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Glenn Sandström[1,2], Mojgan Padyab[1], Haruko Noguchi[3] and Rong FU[4]

[1] *Stockholm University Demography Unit (SUDA), Stockholm University*
[2] *Historical Demography, Department of Historical, Philosophical, and Religious Studies, Umeå University*
[3] *Faculty of Political Science and Economics, Waseda University, Waseda Institute of Political Economy, and Waseda Institute of Social & Human Capital Studies*
[4] *School of Commerce, Waseda University*

Abstract

The increase in one-person household (OPHs) in the developed world is often seen as the result of a trend where family solidarity is replaced by individualistic values and behaviours where the Nordic countries have been identified as forerunners in this development. In Asia, countries such as Japan have reached equal levels of economic development but retain elements of a strong family system and exhibit a much more asymmetric gender regime. This study compares the changes in the demographic and socioeconomic composition of OPH women in Sweden and Japan between 1990 and 2016. The probability to be an OPH-household is analysed by means of logistic regression models using microdata covering the entire population in Sweden and the Comprehensive Survey of Living Conditions in Japan. In Sweden, the growth of the female OPH-population has halted and shifted to a decline compared to Japan where it has increased rapidly since the 1990s. The analysis finds increasing similarities between the countries in the age patterns and urban-rural differences while persistent contrast in the impact of women's socioeconomic status and family history remain salient. The findings provide evidence that the transformation of women's economic role does not result in an ever-increasing shift towards "less" family. Rather, living arrangements depend on the extent to which gender regime adapts to increased economic self-sufficiency among women. These findings highlight the need for preparedness for continued increases of the OPH population among policy makers in economically developed strong family societies such as Japan.

Keywords: one person households, single living, gender, family systems, Sweden, Japan

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Introduction

One of the most distinct demographic trends in Western societies during the last 50 years is the increase in the share of one-person households (Esteve et al., 2020; Sandström & Karlsson, 2019). Although the trend is evident in all highly developed countries, it is pronounced in different societies. This article aims to uncover potential similarities and differences in the characteristics of one-person households (OPHs) between one Asian strong-family society, characterized by moderate but rapidly increasing levels of OPHs (Raymo, 2015), and a highly individualistic, weak-family Northern European country with a longer history of high levels of OPHs. For our analysis, we have chosen Sweden and Japan. The reason for choosing these two contexts is that the two countries are situated very similarly in terms of economic development but represent very different family systems, as well as different cultural and institutional contexts. The central question we aim to address is, to what extent does Japan's rapid growth in the share of OPHs follow the same trajectory as archetypical weak-family country Sweden, in terms of who lives alone? Or, is Japan rather following its own path, thereby resulting in distinct differences between the countries in the composition of their OPH populations?

Conceptual framework – Second Demographic Transition and U-shape theory

The role of the family in developed countries has undergone radical changes since the 1960s, in terms of reductions in fertility to levels well below replacement, postponement of family formation, decreased marriage rates, a higher share of individuals living as couples outside of wedlock, increased union instability and an increased share of one-person households. This shift in family dynamics has been labeled a Second Demographic Transition (SDT) and is thought to be related to an increased spread and acceptance of secular and individualistic values, support for gender equality, and the pursuit of self-actualization in countries with highly developed economies (Lesthaeghe, 2020; Lesthaeghe & Van de Kaa, 1986). The central tenet of SDT theory is the idea that when economic development reaches a sufficient threshold, individuals can prioritize the fulfillment of higher order needs, such as self-actualization, as access to basic material necessities is guaranteed. This means that the economic functions of conjugal relationships become less important, and unions are first and foremost formed and sustained to the extent that the relationship can provide emotional returns. Individuals that are thought to be the forerunners in this development are women with high levels of education and labor market human capital whose life courses shift and become more like those experienced by men. The end result is thought to be a reduction in

the returns from marriage and family formation due to a reduced potential for specialization and trading of market and non-market skills within unions (Becker, 1991; Becker et al., 1977). This increase in individual autonomy results in a permanent reduction of conjugal solidarity, intergenerational support, and interdependence between family members that explain the trend towards "less family" in Western societies since the 1960s (Giddens, 1992; Beck & Beck-Gernsheim, 1995; Lesthaeghe, 2010). These theoretical presuppositions find support in research on how female human capital was related to family outcomes up until the 1980s in the West that showed that high levels of female income and education tended to be negatively associated with nuptiality, fertility, and union stability during conditions when female labor force participation was moderate to low, but increasing (see eg. Brewster & Rindfuss, 2000; Espenshade, 1985; Ruggles, 1997; Sandström, 2012).

However, to explain the finding that the association between female human capital and family outcomes has tended to become less negative over time, and even shifted from negative to positive in countries exhibiting high levels of institutional and cultural gender equality such as Sweden (for a review see Esping-Andersen, 2016), a number of different scholars have argued that women's integration into market processes outside the family does not necessarily represent a new demographic equilibrium characterized by a persistent state of low fertility and unstable relationships. Rather, it has been suggested that the tendency for especially highly educated women to retreat from parenting and partnering is a transitional stage experienced by societies where a majority of women become economically self-sufficient, but norms in the labor market and political sphere regarding gender equity have not yet adapted in a way that facilitates the economic activity of women who choose to form families (McDonald, 2000, 2013; Esping-Andersen & Billari, 2015). Goldscheider et.al. (2015) argue in a similar manner but focus primarily on the attitudes of men in the private sphere in terms of their internalization of values of gender equality and their corresponding willingness to engage in care work within the family. To summarize, these scholars argue that evidence is mounting that the situation where large shares of women refrain from family formation is merely a transitional stage, as values among men adjust to the increased reproductive and economic autonomy of women. When gender-egalitarian values reach a `dominant normative status´, conditions that result in low fertility and high rates of singlehood among economically active women disappear. The most important indicators for this change are that the individual-level association between family formation and women's education and income shift from a negative to positive gradient and that this change is

correlated with the acceptance and spread of gender-egalitarian values on a societal level. We will refer to this set of perspectives as the U-shape hypothesis, as it predicts a U-shape development over time between female human capital and family outcomes, such as partnering and parenting, that change in tandem with the level of gender equality on a societal level.

Background – demographic regimes in contemporary Sweden and Japan

This development moves at a different pace in the typical forerunner societies in Northern Europe and the US compared to the laggards in Southern Europe and highly developed nations in East Asia. The forerunners, most typically exemplified by the Nordic countries (Ohlsson-Wijk et al., 2020), are described as characterized by as weak-family system (D. S. Reher, 1998), being more "de-familialized" and gender-egalitarian (Esping-Andersen, 1999), and having a more individualistic and post-materialist value system, compared to the strong-family societies in Asia and Southern Europe (Lesthaeghe, 2020; Inglehart, 1990). In these latter contexts, the family typically still plays a much more profound role for the economic and social welfare of the individual, and the gender regime is more asymmetric with higher shares of non-employed women (Raymo et al., 2015; Padyab et al., 2019) than in the more individualistic cultures of the Nordic countries where women's employment rates for many decades have been more or less at the same level as among men (Goldscheider et al., 2015; Stanfors & Goldscheider, 2017).

When comparing the attitudes to gender equality, Sweden, together with the other Nordic countries, has for many decades systematically stood out in international comparisons as a society with the strongest support for gender-egalitarianism in the world (World Economic Forum, 2018; Esping-Andersen, 2016). Although studies have shown that support for symmetrical gender roles has increased in Japan since the 1990s (UNDP, 2020; N. Fukuda, 2016), these studies also show that value changes affect women more so than men (Choe et al., 2014), and even taking these changes into account, Japanese values regarding gender roles stand out as one of the most traditional in the world when we compare countries that have a high level of economic development and are stable democracies (Welzel et al., 2002; World Economic Forum, 2018).

Despite the more pronounced emphasis on the role of the family, Japan has not evaded the typical features of the SDT in terms of decreased family formation and union stability (Lesthaeghe, 2020; N. Fukuda, 2016). Like the strong-family countries in southern Europe,

Japan has experienced dramatic falls in fertility and has reached what has been labelled lowest-low fertility rates below 1.5 children per woman (Atoh, 2008; Kohler et al., 2001; United Nations, 2019). Apart from the very low levels of fertility, the sharp rise in the share of OPHs is perhaps the most dramatic expression of the demographic shift associated with the SDT. In the typical weak-family societies of Sweden, Norway, Finland, and Denmark, more than 40% of households contained only one person in 2019 (Eurostat, 2021). However, the increase in OPHs that took off in the 1960s in countries such as Sweden has been attenuated since the 1990s, and levels have remained, in practice, unchanged or even decreased slightly (Sandström et al., 2020). In comparison, the share of OPHs is increasing rapidly in societies where the role of the family typically has been much more important, such as in Southern Europe (D. Reher & Requena, 2017), and in particular in the most developed nations in Asia (Yeung & Cheung, 2015). In Japan, which has the highest share of OPHs in Asia, the share of women aged 30+ living alone has doubled since the 1990s (See Table 1).

Apart from leading the pack among Asian countries in the growth of OPHs, Japan is undergoing other demographic changes associated with SDT. Divorce in Japan has increased strongly across marriage cohorts since the mid-1970s and doubled for couples married in the mid-1990s compared to those married in the early 1980s (Raymo et al., 2004). Since the turn of the millennium, the divorce rates in Sweden and Japan have been at par, hovering at 2-2.5 per 1000 inhabitants (N. Fukuda, 2016, p. 45). Japan was the first non-Western country that completed the first demographic transition and reached replacement level fertility around 2.1 children per woman in the 1950s. After two decades of stable fertility, Japan followed the trends associated with SDT in terms of strong declines in marriage rates and increased postponement of family formation, which in turn resulted in further declines in fertility (Atoh, 2008). Since the mid-1970s, total fertility declined unabated and reached 1.29 children per woman in 2005 and has only recovered slightly to levels around 1.4 since then (Cheng, 2020). In comparison, fertility in the Nordic countries has remained close to replacement level fertility of two children per woman since the end of the baby boom period in the 1970s (Jalovaara et al., 2018).

Although it shares many demographic traits with Western countries, family researchers have argued that Japan is not following the typical Northwestern development towards family nuclearization; rather, Japan still upholds many of the typical behaviors and values characterizing the traditional stem family system (Kumagai, 2010; Kato, 2013). One such trait is the continued relevance of intergenerational co-residence where elderly parents share a

household with their eldest child. Studies of contemporary intergenerational co-residence in Japan show that although the share of children co-residing with parents at the time of marriage has declined, about 30 percent of married women born in the 1960s shared a household with a parent 15 years after marriage (Kato, 2013). In addition, some Asian family researchers have argued that the evidence for a marked shift towards more individualistic values appears to be scant in Asian countries like Japan (Atoh, 2001; Atoh et al., 2004; Raymo et al., 2015). Rather, it has been argued that the trend towards "less family" should be understood as the result of rapid modernization and changes in the economic roles of women, but with slow or absent changes in the expectations for intergenerational support and gender equity among men in line with the explanations proposed by the U-shape theory. Other scholars have argued that the developed Asian societies have not been insulated from the value shifts associated with SDT (Lesthaeghe, 2020), and that it is possible to show that the increased significance of individualism in recent cohorts of young Japanese men and women has worked in conjunction with economic changes to produce lower rates of family formation (N. Fukuda, 2016).

So, even though the demographic regime of Japan is undergoing substantial changes and shares many traits found in the weak-family societies in Northern Europe, the picture is multifaceted, showing signs of both continuity and change. Family dynamics and attitudes still exhibit sharp contrasts in some areas compared to a country such as Sweden, which is a staunchly individualistic society. Sweden has for a long time had one of the lowest levels of intergenerational co-residence in the world (Iacovou & Skew, 2011). In Sweden, only 2.8% of those aged 80+ lived with their children in 2004 (Hank, 2007). Another important contrast between family dynamics in Sweden and Japan is that premarital cohabitation and non-marital childbearing is a majority behavior in Sweden, where most first births are out of wedlock and 57% of all children born to mothers aged 40 in 2015 (born 1975) had occurred out of wedlock (Statistics Sweden, 2014, pp. 70–72). In comparison, the incidence of extramarital births is still exceedingly low in Japan compared to most highly developed countries, amounting to only 2% of all births in 2010 (N. Fukuda, 2016, p. 92).

The main reason for the very low rates of out of wedlock childbearing in Japan is that cohabitation so far has not developed into an acceptable long-term alternative to marriage, although there are signs of both increased incidence and acceptance of cohabitation in the most recent decades (Matsuda, 2020). An example of this development is that the share of 25 to 29-year-olds that have ever cohabitated has tripled in Japan from 3% to 12 % since the

1980s, but it typically remains a short transitional stage in the life-course before formal marriage (N. Fukuda, 2016, p. 46). Only about 2% of unmarried women aged 25-29 cohabitated with a partner in Japan in 2010 (Raymo et al., 2015). In Sweden, 36% of women in the same age group lived in a co-habitational relationship in 2011 (Statistics Sweden, 2020). That cohabitation ratios of unmarried young couples remain low in Japan has been stressed as a contributing factor to the very low fertility rates there (Atoh, 2008). The evident differences in family dynamics highlight how Japan's strong family system still appears resistant to change in several areas compared to Sweden.

These contrasts make a comparison of the demographic and socioeconomic compositions of the OPH populations between the two countries interesting**.** Japan has experienced marked increases, yet Sweden remained virtually stable, in terms of the prevalence of OPH households, so to what extent have the compositions of the OPH populations in the two countries changed over time? Is Japan becoming more like the archetypal post-materialistic Sweden in terms of the characteristics of those who live alone? Or, is Japan following a different path due to the contextual differences in culture and family systems, governing patterns of union formation, dissolution, and intergenerational co-residence?

Until recently, little attention was given to the determinants of living alone in different contexts in demographic research, and there is still limited knowledge on how the composition of the population living alone is changing as this living arrangement goes from being a marginal phenomenon to one of the most common. Most systematic work on this issue has focused on Europe and North America, and to our best knowledge, there have so far not been any comparative studies on potential differences in the characteristics of OPHs between weak-family countries such as Sweden, with a longer history of high rates of OPHs, and strong-family countries in Asia, such as Japan, that are experiencing rapid increases in the share of OPHs. This paper is a first attempt to compare how the determinants of being an OPH have developed over a longer period, stretching from 1990 up until 2016, in a typically weak-family society, such as Sweden, versus a strong-family society in Asia, such as Japan.

Data and method

Data

The focus of the current study is women aged 30 years and older. This is motivated by the fact that women's economic roles have been changing over time, in a much more drastic way compared to the ones of men (Blossfeld & Kiernan, 2019). Theoretical models in both

economy, sociology, and demography tend to stress the changes in women's human capital and integration into market processes outside of the family as the main determinant of changes in family behavior. Given this, we choose to focus our analysis on women, and excluded individuals below age 30 to ensure that a majority of the women included in the analysis have completed their education and have had time to establish themselves in the labor market.

The dataset used for the analysis is microdata from both countries consisting of register data covering the entire population in Sweden for the years 1990, 2011, and 2016 and the Comprehensive Survey of Living Conditions (CSLC) in Japan for the years 1989, 2001, 2011, and 2016. We included only individuals who lived in private dwellings, except for the Swedish data in 1990 for which we were unable to distinguish between private and public dwellings due to data limitations. This means that the data for Sweden in 1990 includes individuals who lived in special housing such as elderly care facilities primarily involving women aged 80+. In the age group 65-79, only about 1.5% lived in collective housing/care facilities, so the impact on results for 1990 should be negligible for all age groups below 80 (Johansson et al., 2018). All datasets for Sweden are based on the administrative population registers from Statistics Sweden, which contain yearly information on household composition based on the Swedish dwelling register (Statistics Sweden, 2013) and the Population and Housing Census of 1990, as well as complete fertility histories based on the multi-generation register (Statistics Sweden, 2011). The reason that we do not provide any estimates for the year 2000 for Sweden is that there is no register-based dwelling information for the period between the last traditional census in Sweden in 1990 and 2011 when the new dwelling register came online. Socio-economic information on income, occupational sector, and education is drawn from the integrated database for labor market research (Statistics Sweden, 2016). Of an initial total of 9,024,618 women aged 30+, 718 observations were excluded due to missing values for some variables and 113,607 individuals who were not living in private dwellings in 2011 and 2016 and were excluded. We eventually constructed a dataset consisting of 8,910,293 women in Sweden.

The Japanese dataset CSLC is a nationally representative, repeated cross-sectional survey of the non-institutionalized population in Japan. CLSC has been conducted once every three years since 1986 by the Ministry of Health, Labour, and Welfare (MHLW). It contains four questionnaires respectively on a respondent's health information, household structures, income statistics, and long-term care utilization. The health and household questionnaires

cover a random sample of the entire population with 600-800 thousand respondents in each survey year. The income questionnaire randomly selects 10% of the full sample to collect income information. We extracted data for the years 1989, 2010, and 2016 in accordance with the Swedish data points. We further added the data for the year 2001 to trace the evolution of OPHs in Japan more precisely with a 10-year interval. Of an initial total of 217,689 women with income information, we eliminated 63,633 cases of women aged under 30 years old and 27,718 cases with missing information on variables of interest, which eventually constructed a sample of 126,338 women in Japan.

Both datasets contain information on the demographic and socioeconomic characteristics of the respective female populations. Previous studies show that the Japanese dataset is nationally representative regarding the relevant characteristics (Shibuya et al., 2002). In fact, many of the released government statistics are calculated based on this dataset (MHLW, 2017).

Variables

We harmonized the variables used in the estimations in order to make a strictly comparative perspective possible. We define the dependent variable identically across the countries based on the living arrangements of individuals coded as a straightforward binary variable: living alone or living with others.

We also defined the following independent variables identically across the countries: age (coded into 11 five-year groups from 30-34 to 80+), civil status (never married, married, divorced, and widowed), parental status (childless women versus mothers), and income quartiles (Q1 low, Q2, Q3, and Q4 high). We harmonized the following independent variables with equivalent meanings across the countries: level of education (primary or less, secondary, university or above), classified based on International Standard Classification of Education (ISCED); place of residence (rural versus urban), where urban is defined for regions with more than 50,000 habitants in Japan. For Sweden, the classification of urban and rural areas is based on the Swedish Association of Local Authorities and Regions division of municipalities, divided into a total of ten groups based on structural parameters, such as population, economic structure, and commuting patterns (Ålhvik & Gillingsjö, 2016). This includes 1) Metropolitan (Stockholm, Göteborg, Malmö), 2) Larger cities, 3) Suburban, metropolitan, 4) Suburban, larger cities, 5) Commuter municipalities, 6) Small towns, 7) Commuter municipalities near small towns 8) Municipalities in sparsely populated regions 9.)

Municipalities in sparsely populated regions with tourism and amenity industries. The first four categories are considered urban areas while 5-9 are designated rural.

Occupational status with seven categories is defined based on Swedish Standard Classification of Occupations (SSYK) codes and Japanese Standard Classification of Occupations (JSCO) codes, which both are based on the international ISCO classification system for occupations. This variable is used as a control variable.

Statistical analysis

Since the dependent variable (living alone versus living with others) is binary, we used logistic regression to estimate the odds ratio of living alone dependent on individual-level characteristics. In addition to odds ratios, we also estimated predicted probabilities in the form of average marginal effects (Williams, Richard, 2012) for the relevant theoretical variables.

As shown in Table 1, parental status and level of education were unavailable in Japan until 2010. Therefore, we estimated logistic models for each year that are restricted to the variables available in both countries for the entire period of 1989-2016 to generate strictly comparable results between the two countries regarding temporal development. The second set of adjustments were made by adding parental status and level of education, which applies only to the year 2016. All estimations were performed using Stata version 16.1 (StataCorp, College Station, TX).

Results

In Tables 1-3, we present the empirical results for both countries for the period of 1989-2016. Table 1 shows descriptive statistics for all variables included in our analysis by survey year. Table 2 shows the descriptive proportion of women living alone by year, country, and sociodemographic characteristics. Finally, in Table 3, we show logistic regression estimates of the net association between individual level characteristics and the likelihood of living alone by year and country for the variables that we have comparable data for across all survey years.

Regarding the temporal changes of OPHs in Sweden and Japan, Table 1 shows that the share of women living alone in Sweden has not increased since the 1990s, but rather decreased slightly from 25.3% to 22.4%. In comparison, the share of Japanese women living alone almost doubled from 6.0% in 1989 to 11.5% in 2016. Particularly, there was a substantial

increase during the 1990s when the share of women living alone increased by 3.3% from 1989 to 2001. The OPH population in Japan has continued to increase since then, although at a slightly slower pace. However, overall, Swedish women aged 30 and older were still twice as likely to live alone compared to Japanese women in 2016.

Table 1: Descriptive statistics

	SWEDEN			JAPAN			
	1990	**2011**	**2016**	**1989**	**2001**	**2010**	**2016**
N	**2,723,308**	**3,034,014**	**3,152,971**	**40,250**	**32,722**	**27,715**	**25,651**
Living arrangement							
Cohabits	2,033,308 (74.7%)	2,357,089 (77.7%)	2,446,545 (77.6%)	37,824 (94.0%)	29,674 (90.7%)	24,701 (89.1%)	22,698 (88.5%)
Alone	690,000 (25.3%)	676,925 (22.3%)	706,426 (22.4%)	2,426 (6.0%)	3,048 (9.3%)	3,014 (10.9%)	2,953 (11.5%)
Age group							
30-34	280,656 (10.3%)	283,522 (9.3%)	306,484 (9.7%)	4,004 (9.9%)	2,716 (8.3%)	1,948 (7.0%)	1,546 (6.0%)
35-39	286,266 (10.5%)	306,369 (10.1%)	299,761 (9.5%)	5,064 (12.6%)	2,687 (8.2%)	2,346 (8.5%)	1,820 (7.1%)
40-44	321,295 (11.8%)	316,701 (10.4%)	316,985 (10.1%)	5,118 (12.7%)	2,787 (8.5%)	2,347 (8.5%)	2,241 (8.7%)
45-49	298,722 (11.0%)	323,683 (10.7%)	323,174 (10.2%)	4,747 (11.8%)	3,070 (9.4%)	2,213 (8.0%)	2,167 (8.4%)
50-54	230,910 (8.5%)	287,724 (9.5%)	326,202 (10.3%)	4,299 (10.7%)	3,948 (12.1%)	2,270 (8.2%)	2,094 (8.2%)
55-59	210,029 (7.7%)	284,088 (9.4%)	286,855 (9.1%)	4,012 (10.0%)	3,056 (9.3%)	2,809 (10.1%)	2,164 (8.4%)
60-64	219,626 (8.1%)	298,324 (9.8%)	279,342 (8.9%)	3,744 (9.3%)	3,154 (9.6%)	3,198 (11.5%)	2,591 (10.1%)
65-69	234,521 (8.6%)	288,922 (9.5%)	288,136 (9.1%)	3,125 (7.8%)	3,343 (10.2%)	2,733 (9.9%)	3,157 (12.3%)
70-74	215,813 (7.9%)	204,995 (6.8%)	271,962 (8.6%)	2,398 (6.0%)	2,997 (9.2%)	2,476 (8.9%)	2,294 (8.9%)
75-79	184,906 (6.8%)	162,820 (5.4%)	183,998 (5.8%)	1,944 (4.8%)	2,306 (7.0%)	2,213 (8.0%)	2,060 (8.0%)
80+	240,564 (8.8%)	276,866 (9.1%)	270,072 (8.6%)	1,795 (4.5%)	2,658 (8.1%)	3,162 (11.4%)	3,517 (13.7%)
Civil status							
Never married	373,418 (13.7%)	693,332 (22.9%)	758,277 (24.0%)	1,617 (4.0%)	2,091 (6.4%)	2,306 (8.3%)	2,390 (9.3%)
Married	1,570,239 (57.7%)	1,512,360 (49.8%)	1,560,794 (49.5%)	30,508 (75.8%)	23,016 (70.3%)	18,911 (68.2%)	17,219 (67.1%)
Divorced	322,835 (11.9%)	491,232 (16.2%)	525,525 (16.7%)	1,276 (3.2%)	1,514 (4.6%)	1,561 (5.6%)	1,584 (6.2%)
Widow	456,816 (16.8%)	337,090 (11.1%)	308,375 (9.8%)	6,849 (17.0%)	6,101 (18.6%)	4,937 (17.8%)	4,458 (17.4%)
Place of residence							
Rural	1,028,937 (37.8%)	1,038,961 (34.2%)	1,048,686 (33.3%)	14,860 (36.9%)	13,965 (42.7%)	6,898 (24.9%)	6,526 (25.4%)
Urban	1,694,371 (62.2%)	1,995,053 (65.8%)	2,104,285 (66.7%)	25,390 (63.1%)	18,757 (57.3%)	20,817 (75.1%)	19,125 (74.6%)

Occupation							
Not working	1,160,740 (42.6%)	486,897 (16.0%)	1,367,538 (43.4%)	22,986 (58.7%)	16,800 (56.2%)	14,470 (55.8%)	12,834 (53.4%)
Senior managers	39,181 (1.4%)	107,985 (3.6%)	104,872 (3.3%)	501 (1.3%)	400 (1.3%)	240 (0.9%)	240 (1.0%)
Professionals	442,691 (16.3%)	990,006 (32.6%)	793,061 (25.2%)	1,545 (3.9%)	2,063 (6.9%)	2,504 (9.7%)	2,504 (10.4%)
Clerks	289,958 (10.6%)	345,984 (11.4%)	182,368 (5.8%)	2,756 (7.0%)	2,526 (8.4%)	2,563 (9.9%)	2,660 (11.1%)
Service workers	413,164 (15.2%)	753,068 (24.8%)	524,576 (16.6%)	5,045 (12.9%)	4,417 (14.8%)	3,880 (15.0%)	3,707 (15.4%)
Skilled agricultural	22,815 (0.8%)	25,238 (0.8%)	21,392 (0.7%)	1,934 (4.9%)	1,279 (4.3%)	776 (3.0%)	657 (2.7%)
Craft workers	354,759 (13.0%)	324,836 (10.7%)	159,164 (5.0%)	4,421 (11.3%)	2,425 (8.1%)	1,496 (5.8%)	1,420 (5.9%)
Income quartile							
Q1 Low	986,578 (36.2%)	912,246 (30.1%)	935,296 (29.7%)	17,297 (43.0%)	12,989 (39.7%)	10,408 (37.6%)	9,548 (37.2%)
Q2	817,570 (30.0%)	866,108 (28.5%)	867,960 (27.5%)	14,384 (35.7%)	11,345 (34.7%)	9,652 (34.8%)	8,776 (34.2%)
Q3	602,414 (22.1%)	765,573 (25.2%)	788,827 (25.0%)	6,605 (16.4%)	6,073 (18.6%)	5,251 (18.9%)	4,983 (19.4%)
Q4 High	316,746 (11.6%)	490,087 (16.2%)	560,888 (17.8%)	1,964 (4.9%)	2,315 (7.1%)	2,404 (8.7%)	2,344 (9.1%)
Level of education							
Primary school	1,089,565 (40.0%)	646,311 (21.3%)	556,471 (17.6%)	-	-	5,883 (23.8%)	4,181 (19.0%)
Secondary	919,350 (33.8%)	1,379,210 (45.5%)	1,420,307 (45.0%)	-	-	13,709 (55.5%)	12,491 (56.8%)
University	435,683 (16.0%)	969,471 (32.0%)	1,133,999 (36.0%)	-	-	5,090 (20.6%)	5,326 (24.2%)
Parental status							
Childless	479,731 (17.6%)	457,567 (15.1%)	487,659 (15.5%)	-	-	5,037 (19.0%)	4,905 (20.1%)
Parent	2,243,577 (82.4%)	2,576,447 (84.9%)	2,665,312 (84.5%)	-	-	21,495 (81.0%)	19,512 (79.9%)

Table 2: Proportion of women living alone by year and sociodemographic characteristics.

	SWEDEN			**JAPAN**			
	1990	**2011**	**2016**	**1989**	**2001**	**2010**	**2016**
Age group							
30-34	11.77%	11.27%	11.59%	1.92%	3.57%	3.90%	3.56%
35-39	7.97%	8.11%	8.43%	1.38%	2.38%	3.37%	2.64%
40-44	8.15%	7.69%	7.94%	1.78%	2.73%	2.94%	3.70%
45-49	11.44%	9.86%	9.76%	2.80%	3.88%	4.43%	5.12%
50-54	15.90%	13.97%	14.04%	3.84%	4.20%	5.24%	5.49%
55-59	20.59%	19.15%	19.28%	6.26%	6.90%	6.62%	6.79%
60-64	26.48%	23.51%	23.96%	8.76%	10.65%	9.38%	8.03%
65-69	34.40%	28.15%	28.26%	12.54%	14.60%	13.06%	12.83%
70-74	44.90%	34.91%	33.68%	16.14%	17.18%	17.21%	17.44%
75-79	56.73%	44.76%	42.81%	16.82%	22.07%	25.58%	22.43%
80+	63.65%	62.61%	62.60%	11.42%	17.57%	23.34%	26.13%

Civil status							
Never married	42.86%	27.55%	28.53%	29.31%	27.14%	23.44%	24.59%
Married	1.28%	1.28%	1.37%	0.19%	0.39%	0.62%	0.60%
Divorced	46.25%	42.55%	43.70%	27.66%	32.50%	32.59%	30.22%
Widow	78.92%	76.41%	77.54%	22.51%	31.12%	37.37%	39.95%
Place of residence							
Rural	23.00%	21.86%	22.38%	5.36%	7.85%	10.52%	10.63%
Urban	26.75%	22.55%	22.42%	6.42%	10.40%	10.98%	11.81%
Occupation							
Not working	41.55%	39.58%	34.07%	6.27%	11.15%	12.57%	14.09%
Senior managers	14.16%	14.50%	10.12%	8.38%	9.50%	10.42%	11.25%
Professionals	14.24%	16.88%	13.14%	6.80%	8.63%	8.46%	7.83%
Clerks	14.44%	22.89%	15.00%	6.10%	6.14%	6.52%	5.86%
Service workers	11.68%	18.98%	13.60%	7.06%	8.11%	8.40%	8.71%
Skilled agricultural	5.20%	22.55%	19.30%	3.46%	3.91%	4.64%	3.35%
Craft workers	13.39%	22.68%	14.36%	3.85%	6.19%	6.95%	9.51%
Income quartile							
Q1 Low	30.56%	26.83%	28.02%	0.01%	1.72%	2.56%	3.90%
Q2	21.28%	26.79%	26.90%	9.83%	12.38%	14.02%	14.88%
Q3	21.98%	15.59%	15.74%	12.34%	18.38%	20.19%	19.33%
Q4 High	25.90%	16.47%	15.46%	9.98%	13.13%	13.89%	13.27%
Level of education							
Primary school	26.62%	34.92%	34.70%	-	-	16.25%	18.27%
Secondary	17.67%	20.32%	21.85%	-	-	9.50%	10.68%
University	16.62%	16.59%	17.08%	-	-	6.03%	6.66%
Parental status				-	-		
Childless	51.16%	41.90%	41.21%	-	-	21.45%	22.03%
Parent	19.80%	18.83%	18.97%	-	-	7.63%	8.27%

Table 3: Estimated odds ratios from logistic regressions for the probability of living alone, by year.

	SWEDEN			**JAPAN**			
	1990	**2011**	**2016**	**1989**	**2001**	**2010**	**2016**
Age group							
30-34	(base)	(base)	(base)	(base)	(base)	(base)	(base)
35-39	0.80***	0.84***	0.87***	1.17	0.94	1.35	1.08
40-44	0.90***	0.84***	0.89***	1.53*	1.48*	1.33	1.88**
45-49	1.53***	1.10***	1.10***	3.26***	2.59***	2.49***	2.99***
50-54	2.84***	1.85***	1.70***	4.43***	2.97***	4.27***	3.97***
55-59	4.74***	3.32***	2.84***	8.40***	6.19***	6.76***	7.02***
60-64	7.21***	5.27***	4.53***	9.51***	10.89***	10.76***	11.88***
65-69	9.54***	7.55***	6.02***	9.89***	12.78***	11.29***	18.63***
70-74	12.06***	10.04***	7.52***	10.20***	11.06***	15.10***	21.54***
75-79	13.30***	12.52***	9.70***	7.82***	10.87***	16.66***	21.96***
80+	7.31***	12.29***	11.83***	4.31***	6.09***	8.53***	14.73***

Civil status							
Never married	116.69***	73.12***	66.87***	272.47***	165.12***	125.74***	152.51***
Married	(base)	(base)	(base)	(base)	(base)	(base)	(base)
Divorced	91.31***	68.15***	65.55***	142.32***	125.83***	85.58***	84.14***
Widow	154.31***	108.32***	107.28***	69.78***	66.94***	60.28***	68.76***
Place of residence							
Rural	(base)	(base)	(base)	(base)	(base)	(base)	(base)
Urban	1.40***	1.23***	1.20***	1.40***	1.37***	1.08	1.21**
Occupation							
Not working	(base)	(base)	(base)	(base)	(base)	(base)	(base)
Senior managers	0.83***	0.79***	0.76***	1.3	0.84	1.08	1.18
Professionals	0.84***	0.91***	0.85***	1.29	1.45**	1.09	1.17
Clerks	0.79***	0.91***	0.84***	1.01	0.82	0.73*	0.76*
Service workers	0.68***	0.78***	0.69***	1.17	0.98	1.05	1.07
Skilled agricultural	0.45***	0.69***	0.73***	0.94	0.56***	0.56**	0.47**
Craft workers	0.62***	0.84***	0.71***	0.89	0.93	0.73*	1.19
Income quartile							
Q1 Low	(base)	(base)	(base)	(base)	(base)	(base)	(base)
Q2	1.31***	1.15***	1.14***	934.33***	5.14***	4.34***	3.21***
Q3	2.02***	1.04***	1.05***	1268.63***	7.52***	5.58***	3.74***
Q4 High	2.14***	1.07***	1	1036.44***	8.05***	6.89***	4.77***
_cons	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
N	2,723,308	3,034,014	3,152,971	39,188	29,910	25,929	24,022

legend: * p<.05; ** p<.01; *** p<.001;

Age

When comparing how age has mattered for OPH living in Sweden and Japan since the 1990s, it is important to acknowledge an overall difference in the aging process in the two countries. From Table 1, we can conclude that there is a relatively minor variation in the age structure over the two decades among Swedish women, but a drastic aging process for Japanese women. Considering women over age 65, this age group has not grown in relative size in Sweden, while in Japan, the share of women aged 75-79 years has almost doubled from 4.8% in 1989 to 8% in 2016. Focusing on the oldest women aged 80+ in Japan, the increase has been even more dramatic, as this age group more than tripled in size from 4.5% to 13.7% of all women aged over 30.

Looking at the association between age and the share of women living alone in Table 2, we find a similar tendency of stability in Sweden, but a strong increase in the share of OPH women in Japan especially in the age spans of 30-55 and 75+. In these age spans, the share of

OPHs in Japan have doubled or more. Because of the relative increase in proportion of older women in Japan, and the fact that these women tend to live alone to a larger extent today, elderly women have made a disproportionate contribution to the overall increase in OPH living in Japan since the 1990s.

Although changes in OPH living have been marginal in Sweden compared to Japan, the modest decrease from 25.3% to 22.4% in the share of OPH living is not evenly distributed across age. Rather, the decrease is more pronounced in the age span 65-79, where the share has dropped considerably. This is the result of decreased mortality among men in Sweden, which has worked to reduce the female advantage in longevity. In Sweden, the difference in mean age at death for men and women has decreased from 5.6 years in 1990 to 3.5 in 2016 (Statistics Sweden, 2021b). This explains the reductions in OPH living among Swedish women aged 65-79 years between 1990 and 2016, where rates were about ¾ in 2016 compared to what they were in 1990. This is also reflected by the decreased share of widows in Sweden since the 1990s seen in Table 1. The share of widows has decreased from 16.8% in 1990 to 9.8% in 2016, although some of this decrease is also explained by a lower share of married women in the more recent cohorts.

When we control for compositional changes in the population over time and look at the net association between being an OPH and age in Table 3, shown by logistic regression estimates (odds ratio) rather than unadjusted proportions, the disproportionate contribution to the increase in OPH living in Japan made by elderly women over 65 stands out again. In Japan, it is these elderly women that have experienced the strongest relative increases in the probability to live as an OPH, with a more than doubling of the odds ratio in 2016 compared to the estimate in 1990. Additionally, the shift from an increase to a decrease in the probability to live alone, when women reach more advanced ages above 75 in Japan, which was evident in the 1990s, has been reduced in 2016. This indicates that elderly women tend to live independently as an OPH more often and to a more advanced age than they did in the 1990s in contemporary Japan. In this sense, the living arrangements of elderly women in Japan are becoming more similar to those found in Sweden since the turn of the new millennium, where we find no reduction in OPH living at all in the oldest age group above 80.

Looking at the development of the overall age pattern in OPH living, the temporal change in Sweden is moving in the opposite direction compared to Japan. Rather than substantial increases in the probability to live alone, we find a reduction in the probability of OPH living

among women in the age span of 45-74 years in comparison to women aged 30. This is not caused by a higher share of young women living alone, but by modest while evident decreases in OPH living among middle aged and older women. As mentioned, the drops among women aged 65+ are the result of increased longevity among men, while for middle aged women a lower share of OPH living among unmarried women in 2016 compared to 1990 is likely the proximate cause as indicated by Table 2.

Figure 1 demonstrates the association between age and OPH living in the form of the average marginal probability calculated from the logistic regression estimates found in Table 3, rather than as relative odds ratios. The figures provide estimates net of compositional changes in the two countries in the other independent variables included in our models across the different time points. Contrary to Sweden, we find strong increases in the probability of OPH living among women aged over 50 years old in Japan, while in Sweden, we find a reduction in the probability to live alone primarily in the age span 45-75. When we control for compositional changes in the population over time, such as a lower share of widows in Sweden in the most recent decade compared to 1990s, we find that only women in the oldest age group of 80+ years have experienced an increased probability of living alone since the 1990s. In comparison, the adjusted probabilities show a sharp increase in Japan across the decades, especially among women aged 60 years and older (Figure 1). Unlike in Sweden, where the women in the oldest age group of 80+ years are the ones that are most likely to live alone of all age groups, there is still an inflection from increase to decline in the share of women living alone among the oldest women aged 80+ years in Japan. The decline is observed even in recent years in Japan but no longer in Sweden (Figure 1).

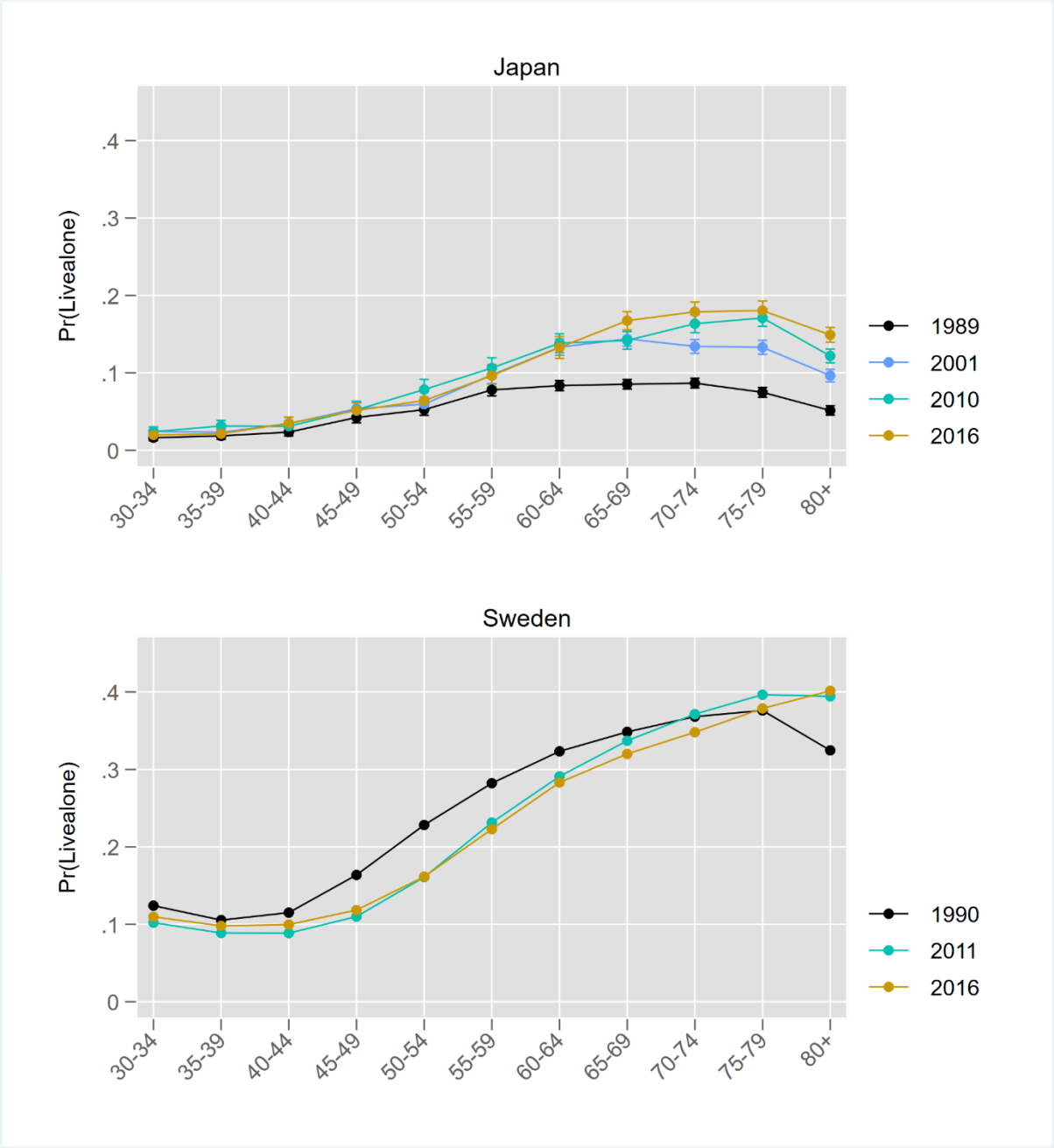

Figure 1: Probability to live alone among women in Sweden and Japan 1989-2016 by age group

Place of Residence

Switching to the issue of how geographical context impacts OPH living in the two countries, both countries exhibit diminishing differences between urban and rural contexts in the share of the population living alone. As shown in Table 2, OPH living has increased sharply among Japanese women in both rural and urban contexts, but the increase has been even stronger in rural compared to urban areas. Also, in Sweden, we find reduced differences between urban and rural contexts. However, the Swedish case is caused by most of the reduction in OPH

living occurring among women living in urban contexts, rather than rural women catching up to urban women, as in the Japanese case.

When we account for compositional differences between urban and rural women in our logistic regression in Table 3, the higher odds ratio of OPH living among urban women decreases considerably, but remains intact, during the entire period from 1990s up until 2016 in both countries. Both Japan and Sweden exhibit a symmetrical decline over time in the difference in OPH living between urban and rural women. In both countries, the higher odds ratio for urban women was cut in half, from a 40% in the 1990s to 20% in 2016. The overall development thus shows diminishing differences between urban and rural women in the probability for OPH living in both Sweden and Japan.

Civil status

There are evident similarities in how the distribution of women across different civil statuses have developed over time in Sweden and Japan. In both countries, the proportions of never married and divorced women have increased substantially over time and the share of married women have decreased in both countries. As already mentioned in the discussion of age patterns of OPH living, the main divergence between the countries is found in the development of widowed women that has decreased in Sweden, from 16.8% in 1990 to 9.7% in 2016, but remained stable in Japan at about 17%.

Regarding the temporal change in the association between OPH living and civil status, two changes in Sweden and Japan stand out in the descriptive proportions found in Table 2. In Japan, there is a marked increase in the share of widows living alone from 22% in 1989, when they were the least likely to live alone of all non-married women, to being the most likely in 2016 when almost 40% of all widows in Japan lived alone. Japan is thus showing convergence towards the pattern found between OPH living and civil status in Sweden when we look at unadjusted rates of living alone in the two countries. In Sweden, rates of OPH living have consistently been the highest among widows, followed by divorced women, and the lowest among never married. After the turn of the millennium, a similar pattern has emerged in Japan.

In Sweden, in contrast, the change that stands out over time is not so much among widows but rather a sharp reduction in the share of non-married women living alone from 43% in 1990 to 28.5% in 2016.

However, looking at adjusted probabilities, shown in Figure 2 calculated based on the regression estimates in Table 3, some evident differences between the countries emerge. When we control for the fact that never married women are younger than widowed and divorced women, there are only modest changes in how civil status influences the probability to live alone over time in Japan. Unlike Sweden, where widows have consistently had the highest probability to live alone, Japanese widows continue to be the least likely to live alone while never marrieds have the highest probability. The most evident change over time is a tendency towards convergence of the probabilities to live alone for widows and the divorced in Japan and a lowering of the probability to live alone among never marrieds in Sweden. This has closed the gap in adjusted probabilities for OPH living between the never married and the divorced in Sweden that are equally likely to live alone when we adjust for the other covariates in our model.

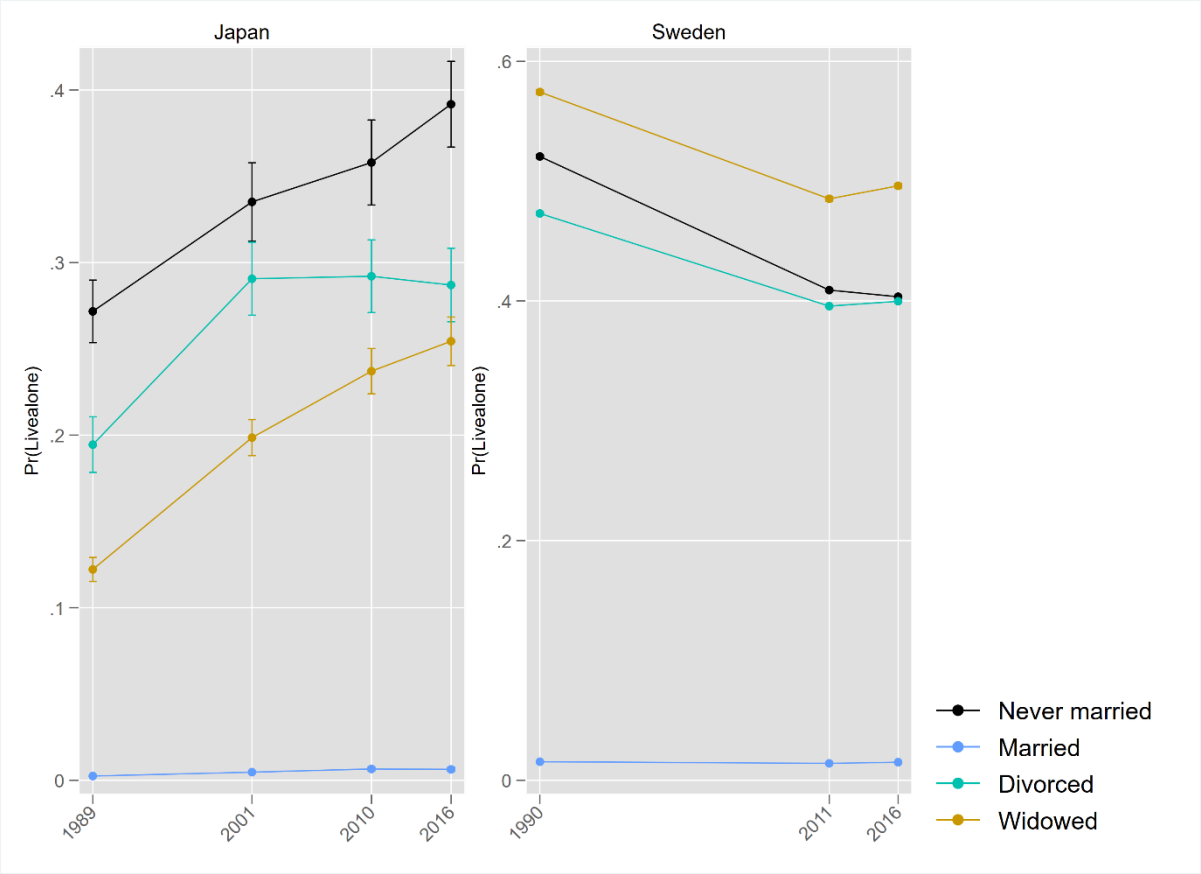

Figure 2: Probability to live alone among women in Sweden and Japan 1989-2016 by civil status

Note: Different Y-axis units are deliberately made to increase the visibility of differences between covariates in the figures.

Income

Table 1 shows that income development for women in both societies since the 1990s is characterized by a more even income distribution, with a higher share of high-income women and reduced dominance of those in the lowest income quartile. Although the increase in the share of high-income women has been more extensive in Japan, the share of women belonging to the highest income bracket has constantly been larger in Sweden during the entire study period. Notably, after a rapid growth from 5% of all women in 1989 to 9% in 2016, the share of women belonging to the highest income quartile was still twice as large (18%) in Sweden compared to Japan in 2016, illustrating the longer history of a women's entry into the labor market and higher education in Sweden compared to Japan.

Compared to age patterns and urban rural differences, where there is a tendency towards convergence in the way OPH living is related to individual level factors in the two countries, we find persistent contrasts in the way both unadjusted proportions and adjusted probabilities of OPH living are associated with women's income.

Focusing first on the unadjusted rates of living alone in Table 2, Sweden shows a strong decline in the share of high-income women living alone over time. OPH living among women in the highest income quartile declined from 26% in 1990 to 15% in 2016 and a substantial decline also occurred among women with medium-high incomes (Q3). For women with incomes below the median, rates of OPH living have remained relatively stable, and even increased among women with medium-low income (Q2).

In comparison, OPH living has increased in all income brackets in Japan, although in relative terms, the increase since the 1990s has by far been the largest in the two lowest income quartiles. Although the increase in absolute terms is very modest, this is especially the case among women with the lowest incomes (Q1), where OPH living was virtually nonexistent in the 1990s in Japan.

Contrasts are also evident between Sweden and Japan when we control for age and other variables in our model that are associated with income. Figure 5 shows the average marginal probability of OPH living for women with different levels of income. We find a strong positive gradient between income and OPH living that has persisted among Japanese women. At the same time, the gradient shows signs of weakening over time, as the growth of OPHs in the two highest income quartiles in Japan has started to attenuate since 2001, while this is not

the case among women with the lowest incomes where the probability has continued to increase in the most recent decade.

In contrast, Swedish women have become less likely to live alone regardless of income, although the decrease was by far the largest for women in the two highest income quartiles. The decreased probability was substantial between 1990 and 2011, resulting in a shift from a clearly positive relationship with income to a distinctly U-shaped one with the highest probability to live alone among women in the middle of the income distribution. So, although the positive income gradient in Japan has been markedly reduced over time, women in higher income brackets are still much more likely to live alone than women with low incomes. In 2016, women in the highest income quartile were still almost five times as likely to live alone as women with the lowest incomes (OR=4.77 in 2016).

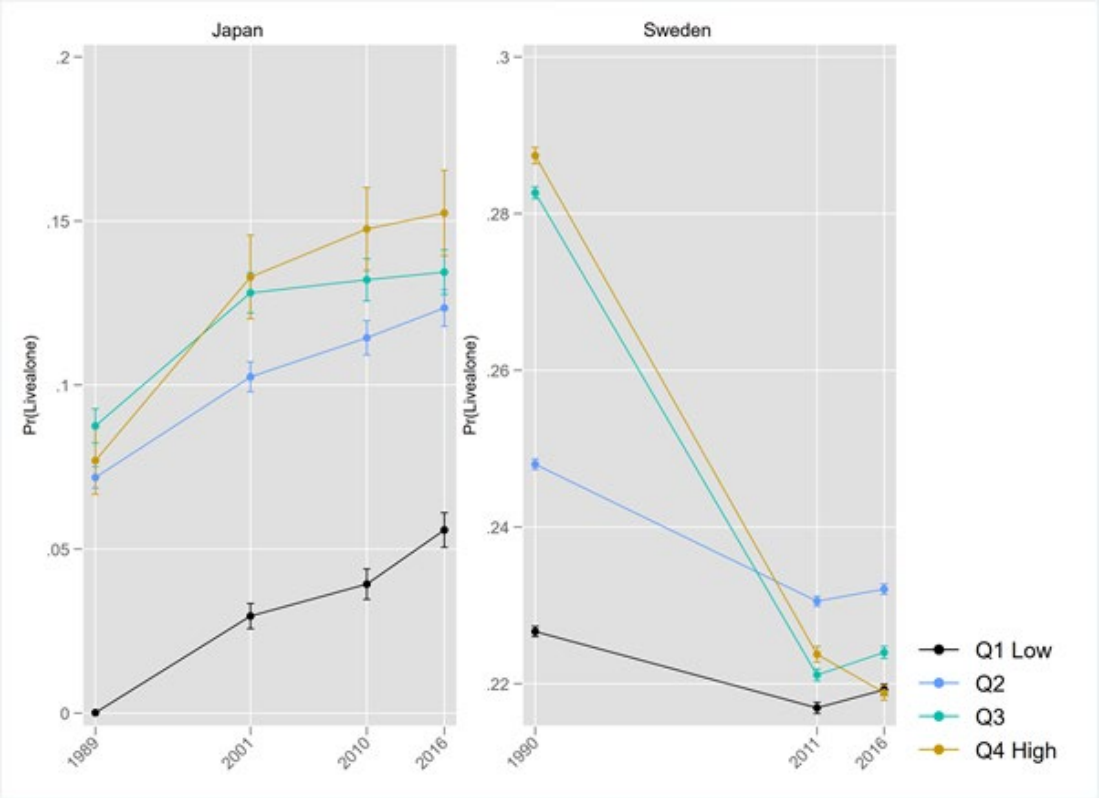

Figure 5: Probability to live alone among women in Sweden and Japan 1989-2016 by income level

Note: Different Y-axis units are deliberately made to increase the visibility of differences between covariates in the figures.

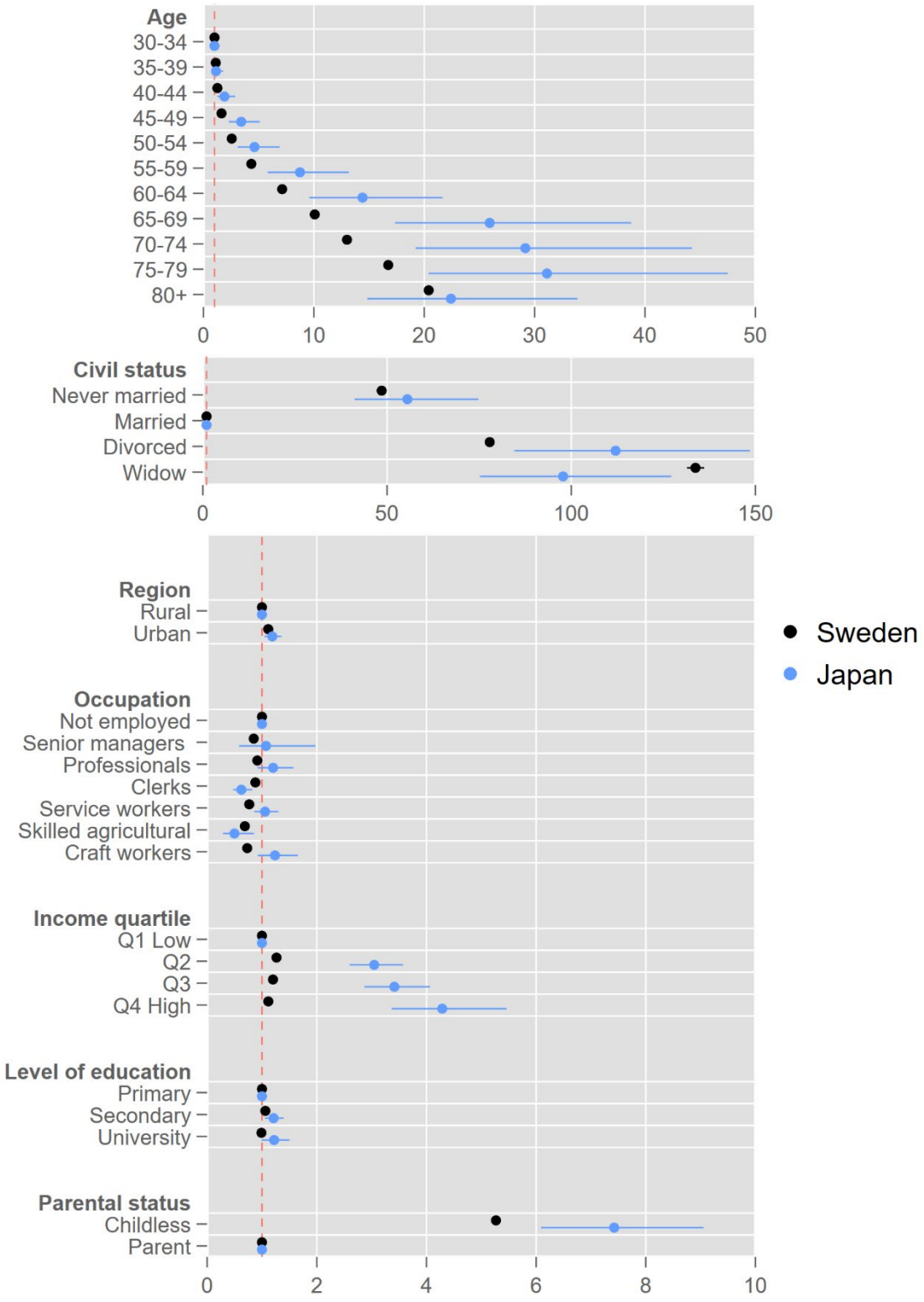

Figure 6: Estimated odds ratio and 95% confidence intervals of OPH living among women in Sweden and Japan 2016

Note: Model estimates in Figure 6 are also available in a table format in Table A1 of the appendix.

We now switch our focus to the contemporary situation in Sweden and Japan by presenting models for 2016 shown in Figure 6, where education and parental status are added to the

initial models presented in Table 3. This gives a picture of how the probability of OPH living in contemporary Sweden and Japan varies according to a fuller set of demographic and socioeconomic variables that were unavailable for Japan until 2010.

Education

Women with university degrees have increased during the last decade in both societies, illustrating further improvements in women's educational attainment (Table 1). Meanwhile, in Sweden, the share of women with university degrees was larger than in Japan (36.5% vs. 24.2% in 2016 respectively). When no adjustments were made for covariates, women with university degrees exhibit the lowest share of OPH living in both societies (Table 2). However, this relationship is strongly dependent on the fact that highly educated women are much more prevalent among younger women who are in the part of their life-course where OPH living is the lowest in both countries. When we adjust for the full set of variables including age, educational differences in OPH living are very small in both societies (Figure 6). Looking at the socioeconomic differentials, in general, it is clear that they were modest already during the 1990s in Sweden and have become even smaller due to decreases in OPH living among high-income women. In Japan, although education and the sector of employment matter little, there is still a substantial positive gradient between OPH living and income, where high income women are either constrained to, or are choosing to, live alone to a higher extent than low-income women. This relationship is present even when we control for other demographic and socioeconomic factors that might act as confounders to the relationship.

Parental Status

In both societies, majorities of women are parents (Table 1). For instance, 84.5% of Swedish women were mothers in 2016, and so were 80% of Japanese women. Parental status is a strong determinant of living alone in both societies, where childless women in both societies had higher odds of living alone compared to mothers. This is intuitive as mothers would tend to live with their children and are more likely to live with their spouse after the children potentially leave the parental home. But, parental status clearly has a greater influence on the probability to live alone in contemporary Japan, where childless women are more than 7 times as likely to live alone compared to mothers than in Sweden where they are about 5 times more likely to live alone (OR=7.42 vs. OR=5.27, respectively, Table A1).

Concluding discussion

The aim of this study is to explore the similarities and differences in the development of the demographic and socioeconomic characteristics of women aged 30 years and older who live alone in Sweden and Japan since the 1990s. Already in the 1960s, Sweden experienced a rapid increase in the share of OPHs that doubled from 9.1% of the population aged 16 and older in 1960 to 21.5% in 1990 (Lundgren, 1989; Statistics Sweden, 1992, 2021c). Since then, the incidence of OPH living has stabilized, but continues to be one of the highest in the world (OECD, 2016). Since the 1990s, Japan has also started to experience a rapid increase in the OPH population. By 2011, Japan had joined Sweden in the group of countries that has a higher share of OPHs than both the OECD and European Union average (OECD, 2016). Although Japan started out at a lower baseline level of OPH living, with only 6% of women living alone in 1990, our analysis shows that Japan has followed a lagged but similar path to Sweden in terms of doubling the OPH population over a period of about three decades. Besides making the two countries more similar in terms of the relative size of their OPH populations, the development has meant that the two countries now exhibit clear signs of convergence in terms of the characteristics of women who live alone, particularly with regards to age patterns and urban-rural differences, but they also display persistent contrasts in how socioeconomic factors and civil status impact the probability that adult women live alone.

Since the 1990s, the increase in OPH living in Japan has been especially accentuated in the age span of over 60 years, resulting in a much more positive age gradient of OPH living. Although rates of OHP living past middle age still only reach about half of those found in Sweden, the stronger increases with age in contemporary Japan have resulted in much more similar age patterns in the two countries. An interesting development in Japan is that in 2016, we no longer see a reduction in unadjusted proportions in the age group of 80+ years compared to those aged 70-79 years, which was clearly the case up until 2001 when rates of OPH living tended to drop off among the oldest women, presumably due to an substantial share of women cohabiting with children as they grew frail in the age span above 75 years. However, in 2016, OPH living among Japanese women continued to increase even in the age-span above 80 years. But, when we adjust for other variables such as civil status, and the fact that widows are most common among the oldest women, the tendency for an inflection in the probability from positive to negative among the oldest of old is still evident in 2016 in Japan but not in Sweden. We argue that the remaining differences in the age gradient reflect

persistent contrasts in how far individualistic attitudes and interconnected changes in the welfare state regimes have transformed the level of intergenerational co-residence in the two countries.

In contemporary Sweden, the age gradient of unadjusted rates of OPH living has been sharply positive from about age 40 for the entire period of 1990-2016, reaching over 60% OPHs among women aged 80+ years already in 1990 and not having declined since. Unlike Japan, the inflection from positive to negative in the adjusted rates of OPH living among the oldest of old has completely disappeared in the last two decades. The proximate causes for the step age gradient of OPH living in Sweden among women are that the country reached high rates of separation and divorce already during the 1960s (Sandström, 2012), that intergenerational co-residence between elderly and adult children has been exceedingly low for a long time, and that women have retained a mortality advantage over men, although it has diminished in size since the 1990s. Although children provide a substantial amount of care to frail parents in Sweden (Ulmanen & Szebehely, 2015), it is very rarely achieved through co-residence. Sweden has for many decades scored at the very top of surveys measuring the support for post-materialist values such as individual independence (World Value Survey, 2020; World Economic Forum, 2018). Elderly Swedes are the most prone of all Europeans to express negative attitudes to being reliant on filial care from children (Daatland & Lowenstein, 2005; Ulmanen & Szebehely, 2015). Institutional arrangements and the welfare state organization that reduced the need for family-based care of elderly expanded rapidly already in the 1950s, both in terms of long-term care and as home care services, and they have been publicly funded and allocated based on needs assessments. Welfare state provisions for elderly care continued to grow up until the late 1970s when 32% of those aged 65+ years received either institutional or home-based care (Johansson et al., 2018). The welfare state model in Sweden has thus worked to make its elderly highly independent of family members for care needs and services. Although care provisions have been reduced since the 1980s to the extent that researchers have talked about a "re-familiarization" of Swedish elderly care (Ulmanen & Szebehely, 2014), this has not resulted in increased intergenerational co-residence between children and elderly parents. In the last decade, less than 1% of the population aged 65+ years lived with children (Rodrigues et al., 2012, p. 34), which is a further decline since the 1990s when the rate was 4% (Sundström & Malmberg, 2004). Since the 1990s, elderly care policy in Sweden has been characterized by an age-in-place strategy, and home care has been highly targeted against individuals living alone (Johansson et al., 2018; Sandberg et al., 2019).

Consequently, it facilitates the possibility of elderly women retaining living arrangements independent of kin after a separation or becoming a widow.

Although Japan has not reached the outlier conditions of extremely low levels of intergenerational co-residence as found in Sweden, there are evident changes in values and institutions that stand out as important contributing factors to the increase in OPH living among older women in Japan since the 1990s. The most important proximate cause being a decline in the share of the population aged 65+ years living with adult children since the late 1980s, which has almost been cut in half from 56% in 1986 to 29% in 2019 (Ministry of Health, Labour and Welfare, 2021).

We find no evidence of substantial changes in the civil status composition or increased rates of childlessness being significant contributors to increased OPH living among older women in Japan. Although the radical decline in fertility among women born since the 1960s has resulted in sharp increases in childlessness, this only pertains to the cohorts born after 1955 that had not reached retirement age by 2016. Childlessness remained in the range of 8-10% for women born between 1935-1955 but has since increased to 27% for women born in 1970 (Cheng, 2020; Hara, 2008). That childlessness remained low among women born before the 1960s means that increased constraints in the supply of children does not explain increases in OPH living among women 65+ years old in the last decades in Japan. Women aged 65+ years in 2016 belong to the cohorts born prior to 1951 that have approximately the same levels of childlessness as women born in the 1930s (Hara, 2008). However, the radically lower fertility in the cohorts born since the 1960s will, other things remaining equal, have a major impact on OPH living among older women in Japan in the coming decades. Given the strong importance of intergenerational coresidence in Japan compared to Sweden, the fact that childlessness has approximately tripled across the cohort between 1950-1970 will likely have a major positive influence on OPH living among elderly Japanese women in coming decades.

So, rather than childlessness, or civil status composition, other factors like changing preferences and decreased support for filial interdependence in Japan are more likely to be the explanations for the steeper age gradient of OPH living in Japan. Studies show that values favoring independence of the elderly have increased in significance during the period we analyze and attitudes towards filial care have become markedly more negative since the 1980s (N. Fukuda, 2016; Atoh, 2001). The share of Japanese women who agreed with the statement that caring for elderly parents is a “natural duty” decreased from 57% in the late

1980s to 31% around the turn of the new millennium and only 11% percent stated that this kind of intergenerational support was a “good custom” (N. Fukuda, 2016, p. 52).

In additional to changing values regarding filial care, the welfare state regime in Japan has also changed in the direction of Sweden in terms of radically increasing the level of publicly funded care and services to the elderly, which has worked to increase possibilities for elderly women to retain independent living arrangements as they age. In 2000, a public long-term and home care insurance system was introduced in Japan, meaning that Japan “moved decisively toward socialization of care for the frail elderly” (Campbell et al., 2010). The Japanese government justified this expansion of public elderly care services with the need to ensure seniors an independent life with dignity and to alleviate the physical and mental burdens of family caregivers given the shrinking number of multi-generation households and increasing number of working women in Japan (Tamiya et al., 2011). The public long-term care services have become popularized quickly since 2000 with rapid increases in the number of recipients (Fu and Noguchi, 2019). Specifically, the number of recipients almost doubled from 3.7 million in 2003 to 6.1 million in 2015; and in 2015, 4.3% of the population aged 65-74 years and 32.5% of population aged 75 years and above used the services (Government of Japan. Cabinet Office, 2018, p. 31). Our results thus indicate that changes in preferences and institutional structures have worked to make OPH living with public support more popular among elderly Japanese women, compared to co-residing with their children to seek intensive informal daily life support. In this way, Japan has converged with Sweden in terms of both attitudes toward filial care becoming more negative and choosing to expand publicly funded support to the elderly to facilitate living independently from their kin. This finding indicates a culture that has historically had the character of a strong family system is not insulated from the general trends of increased individualism that have spread in the West after levels of affluence increased since the 1960s.

Another area where the two countries exhibit similar development is in the decreasing positive association between urban contexts and OPH living among women in both countries since the 1990s. The reduced differences in both unadjusted and adjusted probabilities of OPH living between urban and rural contexts show that societal restructuring has worked to make determinants of OPH living more evenly distributed across different geographical contexts in both societies. However, based on our results here, it is not clear if the causes for reduced urban-rural differences are the same in both countries.

However, even though we find clear signs of convergence in both the levels and age pattern of OPH living among women in Sweden and Japan since the 1990s, and increased similarities in both values and institutions, persistent contrasts remain when we focus on the effects of family history and even more so on the effect of socioeconomic status in contemporary Sweden and Japan.

For example, the historical path dependencies related to Japan's strong-family system are evident when we consider that although the importance of filial support and intergenerational co-residence has diminished considerably in the last decades in Japan, it still plays a far greater role than in Sweden. Even if we find increased similarities, in terms of the strong increase in the share of Japanese widows who live alone, and that widows today are the most likely civil status among OPH women in both countries, there are still clear differences in the impact of parental status and how it is associated with civil status. When we adjust for differences in age and parental status, widowed women in Sweden are still most likely to live as an OPH. In Japan, we need to include a control for parental status to get a pattern that is more similar to the effect of civil status in Sweden (compare estimates for civil status in Table 3 versus the saturated model including a control for parental status in Figure 6). When parental status is controlled for widows and divorced women have the highest odds ratio to live alone in Japan which is not the case when parental status is not controlled for. Both the fact that the positive effect of childlessness is still much stronger in Japan than in Sweden, and the fact that civil status is much more correlated with parental status in Japan, as shown by its strong impact on the estimates for civil status in Japan but not in Sweden, reveal the lingering relevance of a more traditional family system in Japan and the continued although diminishing impact of intergenerational co-residence in Japan compared to Sweden.

It is perhaps when we look at the impact of female human capital and how socioeconomic factors are associated with women´s likelihoods to live alone that we find the sharpest contrasts between contemporary Sweden and Japan. Japan still exhibits the typical SDT trait that women with high levels of human capital are leading the shift towards "less" family in terms of having the highest probabilities to live alone. Of the socioeconomic indicators we include in the analysis, income is by far the most influential factor for differences in OPH living in Japan. That income is the strongest determinant is the expected pattern, as income is a more immediate indicator of women's economic independence and career orientation than education or sector of employment. Unlike Sweden, the positive income gradient in contemporary Japan remains strong and women with the highest incomes are almost 5 times

as likely to live alone as women with the lowest incomes in 2016. In Sweden, on the other hand, the gradient has shifted from a modest but positive income gradient in the 1990s to an essentially flat or only weakly inverted U-shaped relationship in 2016. Although the differences between women with different levels of income are very small in Sweden, it is the women with medium-low-income levels who have a slightly higher probability of OPH living rather than women at the top of the income distribution.

These persistent contrasts in how female human capital and economic resources influence the probability to live alone among women in Sweden and Japan are most easily explained by the differences in gender regimes that still exist between the two countries. In the economic sphere, Japanese women in peak childbearing ages 25-34 have made a giant leap in labor force participation from less than 50% in the early 1980s to over 80% in 2018 (Statistics Bureau of Japan, 2021). Their human capital accumulation is now at par with men as the gender gap in education was closed already in the early 1990s (N. Fukuda, 2016, p. 49). These changes represent a sharp shift towards economic self-sufficiency and stronger career orientation among Japanese women. However, although attitudes on gender roles and the level of conjugal specialization are undergoing change, they remain highly traditional in comparison to developed Western countries in general and to the Nordic ones in particular. While Sweden ranked as the third country in the world behind Iceland and Norway in the Global Gender Gap Report in 2018, Japan ranked as the 110th country out of a total of 149 countries ranked (World Economic Forum, 2018). Although the exactness of such comparisons can be debated, the vast difference between the two countries illustrates that value changes, both in the labor market and among men, still have a long way to go in Japan in terms of lowering constraints to family formation for economically active women. In addition to general assessments of gender equality on the societal level such as the Global Gender Gap index, studies on assortative mating show that expectations of female hypergamy remain strong in Japan (S. Fukuda et al., 2020) and that the gender regime in the household division of work is still one of the most asymmetrical in the developed world (Fuwa, 2004). Given the tradeoffs imposed by the persistence of a rather traditional gender regime in Japan, it is not surprising that OPH living still has a strong positive relationship with women's income levels in contemporary Japan.

In comparison, the increases in female economic activity in Japan are of a much more recent date than in Sweden. In 1990, when our analysis begins, Swedish women with children under age 16 had a labor force participation rate of 89.9% (Stanfors, 2003) which at that time in

practice was at par with men aged 25-44 (Statistics Sweden, 2021a). During the period we study here, Sweden and the other Nordic countries have consistently remained at the very top of evaluations of the level of gender equality both in the labor market, political institutions and values expressed by men (Esping-Andersen, 2016). Time-use surveys find that conjugal specialization between market and domestic work has declined sharply in Sweden since the 1970s. Although women still allocate more time to unpaid work than men, men contribute slightly more than 40 % of total unpaid domestic work in contemporary Sweden, Norway and Denmark (Esping-Andersen, 2016, p. 50; Statistics Sweden, 2018, p. 44). That the weakly positive effect of income on OPH living that our analysis uncovers for the 1990s in Sweden disappeared by 2016 is an indication that a continued shift towards increased gender symmetrical values has worked to further decrease disincentives to family formation among employed women with higher levels of human capital. Potentially this is also a contributing factor to the shift from an increase to a decrease in OPH living in Sweden since the 1990s, in particular among women in the age span between 40-64 years old, while decreases in the age span above 65 years old has been the result of a mechanical effect of decreased differences in longevity between men and women.

Lastly, we return to the two partly competing theoretical models of the Second Demographic Transition and the U-shape/Gender revolution framework used to explain increasing levels of OPH living in developed countries since the 1960s. Here, we find that the empirical results are more in line with the U-shape hypothesis than the SDT theory, as SDT theory predicts a persistent shift to less family, while the U-shape theory argues that it should be considered a temporary stage, when the traditional family loses significance as the result of a rapid transformation of women's economic roles, but no new egalitarian alternative has emerged. Both the fact that the positive socioeconomic gradient of OPH living has disappeared among women in Sweden, and that the overall level of OPH living has started to decline, make our result hard to reconcile with the SDT perspective. The results do not fit well with the idea of a permanent shift towards "less family" due to the spread of post-materialist values. Also, even if Japan still is a strongly traditional society in terms of its gender regime, the development since the 1990s has meant that it has become more similar to Sweden in the determinants of OPH living. So, even if persistent contrasts remain, especially in how the socioeconomic status of women impacts OPH living, changes in values and an increased significance of non-traditional family behavior have indeed occurred in the last decades. Interestingly, the income gradient of OPH living in Japan has also become substantially less

steep since the 1990s. This might indicate that the tradeoff between family formation and economic independence might be changing also in Japan in ways that will work to counteract the forces that currently are resulting in strong increases in the OPH population in Japan in the more long-term perspective.

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Appendix

Table A1: Estimated odds ratios from logistic regressions for the probability to live alone in 2016

	SWEDEN	JAPAN
Age group		
30-34	(base)	(base)
35-39	1.11***	1.14
40-44	1.26***	1.90**
45-49	1.64***	3.42***
50-54	2.56***	4.62***
55-59	4.34***	8.75***
60-64	7.13***	14.41***
65-69	10.08***	25.93***
70-74	13.00***	29.16***
75-79	16.74***	31.12***
80+	20.41***	22.42***
Civil status		
Never married	48.54***	55.53***
Married	(base)	(base)
Divorced	77.88***	112.05***
Widow	133.74***	97.80***
Parental status		
Childless	5.27***	7.42***
Parent	(base)	(base)
Place of residence		
Rural	(base)	(base)
Urban	1.11***	1.19**
Level of education		
Primary school	(base)	(base)
Secondary	1.06***	1.21**
University	0.99	1.22
Income quartile		
Q1 Low	(base)	(base)
Q2	1.27***	3.05***
Q3	1.20***	3.42***
Q4 High	1.12***	4.29***
Occupation		
Not working	(base)	(base)
Senior managers	0.85***	1.07
Professionals	0.92***	1.2
Clerks	0.88***	0.62***
Service workers	0.77***	1.06
Skilled agricultural	0.69***	0.50*
Craft workers	0.73***	1.24
_cons	0.00***	0.00***
N	3110777	20640

legend: * p<.05; ** p<.01; *** p<.001;

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