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economic growth and life satisfaction. A
case study from Japan**

Yamamura, Eiji

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The influence of government size on economic growth and life satisfaction. A case study from Japan.

Abstract. This paper uses Japanese prefecture-level data for the years 1979 and 1996 to examine how the relationship between government size and life satisfaction changes. The major findings are: (1) Government size has a detrimental effect on life satisfaction when government size impedes economic growth in the economic developing stage. However, this effect clearly decreases when government size is not associated with economic growth in the developed stage. (2) Particularized trust is positively associated with life satisfaction of females but not with that of males. Such a tendency becomes more remarkable in the developed stage. These results are unchanged when the endogeneity bias caused by local government size and proxies of trust are controlled for.

Keywords: Life satisfaction; Government size; Trust; Growth

JEL classification: I31, H50 H11

1. Introduction

How and why do people become happy? Undoubtedly, this has been among the most important questions for policy makers (Layard, 2006), and since the early 1990s, researchers in the fields of economics and political economics have begun to pay it attention (Frey & Stutzer, 2002). Increasing numbers of works attempting to analyze individual subjective well-being have considered not only economic factors such as income level and consumption but also various other ones such as formal and informal institutions¹. It is widely acknowledged that the government plays an important role in society. Therefore, in respect to public choice, exploring government size is now thought to be a major issue and empirical works have investigated its impact on subjective-well being². There is a view based on public choice theory that government size becomes larger than optimal to benefit a country's citizens because governments do not usually act as 'benevolent dictators'³. Bjørnskov et al. (2007) presents evidence that government size can negatively affect on life satisfaction. However, this finding is deduced from limited cross country data, and the dynamic aspect has not been taken into account. It is worthwhile examining whether the negative association between government size and well-being is stable over time because dynamic factors influence on life satisfaction (Bjørnskov et al., 2008d).

It is conjectured that resources are allocated less efficiently by larger governments, leading to lower economic growth. Several reports support this view (e.g., Landau, 1985; Peden & Bradley, 1989; Dar & AmirKhalkhalim 2002; Fölster & Herekson, 2002). On the other hand, some researchers find no discernable relationship between government size and economic growth (e.g., Ram, 1986; Bairam, 1990; Easterly and Rebelo, 1993; Mendoza et al., 1997)⁴. Guseh (1997) pays attention to the institutional features of countries and points out that government size has a detrimental effect on economic growth in developing countries, but that this negative effect is clearly mitigated by democracy⁵. As shown by Acemoglu et al. (2008), per capita income is positively related to the rise of democracy. This leads me to presume that a matured democracy viewed as an outcome of the rise in per capita income decreases government inefficiency, leading to an alleviation of the negative

¹ For instance, informal institutions such as social trust or social capital (e.g., Bjørnskov, 2003; Helliwell, 2006) and formal institution (Frey & Stutzer, 2000; Bjørnskov et al., 2008c) are regarded as critical in determining subjective well-being.

² Bureaucratic rent and decentralization are considered to be determinants of life satisfaction (Luechinger et al., 2006; Bjørnskov et al., 2008 b)

³ Various reports attempt to theoretically investigate the optimal size of government by considering the relationships among benefits, democratic control and government size (Lee 1989; Folsom & Gonzalez 1999). It might be important to consider democratic control in prefectures to establish any correlations between democratic control and government size on one hand and between democratic control and life satisfaction on the other. In an empirical work, this approach is, however, problematic since it is difficult to measure the degree of democratic control over a government.

⁴ There is argument that the relationship between government size and growth is non-linear (e.g., Barro 1997; Grossman, 1988; Chen & Lee, 2005; Angelopoulos et al., 2008).

⁵ The degree of democracy is thought to play a crucial role in improving economic efficiency (Feld & Savioz, 1997).

influence of government size on life satisfaction⁶. However, no work has attempted to examine whether the effect of government size on life satisfaction changes under a dynamic process of institutional change.

As well as government size, it is argued that various factors such as social trust, human capital, and age can be considered as determinants of life satisfaction (Bjørnskov et al., 2007; Bjørnskov et al., 2008 c; Scoppa & Ponzo 2008). The determinants of life satisfaction appear to vary between different periods of time, even in the same country. This might be in part because formal and informal institutional changes appear to influence life styles and interpersonal relationships.

Japan has experienced rapid economic growth, especially in the postwar period (Yamamura et al., 2005; Yamamura & Shin, 2007). Such growth inevitably transformed traditional Japanese society into a modern one; this is reflected, for instance, in the rise in the social standing of women. It seems that in the wake of changes in circumstance, the generational and gender gaps in the way life is perceived have widened⁷. Thus Japan is a country suitable for comparing different circumstances across generations and genders. Survey data on Japan, from 1979 and 1996 cover life satisfaction across 3 age groups and both genders. This data allows me to compare the determinants of life satisfaction between different points in time and across generations and genders. The present paper uses this data to assess the effects of government size and other socio-economic factors on life satisfaction. It also looks at how these effects vary under the influence of societal structural changes. Compared with reports that use cross country data (e.g., Bjørnskov, 2006; Bjørnskov et al 2007; Bjørnskov et al 2008a; Bjørnskov et al 2008b), another advantage of studying a cross-section of a single country is that factors such as national politics, culture, history, and language are the same across jurisdictions. Hence, any bias caused by not controlling for these factors is attenuated. Arguments based on cross country study can thus be more precisely examined in this paper.

The remainder of this paper is organized as follows. Features of Japanese society and changes in life satisfaction are briefly reviewed in Section 2. Section 3 explains the data and methods used. Section 4 discusses the results of the estimations. The final section offers concluding observations.

2. Review of modern Japanese society and life satisfaction

2.1. Local interest groups and public sector

In Japan, the central government distributes local transfer and allocation taxes and national government disbursements to local governments. Hence, representatives of the Diet appeal to the cabinet or bureaucrats to distribute more in the region they represent (Doi & Ihori 2002). Such distributions are critical elements for these representatives to be reelected. This is why that

⁶ It is not observed that the degree of democracy alleviates the detrimental influence caused by government size in cross country analysis (Bjørnskov et al., 2007).

⁷ Empirical research concerning trust in Japan presents evidence that there is a distinct difference in the degree of trust between genders (Yamamura, 2008a), and across generations (Yamamura, 2008 b).

“Allocation of region-specific privileges in the form of subsidies or public works from the central government has been mainly determined by the political factors” (Doi & Ihuri 2002, p.493). About one-third of local government revenues consist of local transfer and allocation taxes and national government disbursements (Doi & Ihuri 2009, p.162). Heavy financial support provided by the central to local government is considered the main reason why there are variations in local government size⁸. The degree of democratic control depends on whether local citizens can discourage local interest groups and politicians from diverting local government away from just serving themselves at the expense of the rest of society. Lobbying activity by local interest groups living in rural and agricultural areas leads to numerous deficits (Doi & Ihuri 2002; Doi & Ihuri 2009, Ch.7)⁹. Variations in government inefficiencies among prefectures are considered to be the result of differences in democratic control.

2.2. Government size and life satisfaction.

As is more fully explained in section 3, the rate of people who feel satisfied with life is used as a measure of life satisfaction index. Data is available separately for males and females across 3 generations at the prefecture level. Change in life satisfaction is exhibited in Table 1 (a); it shows that life satisfaction significantly increases from 1979 to 1996, and that the degree of increase for females is consistently higher than that for males.

Government size is measured by the total share of government expenditure in prefectural income and is presented in table 1 (b).¹⁰ From this data it can be seen that government size increased slightly, despite the difference between 1979 and 1996 being statistically insignificant¹¹. This shows

⁸ About 5 % of GDP is allocated to financial support for local governments. According to Doi & Ihuri (2002), people and firms in urban regions, which hold about 60 % of the population of Japan, pay about 75 % of national taxes in each year. However, they receive fewer grants than those in the rural regions.

⁹ ‘Agricultural-related public capital, fishing ports, flood control, and forest conservation have been over funded as a result of the lobbying activities of local-interest groups’ (Doi & Ihuri 2009, p.181).

¹⁰ Prefectural GDP cannot be obtained in 1979 and so prefectural income is used instead. There are various measures of government size such as the government share of consumption in GDP (Bjørnskov et al., 2007), total tax share in GDP (Fölster & Herekson, 2001), total government share in GDP (Grossman, 1988; Fölster & Herekson, 2001). Chen and Lee (2005) used three measures; share of total government expenditure in GDP, government investment expenditure in GDP and government consumption expenditure in GDP. It should be noted that the way of measuring government size is thought to influence estimation results when the relationship between government size and economic growth is examined (Landau, 1985). Nevertheless, in this paper, the main focus falls on an assessment of the effect of government size on life satisfaction, which is not explained by rigorous growth theory. Hence, in this paper, I use total expenditure comprised of various types of expenditure at a prefectural level.

¹¹ The main areas of government expenditure at the prefectural level are education, public works and public welfare. According to Doi & Ihuri(2009, Ch.7), during the period 1979-1996, education showed a decreasing trend, reflecting smaller numbers of students compared to earlier years, a result of the declining birth rate. By contrast, public welfare showed an increasing trend, indicating larger number of older residents.

that the rise in life satisfaction seems to be associated with an increase in government size, which does not correspond to the conjecture derived from public choice theory. The level of real per capita income in 1996 is higher than that in 1979, whereas the 5 years growth rate during 1996-2001 is nearly 0, distinctly lower than that for 1979-1984¹². This implies that the end of the 1970s can be characterized as a low income and growth stage, and the mid-1990s as a high income and steady growth period¹³. In this paper, 1979 and 1996 are defined as developing and developed stages, respectively.

Although there appears to be a positive relationship between income level and life satisfaction in Table 1, most existing reports provide no evidence that income level is positively associated with life satisfaction (Frey & Stutzer, 2002). If an increase in income leads to a rise in individual's income aspirations (Stutzer, 2004), there might be another channel through which income influences life satisfaction. This channel, if it exists, has not been taken into account in the existing literature. I aim to shed light on an indirect effect of income increase on life satisfaction, rather than a direct one. It seems plausible that a democracy tends to be a mature one when income levels reach those of developed countries (Acemoglu et al., 2008). If this holds true, it would be worthwhile considering how a matured democracy resulting from an income increase is related to life satisfaction. For instance, a possible channel can be considered as follows, "stricter democratic control might restrain bureaucrats' deleterious impact, lead to efficiency gains, and increase people's happiness" (Bjørnskov et al., 2007, pp.270-271).

A cursory examination of Figure 1 shows a slightly negative relationship between government size and life satisfaction, in both 1979 and 1996, which is in line with public choice theory. From Figure 2 (a), government size is negatively related with economic growth. For a closer examination, I compare its relationship in 1979 with that in 1996. Figure 2 (b) demonstrates a negative relationship in 1979 whereas Figure 2 (c) exhibits a slightly positive one in 1996. For a closer examination, simple regression estimations are conducted and their results presented in Table A1, in the APPENDIX. Definitions of the independent variables used in Table A1 are shown in Table 3. I see from Table A1 that signs of government size are negative and positive, in 1979 and 1996, respectively, and are statistically significant. It follows from this that government size has a negative effect on the growth rate in 1979, whereas it has a positive effect on growth in 1996. This result is unchanged when other variables are included as independent variables. That observed in Figure 1 and Table A1 leads me to argue that government size impeded economic efficiency in 1979 but not in 1996. Such an

¹² This paper looks at the efficiency of government in 1979 and 1996, since people's aspirations appear to change over time (Easterlin, 1995); therefore, the efficiency at a different point in time has less impact on life satisfaction than the present efficiency. Previous works have focused on the growth rate between past and current years and assessed its influence on life satisfaction (DiTella et al., 2003). The growth rate between past and current years reflects past efficiency, rather than current efficiency since economic growth can be considered as an outcome of efficient resource allocation. For this reason, I look at economic growth between current and subsequent years.

¹³ It should be noted that Japan experienced miraculous economic growth during the 1950s and 1960s (Hayami, 2001). Therefore, the high growth period in Japan is generally considered to be the two decades prior to 1970s.

improvement of the government size effect on growth is reflected in the fact that the public sector of Japan was more efficient than those of other industrialized countries in 2000 (Afonso et al., 2005).

The supply of public goods is determined through a political process, leading their supply to be different from the optimum level in terms of economics. It is widely acknowledged that bureaucrats in the government sector have an incentive to maximize their budget (Niskanen 1971). The absence of profit incentive induces government organizations to be less efficient (Buchanan & Wagner, 1977). As a consequence, a government tends to become oversized and produce an oversupply of unnecessary public goods. The cost for the supply of public goods is financed through taxation¹⁴. People are thus likely to criticize government policy when the cost of public goods outweighs their benefit. Nevertheless, a government has abundant information, which ordinary people encounter difficulty in accessing. As a result of the information asymmetry, “government can easily manipulate information to inflate the value of the public goods they want to supply” (Hayami 2001, p.227). Such manipulation is thought to be easier in the economic developing stage, since the average education level of the population is lower and the mass media is not sufficiently developed. As shown in Table 1 (b), the human capital index of 1996 is significantly larger than that of 1979, suggesting that people become more educated in the process of economic development. It also seems appropriate to point out that the emergence of Windows 95 led people to have easier access various information through the internet. Thanks to such a change of circumstances accompanied by economic development, information asymmetry between government and ordinary people decreases. Thus, it becomes more difficult for the government to manipulate information. Under these conditions, democracy functions well, which seems to be reflected in governmental policy. As a consequence, budget allocations among various public goods become more efficient, promoting growth. This might be why the detrimental effect of government size on efficiency disappears in the process of economic development. These considerations lead me to advance the Hypothesis¹⁵:

Hypothesis: Government size is negatively related with life satisfaction in the developing stage when government size causes inefficiency. Subsequently, negative relationships between government size and life satisfaction disappear in the developed stage when government size does not cause inefficiency.

2.3. Difference between male and female

I now look more closely at life satisfaction in Japan. Life satisfaction is categorized into genders and generations in 1979 and 1996, as set out in Table 2. From Table 2, I found it interesting that the degree of life satisfaction for the 16-40 year old generation is lower than for other generations for

¹⁴ In Japan, items subject to the local taxes, and the tax rates, are specified in the Local Tax Law. This is a national law; local governments have nearly no authority to set local tax rates or impose local taxes (Doi & Ihori 2009, p. 157).

¹⁵ The argument presented in this paper is suitable not only at an international level but also a prefectural one. This is because variation of government size and life satisfaction, and growth rates among prefecture are sufficiently large as seen in Figures 1 and 2.

both genders in 1979, whereas that of the 16-40 year old generation becomes higher than the others in 1996. World War II finished 51 years before 1996; thus the 16-40 generation in 1996 can be considered as the only generation of people born in the post-World War II period among those generations in Table 2. This generation was educated in a democratic environment and grew up with the growth of the Japanese economy¹⁶. The circumstances in which Japanese people lives changed were partly under the guidance of international society, and partly because of strong citizen empowerment during the postwar period. For instance, Japan ratified the United Nation's "Convention on the Elimination of all Forms of Discrimination Against Women" in 1979¹⁷. What is more, the Equal Employment Opportunity Law for Men and Women was promulgated in 1985. It was partially amended in 1997 and came into force in 1999¹⁸. Women thus gained in social standing and had a larger influence on the social lives of Japanese in the 1990s than in the 1970s. This seems to lead to a gender difference in life satisfaction¹⁹. The postwar generation's way of thinking and life style has been influenced by their education and are thus congruent to the matured democracy circumstances of Japan in the 1990s. This might be one of reasons why the postwar generation tends to be more satisfied with life than other generations in the developed stage.

Gender gaps in respect to view points about political issues are increasingly observed (Goldin, 1990). For instance, it has been found that females are more likely than males to consider growth in social welfare spending important (Funk & Athmann, 2008) and to support left-wing policies (Edlund & Pande, 2002). Past reports acknowledge that women's suffrage has led to an increase in the size of government and the allocation of public spending (e.g., Abrams & Settle, 1998; Aidt & Dallal, 2008; Lott & Kenny, 1999; Miller, 2008). In Japan, employment conditions remain different between males and females, although female's social standing has increased and females are more likely to participate in the labor market than in earlier years²⁰. If females experience substantially lower incomes when there is a disturbed marital situation, it is rational that they will support larger government (Abrams & Settle, 1998). "For government spending, women are more inclined to support spending on social insurance and the public provision of private goods...as they are more exposed to economic hardship than men in cases of marital breakdown or widowhood" (Aidt & Dallal, 2008, p.393). Hence, women prefer larger government because they benefit from the services

¹⁶ Pre-war Japanese education emphasized an emperor-centered historiography based on state Shintoism, which portrayed Japan as a divine country under the unbroken rule of the imperial family. Prewar education was radically different to that under the democracy introduced in the post war period.

¹⁷ See <http://www.un.org/womenwatch/daw/cedaw/>.

¹⁸ <http://www.cc.matsuyama-u.ac.jp/~tamura/kintouhou.htm> (in Japanese).

¹⁹ Recently, difference in life satisfaction between genders has drawn the attention of researchers (Booth & van Ours, 2009).

²⁰ According to Kawaguchi (2007), in 1995 in Japan, males' average hourly wage was 2960 Yen, while for females' it was 1760. The average monthly earnings (including bonus payments) of wage earners and salaried employees in the nonagricultural sector was 496,000 yen for men and 252,800 for women. Whereas in 1995, hours of work per week were 38.7 for men and 33.2 for women. Assuming there are 4.33 weeks in a month, the hourly rate of pay was 2960 yen for men and 1760 for women.

provided. This leads me to expect that the negative effect of government inefficiency on life satisfaction is smaller for females than for males. Therefore, as noted later, estimations are conducted by splitting samples into male and female to examine this gender difference.

3. Data and method

3.1. Data

Table 3 includes the definitions of variables and the means for data analyzed from 1979 and 1996. The life satisfaction and trust data used here are from surveys were carried by the Japan Broadcasting Corporation (Nihon Hoso Kyokai) in 1979 and 1996, Japan Broadcasting Corporation (1979, 1996). Respondents were asked, “Do you feel satisfaction with your life?”. There were four choices; “yes”, “More yes than no”, “no”, “No response”. Male and female respondents were recorded separately, at the prefecture level. Therefore, using this data I can calculate the rate of respondents who responded positively as “yes” and “I would rather say yes”. I use this rate as the measure of satisfaction. There were two questions related to trust; (1) “Are there many persons whom you can trust among your neighbors?”, (2) “Are there many persons whom you can trust among your relatives?”. The rates of respondents who said “yes” to each question are used as the measure of trust. As discussed later, two kinds of proxies for trust are used to assess the different features of trust on life satisfaction.

Per capita real incomes and population are derived from Index Publishing (2006). The Gini coefficients of income in 1979 and 1994 are from the Statistics Bureau of the Ministry of Internal Affairs and Communications²¹. The human capital index is taken from the Hi-Stat data base²². Other variables are from Asahi Shimbun (2004).

3.2. Methods

In line with the discussion above, the estimated function of trust takes the following form:

$$\begin{aligned} \ln(SATISFY)_{itsu} = & \alpha_0 + \alpha_1 \ln(GOVSCAL)_{it} + \alpha_2 \ln(NETRUST)_{itsu} + \alpha_3 \ln(RETRUST)_{itsu} + \\ & \alpha_4 \ln(INCOM)_{it} + \alpha_5 \ln(POP)_{it} + \alpha_6 \ln(GIND)_{it} + \alpha_7 \ln(HC)_{it} + \alpha_8 \text{Age}1640_s + \alpha_9 \text{Age}4160_s \\ & + \alpha_{10} \text{Female}_u + \alpha_{11} \text{Year}_{1979_t} \\ & + \varepsilon_{itsu} \end{aligned}$$

where *SATISFY* represents the rate of trust in prefecture *i*, for year *t*, generation *s* and gender *u*. α 's represents the regression parameters. ε_{itsu} represents the error term.

The structure of the data covers two years, 1979 and 1996, and is for 47 prefectures. Generation

²¹ Gini data at the prefecture level are obtained every five years; as 1996 data is not available, I used 1994 data.

²² Data is available at <http://www.ier.hit-u.ac.jp/~fukao/japanese/data/fuken2000/pfactor.xls>. This prefecture-level panel data base was constructed by Fukao and Yue (2000).

dummies are included to capture the generational effects. *Y1640 and Y4160* stand for the 16-40 and 41-60 generations, respectively. The default generation is the generation over 60 years old. *Female* and *Year_1979* are dummy variables aiming to control for gender and year effects, respectively. To make interpretation easier, the dependent variable and all independent variables, with the exception of dummy variables, take log forms. Therefore, their coefficient, α , means the elasticity, which allows me to directly compare the degree of impact of each variable.

Since causality between satisfaction and government size is not clear, the endogenous problem must be addressed. Satisfied people appear to be lenient in their evaluation of government performance, resulting in excessive government expenditure. That is to say, life satisfaction seemingly influences government size; thus Bjørnskov et al. (2007) attempt to control for the endogeneity of government size. Furthermore, satisfied people are also likely to trust others, resulting in an endogenous bias. Inevitably, it is necessary to control for endogenous bias not only from government size but also from trust. GMM estimation allows me to generalize the covariance structure of ε and therefore the estimation result is valid even if ε is heteroscedastic (Greene 1997, pp. 742-744). To alleviate these potential endogenous problems and heteroscedasticity, GMM 2SLS estimation was employed.

The effects of each variable on life satisfaction are discussed later in this section. The hypothesis raised in the previous section leads me to expect the coefficient sign of *GOVSCAL* to be negative, while its absolute value for 1996 becomes smaller than that of 1979. For the purpose of examining the robustness of the estimation results, an alternative specification model, which included the interaction term of *GOVSCAL* and *Year_1979*, was also conducted. This cross term would become negative if the result of the alternative specification is consistent with the argument above.

Trust is considered to carry the advantage that transaction costs are reduced in a long-term transaction network based on trust; something that can be seen in the subcontract system in the Japanese manufacturing industry (Asanuma, 1989). I thus generally predict the signs of trust to be positive, as in some studies (Bjørnskov, 2003; Helliwell, 2003, 2006; Bjørnskov et al., 2007). Interpersonal trust can be roughly divided into generalized and particularized trust (Uslaner, 2002; Bjørnskov 2006). “The central idea distinguishing generalized from particularized trust is how inclusive your moral community is.” (Uslaner, 2002: 26-27). People with generalized trust have positive views toward both their own in-group and out-groups, whereas those with particularized trust have positive views of their own in-group but a negative attitude toward groups to which they do not belong. Trust in relatives can convincingly be taken as particularized trust because a blood relationship is relatively stable and closed to others²³. As pointed out by Uslaner (2002), neighborhood trust shares the characteristics not only of particularized trust but also of generalized trust. A lack of the population mobility induces neighbors to repeatedly interact with each other so that interpersonal trust is formed among them through long term relationships. This can be

²³ Although other people can become relatives through marriage, this effect seems to be relatively small.

regarded as particularized trust. On the other hand, assuming that there is much mobility in the population of a community, strangers are more apt to become neighbors. In such a situation, trust formed among neighbors can be taken as generalized trust. These differences in characteristics between *RETRUST* and *NETRUST* might lead to different outcomes.

Economic factors are captured by incorporating *INCOM*, *POP* and *GINI* as independent variables. Above all, *INCOM* is included to empirically test the presumption derived from the traditional economic theory that individuals gain satisfaction from income. It is known that people encounter difficulties in making a success of collective action, although it plays a critical role in increasing benefits for society (Olson, 1965). A previous case study of Japan found that income inequality hampers collective action (Yamamura, 2008c). As well, income inequality is considered to harm health status (Kawachi et al., 1997). I thus predict that the sign of *GINI* becomes negative.

It is acknowledged that human capital increases income (Becker, 1964). If this holds true, human capital will improve life satisfaction. As suggested above, however, income level is already controlled for. Accordingly, I should interpret *HC* to capture the impact of human capital on life satisfaction through other channels. For instance, under the same constraint, more educated individuals seem to consume goods more efficiently because they can more easily access useful information. This is why the anticipated sign of *HC* is positive.

Besides the variables mentioned above, other factors seem to influence life satisfaction; for instance, individual characteristics such as marital status and membership in certain groups, particularly religious ones²⁴. Circumstances such as the crime rate are also thought to affect life satisfaction. It is reasonable that people who are dissatisfied with married life are likely to divorce. Intuitively, as a result of emotional instability, unhappy people tend to become members of certain groups to seek relief, or for criminal purposes. Such points lead me to argue that these variables result in endogenous bias when they are included in the estimation function. As mentioned earlier in this section, government size and trust can be considered as endogenous variables. Too many endogenous variables should not be included, since it is more difficult to control for bias as endogenous variables increase. However, some variables are added, but only when alternative estimations using the cross term of government size and year dummy are conducted.

4. Results

Table 4 shows the results of the OLS estimations²⁵. Tables 5 and 6 report the results of

²⁴ One's personality and values seem to influence life satisfaction. The aggregated level data used in this research, however, do not allow me to control for these unobserved individual effects. Further research using individual level panel data is called for to control for these individual effects.

²⁵ This paper uses aggregated level data. Inevitably, there is an ecological fallacy when the results are interpreted. For instance, per capita income is included as an independent variable. Its can be considered as the averaged value of each citizen's income in a prefecture. Distribution of income is, however, unknown. If a particular prefecture is described as having higher income earners, it would be fallacious to conclude that each citizen of the prefecture is a high earner. Because the per capita income of the prefecture depends on each citizen, one very high earner and two low earners may

the GMM 2SLS estimations. Table 7 shows an alternative specification, which includes the interaction term of government size and year dummy. In Table 7, I focus on the results of the interaction term to mainly examine the hypothesis. Therefore, in Table 7, the results of other control variables are not reported to save space.

In Tables 5 and 7, to instrument for *RETRUST* and *NETRUST*, I employ the following variables²⁶; logarithms for changing residence within prefecture, immigrants from other prefectures, and for the number of fire fighting teams, as well as 4 region dummies²⁷. As discussed earlier, social trust seems to collapse through population mobility captured by changing residence and as an immigrant (Yamamura 2008a). A local voluntary organization such as a fire fighting team generalizes trust among its members through interpersonal communication in cooperative activities (Yamamura, 2008b). These variables are relevant determinants of the degree of trust and are not directly associated with life satisfaction. In Table 6, not only *RETRUST* and *NETRUST* but also government size is considered as an endogenous variable. Hence, added to the instrument variables as above, I use a logarithm for the number of natural disasters because government spending increases to recover from it.

In each table, the results for all samples are shown in Columns (1)- (3). The results of subsamples consisting of 1979 and 1996 years are in columns (4)-(6) and (7)-(9), respectively. Furthermore, both male and female samples are used in columns (1), (4), and (7) in each of the Tables. Male samples are in columns (2), (5), and (8) in each of the Tables. Female samples are in columns (3), (6), and (9).

4.1. OLS model.

I begin by looking at the key variable, *GOVESCAL*. As shown in columns (1)-(3), the results estimated using 1979 and 1996 year samples show significant negative signs. The absolute value for males is 0.08, which is two times larger than that for females. If samples are restricted to the 1979 year, they continue to indicate significant positive signs and their absolute values become larger, between 0.09 - 0.20. On the other hand, the results obtained for the 1996 year samples show that they are not statistically significant and absolute values are between 0.002 - 0.02; therefore, showing considerable decline although their signs are negative. These results are consistent with the Hypothesis presented in Section 2. Furthermore, in 1979 and 1996, the absolute values for males are larger than for females, which is consistent with the expectation that the negative effect of

average out as three lower earners. To control for this problem, individual data needs to be examined. Thus careful attention is called for when interpreting the results presented in this paper.

²⁶ Table 7 shows not only results of GMM 2SLS but also those of OLS.

²⁷ Kanto region dummy, Chubu region dummy, Kinki region dummy, and Urban areas dummy. The Kanto region is comprised of 7 prefectures; Ibaragi, Tochigi, Gunma, Saitama, Chiba, Tokyo, and Kanagawa. The Chubu region is comprised of 9 prefectures; Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shizuoka, and Aichi. The Kinki region is comprised of 7 prefectures; Mie, Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama. Urban areas consist of 5 prefectures; Tokyo, Kanagawa, Aichi, Osaka, and Hyogo.

government inefficiency on life satisfaction is smaller for females than for males.

As for trust, signs of *NETRUST* are not stable and are statistically insignificant, which does not correspond to the anticipation. This might be partly because that the results of *NETRUST* suffer from endogeneity bias. On the other hand, as expected, coefficient signs of *RETRUST* are mostly significant positive signs, with the exception of columns (5) and (8). Compared with *NETRUST*, *RETRUST* is more likely to be determined exogenously because a kinship relation was formed in the distant past. As a result of this, the results of *RETRUST* are less inclined to be biased. In 1979, the magnitude of the female coefficient is 0.24, which is approximately 5 times larger than that of the male one. A similar result is obtained in 1996.

Consistent with previous research (Frey & Stutzer, 2002), signs of *INCOM* are not stable and therefore the level of income does not play a critical role in improving life satisfaction. By contrast, in all estimations, I found *GINI* to take the expected negative sign, although not statistically significant in 1996, which is congruent to the anticipation and to the assertion that life satisfaction is influenced by the income of surrounding people (Scoppa and Ponzo, 2008). Negative signs of *HC* in 1979 are not consistent with the prediction, whereas positive signs in 1996 are in line with it. In my interpretation, educated individuals are more inclined to have many opportunities to work when the market mechanism functions more effectively. That is, a university education confers considerable advantages for job seeking. Abundant opportunity to work leads not only to an increase in income but also to a reduction of the likelihood of unemployment. Therefore, the expected sign of *HC* is positive and its absolute value is larger in 1996 than in 1979 because Japan's life time employment system has been undergoing gradual collapse and a more market orientated mechanism appears to be working its way into the Japanese labor market.

It is interesting to observe that the coefficients of *Age_1640* and *Age_4160* exhibit negative signs, with the exception of *Age_1640* in 1996. This implies that, compared with the over 60 years old generation, younger generations such as *Age_1640* and *Age_4160* are less likely to feel satisfied with life, with the exception of *Age_1640* in 1996. The estimation results correspond to Table 2. The education obtained by the generation born post-World War II is considered to be aligned with democracy, much different from the education received by the previous generation. The circumstances of modern Japan are more influenced by democracy than before the end of World War II. It seems thus an appropriate argument that the relationship between postwar period education and modern Japanese life is complementary. As a consequence, the life satisfaction rate of the postwar educated generation was higher than that of the older generation in the developed stage. Hence, I find the extent to which human capital matches up to formal political institutions to be important²⁸. Significant positive signs of *Female* in all estimations correspond to the results of DiTella et al. (2003).

²⁸ Transition economies are expected to confront the same difficulties since there seems to be differences in education in considering the market economy between communist and post communist periods. It is worthwhile examining the matching problem between a communist generation and a modern market oriented society.

4.2. 2SLS model.

Before turning to consider the coefficients of each variable in Tables 5 and 6, I first check the validity of the instrumental variable method. An over-identification test is used to test the hypothesis that the instrumental variables are uncorrelated to the error term²⁹. As in the third row from the bottom, the results fail to reject the hypothesis and so all estimations pass the over-identification test³⁰. Overall, the choice of instruments is valid in all estimations and so the GMM 2SLS estimation is applicable.

As shown in Tables 5 and 6, the results of *GOVSCAL* are unchanged from Table 4, as discussed, above after controlling for endogenous bias; this strongly supports the Hypothesis concerning the effect of government size and its difference between males and females. With respect to trust, *NETRUST* shows consistently positive signs in all estimations, and is statistically significant in 1996.

As for *RETRUST*, I found it surprising that in 1996 the male coefficient takes a negative sign whereas the female one takes a significant positive sign. Any difference from Table 4 might be because of an alleviation of endogenous bias by the GMM 2SLS method. I interpret the results of *RETRUST* as follows; compared with males, Japanese females are less inclined to take full-time jobs and so they don't set up inter-personal networks in the work place. Furthermore, market information is incomplete especially in the labor market, whereas long-term repeated personal interactions within a relative network increase the information shared between network members. Females tend to allocate time to interact with relatives because a woman's time allocated to work could be shorter than a man's. This circumstance induces females to rely on informal relative networks rather than market ones. For instance, matching between a child and a strange babysitter is very difficult, leading to a rise in the transaction cost. In Japan, when a mother raising a child cannot care for her child, she is inclined to rely on relatives via a non-market network rather than demand a babysitter through the market. In the developed stage where the market has matured, interpersonal relationships become relatively scarce. Accordingly, an interpersonal network becomes more valuable, causing trust between people to make a greater contribution to female life satisfaction than before.

As for generation dummies, Tables 5 and 6 continue to demonstrate significant positive signs of *Age_1640* in 1996, although other results show mixed signs. This leads me to argue that postwar education is robustly complementary to the circumstances of the 1990s.

I have presented various estimated results. Taking the results together, I concluded that

²⁹ In a GMM context, when there are more moment conditions than parameters to be estimated, a chi-square test can be used to test the over-identifying restrictions. The test statistic is called the Hansen's J statistic. Therefore, I report J statistics instead of Sargan's.

³⁰ Despite of the validity of an instrumental variable based on the test, natural disasters are likely to have direct consequence on people's well-being. Special attention is called for when the results are interpreted.

those in this section were consistent with and supportive of the hypothesis and argument concerning other socio-economic determinants put forward in the preceding section. Furthermore, the changes in the effect of each variable can be considered to be driven by other factors. For instance, prefectures are at different development stages as they undergo the processes involved with structural change. Besides the level of per capital income, circumstances in Japan have changed remarkably between 1970' and 1990'. Japan has confronted globalization, which has resulted increased competitive pressure. This might lead to reducing the inefficiencies found in local governments.

4.3. Robustness check.

Table 7 (a), (b) and (c) shows results of the OLS estimations in columns(1) and (2) and those of GMM 2SLS in columns(3) and (4). In columns (1) and (3), the same control variables as in Table 4 are incorporated. In addition to these variables, the number of crimes and the number of divorces are included as control variables³¹. Their results are, however, not reported to save space. As in the third row from the bottom, the results fail to reject the hypothesis and so estimations using GMM 2SLS pass the over-identification test.

Looking at Table 7 (a) shows that the interaction terms of *GOVESCAL* and *Year_1979* yield significant negative signs in all estimations. This implies that government size was more negatively associated with life satisfaction in 1979 than in 1996, which supports the hypothesis. What is more, signs of the interaction term are consistently negative in Table 7 (b) and (c). Generally, absolute values in (b) are larger than those in (c), suggesting that difference of *GOVESCAL* effects between 1979 and 1996 for males is clearly larger than that for females. What is observed in Figure 7 is consistent with the findings presented in Tables 4, 5, and 6; meaning that these estimation results are robust³². As for *GOVESCAL* seen in the second row, this produced significant negative signs for the pooled sample and for males. This indicates that government size has a detrimental effect on life satisfaction in the excluded year, 1996. On the other hand, it fails to be significant for females, despite being negative. These findings are not in line with the results in Tables 4, 5, and 6. The results presented in Table 7 imply that generally government size continues to decrease life satisfaction, although improvements in government efficiency attenuated the negative effect of government size, which is not inconsistent with the public choice theory. This holds for males but not females. Furthermore, the gender gap regarding views of government size became more obvious in 1996 than in 1979. From a macro-economic viewpoint, Japan has experienced economic and financial distress since 1990, which is in sharp contrast to the economic growth seen in the previous four decades (Cargill, 2006). As argued in Section 2, economic hardship lead females to be more inclined to support social security provided by government than males. Hence, the negative effect of government size deduced from the public choice view is neutralized for females.

³¹ It should be noted, as argued earlier, that the numbers of crimes and divorces possibly lead to endogenous bias.

³² It might be unclear whether some relationships between life satisfaction and independent variables can be interpreted causally. Thus careful attention is needed when interpreting data.

5. Conclusion

That government size has a detrimental effect on the degree of life satisfaction from the view point of public choice theory is a plausible conclusion. However, a country transits from the developing to the developed stage in tandem with increases in income accompanied by institutional change. There appears to be a positive relationship between income and democracy; thus economic growth is thought to influence life satisfaction through a rise in democracy. Another issue then arises, that of whether the negative influence of government size on life satisfaction continues to be stable over time in the process of economic and institutional development. Little is known about this issue. Therefore, this paper used Japanese prefecture-level data for the years 1979 and 1996 to investigate how government size is associated with life satisfaction. The situations for each year can be roughly characterized as follows. Favorable economic growth was achieved although per capita income level was not so high in 1979, whereas per capital income reached a high level despite the low economic growth rate in 1996. Thus 1979 and 1996 are defined as developing and developed stages, respectively.

Through a GMM 2SLS estimation, which allowed me to control for endogeneity bias, I found as follows: (1) Government size had a detrimental effect on life satisfaction when it impeded economic growth in 1979. By contrast, the negative impact of the effect of government size on life satisfaction decreased in 1996, when government size was not associated with economic growth. (2) Particularized trust is positively associated with female life satisfaction but not with male. Such a tendency becomes more remarkable in the developed stage. These results do not change in the developed stage when I control for the endogeneity bias caused by local government size and proxies of trust. (3) The degree of life satisfaction of the generation born in the post-World War II period is remarkably higher than other generations, for both males and females.

The findings above are consistent with those of Bjørnskov et al. (2007); that government effectiveness alleviates the negative effects of government size. Nonetheless, achieving a mature democracy seems to take a long time. I conjecture that in the mid-1990s, Japan reached a level of income and economic development in which democracy substantially functioned, and so Japan was in a matured state. Consequently, as pointed out by Guesh (1997), stronger democracy subdues the negative effect of government size on economic growth. That is, it can be argued that the relationship between government size and life satisfaction evolves under the influence of changes in circumstances. It is, however, not obvious whether the findings of this paper hold generally, since country specific characteristics such as historical events and institutional conditions seem to influence growth and life satisfaction. For instance, it can be argued that inequality of income and land distribution impedes economic growth (Alesina & Rodrik, 1994). The literature (Ranis, 1990; Wade, 1990) reports that several Asian countries such as Japan, South Korea, and Taiwan experienced land reform after World War II, resulting in a reduction of land ownership inequality. As

a consequence, economic growth was augmented. Unlike some Asian countries, countries without the experience of land reform are thought to encounter difficulties promoting growth (Ranis 1990; Wade, 1990). In the long term, such institutional differences are likely to cause differences in life satisfaction among countries. If the institutions impeding economic growth persist, government size appears to continue to be negatively associated with life satisfaction.

In a case study of a country, it is difficult to find proxy variables to appropriately capture the changes of circumstance such as democracy and other formal institution influences. For instance, direct evidence for variations in democratic control cannot be presented even though democratic control is thought to have an important role. Therefore, to investigate how the results can be generalized, additional international comparative study is required. Further, limitations inherent in the data of this study, deduced from aggregated prefecture-level data, do not allow me to more closely and directly explore life satisfaction at the individual level. For instance, individual characteristics such as the degree of trust, employment and birth year are required to scrutinize the assertion as above (e.g., DiTella et al., 2003; Helliwell, 2003; Bjørnskov et al., 2008a; 2008b). Further research will be necessary to more closely investigate these factors.

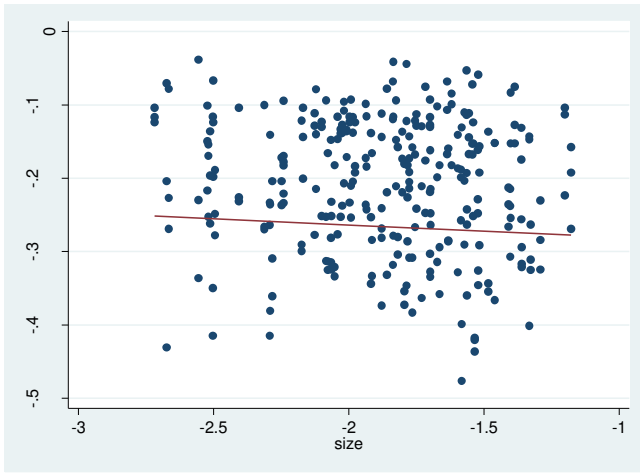
References

- Abrams, B.A., & Settle, R.F. (1998). Women's suffrage and the growth of the welfare state. *Public Choice*, 100, 289-300.
- Acemoglu, D., Simon, J., Robinson, J.A., & Yared, P. (2008). Income and democracy, *American Economic Review*, 98, 808-842.
- Aidt, T.S., & Dallal, B. (2008). Female voting power: the contribution of women's suffrage to the growth of social spending in Western Europe (1869-1960). *Public Choice*, 134, 391-417.
- Afonso, A., Schuknecht, L., & Tanzi, V. (2005). Public sector efficiency: An international comparison. *Public Choice*, 123, 321-347.
- Alesina, A., & Rodrik, D. (1994). Distributive politics and economic growth. *Quarterly Journal of Economics*, 109, 465-490.
- Angelopoulos, K., Pilippopoulos, A., & Tsionas, E. (2008). Does public sector efficiency matter? Revisiting the relation between fiscal size and economic growth in world sample. *Public Choice*, 137, 245-278.
- Asahi Shimbun. (2004). *Minryoku: TODOFUKEN-BETSU MINRYOKU SOKUTEI SHIRYOSHU (CD-ROM edition)*, Asahi-Newspaper, Tokyo.
- Asanuma, B. (1989). Manufacturer-supplier relationships in Japan and the concept of relation specific skill. *Journal of Japanese & International Economics*, 3, 1-30.
- Bairam, E. (1990). Government size and economic growth: The African experience, 1960-1985. *Applied Economics*, 22, 1427-1435.
- Barro, R.J. (1997). *Determinants of economic growth: a cross-country empirical study*. Cambridge: MIT Press.
- Becker, G. (1964). *Human Capital*, Columbia University Press, New York.
- Bjørnskov, C. (2003). The happy few. Cross country evidence on social capital and life satisfaction. *Kyklos*, 56, 3-16.
- Bjørnskov, C. (2006). Determinants of generalized trust: A cross-country comparison. *Public Choice*, 130, 1-21.
- Bjørnskov, C., Dreher, A., & Fischer, J.A.V. (2007). The bigger the better? Evidence of the effect of government size on life satisfaction around the world. *Public Choice*, 130, 267-292.
- Bjørnskov, C., Dreher, A., & Fischer, J.A.V. (2008a). Cross-country determinants of life satisfaction: exploring different determinants across groups in society. *Social Choice and Welfare*, 30, 119-173.
- Bjørnskov, C., Dreher, A., & Fischer, J.A.V. (2008b). On decentralization and life satisfaction. *Economics Letters*, 99, 147-151.
- Bjørnskov, C., Dreher, A., & Fischer, J.A.V. (2008c). Formal institutions and subjective well-being: Revisiting the cross-country evidence. KOF working papers, 192.
- Bjørnskov, C., Gupta, N.G., & Pedersen, P. (2008d). Analyzing Trends in Subjective Well-Being in 15

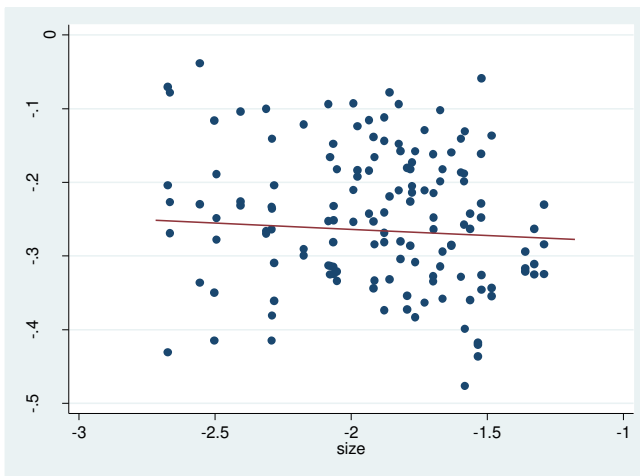
- European Countries, 1973-2002, *Journal of Happiness Studies*, 9, 317-330.
- Booth, A.L., & van Ours, J.C. (2009). Hours of Work and Gender Identity: Does Part-time Work Make the Family Happier. *Economica*, 76, 176-196.
- Buchanan, J.M., & Wagner, R.E. (1977). *Democracy in deficit: The political legacy of lord Keynes*. New York: Academic Press.
- Cargill, T. (2006). Japan's economic and financial stagnation in the 1990's and reluctant to change. In M. Blomestrom & S. La Croix (Ed.), *Institutional Change in Japan*. London: Routledge.
- Chen, S.T., & Lee, C.C. (2005). Government size and economic growth in Taiwan: A threshold regression approach. *Journal of Policy Modeling*, 27, 1051-1066.
- Dar, A.A., & Amirkhalkhali, S. (2002). Government size, factor accumulation, and economic growth: Evidence from OECD countries. *Journal of Policy Modeling*, 24, 679-692.
- DiTella, R., MacCulloch, R., & Oswald, A.J. (2003). The macroeconomics of happiness. *Review of Economics & Statistics*, 85, 809-825.
- Doi, T., & Ihori, T. (2002). Fiscal reconstruction and local interest group in Japan. *Journal of Japanese and International Economies*, 16, 492-511.
- Doi, T., & Ihori, T. (2009). *The public sector in Japan: Past development and future prospects*. Cheltenham: Edward Elgar.
- Easterlin, R. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization*, 27, 35-47.
- Easterly, W., & Rebelo, S. (1993). Fiscal policy and economic growth: An empirical investigation. *Journal of Monetary Economics*, 32, 417-438.
- Edlund, L.C., & Pande, R. (2002). Why have women become left-wing? The political gender gap and the decline in marriage. *Quarterly Journal of Economics*, 117, 917-961.
- Feld, L.P., & Svioz, M.R. (1997). Direct democracy matters for economic performance: an empirical investigation. *Kyklos*, 50, 507-538.
- Folsom, R.N., & Gozales, R.A. (1999). The feasibility of a desirable minimal state. *Public Choice*, 98, 447-464.
- Fölster, S., & Herekson, M. (2001). Growth effects of government expenditure and taxation in rich countries. *European Economic Review*, 45, 1501-1520.
- Frey, B. & Stutzer, A., (2000). Happiness, economy and institutions, *Economic Journal*, 110, 918-38.
- Frey, B. & Stutzer, A., (2002). What can economists learn from happiness research? *Journal of Economic Literature*, 40, 402-435.
- Fukao, K., & Yue, X. (2000). Regional Factor Inputs and Convergence in Japan: How Much Can We Apply Closed Economy Neoclassical Growth Models? (in Japanese), *Economic Review*, 51, 136-151.
- Funk, P. & Gathmann, C. (2008). Gender gaps in policy making: Evidence from direct democracy in Switzerland. Economic Working Papers 1123, Department of Economics and Business, Universitat Pompeu Febra.

- Goldin, C. (1990). *Understanding the gender gap: an economic history of American women*. Cambridge: Cambridge University Press.
- Greene, W.H. (1997). *Econometric Analysis* (3 eds), Prentice-Hall, London.
- Grossman, P.J. (1988). Government and economic growth: A non-linear relationship. *Public Choice*, 56, 193-200.
- Guseh, J.S. (1997). Government size and economic growth in developing countries: a Political-economy framework. *Journal of Macroeconomics*, 19, 175-192.
- Hayami, Y. (2001). *Development economics: From poverty to the wealth of nations*. (second edition). New York: Oxford University Press.
- Helliwell, J.F. (2003). How's life? Combining individual and national variables to explain subjective well-being. *Economic Modeling*, 20, 331-360.
- Helliwell, J.F. (2006). Well-being, social capital and public sector: what's new? *Economic Journal*, 116, C34-C45.
- Index Corporation. (2006). *Chiiki toukei 2006 (CD-ROM edition)*, Index corporation, Tokyo.
- Japan Broadcasting Corporation (Nihon hoso kyokai), 1979; 1996. *Zenkoku kenmin ishiki chosa*.
- Kawachi, I., Kennedy, B .P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health*, 87,1491-1498.
- Kawaguchi, D. (2007). A market test of sex discrimination: evidence from Japanese firm-level panel data. *International Journal of Industrial Organization*, 25, 441-460.
- Landau, D. (1985). Government expenditure and economic growth in the developed countries: 1952-76. *Public Choice*, 47, 459-477.
- Layard, R. (2006). Happiness and public policy: a challenge to the profession. *Economic Journal*, 116, C24-C33.
- Lee, D.R. (1989). The impossibility of a desirable minimal state. *Public Choice*, 61, 277-284.
- Lott, L.R., & Kenny, L.W. (1999). Did Women's suffrage change the size and scope of government? *Journal of Political Economy*, 107, 1163-1198.
- Luechinger, S., Meier, S., & Stutzer, A. (2006). Bureaucratic rents and life satisfaction. Institute for Empirical Research in Economics, University of Zurich Working Paper Series No. 269.
- Mendoza, E.G., Milesi-Ferretti, G.M., & Asea, P. (1997). On the ineffectiveness of tax policy in altering long-run growth: Harberger's superneutrality conjecture. *Journal of Public Economics*, 66, 99-126.
- Miller, G. (2008). Women's suffrage, political responsiveness, and child survival in American history. *Quarterly Journal of Economics*, 123, 1287-1327.
- Niskanen, W. A. (1971). *Bureaucracy and representative government*, Aldine Atherton, Chicago.
- Olson, M. (1965). *The logic of collective action : public goods and the theory of groups*. Harvard University Press, Cambridge.
- Peden, E.G., & Bradley, M.D. (1989). Government size, productivity, and economic growth: The

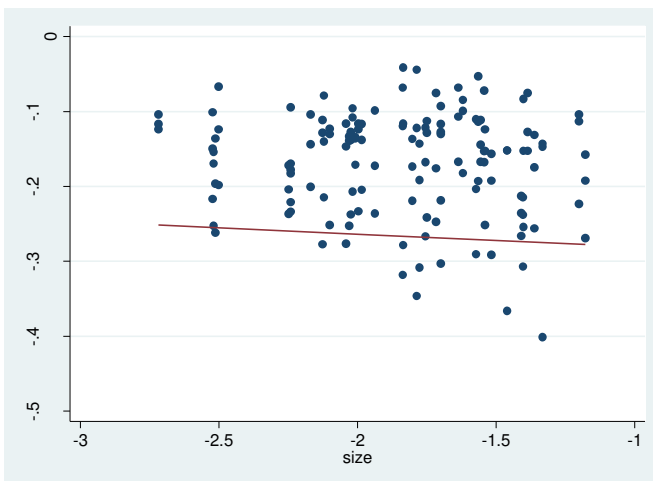
- postwar experience. *Public Choice*, 61, 229-245.
- Ram, R. (1986). Government size and economic growth: A new framework and some evidence from cross-section and time-series data. *American Economic Review*, 76, 191-203.
- Ranis, G. (1990). Contrasts in the political economy of development policy change. In Gereffi, G., & Wyman, D.L., eds., *Manufacturing miracles: paths of industrialization in Latin America and East Asia*. Princeton University Press, Princeton.
- Scoppa, V. & Ponzio, M. (2008). An empirical study of happiness in Italy. *B.E. Journal of Economic Analysis & Policy*, 8(1), 15.
- Statistics Bureau of the Ministry of Internal Affairs and Communications. (various year). *Zenkoku shohi jittai chosa*. Tokyo: Statistics Bureau of the Ministry of Internal Affairs and Communications.
- Stutzer, A., (2004). The role of income aspirations in individual happiness, *Journal of Economic Behavior & Organization*, 54, 89-109.
- Uslaner, E. M. (2002). *The Moral Foundations of Trust*, Cambridge University Press, New York.
- Wade, R. (1990). *Governing the market: economic theory and the role of government in East Asian industrialization*. Princeton University Press, Princeton.
- Yamamura, E. (2008a). Determinants of trust in a racially homogeneous society. *Economics Bulletin*, 26(1), 1-9.
- Yamamura, E. (2008b). Comparison of neighborhood trust between generations in a racially homogeneous society: A case study from Japan. MPRA Paper 10218, University Library of Munich, Germany.
- Yamamura, E., (2008c). The effects of inequality, fragmentation, and social capital on collective action in a homogeneous society: analyzing responses to the 2005 Japan census. *Journal of Socio Economics*, 37(5), 2054-2058.
- Yamamura, E., Sonobe, T. & Keijiro Otsuka, (2005). Time path in innovation, imitation, and growth: the case of the motorcycle industry in postwar Japan. *Journal of Evolutionary Economics*, 15(2), 169-186.
- Yamamura, E. & Shin, I. (2007). Dynamics of agglomeration economies and regional industrial structure: The case of the assembly industry of the Greater Tokyo Region 1960-2000. *Structural Change and Economic Dynamics*, 18(4), 483-499.



(a) 1979 and 1996



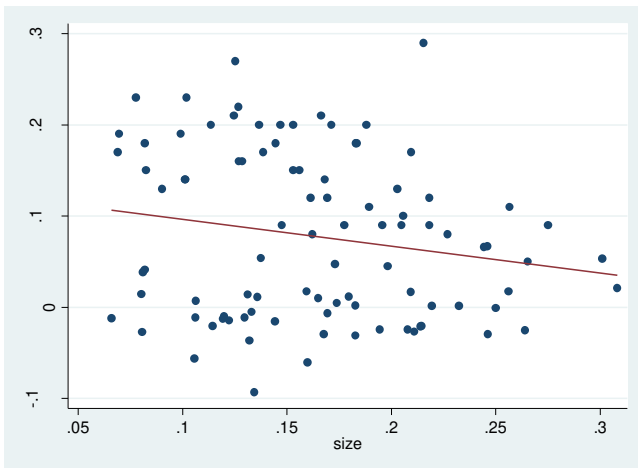
(b) 1979



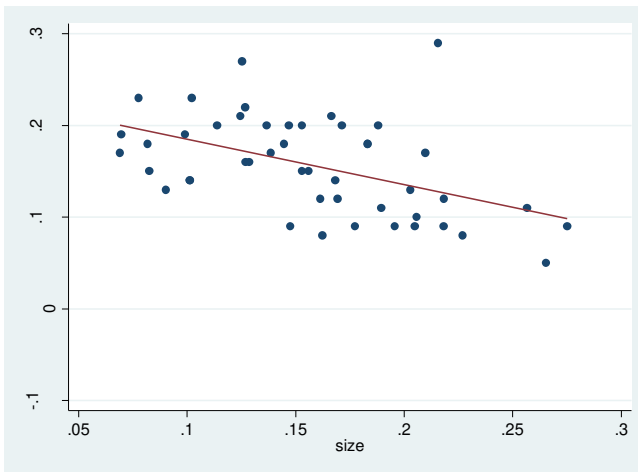
(c) 1996

Fig.1 Government expenditure and life satisfaction.

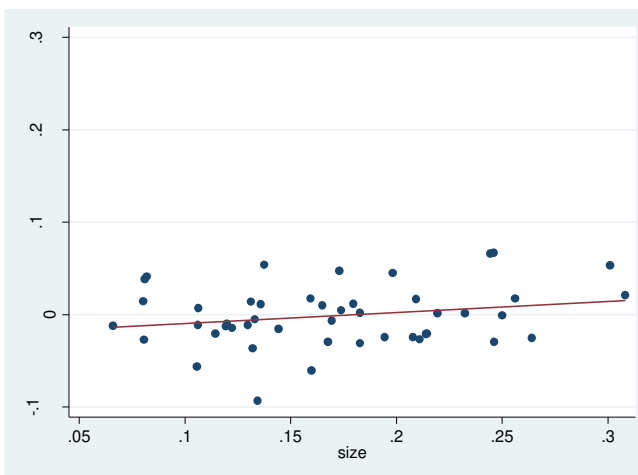
Note. Government size is a log of government expenditure over total income. Life satisfaction is a log of the rate of respondents who feel satisfaction with their life.



(a) 1979 and 1996



(b) 1979



(c) 1996

Fig.2 Government expenditure and growth rate of real per capita income.

Note. Government size is $\ln(\text{Government expenditure}/ \text{Income})$. The growth rates during 1979-1984 and 1996-2001 are presented in the 1979 and 1996 columns, respectively.

Table 1. Comparison between 1979 and 1996 (%)

(a) Life satisfaction

	1979	1996	t-value
<i>All sample</i>	73.6	82.9	12.7**
<i>Male</i>	68.9	81.4	11.4**
<i>Female</i>	78.3	84.5	7.9**

(b) Government expenditure rate, Regional real per capita income, and Growth rate of real per capita income.

	1979	1996	t-value
Government expenditure (%)	15.7	17.0	1.06
Real per capita income (Thousands yens)	2,092	3,009	10.7**
Growth rate (%)	15.1	-0.1	17.2**
Human capital index	1.02	1.04	8.24**

Note. Absolute t-values are presented. ** denote significance at the 5% and 1% levels, respectively. The growth rates during 1979-1984 and 1996-2001 are presented in the 1979 and 1996 columns, respectively.

Table 2. Life satisfaction by generation in 1979 and 1996 (%)

(1)

Generation	Male		Female	
	1979	1996	1979	1996
<i>16-40</i>	63.1	90.5	74.5	88.5
<i>41-60</i>	63.5	72.8	75.0	78.7
<i>60_</i>	79.9	80.8	85.5	86.4

Note. Categories for 1979 are 16-40 years old, 41-60 years old and over 61 years old. Categories for 1996 are 16-30 years old, 31-55 years old and over 56 years old; for comparisons these categories are, respectively, taken as roughly equivalent to those of 1979.

Table 3. Variable definitions and basic statistics

Variables	Definition	Mean	Standard deviation
<i>GOVSCAL</i>	Government expenditure/ Income (%)	16.3	5.61
<i>NETRUST</i>	Rates of respondent trusting neighbors (%)	47.4	10.1
<i>RETRUST</i>	Rates of respondent trusting relatives (%)	68.2	6.8
<i>INCOM</i>	Regional real per capita income (thousands of Yen).	2,550	616
<i>POP</i>	Number of population (thousands).	2,516	2,292
<i>GINI</i>	Gini coefficient of income	0.27	0.02
<i>HC</i>	Human capital index	1.04	0.03
<i>Age_1640</i>	Generation between 16 and 40 years old dummy	0.33	0.47
<i>Age_4160</i>	Generation between 41 and 60 years old dummy	0.33	0.47
<i>Female</i>	Female dummy	0.50	0.50
<i>Year_1979</i>	1979 year dummy	0.50	0.50

Note. Values are simple averages. Data source is the Japan Broadcasting Corporation (1979; 1996), Asahi Shimbun (2004), Index Publishing (2006) and the Statistics Bureau of the Ministry of Internal Affairs and Communications (various years). The definitions of generation dummy variables correspond to those in Table 2.

Table 4. Dependent variable: rates of respondents satisfied with life. (OLS model)

	(1)1979 & 1996	(2)1979 & 1996 MALE	(3) 1979 & 1996 FEMALE	(4)1979	(5)1979 MALE	(6)1979 FEMALE	(7)1996	(8)1996 MALE	(9)1996 FEMALE
<i>Ln(GOVSCAL)</i>	-0.06** (-3.02)	-0.08** (-2.55)	-0.04* (-1.93)	-0.14** (-4.68)	-0.20** (-4.69)	-0.09** (-2.39)	-0.01 (-0.72)	-0.02 (-1.09)	-0.002 (-0.12)
<i>Ln(NETRUST)</i>	-0.01 (-0.57)	-0.005 (-0.13)	-0.009 (-0.32)	-0.01 (-0.51)	0.02 (0.59)	-0.06* (-1.94)	0.008 (0.31)	0.03 (0.92)	0.02 (0.60)
<i>Ln(RETRUST)</i>	0.32** (8.47)	0.35** (5.85)	0.27** (7.32)	0.14** (2.55)	0.05 (0.64)	0.24** (3.66)	0.10** (2.79)	0.03 (0.66)	0.16** (4.16)
<i>Ln(INCOM)</i>	0.02 (0.49)	-0.002 (-0.05)	0.04 (1.05)	0.002 (0.06)	-0.05 (-0.95)	0.04 (0.71)	0.08* (2.01)	0.07 (1.34)	0.08* (1.94)
<i>Ln(POP)</i>	-0.01* (-2.15)	-0.01 (-1.33)	-0.01* (-2.02)	-0.03** (-3.43)	-0.04** (-2.72)	-0.02* (-2.19)	-0.009 (-1.20)	-0.01 (-0.82)	-0.008 (-1.03)
<i>Ln(GINI)</i>	-0.22** (-3.38)	-0.24** (-2.41)	-0.19** (-2.76)	-0.36** (-3.85)	-0.39** (-3.24)	-0.34** (-2.64)	-0.04 (-0.61)	-0.03 (-0.38)	-0.04 (-0.51)
<i>Ln(HC)</i>	0.02 (0.14)	-0.03 (-0.10)	0.11 (0.56)	-0.44* (-1.93)	-0.61* (-1.99)	-0.33 (-1.13)	0.15 (0.85)	0.06 (0.24)	0.29 (1.48)
<i>Age_1640</i>	-0.04** (-3.74)	-0.05** (-2.54)	-0.04** (-3.08)	-0.17** (-11.3)	-0.21** (-10.2)	-0.13** (-6.50)	0.06** (6.28)	0.12** (7.33)	0.03** (2.75)
<i>Age_4160</i>	-0.01** (-12.4)	-0.15** (-9.64)	-0.09** (-8.67)	-0.17** (-14.7)	-0.22** (-12.6)	-0.13** (-9.51)	-0.08** (-7.81)	-0.09** (-6.13)	-0.06** (-5.15)
<i>Female</i>	0.08** (11.8)			0.13** (14.7)			0.04** (6.13)		
<i>Year_1979</i>	-0.15** (-6.93)	-0.21** (-6.31)	-0.09** (-3.77)						
<i>Constant</i>	-0.49 (-1.55)	-0.31 (-0.64)	-0.60* (-1.72)	-0.70* (-1.82)	-0.32 (-0.66)	-0.84 (-1.59)	-0.81** (-3.07)	-0.76* (-2.24)	-0.78** (-2.65)
Obs	564	282	282	282	141	141	282	141	141
Adj. R^2	0.59	0.60	0.54	0.70	0.70	0.55	0.64	0.73	0.60

Note. Values in parentheses are t-statistics calculated by robust standard errors. * and ** denote significance at the 5% and 1% levels, respectively. Year dummies are included, but not reported to save space.

Table 5 Dependent variable: rates of respondents satisfied with life (GMM 2SLS model)

	(1)1979 & 1996	(2)1979 & 1996 MALE	(3) 1979 & 1996 FEMALE	(4)1979	(5)1979 MALE	(6)1979 FEMALE	(7)1996	(8)1996 MALE	(9)1996 FEMALE
<i>Ln(GOVSCAL)</i>	-0.09** (-2.54)	-0.15* (-2.23)	-0.04 (-1.63)	-0.22** (-3.69)	-0.30** (-3.41)	-0.12** (-2.37)	-0.005 (-0.19)	-0.03 (-0.94)	0.005 (0.22)
<i>Ln(NETRUST)</i>	0.68* (2.04)	0.76 (1.62)	0.27 (1.38)	0.53 (1.39)	0.59 (1.34)	0.29 (0.90)	0.42* (2.28)	0.50* (2.03)	0.27* (2.18)
<i>Ln(RETRUST)</i>	0.09 (0.28)	-0.46 (-0.66)	0.42* (1.81)	0.25 (0.55)	0.02 (0.05)	0.40 (1.04)	0.35 (1.50)	-0.24 (-0.54)	0.57** (2.71)
<i>Ln(INCOM)</i>	0.03 (0.64)	-0.07 (-0.65)	0.07 (1.52)	0.03 (0.51)	-0.10 (-1.16)	0.10 (1.26)	0.06 (1.06)	0.04 (0.54)	0.06 (0.92)
<i>Ln(POP)</i>	0.001 (0.05)	-0.001 (-0.05)	-0.008 (-0.80)	-0.03** (-2.33)	-0.03 (-1.49)	-0.03* (-1.97)	0.02 (1.48)	0.01 (0.58)	0.01 (1.14)
<i>Ln(GIND)</i>	-0.17 (-1.50)	-0.13 (-0.74)	-0.23* (-2.27)	-0.43** (-2.60)	-0.44** (-2.64)	-0.42* (-2.10)	0.08 (0.74)	0.07 (0.49)	0.02 (0.27)
<i>Ln(HC)</i>	1.04* (1.82)	0.77 (1.20)	0.62 (1.51)	0.39 (0.67)	0.01 (0.03)	0.38 (0.64)	0.65* (1.70)	0.78 (1.48)	0.52* (1.74)
<i>Age_1640</i>	0.18* (1.67)	0.19 (1.31)	0.06 (0.89)	0.04 (0.40)	-0.01 (-0.13)	0.03 (0.28)	0.19** (3.26)	0.29** (3.02)	0.10** (2.77)
<i>Age_4160</i>	0.02 (0.36)	-0.01 (-0.16)	-0.01 (-0.22)	-0.40 (-0.46)	-0.08 (-0.75)	-0.05 (-0.70)	0.02 (0.51)	-0.01 (-0.30)	0.04 (0.92)
<i>Female</i>	0.05** (4.04)			0.10** (6.52)			0.04* (1.66)		
<i>Year_1979</i>	-0.09** (-2.40)	-0.19** (-3.60)	-0.07* (-2.19)						
<i>Constant</i>	-0.50 (-1.04)	0.21 (-0.25)	-0.73* (-1.91)	-0.83 (-1.52)	0.01 (0.02)	-1.17* (-1.80)	-0.51 (-1.08)	-0.47 (-0.91)	-0.38** (-0.81)
Obs	564	282	282	282	141	141	282	141	141
O-I test chi ²	3.17	3.23	4.57	5.57	4.01	5.18	0.20	0.98	1.97
p<	0.52	0.52	0.33	0.23	0.53	0.26	0.99	0.91	0.74
Adj. R ²	0.02	-0.11	0.29	0.26	0.22	0.15	0.20	0.30	0.12

Note. Values in parentheses are t-statistics calculated by robust standard errors. * and ** denote significance at the 5% and 1% levels, respectively.

Both *NETRUST* and *RETRUST* are treated as endogenous variables and thus instrumented. Six instruments are the logarithm for the number of fire fighting teams, logarithm for changing residence within prefecture, logarithm for immigrants from other prefectures, Kanto region dummy, Chubu region dummy, Kinki region dummy, and Urban areas dummy. The Kanto region is comprised of 7 prefectures; Ibaragi, Tochigi, Gunma, Saitama, Chiba, Tokyo, and Kanagawa. The Chubu region is comprised of 9 prefectures; Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shizuoka, and Aichi. The Kinki region is comprised of 7 prefectures; Mie, Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama. Urban areas consist of 5 prefectures; Tokyo, Kanagawa, Aichi, Osaka, and Hyogo. O-I test presents the Hansen's over-identification test.

Table 6 Dependent variable: rates of respondents satisfied with life (GMM 2SLS model)

	(1)1979 & 1996	(2)1979 & 1996 MALE	(3) 1979 & 1996 FEMALE	(4)1979	(5)1979 MALE	(6)1979 FEMALE	(7)1996	(8)1996 MALE	(9)1996 FEMALE
<i>Ln(GOVSCAL)</i>	-0.15** (-2.63)	-0.23** (-2.40)	-0.08* (-1.66)	-0.40** (-4.33)	-0.49** (-3.07)	-0.30** (-3.60)	0.004 (0.10)	-0.01 (-0.20)	0.03 (1.05)
<i>Ln(NETRUST)</i>	0.55* (1.83)	0.65* (1.70)	0.19 (1.02)	0.29 (1.15)	0.57* (1.67)	0.09 (0.36)	0.37* (2.27)	0.44* (2.08)	0.22* (2.07)
<i>Ln(RETRUST)</i>	0.35 (0.98)	-0.05 (-0.09)	0.44* (1.96)	0.47 (1.17)	0.17 (0.33)	0.40 (1.09)	0.33 (1.13)	-0.20 (-0.43)	0.46* (2.23)
<i>Ln(INCOM)</i>	-0.02 (-0.40)	-0.13 (-1.19)	0.02 (0.48)	-0.12 (-1.65)	-0.22* (-1.76)	-0.09 (-1.08)	0.07 (0.99)	0.06 (0.72)	0.10 (1.42)
<i>Ln(POP)</i>	-0.01 (-0.81)	-0.01 (-0.56)	-0.01 (-1.31)	-0.08** (-3.46)	-0.08* (-2.05)	-0.07** (-2.99)	0.02 (1.50)	0.01 (0.68)	0.01* (1.66)
<i>Ln(GINI)</i>	-0.13 (-1.28)	-0.08 (-0.54)	-0.18* (-2.00)	-0.27* (-1.74)	-0.26 (-1.29)	-0.20 (-1.10)	0.05 (0.53)	0.04 (0.27)	-0.01 (-0.17)
<i>Ln(HC)</i>	0.71 (1.29)	0.52 (0.83)	0.38 (0.89)	-0.44 (-1.03)	-0.53 (-0.82)	-0.53 (-1.19)	0.63* (1.74)	0.79 (1.51)	0.56* (2.02)
<i>Age_1640</i>	0.15 (1.57)	0.16 (1.35)	0.04 (0.61)	-0.01 (-0.20)	-0.007 (-0.07)	-0.04 (-0.58)	0.17** (3.46)	0.27** (3.22)	0.09** (2.86)
<i>Age_4160</i>	0.01 (0.20)	-0.02 (-0.28)	-0.02 (-0.54)	-0.08 (-1.52)	-0.07 (-0.88)	-0.09* (-1.71)	0.01 (0.22)	-0.02 (-0.55)	0.02 (0.45)
<i>Female</i>	0.06** (4.67)			0.11** (8.12)			0.02* (2.03)		
<i>Year_1979</i>	-0.14** (-3.00)	-0.23** (-4.14)	-0.09** (-2.32)						
<i>Constant</i>	0.11 (0.18)	0.82 (0.89)	-0.33 (-0.68)	0.56 (0.81)	1.16 (1.06)	0.42 (0.59)	-0.59 (-0.96)	-0.68 (-1.00)	-0.80 (-1.38)
Obs	564	282	282	282	141	141	282	141	141
O-I test chi ²	6.49	3.01	4.83	1.49	1.43	3.83	0.62	1.56	1.18
p<	0.26	0.55	0.29	0.82	0.83	0.42	0.96	0.81	0.88
Adj. R ²	0.17	0.14	0.37	0.43	0.17	0.34	0.30	0.40	0.30

Note. Values in parentheses are t-statistics calculated by the robust standard errors. * and ** denote significance at the 5% and 1% levels, respectively.

GOVSCAL, *NETRUST* and *RETRUST* are treated as endogenous variables and thus instrumented. Seven instruments are the logarithm for the number of natural disasters, logarithm for the number of fire fighting teams, logarithm for changing residence within prefecture, logarithm for immigrants from other prefectures, Kanto region dummy, Chubu region dummy, Kinki region dummy, and Urban areas dummy. The Kanto region is comprised of 7 prefectures; Ibaragi, Tochigi, Gunma, Saitama, Chiba, Tokyo, and Kanagawa. The Chubu region is comprised of 9 prefectures; Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shizuoka, and Aichi. The Kinki region is comprised of 7 prefectures; Mie, Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama. Urban areas consist of 5 prefectures; Tokyo, Kanagawa, Aichi, Osaka, and Hyogo. O-I test presents the Hansen's over-identification test.

Table 7 Dependent variable: rates of respondents satisfied with life (OLS and GMM 2SLS model)
(a) Male and female

	(1)OLS	(2)OLS #	(3) GMM	(4)GMM #
<i>Ln(GOVSCAL)*</i>	-0.04**	-0.06**	-0.08*	-0.12**
<i>Year_1979</i>	(2.39)	(2.83)	(2.29)	(2.75)
<i>Ln(GOVSCAL)</i>	-0.05*	-0.05*	-0.06*	-0.09**
<i>Year_1979</i>	(-2.22)	(-2.13)	(-1.85)	(-2.53)
<i>Year_1979</i>	-0.25**	-0.27**	-0.27**	-0.39**
	(-5.52)	(-4.62)	(-3.47)	(-3.73)
Obs	564	564	564	564
O-I test chi ²			3.48	7.03
Adj. R ² p<	0.60	0.60	0.48	0.13
			0.06	0.31

(b) Male

	(1)OLS	(2)OLS #	(3) GMM	(4)GMM #
<i>Ln(GOVSCAL)*</i>	-0.06*	-0.07*	-0.07	-0.14**
<i>Year_1979</i>	(-2.09)	(-2.09)	(-1.55)	(-2.38)
<i>Ln(GOVSCAL)</i>	-0.06*	-0.06*	-0.13*	-0.16*
<i>Year_1979</i>	(-1.87)	(-1.67)	(-1.81)	(-2.29)
<i>Year_1979</i>	-0.34**	-0.35**	-0.35**	-0.54**
	(-4.88)	(-3.82)	(-3.07)	(-3.53)
Obs	282	282	282	282
O-I test chi ²			2.98	5.84
Adj. R ² p<	0.60	0.60	0.56	0.21
			0.12	0.26

(c) Female

	(1)OLS	(2)OLS #	(3) GMM	(4)GMM #
<i>Ln(GOVSCAL)*</i>	-0.03	-0.05*	-0.05	-0.08*
<i>Year_1979</i>	(-1.45)	(-2.19)	(-1.61)	(-1.92)
<i>Ln(GOVSCAL)</i>	-0.03	-0.03	-0.02	-0.03
<i>Year_1979</i>	(-1.36)	(-1.57)	(-1.02)	(-1.50)
<i>Year_1979</i>	-0.15**	-0.19**	-0.17**	-0.23*
	(-3.29)	(-2.98)	(-2.56)	(-2.31)
Obs	282	282	282	282
O-I test chi ²			4.82	7.57
Adj. R ² p<	0.54	0.56	0.30	0.10
			0.33	0.44

Note. Values in parentheses are t-statistics calculated by robust standard errors. * and ** denote significance at the 5% and 1% levels, respectively. All estimations include constant and the same control variables used in Tables 4 and 5.

indicates that number of crimes and the number of divorces incorporated as control variables. Results of these variables are, however, not reported to save space.

Both *NETRUST* and *RETRUST* are treated as endogenous variables and thus instrumented in GMM 2SLS estimations. The instruments used are the same as for Table 5. O-I test presents the Hansen's over-identification test.

APPENDIX

Table A1. Government expenditure and growth rate of real per capita income. (OLS model)

	(1)1979 & 1996	1979	1996
<i>Ln(GOVSCAL)</i>	-0.008 (-0.34)	-0.10** (-2.45)	0.04* (1.89)
<i>Ln(POP)</i>	0.004 (0.38)	-0.01 (-0.73)	0.01 (1.34)
<i>Ln(HC)</i>	0.15 (0.74)	-0.21 (-0.72)	0.24 (1.04)
<i>Year_1979</i>	0.16** (13.1)		
<i>Constant</i>	-0.06 (-1.05)	0.06 (0.66)	-0.04 (-0.81)
Obs	94	47	47
Adj. R^2	0.76	0.15	0.03

Note. Values in parentheses are t-statistics calculated by the robust standard errors. * and ** denote significance at the 5% and 1% levels, respectively.