.001)		(0.002)
Survey year=2001 # Years in education		-0.002***		0.007***
		(0.001)		(0.002)
Survey year=2006 # Years in education		-0.004***		0.006**
		(0.001)		(0.002)
Survey year=2011 # Years in education		-0.005***		0.001
		(0.001)		(0.002)
Survey year=2016 # Years in education		-0.008***		-0.002
		(0.001)		(0.002)
Spouse's years in education	-0.001***	-0.001***	-0.002***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)

Age 20-29	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Age 30-39	0.014***	0.015***	0.006*	0.006*
	(0.001)	(0.001)	(0.002)	(0.002)
Age 40-49	0.027***	0.029***	0.009**	0.008**
	(0.001)	(0.001)	(0.003)	(0.003)
Age 50-59	0.012***	0.014***	-0.032***	-0.032***
	(0.001)	(0.001)	(0.003)	(0.003)
Weekday	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Weekend	-0.089***	-0.089***	-0.136***	-0.136***
	(0.001)	(0.001)	(0.002)	(0.002)
Works over 35 hours per week	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Works less than 35 hours a week	0.049***	0.048***	0.077***	0.077***
	(0.001)	(0.001)	(0.002)	(0.002)
Unemployed	0.056***	0.056***	0.097***	0.096***
	(0.001)	(0.001)	(0.002)	(0.002)
Spouse works over 35 hours per week	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Spouse works less than 35 hours a week	-0.022***	-0.022***	-0.028***	-0.028***
	(0.001)	(0.001)	(0.004)	(0.004)
Spouse is unemployed	-0.170***	-0.170***	-0.168***	-0.168***
	(0.001)	(0.001)	(0.006)	(0.006)
under 3.99 million yen	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
4 to 6 million yen	-0.001	-0.001	0.007**	0.006**
	(0.001)	(0.001)	(0.002)	(0.002)
6 to 8.99 million yen	-0.007***	-0.007***	0.005	0.004
	(0.001)	(0.001)	(0.003)	(0.003)
over 9 million yen	-0.008***	-0.009***	-0.002	-0.003
	(0.001)	(0.001)	(0.003)	(0.003)

Number of adults in the household	0.009***	0.009***	0.008***	0.008***
	(0.000)	(0.000)	(0.001)	(0.001)
Constant	0.967***	0.923***	0.869***	0.899***
	(0.003)	(0.005)	(0.008)	(0.022)
Observations	400048	400048	108981	108981
R^2	0.1170	0.1176	0.0855	0.0860

Standard errors in parentheses.
Source: Survey of Time Use and Leisure Activities 1991, 1996, 2001, 2006, 2011, 2016.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 3. Predicted wives' share of domestic work by years in education and survey year



In models without interactions, years in education have a negative association with wife's share of time spent on housework and a positive association with their share of care time. In these models in every survey year wives spend a smaller share of time on both housework and care than they used to in 1991. A series of Wald tests (not shown) confirms that women's share of housework is significantly smaller in every subsequent year, compared to the preceding year. For care, women's share is significantly smaller in every subsequent year, compared to the preceding year between 1991 and 2006. Women's share of care in 2001 is not significantly different to 2006 and their share in 2016 is not significantly different compared to 2011or 2006. In models with interactions, education has an additional negative effect on women's share of housework in all the years compared to 1991 and the size of the coefficient becomes larger in every subsequent year. For care, education is associated with additional

increases of in wife's share of time spent on care only in 2001 and 2006 compared to 1991. The overall predicted results are illustrated in Figure 3, where variables other than education and survey year are taken as the mean value.

Looking at the overall findings of education over time in Figure 3 we see that education has a negative association with women's housework share and the association becomes stronger with every subsequent year. These findings are consistent with both resource perspective, suggesting that better educated wives might be buying themselves out of housework as well gender equal perspective, suggesting that better educated wives subscribe to more gender equal values and are able to achieve a fairer division of labour at home when it comes to housework. The overall result of education over time is less clear when it comes to care. In 1991, 1996, and 2016 education is associated with small declines in women's care share in line with resource and gender equality perspectives. In 2001 and 2006, better education is associated with wives increased share of care work in line with parental investment in education perspective. In 2011, overall effect of education is almost invisible. There is no clear pattern on change in care sharing over time but the total share of care work for women in smaller in 2016 compared to 1991. This suggests that husbands may be catching up with wives on care time and the lag in their catching results in the mixed picture observed in Figure 3.

Conclusion

Despite the growing literature, recording the changing trends in gendered division of labour at home and our knowledge unpaid work contributions vary by individual's educational attainment only one paper (Sullivan et al., 2014) looked at education as a sociodemographic characteristic potentially mediating the changes in domestic division of labour over time. No research to date has analysed the trends of domestic division of labour outside of Western context. To our knowledge, this paper is the first to document the associations between

educational attainment and domestic division of labour for both genders and do this for an East Asian country, namely Japan.

We have found that different levels of education are likely to be associated with different arrangements when it comes to sharing domestic work. We have identified three explanatory frameworks that could explain the observed associations. First, better education is associated with higher earning power. Access to resources could enable men and women to buy themselves out of domestic work. The decreasing educational gender gap should lead to a greater equality in domestic division of labour over time at the population level. If high education compromises female identity, we would expect better-educated women to try to repair this identity through commitment to domestic work. Over time as educational gender gap shrinks, we expect high educational attainment to become less compromising to feminine identity and positive educational gradient in women's housework time to disappear. Second, education is associated with more egalitarian gender attitudes and better-educated people tend to be trendsetters when it comes to value change. Following the gender revolution framework we proposed that over time Japanese men and women will share housework more equally and more educated men and women will be at the forefront of this change. Finally, we noted the differences in the nature of housework and care and proposed the economic incentives theory to explain the trends in care work. This theory predicts that in societies characterised by growing inequality men and women will engage in more intensive parenting. Better-educated men and women will be more willing and able to spend particularly large amounts of time on childcare.

Our results indicate that two distinct paradigms are necessary to make sense of the associations between education and housework and care work over time in Japan. Housework trends are most consistent with the gender revolution framework and suggest that Japan might have started its transition from the first to the second stage in early 2000s. Prior to 2000s both men

and women appear to be "doing gender" with educated men capitalising on their education to reduce their already meagre housework time, and educated women investing more time into housework, perhaps to appear more feminine. From 2000s, the link between education and housework time shifts and this shift is consistent with the society entering into the 2nd stage of the gender revolution and educated men and women being at the forefront of this change. As predicted by the gender revolution framework women decrease their overall housework time and educated women decrease this time to a greater extent than their less educated counterparts, while men start investing more time into housework with educated men leading this change. Crucially, the magnitude of change is small and as in other countries, the observed gender convergence is driven by women decreasing their housework time rather than by men increasing theirs.

While being a good fit for explaining the transitions in the link between education and housework time in Japan gender revolution framework turns out to be much less suitable for understanding the link between education and trends in care time. In case of care time, we observe a transition from negative or non-existent educational gradient to a strongly pronounced positive one for both men and women as social inequality in Japan increases. These transitions are most consistent with the economic incentives framework.

These findings highlight the importance of analysing housework and care work trends separately as they evolve differently and virtually independently of each other.

Japan follows the trend towards greater gender equality in domestic work observed in most industrialised countries, but the transition in Japan is happening very slowly. Domestic work remains overwhelmingly women's work in Japan throughout these years. Men do proportionately more care work than housework, but even in 2016 women contribute 80% of time spent on care and 87% of housework time. The very slow pace of the observed gender

convergence in housework time and the limited convergence in care time does not bode well for the future fertility rates.

One important shortcoming of our analysis is our inability to control for individual income due to limitations of our data. Japanese time use surveys only started collecting information on individual income information from 2011. Future research that would use models controlling for both education and income in the models would make it clearer to which extent education translate into resources individuals could use to further their goals in domestic division of labour in recent years. This paper highlighted major differences in the evolution of trends in housework and care in Japan. Future research, however, is needed to illuminate whether the trends in housework and care behave as differently in different cultural contexts.

References

ALLISON, A. 2000. *Permitted and prohibited desires: mothers, comics, and censorship in Japan,* Berkeley, Calif. ; London, University of California Press.

ALTINTAS, E. & SULLIVAN, O. 2016. Fifty years of change updated: Cross-national gender convergence in housework. *Demographic Research,* 35**,** 455-470.

ALTINTAS, E. & SULLIVAN, O. 2017. Trends in Fathers' Contribution to Housework and Childcare under Different Welfare Policy Regimes. *Social Politics,* 24**,** 81-108.

BIANCHI, S. M., MILKIE, M. A., SAYER, L. C. & ROBINSON, J. P. 2000. Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor. *Social Forces,* 79**,** 191-228.

BITTMAN, M., ENGLAND, P., FOLBRE, N., SAYER, L. & MATHESON, G. 2003. When does gender trump money? Bargaining and time in household work. *American Journal of Sociology,* 109**,** 186-214.

BONKE, J. & ESPING-ANDERSEN, G. 2011. Family Investments in Children-Productivities, Preferences, and Parental Child Care. *European Sociological Review,* 27**,** 43-55.

CANO, T., PERALES, F. & BAXTER, J. 2019. A Matter of Time: Father Involvement and Child Cognitive Outcomes. *Journal of Marriage and Family,* 81**,** 164-184.

CHA, S. E. & SONG, Y. J. 2017. Time or Money: The Relationship Between Educational Attainment, Income Contribution, and Time with Children Among Korean Fathers. *Social Indicators Research,* 134**,** 195-218.

CHESTERS, J. 2012. Gender Attitudes and Housework: Trends over Time in Australia. *Journal of Comparative Family Studies,* 43**,** 511-526.

DAVIS, S. N. & GREENSTEIN, T. N. 2013. Why Study Housework? Cleaning as a Window Into Power in Couples. *Journal of Family Theory & Review,* 5**,** 63-71.

DOEPKE, M. & ZILIBOTTI, F. 2019. *Love, money, and parenting : how economics explains the way we raise our kids,* Princeton, NJ, Princeton University Press.
ENGLAND, P. & SRIVASTAVA, A. 2013. Educational differences in US parents' time spent in child care: The role of culture and cross-spouse influence. *Social Science Research,* 42**,** 971-988.
ESTEVEZ-ABE, M. 2015. The Outsourcing of House Cleaning and Low Skill Immigrant Workers. *Social Politics,* 22**,** 147-169.
FUWA, M. & COHEN, P. N. 2007. Housework and social policy. *Social Science Research,* 36**,** 512-530.
GERSHUNY, J. & SULLIVAN, O. 2003. Time use, gender, and public policy regimes. *Social Politics,* 10**,** 205-228.
GOLDSCHEIDER, F., BERNHARDT, E. & LAPPEGARD, T. 2015. The Gender Revolution: A Framework for Understanding Changing Family and Demographic Behavior. *Population and Development Review,* 41**,** 207-239.
GURYAN, J., HURST, E. & KEARNEY, M. 2008. Parental education and parental time with children. *Journal of Economic Perspectives,* 22**,** 23-46.
HERTOG, E. forthcoming. Attitudes to Marriage and Childbearing. *In:* COATES, J., FRASER, L. & PENDLETON, M. (eds.) *Routledge Companion to Gender and Japanese Culture.*
HOOK, J. L. 2010. Gender Inequality in the Welfare State: Sex Segregation in Housework, 1965–2003. *American Journal of Sociology,* 115**,** 1480-1523.
ISHII-KUNTZ, M. & COLTRANE, S. 1992. Predicting the Sharing of Household Labor: Are Parenting and Housework Distinct? *Sociological Perspectives,* 35**,** 629-647.
KAMANO, S. 2013. Trends in women's attituides to marriage, family, and gender from the 1990s onwards (1990-Nendai ikō no kekkon kazoku jendā ni kansuru josei no ishiki no hensen). *Journal of Population Problems (Jinkōmondai kenkyū),* 69**,** 3-41.
KAN, M.-Y. 2008. Does gender trump money? Housework hours of husbands and wives in Britain. *Work, Employment and Society,* 22**,** 45-66.
KAN, M.-Y. & GERSHUNY, J. 2009. Gender and Time Use Over the Life-course. *In:* BRYNIN, M. & ERMISCH, J. (eds.) *Changing Relationships.* New York & Oxford: Routledge.
KAN, M.-Y. & GERSHUNY, J. 2010. Gender segregation and bargaining in domestic labour: Evidence from longitudinal time use data. *In:* CROMPTON, R., SCOTT, J. & LYONNETTE, C. (eds.) *Gender Inequalities in the 21st Century.* Aldershot: Edward Elgar.
KAN, M.-Y. & HERTOG, E. 2017. Domestic division of labour and fertility preference in China, Japan, South Korea, and Taiwan. *Demographic Research,* 36**,** 557-587.
KAN, M.-Y., SULLIVAN, O. & GERSHUNY, J. 2011. Gender Convergence in Domestic Work: Discerning the Effects of Interactional and Institutional Barriers from Large-scale Data. *Sociology-the Journal of the British Sociological Association,* 45**,** 234-251.
LAREAU, A. 2003. *Unequal childhoods : class, race, and family life,* Berkeley, Calif.; London, University of California Press.
MEXT 2017. Report of Education related statistics (Monbu kagaku tōkei yōran). Ministry of Education, Culture, Sports, Science, and Technology.
MILKIE, M. A., NOMAGUCHI, K. M. & DENNY, K. E. 2015. Does the Amount of Time Mothers Spend With Children or Adolescents Matter? *Journal of Marriage and Family,* 77**,** 355-372.
MYRSKYLA, M., GOLDSTEIN, J. R. & CHENG, Y. H. A. 2013. New Cohort Fertility Forecasts for the Developed World: Rises, Falls, and Reversals. *Population and Development Review,* 39**,** 31-56.
MYRSKYLA, M., KOHLER, H. P. & BILLARI, F. C. 2009. Advances in development reverse fertility declines. *Nature,* 460**,** 741-743.

NIPSSR 2015. 15th basic survey of childbearing trends (Dai jugokai shussei dōkō kihon chōsa). Tokyo: National Institute of Population and Social Security Research.
NOONAN, M. C. 2001. The Impact of Domestic Work on Men's and Women's Wages. 63**,** 1134-1145.
OECD. 2019a. *OECD Gender Data Portal* [Online]. Available: http://www.oecd.org/gender/ [Accessed].
OECD 2019b. OECD Income Distribution Database.
OSHIO, T., NOZAKI, K. & KOBAYASHI, M. 2013. Division of Household Labor and Marital Satisfaction in China, Japan, and Korea. *Journal of Family and Economic Issues,* 34**,** 211-223.
PAMPEL, F. 2011. Cohort change, diffusion, and support for gender egalitarianism in cross-national perspective. *Demographic Research,* 25**,** 667-693.
PIMENTEL, E. E. 2006. Gender Ideology, Household Behavior, and Backlash in Urban China. *Journal of Family Issues,* 27**,** 341-365.
RAYMO, J. M., PARK, H., XIE, Y. & YEUNG, W.-J. J. 2015. Marriage and Family in East Asia: Continuity and Change. *In:* COOK, K. S. & MASSEY, D. S. (eds.) *Annual Review of Sociology, Vol 41.*
SANI, G. M. D. & TREAS, J. 2016. Educational Gradients in Parents' Child-Care Time Across Countries, 1965-2012. *Journal of Marriage and Family,* 78**,** 1083-1096.
SAYER, L. C., GAUTHIER, A. H. & FURSTENBERG, F. F. 2004. Educational differences in parents' time with children: Cross-national variations. *Journal of Marriage and Family,* 66**,** 1152-1169.
SCHWAB, K., SAMANS, R., ZAHIDI, S., LEOPOLD, T. A., RATCHEVA, V., HAUSMANN, R. & TYSON, L. D. A. 2017. *The global gender gap report 2017,* Geneva, World Economic Forum.
SCOTT, J. & CLERY, E. 2013. Gender roles: An incomplete revolution? *In:* PARK, A., BRYSON, C., CLERY, E., CURTICE, J. & PHILLIPS, M. (eds.) *British Social Attitudes: the 30th Report.* London: NatCen Social Research.
SHIRAHASE, S. 2014. *Social inequality in Japan,* Abingdon, Routledge.
STATISTICS BUREAU 2016. Survey on Time Use and Leisure Activities. Summary of Results. Ministry of Internal Affairs and Communications.
SULLIVAN, O. 2000. The Division of Domestic Labour: Twenty Years of Change? *Sociology,* 34**,** 437-456.
SULLIVAN, O. 2010. Changing Differences by Educational Attainment in Fathers' Domestic Labour and Child Care. *Sociology,* 44**,** 716-733.
SULLIVAN, O., BILLARI, F. C. & ALTINTAS, E. 2014. Fathers' Changing Contributions to Child Care and Domestic Work in Very Low-Fertility Countries The Effect of Education. *Journal of Family Issues,* 35**,** 1048-1065.
SULLIVAN, O., GERSHUNY, J. & ROBINSON, J. P. 2018. Stalled or Uneven Gender Revolution? A Long-Term Processual Framework for Understanding Why Change Is Slow. *Journal of Family Theory & Review,* 10**,** 263-279.
TUCKER-DROB, E. M. & HARDEN, K. P. 2012. Early childhood cognitive development and parental cognitive stimulation: evidence for reciprocal gene-environment transactions. *Developmental Science,* 15**,** 250-259.
WILS, A. & GOUJON, A. 1998. Diffusion of education in six world regions, 1960-90. *Population and Development Review,* 24**,** 357-368.
YAMAMOTO, M. & RAN, W. N. 2014. Should Men Work Outside and Women Stay Home? Revisiting the Cultivation of Gender-Role Attitudes in Japan. *Mass Communication and Society,* 17**,** 920-942.
ZHANG, Y. P., HANNUM, E. & WANG, M. Y. 2008. Gender-based employment and income differences in urban China: Considering the contributions of marriage and parenthood. *Social Forces,* 86**,** 1529-1560.

[i] Defined here as housework, caring or nursing, childcare, and shopping.

[ii] In Japan, few unmarried couples cohabit, and cohabitation tends to be a temporary state, that progresses to marriage or separation and few women have children outside marriage (Hertog, 2009; Raymo, Iwasawa, & Bumpass, 2009). Consequently, few surveys have an explicit question about cohabitation and STULA is not one of them. Given the nature of cohabitation, we believe we are justified to focus on married couples and ignore cohabiting unions when analysing domestic division of labour.

[iii] In 1991 and 1996 all the respondents were administered the same questionnaire (questionnaire A), which included a set of 20 pre-coded activities for respondents to choose from. From 2001 onwards, 5% of all respondents were administered questionnaire B (95% answered questionnaire A), which enabled respondents to describe activities in their own words. These activities were then post-coded by Statistics Bureau staff. For Questionnaire A respondents housework is defined as time spent on "shopping" and "housework" and care refers to the sum of time spent on "childcare", "care for an adult family member". For questionnaire B respondents housework and care were constructed as the sum of all the activities listed above.

[iv] http://uis.unesco.org/en/isced-mappings No education was taken as equal to 0 years in education, compulsory education (primary and secondary school) was recoded as 9 years in education, high school education was recoded as 12 years in education, completing a college or a professional school, meant that the individual spent 14 years in education, and graduating from university was recoded as 16 years in education. In most years, the data does not allow us to distinguish between people who completed primary school only from those, who completed primary and secondary school. People with only primary school education (6 years of education) are likely to be overrepresented among the older generation. Later surveys collect more detailed educational information. Crucially, before 2011 we could not distinguish between individuals who only obtained an undergraduate degree in university and those who graduated from a masters or a doctoral course. We assigned a value of 16 years in education to everyone who has a university degree, as those with undergraduate degrees vastly outnumber those with graduate degrees. In 2011 and 2016 surveys, we assigned the value of 18 years in education to those with graduate degrees, reflecting that those with master degrees outnumber individuals with doctorates.

[5] Household income and own employment status may weaken education as a proxy for resource as these variables are also proxies for own earning power. As a robustness check, we reran our models (available upon request) without household income and employment status controls. The size of the coefficients changes slightly in these models, but there is no clear pattern for this change and the size of this change is small. The direction and the significance of the effects of years in education and survey year variables, as well as their interactions remain the same.

[6] Calculations comparing the coefficients between different years available upon request.

[7] Calculations comparing the coefficients between different years available upon request.