Making economic growth and well-being compatible: evidence from Japan*

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Abstract

Whether economic growth improves the human lot is a matter of conditions. We focus on Japan, a country where reforms in the mid-1990s shifted the country from a pattern of rampant economic growth and stagnant well-being, to one of modest growth and increasing well-being. We discuss the policy reforms and analyze the

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changes that explain the increase in well-being. In particular, we assess whether the factors that explain the increase are consistent with those expected from the reforms. We apply Blinder-Oaxaca decomposition to World Values Survey data. Results show that well-being increased due to improved conditions for elderly people, people with children, and women, in other words, the primary groups targeted by the reforms. We conclude that adopting a system of social safety nets contributes to make economic growth compatible with increasing well-being over time.

Key-words

Life satisfaction, Japan, inclusive growth, Blinder-Oaxaca decomposition, World Values Survey, social safety nets, welfare state

1 Introduction

The relationship between economic growth and well-being has received considerable attention (Sacks et al., 2012; Easterlin et al., 2010). By extending the possibilities to satisfy people's needs, economic growth is regarded as a means to improve quality of life. However, when scholars contrasted the trends of GDP per capita with those of other objective measures – such as mental illnesses, anxiety and depression, suicide rates, or use of psychotropic drugs – they found that economic growth does not always translate into better lives (Bartolini, 2018, p. 49). Studies using subjective measures of quality of life reached similar conclusions, notably for the United States (Easterlin, 1974; Bartolini et al., 2013a) and China (Brockmann et al., 2009; Easterlin et al., 2012; Steele and Lynch, 2013; Bartolini and Sarracino, 2015). In the case of the United States, real GDP per capita increased by more than 250 percent from 1946 to 2014, but there was no indication of an overall positive trend in subjective well-being.[1] Bartolini et al.

[1]For the trend in subjective well-being from 1946 to 1970 see Easterlin (1974); and for the period 1972 - 2014, many authors have documented the lack of a positive trend in the U.S. For

(2013a) explain the trend since the 1970s with the trends of several economic and non-economic factors that worked against each other, and for which the combined effect was slightly negative.[2] Moreover, citing the cases of China and Russia, Easterlin (2013) showed that while these countries experienced unprecedented growth following the transition, their level of happiness remained basically flat. This disconnect seems largely due to the deterioration of the social safety net and to the privatization of social insurance which accompanied the transition. That does not mean, however, that promoting subjective well-being is impossible. In a couple of recent contributions Oishi and Kesebir (2015) and Mikucka et al. (2017) argued that economic growth correlates with well-being when income inequality declines and social capital increases.

These studies highlight the need to go beyond the question of *whether* economic growth affects well-being, to instead address the questions of (i) under which conditions does economic growth improve well-being, and (ii) which policies can we adopt to implement such conditions. The answers could provide the groundwork to design policies to make economic growth compatible with increasing well-being over time. From this point of view, there is much to learn from the "positive" examples of when growth and well-being are compatible.

In this paper we focus on Japan, a country where economic reforms in the early 1990s shifted the country from a pattern of rampant economic growth and stagnant well-being, to one of moderate growth and increasing well-being. In particular, we use Blinder-Oaxaca decomposition to determine which changes explain the increase in well-being from 1990 to 2010. To measure well-being, we use individual responses to nationally representative surveys from the World Values Survey (WVS) concerning individuals' satisfaction with their lives, i.e. life satisfaction. This analysis allows us to assess the changes which explain the increase

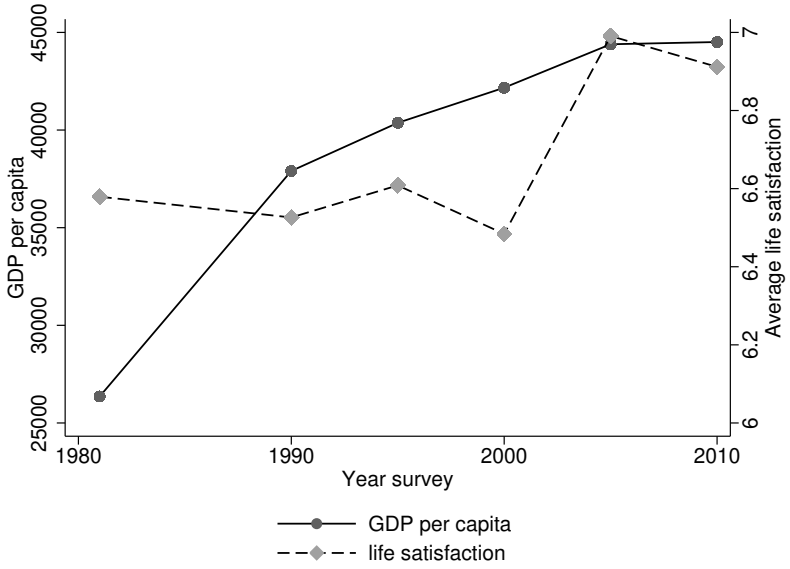
example, recently: O'Connor (2017) and Easterlin (2017), and also those that support the view that economic growth positively affects subjective well-being (Stevenson and Wolfers, 2008).

[2]Bartolini et al. (2013a) show that increases in per capita income (per se) positively affected subjective well-being , but over the same period, social comparisons increased (mitigating two thirds of the benefits from greater income), confidence in institutions declined, and social capital declined. The net result for Americans' well-being is negative. Similar evidence is available for Germany (Bartolini et al., 2013b).

in well-being over time in Japan and, most importantly, which policies made this change possible. We thereby make the point that it is possible to design policies that make economic growth compatible with long term well-being growth.

Japan constitutes an ideal case study. It experienced two phases since 1980: one of economic growth and stagnating well-being (1980 - 1990), and one of modest economic growth and growing well-being (1990 - 2010) during which Japanese people experienced healthier lives, more social relationships, and higher overall life satisfaction. To illustrate, we contrast the trends of GDP per capita (GDP) and life satisfaction between 1981 and 2010 in Figure 1.

Figure 1: Trends of life satisfaction and of GDP (constant 2010 US$) in Japan between 1981 and 2010.



Note: Life satisfaction data are from the WVS, whereas GDP figures, presented in real dollars with base year set to 2010, are issued from the World Development Indicators of the World Bank. The trends in life satisfaction from WVS are roughly consistent with those issued from other sources.[3]
Source: WVS data, authors' own elaboration.

[3]Additional sources include the World Database of Happiness, the Public Opinion Survey on

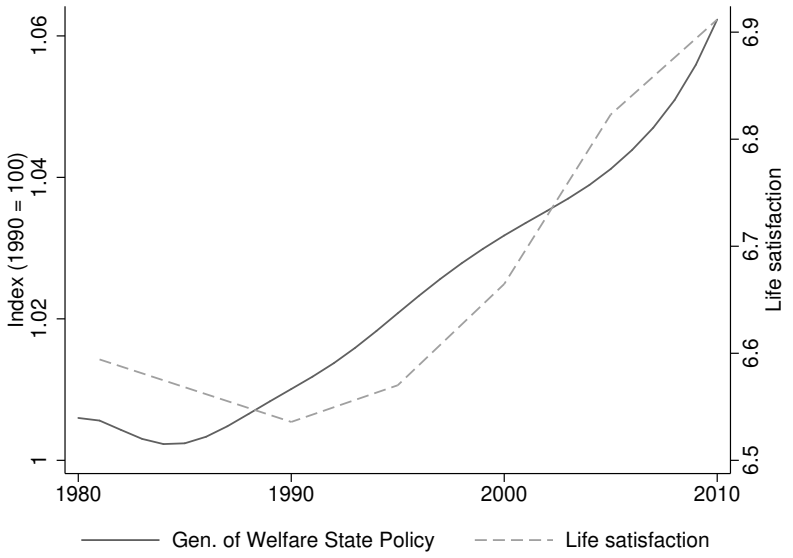
The transition from the first to the second phase is characterized by significant policy changes aimed at increasing social welfare spending, and strengthening social safety nets. To illustrate this point, we plot life satisfaction and a measure of the scope and generosity of welfare state policies over time in Japan.[4] As observed in Figure 2, the trend in life satisfaction closely matches that of the Generosity Index. Thus, the Japanese case allows us to address the two questions raised above: under which conditions is economic growth and well-being compatible, and which policy reforms made this possible. These points can help to reform modern economic policies to make prosperity and well-being compatible.

In what follows, section 2 summarizes the relevant literature. Section 2.1 discusses the reforms that took place in Japan in the 1990s which moved it towards a Scandinavian welfare state model. In section 3 and 4 we describe the data and methods used in the paper. In Section 5 we illustrate our findings, and in section 6 we summarize our main results and policy conclusions.

the Life of the People, and The National Survey of Lifestyle Preferences. The latter two are nationally representative surveys of Japanese residents administered by the Cabinet Office. From these sources we compared comparable measures with aggregate life satisfaction from the WVS and found the trendlines to be roughly consistent.

[4]The Generosity Index is calculated based on replacement rates, eligibility criteria, and duration of benefit payments associated with unemployment insurance, sickness pay, and public pensions. It is intended to follow and further develop on Esping-Andersen's decommodification index (Scruggs et al., 2017).

Figure 2: Average life satisfaction and Generosity of Welfare State (Japan 1981-2010).



Lowess Smoothed Curves.
Source: WVS data, Scruggs Comparative Welfare Entitlements Dataset.

2 Review of the literature

Economists traditionally use income to proxy utility, both at individual and aggregate levels (using Gross Domestic Product per capita for the latter). The idea is that growing income allows individuals to satisfy more needs, and therefore to increase people's utility. Hence, promoting GDP growth has been equated to maximizing people's utility. Yet, income is not the only way to measure utility. For instance, since the 1970s, psychologists argued that people's self-reports about their well-being – so-called subjective well-being – are reliable and valid measures of how people fare (Diener et al., 1985, 2009; Oswald and Wu, 2010). These measures are usually collected via answers to questions such as: "all things considered, how satisfied are you with your life as a whole these days?" (Van Praag et al., 2003). Subjective well-being measures encompass all aspects of an individual's life that he or she deems to be important, including material and non-material factors that are often difficult to measure. Thus, measures of subjective well-being provide scholars with an alternative way to measure people's utility.

In recent years, subjective well-being has received considerable attention in economics, mainly because it allowed economists to test the assumption that economic growth improves well-being. To date, disagreement remains over the validity of this assumption. Some scholars argue that contemporary societies should not expect significant improvements in subjective well-being from economic growth (Easterlin, 1974, 2017); others show that economic growth and increasing subjective well-being are associated over time (see e.g. Stevenson and Wolfers, 2008; Deaton, 2008; Sacks et al., 2012; Veenhoven and Vergunst, 2013); others still, point out that whether a relationship exists depends on the set of countries considered (developed and developing countries vs. transition countries) or the period of time, i.e. economic growth and the trends of well-being are associated in the short run, but this association vanishes in the long run (Easterlin and Angelescu, 2009; Becchetti et al., 2011; Easterlin et al., 2010; Clark et al., 2014; De Neve et al., 2018; Bartolini and Sarracino, 2014); Beja (2014) has found that even if the trends of subjective well-being and economic growth are statistically

related, the magnitude is too small for growth to have a meaningful impact on well-being. More recently, some scholars have argued that the question is not *whether*, but *when* and *under what conditions* is economic growth associated with increasing subjective well-being (Oishi and Kesebir, 2015; Mikucka et al., 2017). Indeed, the subjective well-being literature provides evidence for three conditions that can make economic growth compatible with subjective well-being over time: income inequality (Oishi and Kesebir, 2015; Mikucka et al., 2017), social capital (Uhlaner, 1989; Helliwell, 2003, 2008; Bartolini et al., 2013a; Clark et al., 2014), and social policy (Easterlin, 2013; Ono and Lee, 2016).

Concerning income inequality, the evidence about the cross-sectional relationship with well-being is mixed (e.g. Alesina et al., 2004; Clark and D'Ambrosio, 2015). A possible explanation for contradictory evidence is that the relationship between inequality and well-being depends on a country's level of development (Jiang et al., 2012; Iniguez-Montiel, 2014). However, *increasing* income inequality is consistently negatively related to well-being (Bartolini and Sarracino, 2015; Oishi and Kesebir, 2015; Mikucka et al., 2017). By increasing the opportunities to establish social comparisons, growing income inequality undermines the positive effect of income growth for well-being. Raising income inequality can also undermine well-being by reducing feelings of fairness and trust in others (Oishi et al., 2011) or by weakening social linkages and feelings of cooperation (Graham and Felton, 2006; Oishi et al., 2011).

Social capital is defined by OECD (2001) as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups". A large body of research confirms that social capital correlates positively with subjective well-being at both the individual level (Helliwell et al., 2017; Clark et al., 2014; Becchetti et al., 2009) and aggregate level over time, within individual countries (Bartolini et al., 2013a; Bartolini and Sarracino, 2015; Brockmann et al., 2009; Easterlin et al., 2012) and country panels (Bartolini and Sarracino, 2014). For a discussion of how social capital and subjective well-being are related, see Helliwell and Aknin (2018).

The importance of social safety nets for well-being is illustrated by the expe-

rience of countries that transitioned from communist economic systems (Ono and Lee, 2013). The post-communist countries of Eastern Europe consistently rank among the unhappiest in Europe, and life satisfaction on average declined after the transition. To a large extent, this decline can be attributed to the loss of jobs and deterioration of the safety net. Under communism, people were guaranteed jobs, basic income, health insurance, education, and other benefits. While life satisfaction eventually recovered, it took more than ten years and required an increase in GDP per capita averaging about 25 percent above the 1990s value (Easterlin, 2009, p. 142).[5] The transition to market capitalism may have paved the path to meritocracy, but it was also accompanied by widespread corruption and a collapse of the social insurance system, which invariably resulted in greater inequality and lower well-being.

In China, life satisfaction exhibited a similar pattern of collapse and recovery following the transition, all the while growing at an average annual rate of more than 9.0%. Potential explanations for these startling facts are discussed in Brockmann et al. (2009), Easterlin et al. (2012), Easterlin et al. (2017) and Bartolini and Sarracino (2015). Each article partially attributes the decline in life satisfaction to increased social comparisons, especially facilitated by rising income inequality. Bartolini and Sarracino (2015) document the importance of social capital, estimating that nearly 19.0% of the well-being loss in China is related to a decrease in social capital. Easterlin et al. (2012) and Easterlin et al. (2017) instead emphasize the rise in unemployment, [6] which was inversely related to life satisfaction over the full cycle from 1990 to 2010 (while inequality, in contrast, rose throughout the period). And like in the European transition countries, with unemployment came not only income losses, but also the elimination of social benefits. The loss of these benefits is expected to have significantly exacerbated the effects of unem-

[5]It is possible that asymmetric responses to economic collapse and positive income growth could explain why life satisfaction did not fully recover at the same time as GDP (e.g., from loss aversion De Neve et al. (2018)), but that is insufficient to explain the pattern in China as discussed in the next paragraph.

[6]Due to government restructuring of state-owned enterprises and large rural to urban migration due to relaxed internal migration laws.

ployment. Social safety nets are positively related to life satisfaction in general (Di Tella et al., 2003; Rothstein, 2010; Pacek and Radcliff, 2008; Boarini et al., 2013; Easterlin, 2013; Ono and Lee, 2016; O'Connor et al., 2017), not just in transition economies, and the association is not limited to those directly affected (e.g., unemployed) (Carr and Chung, 2014).

Summarizing, the decline in Chinese well-being can be explained by (1) increasing income inequality which facilitated increasing social comparisons, (2) declining social capital, and (3) increasing unemployment accompanied by a severely reduced social safety net. The recent recovery appears to be driven by improvements in trust, employment, and the social safety net (Easterlin et al., 2017). It is plausible that the same mechanisms are at work in other countries too, including Japan.

There are few studies that explain the trend of well-being, measured subjectively, in Japan. In an early study, Easterlin (1995) documents a flat trend in satisfaction over the period 1958-1987, which occurred despite a concurrent five-fold increase in real per capita income. More recently, Yamamura (2011) evaluates life satisfaction in 1979 and 1996 in Japan. Over this period, life satisfaction increased; however, the causes could not be determined based on the cross-sectional regressions used in the paper. The author also shows that total government expenditures increased over the period, which would suggest a positive link to life satisfaction, but the increase was not statistically significant.

Following the review of the evidence from other countries, we expect that changes in income inequality, social capital, and the social safety net could explain the rise in life satisfaction in Japan between 1990 and 2010. In the next section we document the Japanese policy reforms of the mid-90s, and then discuss our expectations for well-being.

2.1 Social insurance system in Japan

In *Three Worlds of Welfare Capitalism*, Esping-Andersen (1990) provides a common framework to distinguish various types of welfare states. The essence of the

typology rests on the key question: who is the main provider of the safety net? Under the social democratic model (also known as the Scandinavian model) the role of the state is most prominent, with less reliance on the family and the market. Under the conservative model, social insurance coverage is relatively narrow, and the burden falls on families. Under the liberal model, social insurance becomes more of an individual matter, with greater reliance on privatized markets.

Which regime Japan belonged to was a subject of debate and remained contested for some time until Esping-Andersen (1997) addressed the question in a follow-up study. In essence, he argued that, prior to the 1990s, Japan's situation was rather unique in that the country was a hybrid of both the conservative and the liberal regimes, situated somewhere "between Europe and America." The system resembles an "ad hoc postwar construct" (Esping-Andersen, 1997) of welfare programs from Germany and the U.S., which was built on top of the existing traditional family-based system of intergenerational dependence. For example, familialism, i.e. features of the conservative regime such as "filial piety, reverence of the elderly, and obligations toward family members" (Esping-Andersen, 1997, p.185) remains powerful and influential.

Under the familialist system which remained prominent during the postwar period, parents and children were mutually dependent. The majority of young married couples lived with their parents. The younger couple took care of the grandparents, who often reciprocated by assisting with childcare and household chores. The arrangement was especially helpful in the case of dual-career couples as they were able to depend on their parents to take care of family matters during their absence from home.

At the same time, aspects of the liberal regime were present, in the form of corporatist or company-sponsored welfare. Indeed, Japanese corporations exemplified "welfare corporatism" (Dore, 1973) or "Japanese style corporatism" (Esping-Andersen, 1997) with companies providing job security (in the form of lifetime employment) and extensive benefits for employees and their families. Inequality in the quality and generosity of benefits exists by virtue of firm-size, with the greatest benefits being offered to employees in large firms (typically over 1000

employees). As Aspalter (2006) explains, "Japan continues to display a great duality between welfare provision to workers in large companies and dependents, on the one hand, and workers in medium-sized and small enterprises, as well as people who do not join the workforce, on the other" (p. 292). This corporatist model of welfare implicitly assumes a traditional division of labor between men and women: "it implies that families will be quite dependent on the male breadwinner since coverage under social insurance assumes long, unbroken employment careers" (Esping-Andersen, 1997).

2.1.1 Demographic crisis

The 1990s witnessed a gradual transformation of family and social ties in Japan. Greater urbanization and industrialization put pressure on extended families. Intergenerational ties weakened. The share of three-generation-family households dwindled from 54 percent in 1975 to 13 percent in 2013 (Ministry of Health, Labour and Welfare, 2014). The share of the elderly (over age 65) living alone doubled from 9 percent to 18 percent, and the share of elderly couples living alone (without children) also doubled from 20 to 39 percent.

The corporate safety net also diminished throughout the 1990s as the Japanese economy entered a period of prolonged stagnation. Benefits became less generous as the companies pinched their expenditures. Women entered the labor force in large numbers, and the traditional male breadwinner model eroded (affecting the viability of the corporatist model). Moreover, the "good jobs" which offer job security with good benefits became fewer in number. Lifetime employment was still offered but the likelihood of getting those offers was declining (Ono, 2010). The share of workers in nonstandard employment more than doubled from 15 to 38 percent between 1984 and 2016 (Ministry of Health, Labour and Welfare, 2014). Consequently, the population in need of social protection greatly expanded during the 1990s.

Meanwhile, the population was projected to decline: the fertility rate had been declining and the population continued to age. In 1989, the country experienced the "1.57 shock" which was the lowest total fertility rate ever recorded in Japan at

the time.[7]

These challenges, especially the fertility shock, sent the country into crisis mode. Achieving higher fertility and reviving the population could no longer be left to the market or to families alone: the familialist/corporatist model of social insurance had reached its breaking point.

2.1.2 Policy responses

To address these issues the government made a clear and conscious decision to steer course towards the social-democratic welfare regime, eyeing Scandinavian countries as role models. The (liberal) market-centric regime was unsuitable for the Japanese ideology as policymakers feared rising inequality. The economic stagnation of the 1990s also showed that the familialist/corporatist model was vulnerable and unsustainable as it exposed individuals and households to excessive risk. What was needed was a state-centric model of socializing risk, whereby social risk is shared equitably by society as a whole (Horioka and Kanda, 2010). As a consequence, Japan developed a state-sponsored social support system.

Public social expenditures (as percentage of GDP) remained stable at about 10 percent during the 1980s, but increased to 16 percent in 2000 and 23 percent in 2013[8]. This percentage now exceeds the OECD average of 21 percent, and is quickly approaching the Scandinavian countries', for example Sweden, which was 27 percent in 2013. Much of this growth was attributed to a greater allocation of expenditures targeted at the elderly to care for the aging population. For example, between 1990 and 2000, expenditures for elderly care alone increased from 0.57 trillion to 3.57 trillion yen, while expenditures for the support of families and small children increased from 1.6 trillion to 2.74 trillion yen (Peng, 2004). In recent years, roughly 70 percent of social insurance was allocated towards elderly care (Oshio et al., 2014), which is a significantly larger share than in other OECD

[7] The fertility rate declined to its lowest level of 1.26 in 2005, but has since recovered somewhat to 1.44 in 2016.

[8] Figures are from the online OECD Social Expenditure Database. For more details, please, see: `http://www.oecd.org/social/expenditure.htm`.

countries (Horioka and Kanda, 2010).

The 2000s witnessed a flurry of reforms targeted at the elderly in the areas of pension, long-term care insurance, and elderly health care (Oshio et al., 2014). Previous to 2000, caring for the elderly was covered by either the welfare system or by the medical system, but these systems faced two constraints: the need to provide long-term care, and the lengthening of the care period (Ministry of Health, Labour and Welfare, 2016). Against this backdrop, the Ministry rolled out the Long-Term Care Insurance System in 2000. It first explained to the public that traditional family support for the elderly had become unstable and untenable, and because of the weakening dependence between the elderly and family members, the country needed a long-term care system "to support the independence of elderly people" (Ministry of Health, Labour and Welfare, 2016). To this end, the Long-Term Care Insurance System developed a broad range of integrated medical and welfare services and the elderly gained access to a wider range of service providers to choose from. In 2005, the system was revised to emphasize preventive measures more in hopes of easing the burden of increasing expenditures for long-term care, e.g. dementia (Oshio et al., 2014).

A number of work-family policies aimed at addressing low fertility were introduced in the 1990s to motivate couples to have at least two children (Brinton and Mun, 2015). The Angel Plan of 1994 aimed to increase social care and support for families with small children, for example, by providing childcare services (An, 2013; Peng, 2004). Toivonen (2007) points out that the Angel Plan was a key moment when the national government acknowledged that caring for children was no longer the sole responsibility of the families, but one that requires institutional support. Following the Angel Plan, the government introduced a number of measures which provided further support for families and small children. This included the New Angel Plan (1999), Declining Birthrate Plus One Initiative (2002), Next Generation Education and Support Promotion Act (2003), and Declining Birthrate Society Countermeasures Basic Law (2003) (Oshio et al., 2014). Through these measures, the national government added more childcare facilities, introduced parental leave policies, and enhanced income replacement levels. As

an example of increasing benefits, in 1990 the monthly allowance for families with small children was nil for the first child, 2500 yen for the second child and 5000 yen for the third child and thereafter. In 2013, this allowance had been raised to 10000 yen for first and second child, and 15000 yen for third child and thereafter (Chuo-hoki, 2013). In short, the period from 1990 to 2010 was a critical turning point in the development of the welfare state in contemporary Japan, when the locus shifted from the family to the state.[9]

Concerning women, growing opportunities outside the family can be a cause of tension when they are at the same time expected to fulfill obligations within the family (Raymo et al., 2015). However, when growing opportunities are accompanied by institutional support, e.g. child and elderly care, such tensions can be alleviated (Ono and Lee, 2016). For example, middle-aged women who cared for a family member experienced significantly lower subjective well-being (Moriyama et al., 2018); however, provision of family homecare services significantly reduced feelings of burden among family caregivers (Kumamoto et al., 2017). It stands to reason that the benefits of advancing the welfare of the elderly, families and small children should improve the well-being of women relative to men.

2.2 Our contribution

The relationship between economic growth and subjective well-being changed at the same time as important changes in Japanese society. It is possible that the policy changes caused the Japanese society to shift towards a path of moderate economic growth and growing well-being, with the latter attributable to the effect of the policy reforms on the overall population, especially on elderly people and women. Our aim is to explain Japan's increase in life satisfaction using micro data,

[9] In spite of these drastic measures by the Japanese government to intervene in the sphere of elderly care and support for families with small children, the supply of care facilities remains inadequate. The weakening of family support came suddenly. The speed of transformation was so swift that the government could not keep up with the demand for facilities. To this day, the demand for elderly care and childcare facilities far outnumbers the available supply. Japan continues to invest in the facilities, but the waiting list remains long.

and to assess whether the factors that explain the increase are consistent with those expected from the reforms. We focus on the overall impact of the reforms over this period. Alternative strategies focusing on one reform (such as diff-in-diff) are not feasible because numerous reforms occurred at approximately the same time, and their effects can not be disentangled.

3 Data

Our source of data is the World Values Survey, a compilation of internationally comparable surveys collecting information on many aspects of people's lives including economic, social, cultural and political issues. Each survey provides nationally representative samples of the population of more than 150 countries from all over the world. In particular, the WVS provides repeated, cross-sectional data on social capital, subjective well-being, and socio-demographic and economic variables about Japan intermittently from 1981 to 2010. The Japanese sample is comprised of about 1000 observations per wave selected according to multi-stage stratified sampling (WVS, 2014).

Although data for Japan are available beginning in 1981, we solely use the 1981 data for descriptive purposes. Our analysis focuses on the period 1990 - 2010 because our interest is explaining the increase in life satisfaction that occurred during that period. In contrast, life satisfaction did not change much between 1981 and 1990.

Our measure of well-being is life satisfaction as observed through answers to the question: "all things considered, how satisfied are you with your life as a whole these days?". Answers range from 1 = "dissatisfied" to 10 = "satisfied". The WVS also provides another measure of well-being: happiness. However, we focus only on the former variable for two main reasons: i. life satisfaction (1-10 points scale) provides a better and more differentiated information than happiness (1-4 points scale); ii. despite the fact that the evidence from the two variables is often consistent, happiness is usually regarded as a more emotional measure of well-being, whereas life satisfaction is considered more a cognitive evaluation

of well-being. Hence, the second is usually regarded as a more reliable measure (Diener, 2006).

Household income, financial dissatisfaction and social capital are the three main independent variables. Income is measured through respondents' evaluations of their own net household income. In particular, respondents are asked to place themselves on a scale from 1 to 10 where each point corresponds to a specific income bracket. For present analysis, we substituted each value on the scale with the average value of the bracket. Subsequently, the income has been transformed in real Yen of 2005 and converted in logarithm.

Financial dissatisfaction is based on answers to the question: "how satisfied are you with the financial situation of your household?". The answers range on a 10 point scale which we inverted so that higher values stand for greater dissatisfaction. Previous studies documented that financial dissatisfaction strongly correlates with measures of social deprivation, whereas it is weakly predicted by income. These findings suggest that financial dissatisfaction reflects social comparisons, i.e. people's own evaluation of their achievements relative to the achievements of others (Brockmann et al., 2009; D'Ambrosio and Frick, 2012). Moreover, controlling for income, allows us to account for its possible confounding effect on financial dissatisfaction, which thus mirrors relative concerns.

We observe social capital using generalized trust, a measure of civic cooperation (civicness), and participation in groups and associations. Trust in others is measured with the answers to the question: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?". Answers are coded 1 if the respondent answers positively, 0 otherwise (Knack and Keefer, 1997). The index of civicness is based on answers to questions about whether "avoiding a fare on public transport", "cheating on taxes if you have the chance", "claiming government benefits which you are not entitled to", or "accepting a bribe" are acceptable. The answers range on a 1 (never justifiable) to 10 (always justifiable) scale. Each variable has been recoded so that larger values stand for stronger norms of civic cooperation. A factor analysis on the four questions indicated the stability and comparable magnitude of the factor loadings,

both across waves and within waves. Thus we created the index of civicness as the average value of the four initial variables, on a 10 point scale where higher values stand for higher civicness.

We observe respondents' involvement in social activities through answers about their participation in a number of groups and associations. The WVS includes a large battery of questions asking whether people belong or actively participate in groups or associations. The list includes – among others – religious, cultural, sports, professional, environmental, human rights and political associations (for the complete list of groups or associations see Appendix D). Given the various nature of participation in groups and associations, we created two dummy variables which take respectively the value of one if the respondent declared to belong to a Putnamian or to an Olsonian group, zero otherwise. The distinction between the two groups of associations is based on the authors' different views about the role of the association. Putnam et al. (1993) identify in associations a source of general trust and of social ties leading to governmental and economic efficiency, whereas Olson (1982) emphasizes the tendency of associations to act as lobbies to get policies that protect the interests of special groups at the expenses of the society as a whole.

We also included a standard set of socio-demographic controls such as gender, age, marital and employment status, reported health, and the region where the interview was conducted. Table 1 summarizes the main variables used in this study together with some descriptive statistics.

Table 1: Descriptive statistics for Japan between 1990-2010

variable	mean	sd	min	max	obs	missing (%)
satisfaction with life	6.835	1.908	1	10	3038	0
log of yearly income (real Yen 2010)	10.72	0.630	9.110	11.70	2551	16
financial dissatisfaction	4.938	2.208	1	10	2903	4
health	3.536	0.829	1	5	3002	1
social trust	0.402	0.490	0	1	3038	0
civicness	9.279	1.280	0.500	10	3038	0
putnamian groups	0.335	0.472	0	1	3032	0
olsonian groups	0.171	0.376	0	1	3019	1
18 <= age < 35 years	0.229	0.420	0	1	3030	0
35 <= age < 60 years	0.475	0.499	0	1	3030	0
60 years and more	0.296	0.457	0	1	3030	0
female	0.491	0.500	0	1	3038	0
married	0.725	0.447	0	1	3021	1
divorced/separated	0.0453	0.208	0	1	3021	1
widowed	0.0391	0.194	0	1	3021	1
single	0.191	0.393	0	1	3021	1
no child	0.246	0.431	0	1	3008	1
one child	0.134	0.340	0	1	3008	1
two or more children	0.620	0.485	0	1	3008	1
full time	0.421	0.494	0	1	3038	0
part time	0.120	0.325	0	1	3038	0
self employed	0.0932	0.291	0	1	3038	0
retired	0.108	0.310	0	1	3038	0
housewife	0.161	0.368	0	1	3038	0
student	0.0267	0.161	0	1	3038	0
unemployed	0.0158	0.125	0	1	3038	0
other	0.0197	0.139	0	1	3038	0
year	–	–	1990	2010	3038	0

4 Method

Our aim is to explain the variation of subjective well-being in Japan and to quantify the relative importance of the changes in social capital, income and social comparisons along with the other determinants of life satisfaction. To this end we use the Blinder-Oaxaca decomposition. This technique allows us to decompose the well-being gap between the initial (1990) and the final year (2010) of observations and to identify how well the changes in variable values and their relationships with life satisfaction explain the gap. Indeed, life satisfaction may change because people have more of what matters for well-being (e.g. health), and/or because the correlation of what matters for well-being changed (e.g. the coefficient of health in 2010 is higher than in 1990). We consider the latter effect a consequence of a change in people's preferences. The Blinder-Oaxaca decomposition allows us to account for the effect of changes in endowments and in preferences at the same time.

The Blinder-Oaxaca decomposition was developed in the early 1970s by Oaxaca (1973) and Blinder (1973) to study discrimination between men and women in the labour market. Recently, it has also been applied in other fields, including the literature on subjective well-being (Helliwell and Barrington-Leigh, 2010; Becchetti et al., 2014; Bartolini and Sarracino, 2015).

The decomposition method is used to study group differences for a given outcome variable by dividing such differential in two parts: the *explained* one, accounting for differences in observed characteristics of the population and the *unexplained* one, measuring the differences in the coefficients between two groups or periods (Jann, 2008). The latter is generally considered a discrimination measure (Jann, 2008). For the purpose of the present article, the decomposition is used to identify how much of the overall differential in the average life satisfaction between two years can be ascribed to differences in the set of characteristics as presented in equation 1 (the explained part) and to differences in how these characteristics correlate with well-being (the unexplained part).

We are aware that the ordered nature of the dependent variable would require

ordered probit or logit techniques. However, we adopted a linear model for ease of computation and comparison of the coefficients across years.[10] Moreover, the literature on subjective well-being demonstrated that, when the dependent variable has a sufficient number of categories, linear models provide equivalent results of their ordered counterparts. In particular, Ferrer-i Carbonell and Frijters (2004) conclude that assumptions on ordinality or cardinality of the answers to a subjective well-being question are "relatively unimportant to results"[11].

A downside of the Blinder-Oaxaca approach is that the unexplained part captures also the potential effects of differences in any unobserved variables (Jann, 2008).

Formally, the decomposition can be represented as follows:

$$\Delta LS = \underbrace{[E(X_{2010}) - E(X_{1990})]' \cdot \beta^*}_{explained} + \underbrace{[E(X_{2010})' \cdot (\beta_{2010} - \beta^*) + E(X_{1990})' \cdot (\beta^* - \beta_{1990})]}_{unexplained} \tag{1}$$

where ΔLS is the difference in average subjective well-being between 1990 and 2010, respectively the initial and final year of observations, $E(X)$ is the yearly average of a vector of explanatory variables – as presented in section 3 – measured at the beginning and at the end of the period of observation, β_{2010} and β_{1990} are vectors of coefficients and β^* is a vector of *non-discriminatory* coefficients to quantify how much each group of variables explains the overall difference of means. In all our estimates we use standard errors robust to heteroskedasticity, and sample weights provided by the World Values Survey.

5 Results

Table 2 reports the coefficients from three ordinary least squares (OLS) regressions of life satisfaction. The coefficients are used in the decomposition as re-

[10] Estimated coefficients are qualitatively similar to those from ordered probit estimates, which are available upon request to the authors.

[11] (pag. 655 Ferrer-i Carbonell and Frijters, 2004)

ported in equation 1. The first two columns provide the results for the years 1990 and 2010 separately, whereas the third column provides the results from a regression on pooled data. The coefficients in the third column coincide with the reference βs of the Blinder-Oaxaca decomposition (see β^* in equation 1). Results are consistent with expectations from standard happiness regressions (Dolan et al., 2008). Specifically, age exhibits a U-shape relation with life satisfaction; men, and unemployed people are less satisfied than their counterparts; being married and high income positively correlate with life satisfaction, and financial dissatisfaction negatively. Greater trust and participation in a Putnamian group are each positively associated with life satisfaction, while membership in an Olsonian group is not significantly related. Last, as is expected, healthier people are more satisfied with their lives.

Table 2: Happiness regression in Japan in 1990 and 2010 using an OLS model.

	1990		2010		pooled	
log yearly income (real Yen 2010)	0.123	(1.21)	0.169**	(2.55)	0.168**	(3.02)
financial dissatisfaction	−0.444***	(−14.57)	−0.389***	(−19.56)	−0.400***	(−23.59)
state of health	0.383***	(5.33)	0.526***	(10.44)	0.510***	(12.37)
trust in others	0.293**	(2.79)	0.193**	(2.59)	0.215***	(3.52)
index of civicness	0.0539	(1.55)	−0.00363	(−0.12)	0.0166	(0.68)
membership in at least 1 Putnam's group	0.187	(1.52)	0.110	(1.43)	0.170**	(2.61)
membership in at least 1 Olson's group	−0.256*	(−1.72)	−0.0535	(−0.56)	−0.0697	(−0.85)
35 <= age < 60 years	−0.538***	(−3.85)	−0.228*	(−1.90)	−0.259**	(−2.86)
60 years and more	−0.568**	(−2.76)	0.0346	(0.23)	0.0315	(0.27)
female	0.000	(0.00)	0.164*	(1.78)	0.131*	(1.78)
single	−1.233***	(−4.50)	−0.702***	(−4.31)	−0.803***	(−5.72)
divorced/separated	−0.358	(−0.58)	−0.641***	(−3.65)	−0.510**	(−3.09)
widowed	−0.438	(−1.18)	−0.531**	(−2.76)	−0.496**	(−2.91)
one child	−0.341	(−1.21)	0.0249	(0.16)	−0.0513	(−0.38)
two or more children	−0.274	(−1.12)	−0.000127	(−0.00)	−0.0967	(−0.82)
part time	0.276	(1.60)	−0.0997	(−0.79)	0.0173	(0.17)
self employed	0.0504	(0.29)	0.101	(0.63)	0.0602	(0.50)
retired	0.419	(1.39)	0.0146	(0.10)	0.0861	(0.68)
housewife	0.0993	(0.60)	0.0851	(0.65)	0.0620	(0.60)
student	−0.246	(−0.69)	0.880**	(2.65)	0.154	(0.56)
unemployed	0.297	(0.33)	−0.797***	(−3.71)	−0.648**	(−3.08)
other	−0.317	(−1.15)	0.652	(1.46)	0.248	(0.78)
Constant	6.262***	(5.19)	5.314***	(6.81)	5.211***	(7.94)
Observations	740		1653		2393	
Adjusted R^2	0.395		0.404		0.397	

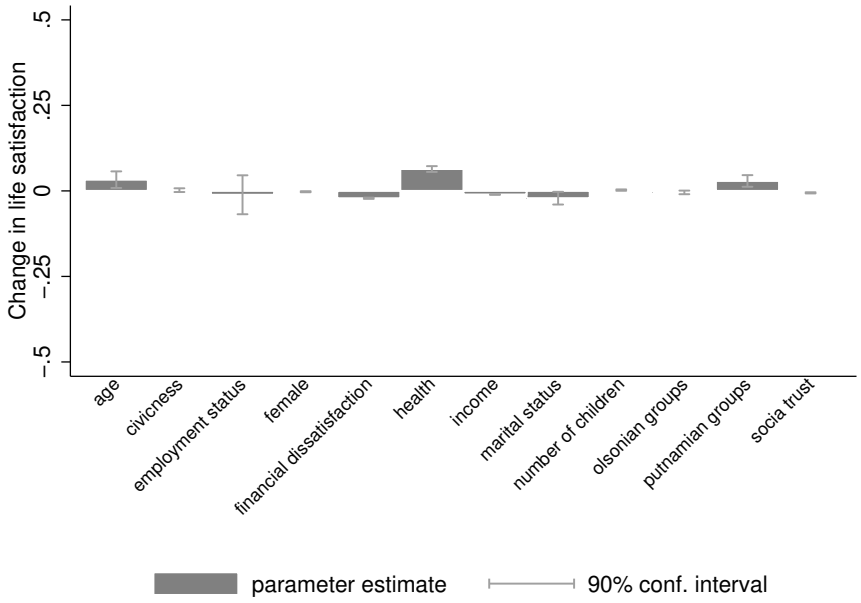
Standard errors in parentheses

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

5.1 Decomposition of the well-being gap between 1990 and 2010

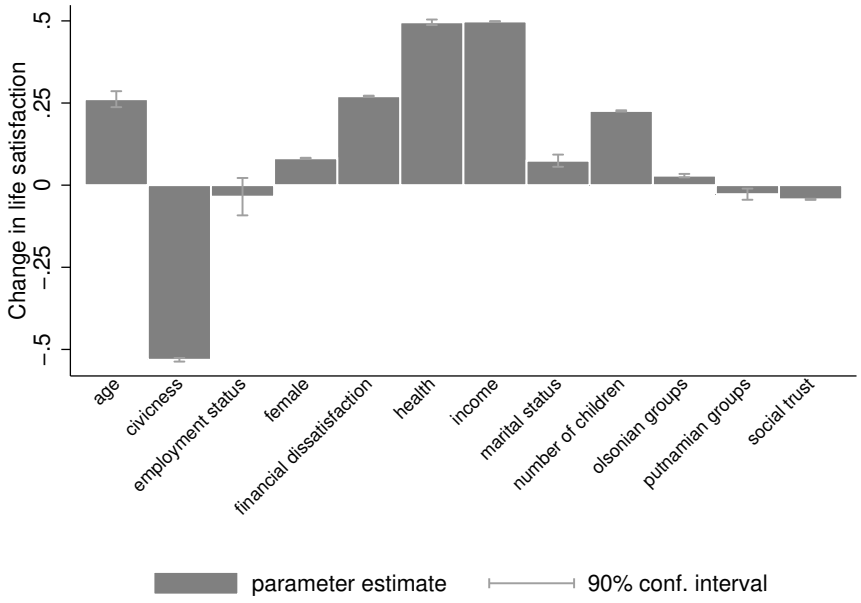
As illustrated in Figure 1, life satisfaction increased between 1990 and 2010. In particular life satisfaction increased from 6.6 to 7.0 on a 10-point scale (see Column 1, Table 3 in Appendix A). The results of the decomposition show that the unexplained portion, which can be thought of as a change in preferences or circumstances, accounts for the bulk of this change, 0.35 points (see the row "total" in Table 3). The explained portion, which includes changes in characteristics such as the aging population, only accounts for 0.05 points. However, the aggregate figures mask considerable heterogeneity.

Figure 3: Explained part of the life satisfaction gap between 1990 and 2010



Figures 3 and 4 – based on Table 3 – illustrate the detailed results of the decomposition, i.e. how much change in life satisfaction is explained by each of its correlates. Although accounting for the smaller portion, it is perhaps more intuitive to start with Figure 3, which presents the explained part of the decomposition of life satisfaction, i.e. the part that is associated with the changes over time in the

Figure 4: Unexplained part of the life satisfaction gap between 1990 and 2010



levels of the explanatory variables. The aging of the population predicts a statistically significant increase in life satisfaction. Improving health and greater membership in Putnamian groups also predict an increase in life satisfaction. On the other hand, household income, marriage rates, and social trust declined, which are associated with reduced life satisfaction. Financial dissatisfaction also increased, further reducing life satisfaction. The life satisfaction changes associated with each variable are detailed in Table 4 in Appendix A. The column X_{2010} provides the average score of each variable in 2010, while the column X_{1990} provides the same information for 1990. For example, the sample proportion of people aged 60 or more increased from 13.8 percent to 35.6 percent.

Figure 4 presents the changes in life satisfaction due to changes in the coefficients between life satisfaction and each of the predictors included in equation 1. The impact of increasing age on life satisfaction grew during this period, which had a positive impact on life satisfaction. The increased relationship supports the effectiveness of greater government support for elderly people during this period

(discussed further below). Similarly, greater government support for women and families improved women's relationship with life satisfaction relative to men. The number of kids is also more positively associated with life satisfaction. Over this period, changing relationships related to health, household income, marital status, and social comparisons also increased life satisfaction. Health and income became more important while marital status (single relative to married) and social comparisons became less important. Changing relationships related to civicness, participation in Putnamian groups, and social trust correlate less with life satisfaction over time, i.e. their coefficients became smaller between 1990 and 2010. The column β_{2010} of Table 4 lists the coefficients from a happiness regression estimated on the subsample of year 2010, while β_{1990} provides the same information relative to year 1990. Using age again as an example, in 1990 being 60 or older was negatively associated with life satisfaction (-0.568 life satisfaction points relative to being less than 35), but in 2010 this relationship turned positive, although not significant, meaning that people 60 or older in 2010 are no longer less satisfied with their lives than younger people.

The sizes of the explained and unexplained changes in life satisfaction, by variable, are presented in Table 3. Aging, health, gender, and social trust had consistent relations with life satisfaction. The aging population (explained portion) which also became relatively more satisfied with being older (unexplained) were each positively correlated with life satisfaction. People became healthier and health mattered more in 2010 than it did in 1990. There were more women (as a proportion)[12] and they became relatively more satisfied. Social trust worked in the opposite direction; trust declined and it also had a smaller positive relationship with life satisfaction in 2010. If trust had not changed since 1990, than life satisfaction in 2010 would have been 0.12 points higher than observed, i.e. 0.52 rather than 0.40. The other variables had contradictory changes (e.g., household income and social comparisons).

The improvement in health likely reflects the global trend in improving health

[12]It makes sense that there would be more women because the population aged and women live longer on average.

care (though perhaps not access), and growing importance makes sense for an older population. Social trust and its importance likely declined as a result of Japan modernizing. The improving relationships of life satisfaction with age and women are consistent with the policy changes discussed in section 2.1. For this reason we further focus on people aged 60 and over, and women.

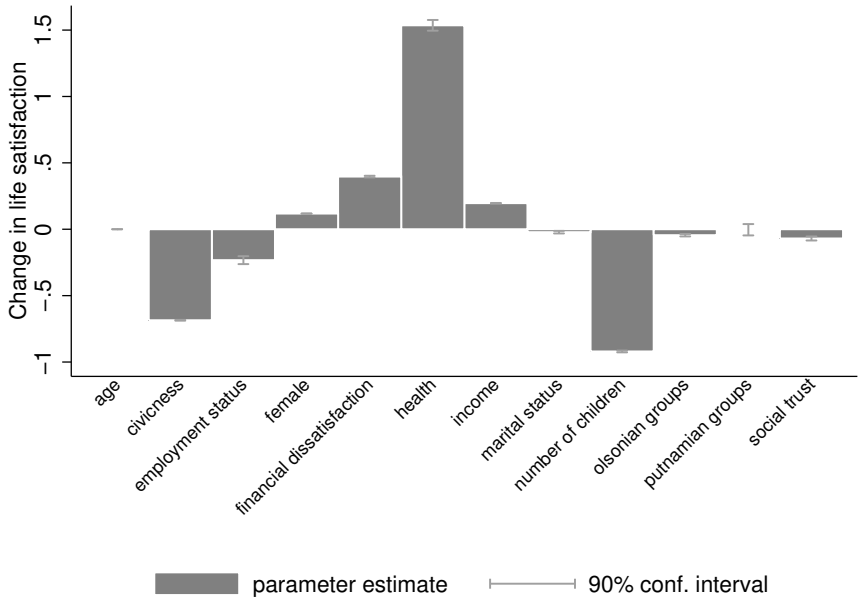
5.2 Decomposition of the well-being gap between 1990 and 2010 for elderly people

Column 1 in Table 5 in Appendix B reports the results of the decomposition of the life satisfaction gap for people aged 60 years or more. Between 1990 and 2010 the average life satisfaction of elderly people in Japan increased from 6.7 in 1990 to 7.2 in 2010. The decomposition indicates that the largest share of this difference is attributable to changes in people's preferences over time. These changes account for nearly three quarters of the overall difference.

Figure 5 – based on Table 5 – shows the main predictors of the unexplained part of the life satisfaction gap. Between 1990 and 2010 elderly people in Japan attached more importance to health and income, and less importance to financial dissatisfaction. These changes predict an increase of life satisfaction that is partially offset by the lower importance for life satisfaction of aspects such as having children and social capital. Among the social capital variables, only participation in Putnamian groups became more positively associated with life satisfaction, but this change is not sufficient to counterbalance the effect of the other proxies. The coefficient of trust in others halves, but remains positive, and the ones for civicness and participation in Olsonian groups turn negative. Other negative correlations with life satisfaction include being a man and employment status which became less important. In 1990 retired people or those working part-time were more satisfied with their lives than those in full-time employment, but in 2010, working part-time, being self-employed or retired correlated negatively with life satisfaction (relative to full-time employment).

The elderly also experienced a significant increase in life satisfaction that was

Figure 5: Unexplained part of the life satisfaction gap for elderly people between 1990 and 2010



not captured by the comprehensive set of covariates (see the constant in Table 5 in Appendix B). Health, family, and other social networks are obvious candidates to explain this increase, but as they are controlled, the change must operate through different channels. Another candidate could be a general change in self-perception or reception in society that was improved through the policy reforms – each could operate in tandem or independently from the policy change.

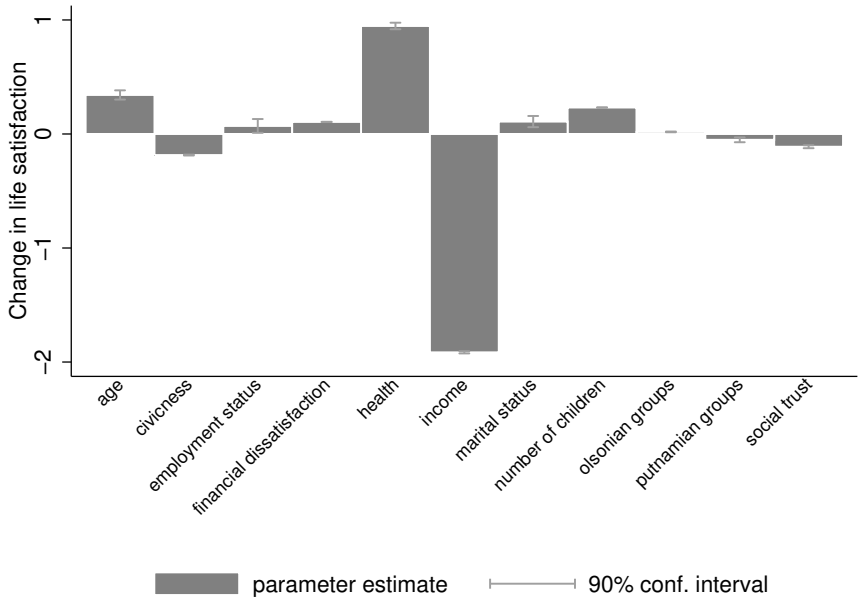
The remaining 23 percent of the life satisfaction difference is attributable to changes in the levels of the explanatory variables over time. The average health of elderly people and their social involvement increased: participation in Putnamian groups increased (from 22.5 percent to 49.7 percent) as well as trust in others (from 27.5 percent to 39.3 percent). These changes explain the shift upward in life satisfaction that is partially offset by the increase in financial dissatisfaction. The remaining variables predict a negligible share of the explained gap of life satisfaction (for more details, see the column "explained" in Table 5).

5.3 Decomposition of the well-being gap between 1990 and 2010 for women

The life satisfaction of women in Japan increased from 6.7 in 1990 to 7.1 in 2010 (see Column 1 of Table 7 in Appendix C). Similar to the elderly, the largest part (nearly 83%) of the increase is due to changes in womens' preferences.

Figure 6 – based on Table 7 – shows the main variables affecting the unexplained part of the life satisfaction gap. Reduced importance attached to income, civicness, and social trust correlate with reductions in life satisfaction. The importance of income became nearly five times smaller in 2010 than in 1990. Also the coefficients of the index of civicness and social trust nearly halved since 1990. However, the decrease in life satisfaction associated with these changes is counterbalanced by changes in the correlations with health, age, marital status, number of kids and, to a minor extent, financial dissatisfaction. Health correlated positively with life satisfaction in 1990 and the coefficient nearly doubled from 0.29 to 0.56 in 2010. Aging became less negatively correlated with life satisfaction over time.

Figure 6: Unexplained part of the life satisfaction gap for women between 1990 and 2010



In 1990, aging attracted a large negative coefficient, while in 2010, it was nearly zero for women in the age group 35 to 60 (compared to people less than 35). The coefficient for elderly women (60 years old or more) was positive (although very small in magnitude).

Changes in the importance of marital status also led to an increase in life satisfaction. In general, being married is associated with greater life satisfaction than being single (consistent with "the benefits of marriage" (Waite, 1995)), but this marriage premium is lower in 2010 compared to 1990 – meaning, single women's life satisfaction improved over the period. In contrast, the life satisfaction of divorced, separated, or widowed women declined relative to married women. Divorce and separation are positively though insignificantly associated in 1990, but negatively in 2010. Widowed is slightly more negatively associated in 2010. However, the declines for divorced, separated, and widowed women are more than offset by the positive ones for single women.

Another important change in women's correlates of life satisfaction is related to the number of children. The literature has shown that having children is often negatively associated with life satisfaction (e.g. Ono and Lee, 2013). The effect of having children is negatively correlated to marital happiness in Japan, and more so for women than for men (Lee and Ono, 2008). Having children is negatively associated with life satisfaction in the present analysis as well, but the negative association improved over the period 1990-2010. In particular, having two or more children has nearly a nil association with life satisfaction in 2010, whereas in 1990 the coefficient is -0.44, i.e. nearly half the size of the coefficient of being unemployed.

The changes in women's correlates of life satisfaction are compatible with the policy reforms adopted in Japan, especially in relation to: aging and raising children. Women also experienced a significant increase in life satisfaction that was not captured by the comprehensive set of covariates (see the constant in Table 7). As with the elderly, this change could represent a general change in self-perception or reception in society that could have been affected by numerous items including the policy reforms.

The remaining 17 percent of women's increase in life satisfaction, i.e. 0.07 points, is due to changes in the average levels of the explanatory variables (see Table 7 in Appendix C). This relatively small amount can be explained by improved health and a greater involvement in Putnamian associations. In 1990 nearly one out of five women participated in Putnamian associations, but twenty years later nearly 36.6 percent of women reported participating in at least one Putnamian association. On the other hand, life satisfaction decreased because of increased financial dissatisfaction and decreased trust in others. In particular, the share of women who declared trusting others went from 47.7 percent in 1990 to 40.8 percent in 2010. The changes of the other variables had negligible effects on the life satisfaction gap.

6 Conclusions

Japan provides a most interesting case study for policy makers hoping to improve the well-being of their citizens. Post World War II, Japan experienced exciting economic growth rates that extended into the 1980s. However, later concerns began to arise due to an impending demographic crisis, specifically aging and low fertility rates. At the same time intergenerational ties and traditional family-based social support weakened. In the 1990s policy makers reformed the social safety net system moving Japan from a familialist-corporatist system to a social democratic model. Subsequently, while economic growth slowed, well-being increased (1990 - 2010), which provides a sharp contrast with the earlier period of high growth and stagnating well-being (1981 - 1990).

Using Blinder - Oaxaca decomposition techniques and data from the World Values Survey, we show that the increase in life satisfaction from 1990 to 2010 is attributable in part to an aging population, but a population where the elderly are more satisfied with their lives. Also, health and its importance increased, and women became more satisfied with their lives relative to men. The improvements for elderly people and women are consistent with the expected impacts of the policy reforms of the 1990s. However, not all changes were positive. Social trust

declined (negatively affecting life satisfaction), which was likely due to distinct forces, such as the impacts of modernization on social capital. Nevertheless the positive impacts outweighed the negative.

At the time of his writing in 1997, Esping-Andersen explained that the Japanese welfare state, long viewed as a synthesis of the liberal and conservative regimes, may still be "in the process of evolution... (and) that it has not yet arrived at the point of crystallization" (p.187). Now, some 20 years after his observation, it is becoming increasingly clear that the Japanese welfare state is transitioning from a familialist/corporatist model to a state-sponsored model. This transformation was in large part a much needed response to the looming demographic crisis. Steering the country towards higher fertility and looking after the well-being of the aging population could not be left to market forces, and a functional substitute was required to fill the gap which had been left by weakening intergenerational ties and the declining corporate safety net.

The state-sponsored safety net that was put in place in the 1990s was followed by an increase in the life satisfaction of the overall population and especially of the elderly and women. Thus, whether economic growth improves the human lot depends on certain conditions. In particular, the findings support Easterlin (2013)'s assertion that a strong state-sponsored social safety net provides one of the conditions for durably improving people's well-being. The case of Japan illustrates that it is possible to adopt policies to make economic growth and well-being compatible over time.

A Detailed decomposition 1990 - 2010

Table 3: Detailed decomposition of the well-being gap between 1990 and 2010 in Japan.

	satisfaction with life		
	Differential	Explained	Unexplained
average value in 2010	6.974^{***}		
	$(6.70e+16)$		
average value in 1990	6.569^{***}		
	$(5.14e+16)$		
difference	0.405^{***}		
	$(1.75e+15)$		
yearly income (real Yen 2010)		-0.0105^{***}	0.498^{***}
		(-17.08)	(809.71)
financial dissatisfaction		-0.0215^{***}	0.271^{***}
		(-19.84)	(250.09)
health		0.0639^{***}	0.496^{***}
		(12.38)	(96.01)
social trust		-0.00568^{***}	-0.0431^{***}
		(-5.57)	(-42.31)
civicness		0.00218	-0.532^{***}
		(0.66)	(-160.58)
putnamian groups		0.0291^{**}	-0.0274^{**}
		(2.81)	(-2.65)
olsonian groups		-0.00435	0.0290^{***}
		(-1.35)	(8.99)
age		0.0329^{**}	0.262^{***}
		(2.23)	(17.74)
female		-0.00240^{**}	0.0818^{***}
		(-2.59)	(88.34)
marital status		-0.0212^{*}	0.0744^{***}
		(-1.88)	(6.59)
number of children		0.00241^{**}	0.226^{***}
		(2.01)	(188.54)
employment status		-0.0113	-0.0350
		(-0.33)	(-1.01)
total		0.0535	0.352^{***}
		(1.44)	(9.49)
Constant			-0.949^{***}
			$(-4.29e+12)$
Observations	2393		

Table 4: Coefficients and X-values for 1990 and 2010.

	β_{2010}	β_{1990}	β_{ref}	X_{2010}	X_{1990}
log yearly income (real Yen 2010)	0.169	0.123	0.168	10.714	10.776
financial dissatisfaction	−0.389	−0.444	−0.400	5.004	4.950
health	0.526	0.383	0.510	3.581	3.455
social trust	0.193	0.293	0.215	0.411	0.438
civicness	−0.004	0.054	0.017	9.330	9.199
putnamian groups	0.110	0.187	0.170	0.396	0.224
olsonian groups	−0.054	−0.256	−0.070	0.200	0.138
35 <= age < 60 years	−0.228	−0.538	−0.259	0.485	0.585
60 years and more	0.035	−0.568	0.031	0.356	0.138
female	0.164	0.000	0.131	0.486	0.504
single	−0.702	−1.233	−0.803	0.150	0.166
divorced/separated	−0.641	−0.358	−0.510	0.062	0.011
widowed	−0.531	−0.438	−0.496	0.036	0.020
one child	0.025	−0.341	−0.051	0.152	0.120
two or more children	−0.000	−0.274	−0.097	0.629	0.670
part time	−0.100	0.276	0.017	0.128	0.095
self employed	0.101	0.050	0.060	0.090	0.115
retired	0.015	0.419	0.086	0.129	0.049
housewife	0.085	0.099	0.062	0.148	0.181
student	0.880	−0.246	0.154	0.010	0.030
unemployed	−0.797	0.297	−0.648	0.021	0.004
other	0.652	−0.317	0.248	0.015	0.019
Constant	5.314	6.262	5.211	1.000	1.000

Note: The coefficients of columns β_{2010}, β_{1990} and β_{ref} are the same as those from table 2. The values in the last two columns (X_{2010} and X_{1990}) report the weighted sample averages of each independent variable.

B Detailed decomposition 1990 - 2010 for elderly people

Table 5: Detailed decomposition of the well-being gap for elderly people between 1990 and 2010 in Japan.

		satisfaction with life		
	Differential	Explained	Unexplained	
average value in 2010	7.235^{***}			
	$(1.41e+16)$			
average value in 1990	6.696^{***}			
	$(1.06e+16)$			
difference	0.539^{***}			
	$(6.61e+14)$			
yearly income (real Yen 2010)		-0.00672^{***}	0.196^{***}	
		(-6.91)	(201.92)	
financial dissatisfaction		-0.112^{***}	0.397^{***}	
		(-29.50)	(104.41)	
health		0.166^{***}	1.536^{***}	
		(6.72)	(62.34)	
social trust		0.0354^{***}	-0.0693^{***}	
		(3.81)	(-7.45)	
civicness		-0.00248	-0.685^{***}	
		(-1.37)	(-378.35)	
putnamian groups		0.0481^{*}	-0.00367	
		(1.85)	(-0.14)	
olsonian groups		-0.00425	-0.0446^{***}	
		(-0.75)	(-7.85)	
age		0	0	
		$(.)$	$(.)$	
female		0.00107^{**}	0.118^{***}	
		(2.40)	(265.27)	
marital status		-0.00914	-0.0219^{***}	
		(-1.54)	(-3.70)	
number of children		0.0108^{**}	-0.920^{***}	
		(2.65)	(-226.30)	
employment status		0.00199	-0.233^{***}	
		(0.11)	(-12.87)	
total		0.128^{***}		0.410^{***}
		(3.69)	(11.79)	
Constant			0.141^{***}	
			$(6.03e+12)$	
Observations	690			

Table 6: Coefficients and X-values of the sample of elderly people for 1990 and 2010 .

	β_{2010}	β_{1990}	β_{ref}	X_{2010}	X_{1990}
log yearly income (real Yen 2010)	0.155	0.136	0.139	10.516	10.565
financial dissatisfaction	−0.457	−0.547	−0.465	4.643	4.402
health	0.611	0.128	0.567	3.449	3.157
social trust	0.245	0.475	0.299	0.393	0.275
civicness	−0.051	0.022	−0.034	9.509	9.436
putnamian groups	0.108	0.040	0.177	0.497	0.225
olsonian groups	−0.111	0.357	−0.062	0.156	0.088
35 <= age < 60 years	0.000	0.000	0.000	0.000	0.000
60 years and more	0.000	0.000	0.000	1.000	1.000
female	0.129	−0.127	0.104	0.471	0.461
divorced/widowed	−0.470	−0.324	−0.423	0.131	0.127
single	−0.335	0.000	−0.237	0.032	0.000
one child	−0.137	0.682	−0.121	0.119	0.147
two or more children	−0.430	0.532	−0.362	0.813	0.833
part time	−0.060	0.552	0.025	0.116	0.069
self employed	−0.094	−0.070	−0.067	0.124	0.098
retired	−0.066	0.532	0.044	0.364	0.304
other	0.000	−0.234	−0.048	0.020	0.020
Constant	6.391	6.249	6.364	1.000	1.000

Note: The coefficients of columns β_{2010}, β_{1990} and β_{ref} are the same as those from table 2. The values in the last two columns (X_{2010} and X_{1990}) report the weighted sample averages of each independent variable.

C Detailed decomposition 1990 - 2010 for women

Table 7: Detailed decomposition of the well-being gap for women between 1990 and 2010 in Japan.

	satisfaction with life		
	Differential	Explained	Unexplained
average value in 2010	7.120^{***}		
	$(1.94e+16)$		
average value in 1990	6.694^{***}		
	$(6.24e+15)$		
difference	0.425^{***}		
	$(3.75e+14)$		
yearly income (real Yen 2010)		-0.00835	-1.915^{***}
		(-1.45)	(-331.85)
financial dissatisfaction		-0.0405^{***}	0.106^{***}
		(-61.20)	(159.69)
health		0.0989^{***}	0.947^{***}
		(5.68)	(54.39)
social trust		-0.0144^{*}	-0.112^{***}
		(-1.85)	(-14.39)
civicness		0.00651^{**}	-0.185^{***}
		(2.83)	(-80.25)
putnamian groups		0.0217^{*}	-0.0513^{***}
		(1.68)	(-3.98)
olsonian groups		-0.00438^{**}	0.0182^{***}
		(-2.39)	(9.96)
age		0.00919	0.342^{***}
		(0.37)	(13.91)
marital status		0.000761	0.109^{***}
		(0.03)	(3.63)
number of children		-0.00207^{**}	0.232^{***}
		(-3.23)	(362.20)
employment status		0.00195	0.0706^{*}
		(0.05)	(1.92)
Total		0.0693^{**}	0.356^{***}
		(2.84)	(14.59)
Constant			0.794^{***}
			$(9.58e+12)$
Observations	1176		

Table 8: Coefficients and X-values of the sample of women for 1990 and 2010 .

	β_{2010}	β_{1990}	β_{ref}	X_{2010}	X_{1990}
log yearly income (real Yen 2010)	0.048	0.226	0.094	10.680	10.769
financial dissatisfaction	−0.402	−0.425	−0.404	4.864	4.764
health	0.569	0.295	0.520	3.619	3.429
social trust	0.129	0.376	0.209	0.408	0.477
civicness	0.023	0.043	0.033	9.357	9.158
putnamian groups	0.079	0.257	0.157	0.366	0.228
olsonian groups	−0.098	−0.333	−0.099	0.122	0.078
35 <= age < 60 years	−0.048	−0.503	−0.157	0.507	0.550
60 years and more	0.053	−0.645	0.011	0.345	0.126
single	−0.307	−1.135	−0.545	0.127	0.172
divorced/separated	−0.369	0.348	−0.204	0.083	0.013
widowed	−0.417	−0.387	−0.390	0.059	0.035
one child	−0.217	−0.235	−0.215	0.161	0.147
two or more children	−0.088	−0.446	−0.231	0.640	0.643
part time	0.096	0.365	0.183	0.204	0.155
self employed	0.294	−0.062	0.147	0.068	0.088
retired	0.518	0.930	0.571	0.070	0.016
housewife	0.356	0.190	0.281	0.304	0.359
student	1.013	−0.066	0.280	0.010	0.029
unemployed	−0.773	−0.784	−0.712	0.019	0.005
other	1.179	−0.027	0.612	0.017	0.024
Constant	6.211	5.416	5.846	1.000	1.000

Note: The coefficients of columns β_{2010}, β_{1990} and β_{ref} are the same as those from table 2. The values in the last two columns (X_{2010} and X_{1990}) report the weighted sample averages of each independent variable.

D List of groups and associations mentioned in the WVS/EVS questionnaire

Respondents were asked to mention whether they belonged or were performing unpaid voluntary work for any of the following list of associations:
Associations considered to be Putnamian

- social welfare service for elderly;
- religious organization;
- education, arts, music or cultural activities;
- political parties;
- local political actions;
- human rights;
- conservation, the environment, ecology, animal rights;
- conservation, the environment, ecology;
- animal rights;
- sports or recreation;
- women's group;
- peace movement;
- consumer groups;
- other groups.

Associations considered to be Olsonian

- labour unions;
- organization concerned with health;
- professional associations;
- youth work;

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