Comparison of neighborhood trust between generations in a racially homogeneous society: A case study from Japan.

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3 July 2008

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Abstract. Using Japanese prefecture-level data for the years 1979 and 1996, I explore the extent to which inequality, age heterogeneity, and human capital have an effect upon neighborhood trust, which is ordinarily considered as a kind of particularized trust. The major findings are as follows: (1) Income inequality is associated with low trust for both young and the old generations. (2) Age homogeneity and education have a detrimental effect on trust. However, this tendency is not observed when the sample includes older-generation respondents only. These results are not changed when I instrument for inequality and per capita income using the relative size of the mature-aged cohort and the occurrence of natural disasters. It follows that neighborhood trust contains mixed features of generalized and particularized trust.

Keywords: Trust; Inequality; Age Heterogeneity; Social Capital
JEL classification: D30, Z13

1. Introduction

Since the seminal work of Knack & Keefer (1997), a growing number of researchers have explored how and the extent to which interpersonal trust plays an important role in economic outcomes such as economic growth (e.g., Knack, 1997; Whiteley 2000; Zak & Knack, 2002; Beugelsdijk et al, 2004), tax compliance (Lassen, 2007), and loan repayment (Cassar, 2007) [1]. It seems appropriate that there is also a reverse causality, whereby socio-economic condition determines interpersonal trust. Thus, researchers have applied themselves to investigations of the determinants of trust (Alesina and La Ferrara 2002; Berggren and Jordahl, 2006; Bjørnskov 2006; Leigh, 2006 a, 2006b; Chan 2007).

Previous work has mainly shed light on the influence of racial heterogeneity and economic inequality on trust (Alesina & La Ferrara, 2002; Bjørnskov 2006; Leigh, 2006b; Gustavsson & Jordahl 2008.). It has been found that there is a negative relationship between trust and ethic and income heterogeneity[2]. This might be partly because racial heterogeneity is a strong factor in the countries studied, such as the United States (Alesina & La Ferrara, 2002) and Australia (Leigh, 2006b)[3]. Vigdor (2004) examined the effect not only of race and economics, but also of age and socio-economic heterogeneity on collective action. These factors are also likely to be critical, especially in a racially homogeneous society, so the effect of age heterogeneity should be analyzed[4] and compared with income and racial heterogeneities. Besides various heterogeneities, there are other important factors influencing trust. Education, which can be considered as human capital, is found to increase generalized trust (Alesina & La Ferrara, 2002). It is reasonable to argue that social capital is positively associated with interpersonal trust (Putnam 1993, 2001; Fukuyama, 1995).

Interpersonal trust can be roughly divided into generalized and particularized trust (Uslaner, 2002; Bjørnskov 2006). Generalized trust and neighborhood trust are ordinarily regarded as particularized trusts thought to play a critical role in

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[1] In an attempt to bridge the psychological facet and economic ones, there has recently been increasing interest in the association between trust and subjective life satisfaction (Bjørnskov 2003; Helliwell 2003; 2006; Kingdom and Knight 2007; Uslaner 2002). Trust can also be explored from interpersonal relationships and from relationships between media and governance (Connolly and Hargreaves Heap 2007).

[2] As for economic inequality, in contrast to the United States, Leigh (2006b) found no apparent link between trust and inequality across Australia.

[3] Alesina and La Ferrara (2000) studied participation behavior in heterogeneous communities.

[4] Leigh (2006b) examined the effect linguistic heterogeneity on trust and found trust is lower in a linguistically heterogeneous community.

improvements in economic efficiency (Hayami, 2001). Even if this is the case, the effects of factors like those above on neighborhood trust are likely to differ from those of generalized trust since features of neighborhood trust are in part contrasting to those of generalized trust. Little is known, though, about the determinants of neighborhood trust; thus the question of how neighborhood trust is formed needs to be examined, and its determinants compared with those of generalized trust found in the earlier reports.

As the degree of trust and its causes might depend on the cultural background of the society, cross cultural studies are called for. Recently, case studies concerning trust have been compiled (Barr, 2003; Carpenter et al., 2004; Danielson & Holm, 2007; Schechter, L. 2007) and international comparative studies conducted (e.g., Yamagishi & Yamagishi, 1994; Yamagishi et al., 1998; Buchan & Crosson, 2004; Holm & Danielson, 2005). The key determinants of trust appear to vary between different age groups and across different periods, even when the same country is considered. This might be partly because of the situations in which individuals confront changes over time alter as they become older. Further, economic development appears to influence lifestyles and interpersonal relationships. Nevertheless, the existing literature does not pay sufficient attention to such an effect. Survey data on Japan, conducted in 1979 and 1996, respectively cover trust across five age groups. This data therefore allows me to control for the conditions in different periods and to compare the determinants of trust between different age groups. Accordingly, this paper aims to consider both socio-economic factors and differences among generations to ascertain the determinants of neighborhood trust in a racially homogeneous society. The results of estimations made it evident that income inequality is negatively associated with neighborhood trust in both young and old generations, although the effect of inequality is stronger for the young generation than for the older. On the other hand, age homogeneity and education lead to decreased neighborhood trust for the young generation but not for the old[5]. This implies that determinants of neighborhood trust partly differ from generalized trust.

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

2. Overview of features of Japanese society

[5] In this paper, generations are divided into the young generation, under 45 years old, and the old generation, over 46 years old.

2.1. Homogeneity and community mechanism

It is generally believed that Japan is a racially homogeneous society (Index Corporation, 2006)[6] and that it was in a country group with the lowest inequality (Tachibanaki, 2005: Chapter 1). Under the assumption that people have a greater tendency to trust each other in a more homogeneous society (e.g., Alesina and La Ferrara, 2002; Uslaner 2002; Bjørnskov 2006), this characteristic of Japan leads me to the conjecture that the degree of trust in Japanese society is high. As argued by Hayami (2001), "The psychological basis of mutual trust could further be strengthened by incorporating personal elements in business transactions, such as the exchange of gifts and attendances at weddings and funerals" (Hayami 2001, 290). Accordingly, Japanese society is characterized not only by racial and economic homogeneity but also by tightly-knit communities, resulting in generating interdependent trust. Hence, when it comes to Japanese society, a high degree of trust appears limited to tightly-knit communities or business groups.

In the literature (Uslaner 2002; Bjørnskov 2006), trust has been categorized into generalized and particularized kinds of trust[7]. "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 of 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[8]. That is, generalized trust can be extended to strangers while particularized trust might be restricted to within a well-established personal network. The social network can be considered as the alternative to the market for exchanges between a seller and a buyer (Kranton & Minehart, 2001). It is also thought to increase the economic benefit by enhancement of trade (Ranch, 2001; Casella & Rauch, 2002; Ranch & Trindade, 2002) and by fostering the manufacture-supplier relationship (Asanuma, 1989). People make efforts to enter or continue to be connected to informal social networks from which they expect to receive great returns (Hayami, 2001). Under the condition that a network is less open, the higher the cost of entry into that network becomes for a stranger (Annen, 2001). If so, open social networks are more

[6] The component ratio of Japanese in the 1996 population was 99 % and suggests that Japan can be considered as a racially homogeneous society (Index Corporation, 2006).

[7] Banfield (1958) provided a similar argument based on the case of a Southern Italian Village.

[8] Yamagishi & Yamagishi (1994) defined what I called the particularized trust as "mutual assistance". Japanese society characterized by preferential treatments given to in-group members provides mutual assurance in closed and tightly-knit relationships (Yamagishi & Yamagishi, 1994).

likely to be formed in a society with generalized trust than in one with particularized trust. Generalized trust thus has an economic benefit, for instance, through formation and expansion of networks. Yamagishi and Yamagishi (1994) found that Americans have a higher level of generalized trust than Japanese[9]. This leads me to predict that the Japanese economy will be impeded by the structure of trust in Japan.

However, particularized trust also seems to have a positive effect on economic development under some socio-economic conditions. Taking the example of Japan, it has been pointed out that "long-term continuous transactions between a main bank and an in-group of borrowers increases information and reduces the cost of monitoring credits, while a community relationship of trust and cooperation is effective in reducing moral hazards for borrowers" (Hayami, 2001: 326).

Nevertheless, the role of community trust, as above, does not continue to be stable because of the changes in circumstance in modern society. Yamamura (2005), based upon the case of a Japan garment cluster, found that interpersonal trust within a community improved a firm's performance in the developing stage of the cluster whereas it deteriorated its performance in the developed stage, This suggested that the role played by community-based trust in economic performance changes over time. There is an argument that neighborhood trust, which seems equivalent to community trust, has a mixture of generalized and particularized trust since "some neighbors we know well, others we don't. So trusting neighbors is a mixture of faith in both friends (slightly higher weighting) and strangers (slightly lower)." (Uslaner, 2002: p.53). If the number of immigrants increases and then come to cooperate with the original community members, community-based trust can be categorized into generalized trust. It might be possible that interpersonal trust within a community becomes open to strangers in response to a transition in socio-economic conditions[10]. That is to say, the characteristics of community based trust can evolve to adapt to changes in community surroundings. Thus it is interesting to examine the question of how community-based trust is formed and if the determinants of community-based trust are different from those for generalized trust in modern society.

Changes of neighborhood trust

[9] According the World Values Survey, the generalized trust ratio for USA of 41.5 % is about 1.4 % lower than Japan's. Data is available at http://www.worldvaluessurvey.org/. The World Values Survey is organized through a network of social scientists coordinated by the World Values Survey Association. The World Value Survey has been widely used in previous research (e.g., Bjørnskov 2006, Chan 2007).

[10] Chan (2007) found a positive relationship between openness-generalized trust under pressure of globalization.

Surveys in 1979 and 1996, carried out by the Japan Broadcasting Corporation (Nihon Hoso Kyokai), asked respondents, "Are there many persons whom you can trust in your neighborhood?". I use this Japan Broadcasting Corporation (1979, 1996) data at the prefecture level., The rate of respondents who said "yes" was separately reported for five generations, 16-25 years old, 26-35 years old, 36-45 years old, 46-55 years old, and over 56 years old. This rate is used as the measure of trust.

It seems appropriate that the degree of trust differs among age groups not only because the experience of life changes interpersonal relationships, but also because individuals' economic circumstances change as time passes.

Table 1 presents the degree of average neighborhood trust across generations in 1979 and 1996, separately. I see from Table 1 that individuals are more likely to trust neighbors as they become older.[11] As well, the degree of trust in 1979 is higher than in 1996, which is in line with the United States, where generational decline in generalized trust between 1970s and 1990s was reported (Putnam, 2000: Chapter 8)[12]. The decline of neighborhood trust presumably reflects the change of the community in which neighborhood trust was shaped. When I use samples of all generations, the rates are 47 % and 44 % in 1979 and 1996, respectively. This is almost the same as the generalized trust value for Japan of 42.9 % taken from the World Value Survey. This supports the assumption, as previously discussed, that neighborhood trust shares the characteristics not only of particularized trust but also of generalized trust (Uslaner, 2002).

For simplicity, in this paper, generations are divided into a young generation, between 16-45 years of age, and an old generation, older than 46 years of age. Table 2 (1) showing a comparison of young and old generations in each period reveals that the degree of trust in the young generation is lower than the old one and hardly changes from 1979 to 1996. On the other hand, for the old generation, the fact that the degree of trust in 1996 is significantly (6 %) lower than that of 1979, indicates a substantial decline of trust. This implies that the degree of connection between the older generation and the community weakened. The difference of trust between urban and other regions is set out in Table 2(2)[13]. The degrees of trust in other regions are consistently

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[11] Older people are generally more trusting (Glaeser et al., 2000; Alesina & La Ferrara, 2000).

[12] The index of trust used in Putnam (2000) is the percent of who say "most people can be trusted".

[13] The urban region consists of 5 prefectures; Tokyo, Osaka, Kanawa, Aichi, and Hyogo. Tokyo is the most urbanized prefecture followed by Osaka. Kanagawa, Aichi, and Hyogo include and the well known large cities of Yokohama, Nagoya, and Kobe, respectively.

higher than for the urban regions. However, I found a significant decrease in other regions between 1979 and 1996, but not in urban regions. It follows from Table 2(1) and 2(2) that the gap between generations and regions has narrowed as time has passed.

Table 3 (1) and (2) presents comparisons between urban and other regions by generation and period. From Table 3 (1), I find that there is a significant difference between regions for the young generation but not the old. In Table 3(2), I find a significant difference between regions in 1979 but not in 1996. Considering Table 2 and Table 3 together, the gap of trust disappears as time has passed and people become older. More precisely, community connections in non-urban regions become weaker, becoming similar to those in urban areas. If a community becomes more open to strangers in exchange for closely-knit community ties becoming weaker, neighborhood trust comes to have features of generalized trust.

3. Data and method

3.1. Data and socio-economic conditions

The data set used in this study is a survey panel of 47 prefectures covering 15 years from 1988 to 2002. As earlier noted, the trust data used here was drawn from the Japan Broadcasting Corporation surveys of 1979 and 1996. Table 4 includes variable definitions and means for the data analyzed from 1979 and 1996. Variables are discussed later. The population of each generation, numbers for per capita incomes, numbers of firefighting teams and members are derived from Index Publishing (2006). The Gini coefficients of income in 1989, 1994, 1999 and 2004 are from the Statistics Bureau of the Ministry of Internal Affairs and Communications[14]. The human capital index is taken from the Hi-Stat data base[15]. Other variables are from Asahi Shimbun (2004).

I proceed to discuss socio-economic changes of Japan as presented in Table 4. As researchers have pointed out, the situation for Japan has recently changed; for instance, income inequality in Japan has increased (Tachibanaki, 2005: 6-9). Compared with 1979, *GINI* is significantly augmented in 1996. As well, although the ratio of non-Japanese

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[14] Gini data at the prefecture level can be obtained every five years. Therefore, to construct the panel data, additional data used for the estimations were generated by interpolations based on an assumption of constant changing rates.

[15] 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).

remains less than 1 %, it did significantly increase from 0.39 % to 0.66 % between those years. These increases of income and racial heterogeneity are thought to be related to the decline of neighborhood trust, as discussed in the previous subsection. By contrast with income and racial heterogeneity, age heterogeneity falls just slightly. Furthermore, to ascertain the age structure in more detail, the ratios for each generation are presented. It is clearly observable that the young generation ratios, such as *GEN1524*, *GEN2534,* and *GEN3544*, decreased whereas the older generation ones, *GEN4554,* and *GEN55*, increased, implying demographic shifts. It is especially striking that *GEN55* rose by over 11%, reflecting the fact that Japan is moving towards an aged society.

HC, the human capital index, increases significantly, indicating that more human capital was accumulated in 1996 than in 1979. It is observed in the development process of a garment cluster located in a rural region, that school education became more important than community-based trust when the production base was relocated to outside the cluster (Yamamura, 2005). The fact that trust decreases, as shown previously, and that human capital become greater is in line with the above case study.

Modern Japanese society is rooted in the group responsibility system within a community. For instance, community firefighting teams originated in the Edo period and continue to exist (Goto 2001). Community firefighting teams, informal institutions, are called for nowadays because of the scarcity of public firehouses, and are regarded as formal institutions; hence they are a substitute for public firehouses. What is more, such a team plays an important role in deterring the incidence of fires and also in generating social capital through interpersonal communication in cooperative protective activities against disasters (Goto 2001). *FFTM* and *FFME*, the number of fire fighting teams and its members, are thus considered as proxies for social capital. They are stable between 1979 and 1996.

MOBIN and *MOBIM* are the number of those changing residence within a prefecture and immigrants from another prefecture. I include them to capture, to some extent, the number of strangers present within a community. *POP* and *INCOM* are included for the economic condition. Total income level was significantly augmented, from 43.8 to 50.5 trillion yen; reflecting the economic growth seen in Japan during that period.

3.2. Method

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

$$Ln(TRUST)_{its} = \alpha_0 + \alpha_1 Ln(GINI_{it} + \alpha_2 Ln(ETFRA)_{it} + \alpha_3 Ln(AGEFRA)_{it} + \alpha_4 Ln(GENSAM)_{its} + \alpha_5 Ln(HC)_{it} + \alpha_6 Ln(FFTM)_{it} + \alpha_7 Ln(FFME)_{it} + + \alpha_8 Ln(MOBIN)_{it} + \alpha_9 Ln(MOBIM)_{it} + \alpha_{10} Ln(POP)_{it} + \alpha_{11} Ln(INCOM)_{it} + \varepsilon_i + \nu_t + \lambda_s + \omega_{its},$$

where *TRUST* represents the rate of trust in prefecture *i* in year *t*, and generation s. α's represents the regression parameters. ε_i, ν_t and λ_s represent the unobservable specific effects of the individual effects of *i*'s prefecture (a fixed effect prefecture vector) in year *t* (a fixed effect time vector) and generation *s* (a fixed effect generation vector), respectively; ω_{it} represents the error term.

As earlier mentioned, the structure of the data set is a panel covering two years and 47 prefectures; ε_i holds the time invariant feature, for which I control by means of fixed effects estimation. Macroeconomic conditions are captured in ν_t, and I incorporate each year's dummy variables to restrain the time specific effects. Generations dummies are included to capture the generation effects λ_s as follows. *Y1524, Y2534, Y3544, and Y4554* stand for the 15-24, 25-34, 35-44, and 45-54 generations, respectively. 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. Furthermore, it should be emphasized that it is necessary to deal with the endogenous problem, which has been recently stressed in research (e.g., Leigh 2006a; Bjørnskov 2006; Gustavsson & Jordahl, 2008). With aim of alleviating potential endogenous problems with the Gini coefficient and per capita income, 2SLS estimation was performed.

The effects of each variable on trust are discussed. Yamagishi et al (1998) argued that social uncertainty stemming from, for instance asymmetric information in the market, tends to encourage stable relationships with specific partners. A heterogeneous society where people have different characteristics is expected to increase social uncertainty and therefore strengthen closed and stable relationships. It is reasonably assumed that closed and stable relationships generate particularized trust (Yamagishi & Yamagishi, 1994). If this is the case, social heterogeneity is positively associated with particularized trust. Assuming that neighborhood trust is regarded as particularized trust, the coefficients of the proxy for heterogeneity are predicted to take the positive sign. On the other hand, the sign of *GINI* [16] *ETFRA* and

[16] Gini data at the prefecture level is obtained five years, though data for 1996 are not

AGEFRA [17] will be negative if income, social and age heterogeneity result in the lowering of trust as found in reports that have investigated generalized trust. A cursory examination of Figures 1 and 2 reveals that income inequality and racial heterogeneity are negatively associated with neighborhood trust; supporting the latter presumption that neighborhood trust has features of generalized trust. Nevertheless, as shown in Figure 3, age heterogeneity seems unrelated to trust.

Age heterogeneity differs from other kinds of heterogeneity in that people belonging to the same generation are likely to become competitors in various situations. For instance, during school age, there are entrance examinations for high school and university [18]. Even after graduation, severe competition for high positions occurs. Hence, people are less likely to cooperate with their own generation if the hostility coming from competitive pressure outweighs the familiarity stemming from generational homogeneity, leading to generational members distrusting each other. Necessarily, to capture such an effect, adding a proxy for age heterogeneity, I incorporate *GENSAM,* which stands for the ratio of the same generation population for the corresponding generation sample. That is to say, for instance, the value of *GENSAM* is the ratio of the 15-24 years old population in each prefecture and in each year when the dependent variable is the trust ratio of *Y15-24* in the corresponding prefecture and year. The anticipated sign of *GENSAM* would be negative.

From previous reports (Zak & Knack 2001; Alesina & La Ferrara, 2002), *HC* will be positively correlated with trust and take a positive sign. The more educated people are, the more they are inclined to work and trust each other than to spend time verifying each others' actions because the opportunity cost for them is high (Zak and Knack, 2001). Nevertheless, with respect to neighborhood trust, this seems to be formed through long-term and frequent interactions with neighbors. Time spent in such a community-based and closed relationship is considered to be an opportunity cost. It becomes relatively higher for more educated people. Better-educated people can access information concerning business opportunities outside of their community

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available. Therefore, I use the 1994 data.

[17] Because of the lack of data, the ratio of non-Japanese is used as a proxy for ethnic fractionalization. Following the general index of fractionalization (Alesina and La Ferra, 2002), age fractionalization can be written as

$$AGFRAC = 1 - \sum_{i=1}^{N} \pi_i^2$$

where π_i is the proportion of people who belong to the age group i, and N is the number of groups.

[18] It is well known that entrance examinations in Japan are very competitive, at least through the 1990s.

network, and thus increase their benefits. Inevitably, better-educated people are less apt to get along with community members, resulting in lower neighborhood trust. As a consequence, the sign of *HC* is predicted to become negative.

People are more likely to trust each other if there is a place where they can communicate with each other and if the community is well-organized. As discussed in the previous subsection, *FFTM* and *FFME* can be considered as proxies for social capital. Hence, it is possible that the coefficients of *FFTM* and *FFME* would take positive signs. *MOBIN* and *MOBIM* are thought to capture the influence of strangers. If their signs become negative, neighborhood trust is characterized by the tendency that people do not believe strangers, and so are categorized into particularized trust. In the case that the signs of *MOBIN* and *MOBIM* coefficients are not stable, strangers do not influence neighborhood trust, implying that neighborhood trust has features of generalized trust. *POP* and *INCOM*, representing population and per capita income, respectively, are the control variables used to capture economic conditions. It is reasonably assumed that larger prefectures are more diverse, which controls for the heterogeneity that cannot be captured by heterogeneity variables as above (Bjørnskov 2006).

4. Results

4.1. Fixed Effects model.

Table 5 presents the results of the fixed effects estimations made in this study. In Table 6, the results of the fixed effects 2SLS estimations are reported; where, following Leigh (2006a), the sizes of the mature-age cohorts are used as instruments for *GINI* and *INCOM*[19]. As well as cohorts, I also use the number of disasters as an instrument since it is plausibly hypothesized that an external shock has a tremendous effect on levels of income. In particular, poor people who live in fragile houses might suffer more seriously from a disaster, leading to an increase in income inequality. The results for all samples are shown in Columns (1) and (2) of Table 5, and columns (1)-(4) of Table 6. Those for the young generation are reported in columns (3) and (4) of Table 5, and columns (5)-(8) of Table 6, respectively. Those for the older generation samples are in columns (5) and (6) of Table 5, and columns (9)-(12) of Table 6.

All coefficients of *GINI* take negative signs although the results for the older generations, as reported in columns (5) and (6), are not statistically significant. This

[19] I use the following as instrument variables: (1) a logarithm of the population aged 20-59, 40-44, 45-49, 50-54, and 55-59. (2) a logarithm of the number of disasters. These have been collected from Index Publishing (2006).

does not support the expectation that economic inequality increases trust under the assumption that neighborhood trust is particularized trust. But this is consistent with the results provided in reports that have examined generalized trust. It follows from the result of inequality that neighborhood trust has features of generalized trust. Furthermore, the absolute values for the young generation are 6 times larger than those for the older one. These results tell me that income inequality has a far larger negative effect on neighborhood trust for the young generation than for the old.

Signs of *ETFRA* become positive in all columns, which is consistent with the prediction that heterogeneity is positively associated with trust. With respect to *AGEFRA,* signs are found to be positive for all samples and the young generation, but negative for the old generation; implying that age heterogeneity has different effects on young and old generations. Looking at the fourth row of columns (2) reveals that *GENSAM* has a negative influence on trust. In the case that samples are divided into young and old generations, it is interesting to observe that negative and positive coefficient signs are reported in columns (4) and (6), respectively. This tells me that trust is a decreasing function of *GENSAM* for the young generation but an increasing function of *GENSAM* for the old one. My interpretation of the results of *AGEFRA* and *GENSAM* is as follows. As generally anticipated, the larger the size of a generation, the larger the number of rivals within it. People are, in general, more likely to become rivals to each other in various situations if they belong to the same generation, resulting in a reduction in trust between them. Nevertheless, this seems inappropriate for the older generation since the likelihood is that people's conduct changes as the effects of competition decrease. That is, it seems that income level and position for the older generation is more stable than for the younger one, which leads to a decrease in competitive pressure within the older generation. Once people within the same generation are not rivals, they become more familiar with each other than before because they share the same generational characteristics.

The significant negative signs of *HC* in columns (1) and (2) tell me that education has a negative effect on neighborhood trust, as previously anticipated. Furthermore, it is surprising to observe that the absolute values are about 3.8, showing that neighborhood trust decreases 3.8 % when *HC* increases by 1 %. Compared with the results of other variables, where absolute values are less than 1.00, I found the effect of *HC* remarkably large. For a closer examination, I examine the results for the younger and older generations. Looking at columns (3) and (4) reveals that its signs continue to be significantly negative and that its absolute values become larger than 5. By contrast with the young generation, the signs for the old generation are negative in column (5) but positive in column (6), but are statistically insignificant. As well, the absolute values of *HC* sharply decrease and become less than 1. From what is observed in the results of *HC*, I derive that the negative effect of education on neighborhood trust holds for the younger generation but not for the older one. I interpret this as suggesting that the younger generation is more competitive than the old and hence the incentive to search for profitable opportunities increases, leading to a decrease in the time available to get along with other community members. As a consequence, educated younger generation members are less inclined to trust neighbors than those in the older generation. This is consistent with the results of *GENSAM.*

In all estimations, the coefficient of *FFTM* becomes the predicted positive, whereas *FFME* are unexpectedly negative, which implies that the effect of social capital is ambiguous. *MOBIN* takes a negative sign while the signs of *MOBIM* are not stable. Furthermore, their absolute values are mostly smaller than 0.10 so that neighborhood trust is relatively inelastic with respect to strangers. The negative signs of *POP* in columns (1) and (2) are congruent with the expectation, despite being statistically insignificant. This continues to be hold for the younger generation but not for the older one.

As for the generation dummies such as *Y1524, Y2534, Y3544, and Y4554,* the default for generation dummies is the generation over 55 years old in columns (1),(2), (5), and (6). When it comes to columns (3) and (4), the default is *Y3544.* All signs are significantly negative and absolute values almost become larger if the generations become younger. This tells me that, compared with the older generation, members of the younger generation are less apt to trust neighbors, which is consistent with previous reports.

4.2. Fixed Effects 2SLS model.

Before turning to consider each variable's coefficients, I begin by checking the validity of the instrumental variable method. In odd numbered columns, only *GINI* is instrumented, while in even numbered columns, both *GINI* and *INCOM* are instrumented. As shown in the second and third rows from the bottom, all F-statistics are larger than 30. What is more, an over-identification test is used to check the exogeneity of instruments. As reported in the third row from the bottom, the results of the over-identification test indicate that exogeneity is a valid assumption in all estimations. Overall, the choice of instruments is valid in all estimations and thus the Fixed Effects 2SLS estimation is applicable.

As is reported in Table 6, the signs of *GINI* remain the same as in Table 5 when not only unobservable individual fixed effects but also endogeneity bias are controlled for. With respect to magnitude, absolute values are mostly over 2 and thus become about 4 times larger than those shown in Table 5; telling me that neighborhood trust becomes more elastic with respect to income inequality after controlling for endogeneity. This result is similar to that suggested in Bjørnskov (2006). Furthermore, the influence of *GINI* for the young generation continues to be larger than for the old when Fixed Effects 2SLS is employed.

ETFRA and *AGEFRA* in general affect negatively on neighborhood trust, as reflected by their negative signs in columns (1)-(4), with the exception of *AGEFRA* in columns (3) and (4), though statistically insignificant. This is the reverse of what is observed in Table 5, implying that the influences of various types of heterogeneity on neighborhood trust are generally equivalent to those of generalized trust as seen in earlier studies (Alesina & La Ferrara, 2002; Bjørnskov 2006; Leigh, 2006b; Gustavsson & Jordahl 2008). When I divide the sample into young and old generations, most signs become positive in the young but negative in the old. These results lead me to presume that neighborhood trust can be categorized as particularized trust for the younger generation but generalized trust for the older. In my interpretation, features of neighborhood trust appear to depend on the generation's perception, which, however, requires special attention and is thus open for discussion. I obtained similar results for *GENSAM* as those in Table 5, indicating its robustness for alternative estimations and specifications.

Signs of *HC* remain the same as in Table 5. However, their absolute values become distinctly larger than those of Table 5 after controlling for endogeneity. Results for the rest of the variables are the same as in Table 5.

In most case, signs of *MOBIN* and *MOBIM* are negative and positive, respectively, and their values are smaller than 0.10. They are not statistically significant, which is in line with the results in Table 5. The fact that strangers do not affect neighborhood trust might indicate that neighborhood trust can be partly characterized as generalized trust.

5. Conclusion

Neighborhood trust is thought to play an important role in lowering transaction costs and raising economic performance within a community. Such a positive effect of trust appears important, especially in the early stage of the development process. However, little is reported about how neighborhood trust is formed, although some researchers have attempted to explore generalized trust. Neighborhood trust might ordinarily be considered as particularized trust. A community where neighborhood trust is formed, however, might alter under the influence of changes in socio-economic circumstances. In conjunction with this, neighborhood trust would also change and become characterized by both particularized and generalized trust. This research aimed to ascertain the determinants of neighborhood trust and investigate its features in Japan, where neighborhood trust is thought to play a crucial role in improving economic performance. To this end, using prefecture level data of Japan for the years 1979 and 1996, I explored the extent to which inequality, age heterogeneity, and human capital have effects on neighborhood trust. Using Fixed Effects 2SLS allowed me to control for unobservable fixed effects and endogeneity.

The major findings are as follows: Consistent with earlier reports that have examined generalized trust, income inequality is associated with low trust for both young and old generations, although its magnitude is smaller for the old. It is also interesting to observe that strangers hardly affect neighborhood trust. Age homogeneity and education are associated with low trust; this tendency is, however, not observed when the sample includes only old generation respondents. These results were not changed when I instrumented for inequality and per capita income using the relative size of the mature-aged cohort.

Findings as above clarify that neighborhood trust is a mixture of generalized and particularized trust. Income inequality effects on neighborhood trust are equivalent to those for generalized trust, as previously reported (Gustavsson & Jordahl 2008). Features of generalized trust are also reflected in the fact that strangers do not influence trust. On the other hand, influences of age homogeneity and human capital on neighborhood trust are not consistent with those on generalized trust. Furthermore, their impacts are in part affected by the feature of the generations. From what is presented here, it is plausible to argue that features of neighborhood trust are under the influence of changes in circumstances and so evolve over time. Even if, as generally believed, a community is closed to strangers, it is induced to open up and adjusted to the modern socio-economic environment under pressure of nation-wide or global economic integration.

Evidence provided in this research has been deduced from aggregated prefecture-level data. Limitations inherent in the data do not allow me to more closely explore how and the extent to which heterogeneity and human capital have an influence on neighborhood trust. What is more, it is unclear that features of a neighborhood are altered to adjust to changes in conditions such as those involving economic integration.

Hence, it will be necessary to more carefully scrutinize features of neighborhood trust. Thus, further research, using disaggregated individual data, including information about the level of trust, sex, age, education and income, is required.

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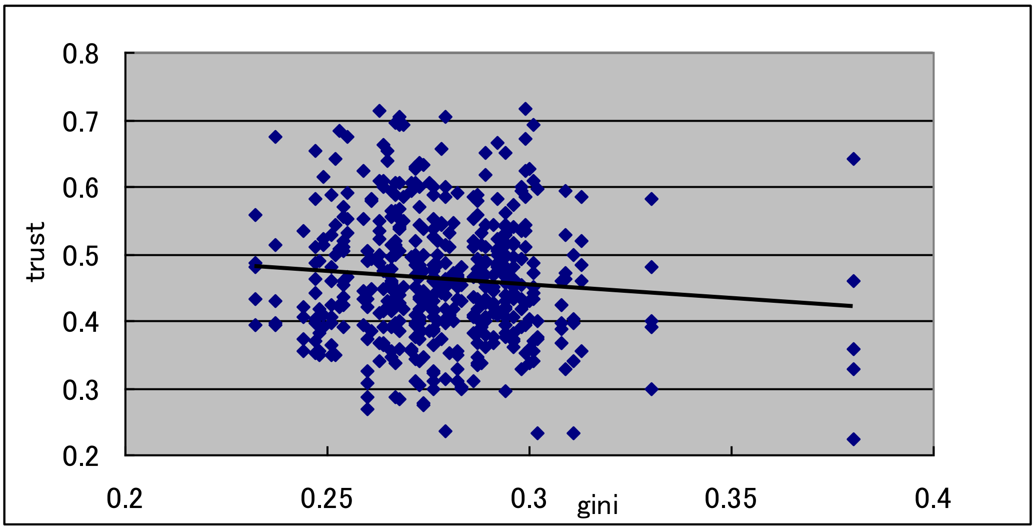

Figure 1. Relationship between gini and trust.

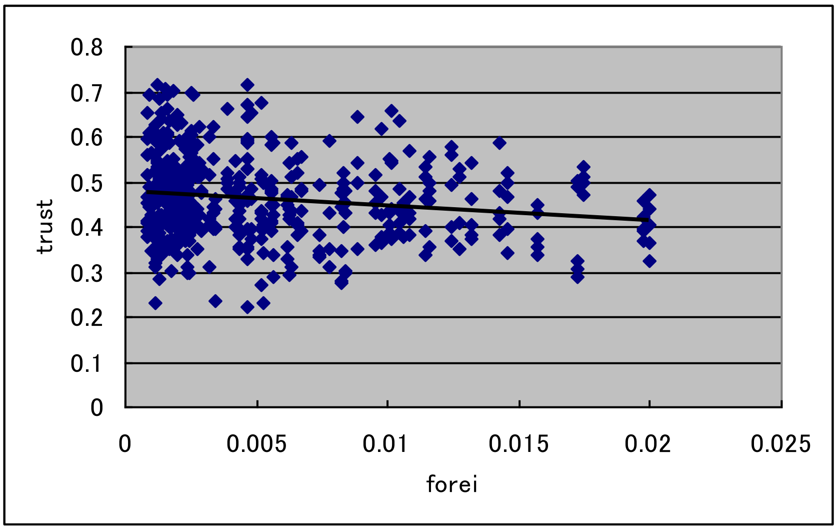

Figure 2. Relationship between the ratio of non-Japanese and trust.

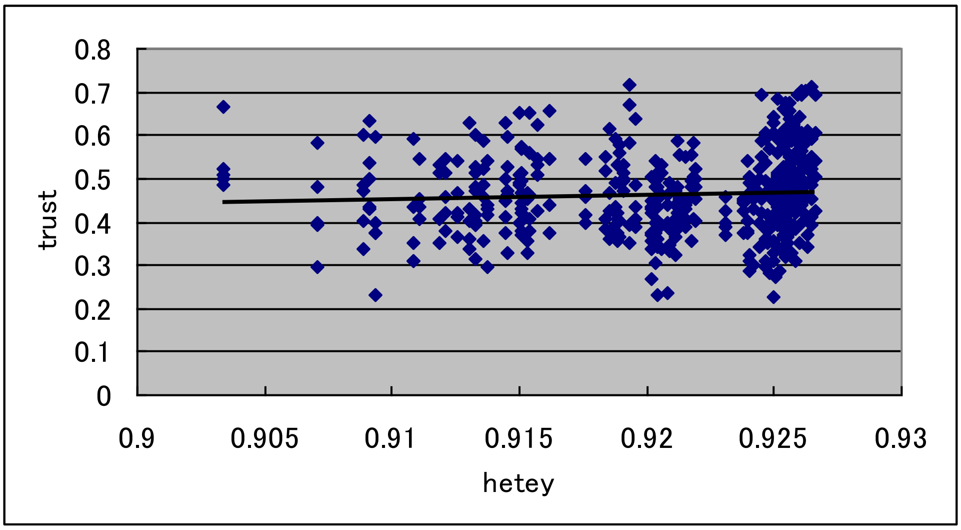

Figure 3. Relationship between age heterogeneity and trust.

Table 1. Neighborhood trust by generation in 1979 and 1996 (%)

Generation	1979	1996
16-25	42	39
26-35	38	41
36-45	45	44
46-55	51	44
56-	59	55
ALL	47	44

Table 2. Comparison of neighborhood trust levels (%)

(1) Comparison between 1979 and 1996 by generation [a]

Generation	1979	1996	t-value[b]
26-45	42	41	0.30
46-	55	49	4.62**

(2) Comparison between 1979 and 1996 by area [c]

Generation	1979	1996	t-value[b]
urban	41	42	0.24
others	48	45	3.02**

Notes:

a. Generation 26-45 is aggregated the observations of three generations such as 16-25, 26-35 and 36-45. Generation 46- is aggregated the observations of two generations such as 46-55 and 56-.

b. Absolute t-values are presented. * and ** denote significance at the 5% and 1% levels, respectively.

c. Urban areas consist of the 5 prefectures of Tokyo, Kanagawa, Aichi, Osaka, and Hyogo.

Table 3. Comparison of neighborhood trust levels(%)

(1) Comparison between urban and other by generation [a, c]

Year	urban	other	t-value[b]
26-45	44	53	4.35**
45-	40	42	1.26
All	42	46	3.24**

(2) Comparison between urban and other by year

Year	urban	other	t-value[b]
1979	41	48	2.97**
1996	42	45	1.57

Notes:

a. Generation 26-45 is aggregated the observations of three generations such as 16-25, 26-35 and 36-45. Generation 46- is aggregated the observations of two generations such as 46-55 and 56-.

b. Absolute t-values are presented. * and ** denote significance at the 5% and 1% levels, respectively.

c. Urban areas consist of the 5 prefectures of Tokyo, Kanagawa, Aichi, Osaka, and Hyogo.

Table 4. Variable definitions and comparison between 1979 and 1996

Variables	Definition	1979	1996	t-value[b]
GINI	Gini coefficient of income	0.26	0.29	7.56**
ETFRA	Ratio of non-Japanese in population of Japan. (%)	0.39	0.66	2.83**
AGEFRA	Herfindahl-type index of age heterogeneity	0.92	0.91	10.1**
GEN1524	Ratio of generation between 15 and 24 years old. (%)	14.6	13.8	3.35**
GEN2534	Ratio of generation between 25 and 34 years old. (%)	16.4	12.3	10.6**
GEN3544	Ratio of generation between 35 and 44 years old. (%)	14.5	13.2	10.1**
GEN4554	Ratio of generation between 45 and 54 years old. (%)	12.4	15.2	11.2**
*GEN55_*	Ratio of generation over 55 years old. (%)	17.7	29.0	18.1**
HC	Human capital index	1.02	1.06	8.24**
FFTM	Number of fire fighting teams (thousands).	0.63	0.61	0.25
FFME	Number of fire fighting team members (thousands).	22.9	20.6	0.91
MOBIN	Numbers changing residence within prefecture (thousands).	81.4	75.5	0.28
MOBIM	Number of immigrants from other prefectures (thousands)	75.9	63.0	0.72
POP	Number of population (millions).	2.37	2.65	0.59
INCOM	Regional real income (Trillions of Yen).	43.8	50.5	7.65**

Note: Values are simple averages. Data source is from Asahi Shimbun (2004) and Index Publishing (2006), and the Statistics Bureau of the Ministry of Internal Affairs and Communications (various years).

b. Absolute t-values are presented. * and ** denote significance at the 5% and 1% levels, respectively.

Table 5. Dependent variable: rates of respondent trusting neighbors.

(Fixed effects model)

	(1)ALL	(2)ALL	(3)YOUG	(4)YOUG	(5)OLD	(6)OLD
Ln(GINI)	-0.44*	-0.44*	-0.65*	-0.61*	-0.11	-0.08
	(-1.83)	(-1.85)	(-1.94)	(-1.84)	(-0.41)	(-0.31)
Ln(ETFRA)	0.03	0.03	0.05	0.05	0.01	0.01
	(1.39)	(1.45)	(1.40)	(1.37)	(0.45)	(0.26)
Ln(AGEFRA)	0.68	1.46	1.36	1.91	-0.32	-2.84
	(0.18)	(0.40)	(0.26)	(0.37)	(-0.08)	(-0.66)
Ln(GENSAM)		-0.12**		-0.38**		0.19**
		(-3.43)		(-3.54)		(2.63)
Ln(HC)	-3.84*	-3.87*	-6.06**	-5.50**	-0.51	0.03
	(-2.25)	(-2.30)	(-2.52)	(-2.34)	(-0.26)	(0.02)
Ln(FFTM)	0.42*	0.42*	0.33	0.35	0.57*	0.59*
	(1.79)	(1.80)	(0.99)	(1.08)	(2.06)	(2.20)
Ln(FFME)	-0.41	-0.45	-0.19	-0.18	-0.73*	-0.75*
	(-1.20)	(-1.20)	(-0.40)	(-0.39)	(-1.87)	(-1.95)
Ln(MOBIN)	-0.07	-0.07	-0.06	-0.04	-0.09	-0.07
	(-0.49)	(-0.50)	(-0.30)	(-0.22)	(-0.52)	(-0.43)
Ln(MOBIM)	0.04	0.04	-0.01	-0.01	0.14	0.15
	(0.29)	(0.27)	(-0.06)	(-0.04)	(0.73)	(0.84)
Ln(POP)	-0.001	-0.002	-0.12	-0.08	0.17	0.21
	(-0.001)	(-0.01)	(-0.26)	(-0.20)	(0.47)	(0.56)
Ln(INCOM)	0.25	0.25	0.35	0.33	0.10	0.09
	(1.63)	(1.65)	(1.61)	(1.59)	(0.58)	(0.55)
Y1524	-0.34**	-0.40**	-0.09**	-0.08**		
	(-17.2)	(-15.3)	(-4.40)	(-4.04)		
Y2534	-0.37**	-0.43**	-0.12**	-0.12**		
	(-18.7)	(-16.3)	(-5.90)	(-5.61)		
Y3544	-0.24**	-0.30**				
	(12.3)	(11.5)				
Y4554	-0.18**	-0.25**			-0.18**	-0.09**
	(9.38)	(9.30)			(-12.8)	(2.42)
Obs	470	470	282	282	188	188
Adj. R^2	0.55	0.55	0.20	0.21	0.65	0.65

Note: Values in parentheses are t-statistics calculated by the robust standard errors.

* and ** denote significance at the 5% and 1% levels, respectively. Year dummies are included, but not reported in order to save space.

Table 6 Dependent variable: rates of respondent trusting neighbors. (Fixed effects 2sls model)

	(1)ALL	(2)ALL#	(3)ALL	(4)ALL#	(5)YOUG	(6)YOUG#	(7)YOUG	(8)YOUG#	(9)OLD	(10)OLD#	(11)OLD	(12)OLD#
Ln(GINI)	-2.37**	-2.16*	-2.36**	-2.17*	-2.58*	-2.66*	-2.42*	-2.38*	-2.06*	-1.40	-2.02*	-1.14
	(-2.61)	(-2.06)	(-2.63)	(-2.10)	(-2.03)	(-1.79)	(-1.95)	(-1.65)	(-1.80)	(-1.05)	(-1.78)	(-0.83)
Ln(ETFRA)	-0.01	-0.01	-0.01	-0.01	0.01	0.01	0.01	0.01	-0.03	-0.02	-0.03	-0.02
	(-0.26)	(-0.20)	(-0.23)	(-0.17)	(0.13)	(0.11)	(0.14)	(0.15)	(-0.74)	(-0.57)	(-0.86)	(-0.62)
Ln(AGEFRA)	-0.18	-0.06	0.59	0.70	0.49	0.44	1.05	1.08	-0.12	-0.82	-3.41	-3.13
	(-0.05)	(-0.02)	(0.15)	(0.18)	(0.09)	(0.08)	(0.19)	(0.20)	(-0.24)	(-0.16)	(-0.67)	(-0.59)
Ln(GENSAM)			-0.12**	-0.12**			-0.35**	-0.35**			0.16*	0.18*
			(-3.17)	(-3.20)			(-3.07)	(-3.05)			(1.93)	(2.03)
Ln(HC)	-5.61**	-4.48	-5.63**	-4.65	-7.82**	-8.23*	-7.19**	-6.98	-2.29	1.12	-1.79	2.65
	(-2.80)	(-1.32)	(-2.84)	(-1.39)	(-2.79)	(-1.71)	(-2.62)	(-1.49)	(-0.91)	(0.26)	(-0.71)	(0.59)
Ln(FFTM)	0.31	0.27	0.31	0.27	0.22	0.24	0.24	0.24	0.46	0.31	0.48	0.29
	(1.21)	(0.94)	(1.22)	(0.97)	(0.61)	(0.60)	(0.70)	(0.61)	(1.39)	(0.85)	(1.48)	(0.79)
Ln(FFME)	0.20	0.21	0.21	0.21	0.42	0.42	0.40	0.40	-0.11	-0.09	-0.12	-0.11
	(0.45)	(0.47)	(0.47)	(0.48)	(0.66)	(0.65)	(0.64)	(0.64)	(-0.19)	(-0.16)	(-0.22)	(-0.19)
Ln(MOBIN)	-0.03	-0.07	-0.03	-0.06	-0.02	-0.01	-0.01	-0.01	-0.05	-0.15	-0.03	-0.17
	(-0.21)	(-0.37)	(-0.22)	(-0.36)	(-0.10)	(-0.05)	(-0.04)	(-0.06)	(-0.25)	(-0.66)	(-0.18)	(-0.70)
Ln(MOBIM)	0.12	0.05	0.12	0.05	0.06	0.09	0.06	0.05	0.22	-0.01	0.23	-0.06
	(0.70)	(0.20)	(0.69)	(0.22)	(0.26)	(0.25)	(0.27)	(0.15)	(0.96)	(-0.04)	(1.04)	(-0.19)
Ln(POP)	0.30	0.37	0.30	0.36	0.18	0.16	0.19	0.21	0.49	0.70	0.51	0.78
	(0.80)	(0.90)	(0.80)	(0.89)	(0.35)	(0.27)	(0.38)	(0.37)	(1.01)	(1.32)	(1.04)	(1.45)
Ln(INCOM)	0.37*	0.05	0.37*	0.09	0.47*	0.59	0.45*	0.39	0.22	-0.76	0.22	-1.05
	(2.14)	(0.06)	(2.16)	(0.11)	(1.93)	(0.51)	(1.91)	(0.35)	(1.03)	(-0.73)	(1.08)	(-0.98)
Y1524	-0.34**	-0.34**	-0.40**	-0.40**	-0.09**	-0.09**	-0.08**	-0.08**				
	(-15.9)	(-16.1)	(-14.2)	(-14.4)	(-4.11)	(-4.08)	(-3.81)	(-3.82)				
Y2534	-0.37**	-0.37**	-0.43**	-0.43**	-0.12**	-0.12**	-0.12**	-0.12**				
	(-17.4)	(-17.6)	(-15.4)	(-15.5)	(-5.52)	(-5.49)	(-5.29)	(-5.30)				
Y3544	-0.24**	-0.24**	-0.30**	-0.30**								
	(-11.4)	(-11.5)	(-10.7)	(-10.8)								
Y4554	-0.18**	-0.18**	-0.25**	-0.25**					-0.18**	-0.18**	-0.10*	-0.09*
	(-8.72)	(-8.81)	(-8.63)	(-8.71)					(-10.9)	(-10.9)	(-2.28)	(-2.01)
Obs	470	470	470	470	282	282	282	282	188	188	188	188
O-I test chi²	0.46	0.28	0.43	0.33	0.56	0.54	0.30	0.30	1.41	0.02	2.56	0.22
p<	0.79	0.56	0.78	0.56	0.75	0.46	0.85	0.58	0.49	0.87	0.27	0.63
F-stat *GINI*	89.7	94.2	84.5	88.2	55.1	58.3	51.5	54.2	34.1	36.3	31.6	33.5
INCOM		1167		1096		724		674		452		416
Adj. R^2	0.55	0.47	0.54	0.49	0.20	0.07	0.21	0.14	0.64	0.50	0.63	0.49

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

# indicates that both *GINI* and *INCOM* are treated as endogenous variables and thus instrumented. The two proxy variables for the size of the mature aged cohort used as instruments were a) the ratio of the size of the cohort aged between 40 and 59 to the whole population, and b) the logarithm of the population aged between 50 and 59.