The role of social trust in reducing long-term truancy and forming human capital in Japan

Yamamura, Eiji

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Eiji Yamamura

ABSTRACT

This paper attempts to examine how social trust influences human capital formation using prefectural level data in Japan. To this end, I constructed a proxy for social trust, based on the Japanese General Social Surveys. After controlling for socioeconomic factors, I found that social trust plays an important role in reducing the rate of long-term truancy in primary and junior high school. Results suggest that social trust improves educational quality.

1. Introduction

Social capital draws much attention from researchers in the field of social science (Putnam 1993, 2000). In terms of economics, social capital, which includes social trust, improves efficiency by reducing transaction costs, resulting in economic growth (Knack and Keefer, 1997; Zak and Knack, 2001). From another point of view, economic growth in part depends on physical and human capital formation. Previous works provide evidence that social trust is positively associated with school enrollment rates (Papagapitos & Riley, 2009) and growth of schooling (Bjørnskov, 2009). Through human capital formation, social trust also makes a contribution to economic growth.

In contrast to developing countries, school enrollment rates are high in developed countries. Taking Japan as an example, the secondary school enrollment rate was about 99% in 2000, indicating that quantity of education is sufficient. It is more important to improve the quality of education in Japan. According to a white paper, as shown in Fig. 1, the rate of long-term truancy has risen since the 1990s.[1] Even though the scale is different between primary school and junior high school, it appears that both primary and junior high school truancy rates doubled within a fairy short period of time.[2,3] This suggests that a problem in educational quality exists.

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[1] The definition of truancy rate before 1993 was (Students who play truant over 50 days) / (total number of students). This is different from the definition post-1993 (Students who play truant over 30 days) / (total number of students). To be consistent with the most recent information, I have used the post-1993 definition.

[2] The prosperity between the mid 1980s to the beginning of the 1990s is often called the "bubble economy."

[3] This seems to reflect the depression period after 1992 when the prosperity of the bubble economy came to an end in Japan. The number of business bankruptcies steeply increased in this period because of macro-level economic stagnation. The economic recession caused many people to face difficulties and suffer distress. It has been reported that the suicide rate increased rapidly in this period (Chen, Choi, & Sawada, 2009). It is possible that distress is one of the determinants of school truancy and suicide. On the other hand, Yamamura (2010a) found that social capital contributed to a decrease in suicide rate after controlling for economic condition. A rise in suicide and school truancy rates are thought to reflect not only economic stagnation but also the degree of social capital.

Although there are no data regarding the truancy rate for high school, after entering high school, which is not compulsory in Japan, those who had a tendency to skip junior high school are likely to skip high school, resulting in dropouts. It is appropriately argued that long-term truancy has become one of the central issues in Japanese education policy. Social capital, including social networks and social trust, is thought to play a critical role in coping with the long-term truancy problem (Ministry of Education, Culture, Sports, Science and Technology, Japan, 2008, Ch. 2). Long-term truancy or dropping out of school are thought to reflect a low quality of education, leading to an impediment in human capital formation even if quantity of education is sufficiently provided. However, little is known about the effect of social capital on quality of education, with the exception of the work of Coleman (1988) and Anderson (2008). Therefore, this paper attempts to examine how and to what extent social trust, considered a kind of social capital, affects the long-term truancy rate in Japan.

The organization of this paper is as follows: Section 2 provides a review of related literature. Section 3 presents an explanation of data set and simple econometric framework. The results of the estimations and discussion are provided in Section 4. The final section offers concluding observations.

2. Related Literature

According to the seminal work of Putnam, social capital is defined as "features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated action" (Putnam 1993, p. 167). Although social capital has a tremendous influence on research in the social sciences, the notion of social capital is ambiguous. Thus, there seems to be little agreement as to how to measure and conceptualize it (e.g., Paldam, 2000; Sobel, 2002; Durlauf, 2002; Bjørnskov, 2006; Fafchamps, 2006). For

instance, in some works, an interpersonal network is considered social capital (e.g., Annen, 2001, 2003; Fafchamps & Minten, 2001, 2002). The magnitude of civic participation is also regarded as social capital (Fidrmuc & Gërxhani, 2008). In other works, magnitude of trust is considered social capital (Berggren & Jordahl, 2006; Bjørnskov, 2009; Papagapitos & Riley, 2009). These notions regarding social capital cannot be considered equivalent, and the relationship between them is complicated. For example, Sabatini (2009) suggested that although participation in voluntary organizations increases generalized trust, interpersonal trust encourages civic engagement. The role of social capital varies according to its precise definition and context. Hence, it is important to precisely define a proxy for social capital and then assess the role of social capital.

In the real world, mutually beneficial exchange is hindered because of the rise in transaction costs caused partly by opportunistic behavior, leading to an impediment to economic development. The cost of contract enforcement is high because there is the possibility that individuals will breach a contract. Social capital is thought to play a critical role in preventing individuals from engaging in opportunistic behavior, thus raising efficiency and promoting economic growth (Hayami, 2001).[4] This general view has triggered a plethora of research aiming to explore how and the extent to which social capital favors economic growth (e.g., Knack & Keefer, 1997; Knack, 1997; Hall & Jones, 1999; Zak & Knack, 2001). Social capital contributes to economic growth directly, and also indirectly through accumulation of human capital. As widely acknowledged, accumulation of human capital through education is one of the main factors contributing to economic growth. Coleman (1988) was the first to

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[4] Contrary to the evidence provided by most researchers supporting Putnam's argument (1993, 2000), Miguel, Gertler, and Levine (2005) provided evidence that initial social capital failed to make a contribution to subsequent industrial development in Indonesia. This result, however, is in line with Olson's assertion (1965, 1982) that social organizations, acting as specialized interest groups, might decrease efficiency, resulting in limiting growth possibilities.

assess the influence of social capital on accumulation of human capital, suggesting that social capital plays a critical role in reducing high school dropouts. The definition of social capital by Coleman (1988) is ambiguous given that he includes trustworthiness of the social environment, information flow capability of the social structure, and norms accompanied by sanctions. The more recent work of Anderson (2008) also defines social capital loosely. He used various proxies for social capital to examine the social capital effect on language and math achievement scores in Latin American primary schools.[5] Papagapitos and Riley (2009) and Bjørnskov (2009) defined social capital more rigorously as social trust and then explored social trust effects on human capital formation. Effects of social trust on accumulation of human capital seem to be divided into a supply-side effect and a demand-side effect. From the standpoint of the supply side, Coleman (1988) argued that links among parents of children play an important role in collectively monitoring and guiding their children's behavior to form human capital. Assuming that there are parents A, B, and C in the community, the collective action of forming human capital can be successful when parents A trust that parents B and C will help parents A's child when parents A help other parents' children. Papagapitos and Riley (2009) suggested another mechanism of social capital formation from the supply side standpoint as follows. A higher level of trust in others leads individuals to be more certain that they will receive a fair return on their investment in education. Therefore, individuals will invest more in education (Papagapitos & Riley, 2009). As a result, the supply of education will increase.

On the other hand, Bjørnskov (2009) analyzed the effect of trust on growth of schooling by putting the focus on the demand side. Social trust is important in reducing search costs. In a

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[5] Proxies for social capital are as follows: time spent discussing children with principal, time spent discussing children with teachers, number of calls between teacher and parents, how much a child likes school, amount of class time discussions with students, and teachers' receptiveness to student questions.

low trust society, trustworthy and honest individuals are relatively scarce. In this situation, what is important to employers when they search for employees? Information about the extent to which an employee is honest and reliable becomes important for employers in order to reduce the cost of monitoring cheating by employees. Thus, employers may consider direct information obtained from trustworthy sources about the honesty of job applicants more important than formal qualifications such as education. As a consequence, demand for education is small in a society where interpersonal trust and honesty is low. Therefore, demand for education leads to growth of human capital if people are likely to trust each other.

Previous empirical works used cross-country data to assess how social trust influences accumulation of human capital (Bjørnskov, 2009; Papagapitos & Riley, 2009). It seems appropriate that different cultures and historical backgrounds among countries would have a critical impact on economic outcomes (Acemoglu, Johnson, & Robinson, 2001; Glaeser & Shleifer, 2002). Inevitably, culture and historical factors play an important role in accumulation of human capital. However, it is difficult to control for culture and historical factors when cross-country data is used. As a consequence, estimation results are likely to suffer from omitted variable bias, a potential problem with cross-country analysis. This study used prefecture data of Japan. Prefectures share a similarity in culture and historical background. Therefore, estimation results are less likely to suffer from this bias. In this regard, this study has an advantage compared with previous works.

3. Data and Model

3.1. Data

Table 1 includes variable definitions and a summary of statistics. I used 2004 prefectural

level data for Japan.[6] A Japanese prefecture is roughly the equivalent of a state in the United States or a province in Canada. As explained later, the proxy for the social trust variable was calculated based on Japanese General Social Surveys (JGSS) in 2000-2003.

Rates of long-term truancy (i.e., skipping school more than 30 days) in primary or junior high school, denoted as PRSKIP and JHSKIP, were collected from the *School Basic Survey* (Ministry of Education, Culture, Sports, Science and Technology, Japan, 2005a). Public spending per student is represented as SPEPR (or SPEJH), collected from the *Survey of Local Education Spending* (Ministry of Education, Culture, Sports, Science and Technology, 2005b). The Gini coefficient, represented as GINI of income, came from the *National Survey of Family Income and Expenditure* (Ministry of Internal Affairs and Communications, 2005).[7] Per capita income, represented as INCOM, was collected from the *Japan Statistical Yearbook* (Ministry of Internal Affairs and Communications, 2006). The index of human capital (HC) can be obtained from Fukao and Yue (2000).[8] The HC is available for the period during 1955-1995. Therefore, the HC for 2004 could not be obtained. In previous work (Papagapitos & Riley, 2009), the lagged human capital index was used as the independent variable.[9] Consistent with that study, I incorporated the HC in 1995 into the function as the independent variable.[10] Unemployment rate was obtained from the *Labor Force Survey* (Ministry of Internal Affairs

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[6] To more closely examine the relationship between social trust and skipping school, microdata is more appropriate. However, I could not obtain microdata.

[7] The data is available at http://www.stat.go.jp/english/data/zensho/2004/submen10.htm (Accessed June 14, 2010).

[8] Human capital data is available from the Hi-stat HP: http://21coe.ier.hit-u.ac.jp/research/database/ (Accessed June 14, 2010). See http://www.ier.hit-u.ac.jp/~fukao/japanese/data/fuken2000/datamaking.pdf (Accessed June 14, 2010) for a full account of the method of calculation.

[9] Papagapitos and Riley (2009) used average years of education in the adult population in 1970 to examine the determinants of average secondary school enrollment from 1999–2002.

[10] The estimation results do not change according to years of lagged HC prior to 2004. That is, results are similar when HC in 1980, 1970, or 1960 is used instead of HC in 1995. Results are available upon request.

and Communications).[11] Rate of agriculture workers (AGRI), divorce rate (DIV), rate of towns and villages that had issued the disclosure of official information ordinance (OINF), number of community centers (CCENT), and proxy of heterogeneity of generation (AGHET) were gathered from Asahishimbun (2008). As explained later, the rate of people who never met or dined out with friends was calculated based on Japanese General Social Surveys (JGSS) in 2000-2003.

With the aim of constructing a proxy for social trust, this paper used data from the Japanese General Social Surveys (JGSS), which are individual level data. The JGSS adopted a two-step stratified sampling method and were conducted throughout Japan between 2000 and 2003. The JGSS was designed to be the Japanese counterpart of the General Social Survey in the United States. This survey included standard questions concerning the prefecture of the respondent's current address and various subjective questions presented in face-to-face interviews. The survey collected data on 12,299 adults between ages 20 to 89. One question included was "Generally speaking, would you say that most people can be trusted?" There were three choices for respondents: "Yes", "Depends", and "No". Not all respondents answered the question. Therefore, the number of samples used for calculating the average score of social trust within a prefecture was 10,519. For measuring the degree of social trust, I quantified the choices "Yes", "Depends", and "No" as 3, 2 and 1, respectively. In addition, I calculated the average value of social trust within a prefecture and used it as a proxy for social trust used in this paper. This is TRUST1. Among responses, "depends" calls for careful interpretation. It is unclear whether "depends" can be considered as an intermediate category or if it might include a number of respondents who would have answered differently if other possible responses were included in the questionnaire. For alleviating any bias arising from

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[11] The data is available at http://www.stat.go.jp/data/roudou/pref/index.htm (Accessed October 18, 2010).

this, I used a dummy which takes 1 if the response is "yes" otherwise 0, excluding "depends" from the sample as a dependent variable. This is TRUST2.

3.2. Model

The seminal work of Coleman (1988) raised the hypothesis that communities rich in trust, considered social capital, contribute to lowering rates of high school dropouts. Along the same lines, I postulated the hypothesis that social trust deters students from skipping school. This hypothesis was examined using the data explained in the previous section.[12] A cursory examination of Fig. 2 (a) and (b) reveals that social trust measured by TRUST1 is negatively associated with rates of long-term truancy for primary school as well as junior high school. Consistent with the hypothesis, social trust seems to decrease the rate of long-term truancy. This relation can be observed when social trust is measured by TRUST2, not presented in this paper in the interest of saving space.

For a closer examination of the influence of social trust on the rate of long-term truancy, the estimated function takes the following form:

$$\text{PRSKIP (or JHSKIP)}_i = \alpha_0 + \alpha_1 \text{ TRUST 1(or TRUST2)}_i + \alpha_2 \text{ SPEPR(or SPEJH)}_i + \alpha_3 \text{HC}_i + \alpha_4 \text{INCOM}_i + \alpha_5 \text{UNEMP}_i + \alpha_6 \text{AGRI}_i + \alpha_7 \text{DIV}_i + \alpha_8 \text{ GINI}_i + \varepsilon_i,$$

where $\text{PRSKIP (or JHSKIP)}_i$ are dependent variables in the prefecture i, α represents the regression parameter, and ε_i represents the error term. If TRUST decreases the rate of long-term truancy, TRUST would take the negative sign. Dependent and independent variables were evaluated at the sample means. Therefore, the coefficient values reported can be

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[12] Existing works mainly consider the association between social trust and the supply of education (e.g., Coleman, 1988; la Porta, Lopez-de-Silanes, Schleifer, & Vishny, 1997; Putnam, 2000). Bjørnskov (2009) focused on demand for education rather than supply. His argument was that, generally speaking, educated workers tend to do complex work. When social trust is low, the cost of monitoring educated workers inevitably becomes very high. As a consequence, the demand for education is low.

interpreted as elasticity.[13] Public spending per student was captured by SPEPR (or SPEJH). In the Japanese governance system, revenue for local government is broadly financed by local taxes and transfers from the central government. Fiscal transfers from the central government are roughly divided into national government disbursement and local allocation tax grants (Doi & Ihori, 2009). The revenue source for public education is mixed. That is, public education spending is funded by local taxes as well as central government transfers. Low income households have difficulty financing education costs. Therefore, children in these households may not attend school and instead earn money to help the family finances. The unemployment rate was incorporated to capture this effect. Experiencing their parents' divorce has a psychologically detrimental effect on children. Furthermore, the family life of single parents is economically and psychologically challenging, contributing to school truancy in children. Divorce rate, DIV, was included with the aim of capturing this effect. In rural areas where the agriculture sector is dominant, transportation is not sufficiently provided, leading students to play truant. Hence, the rate of workers in the agricultural sector was a proxy for transport time to school.

3.3. Instrumental Variables

In this paper, the effect of social trust on quality of education captured by school truancy

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[13] See more details in Greene (1997, p. 280).

In the linear model, $y = x'\beta + e$; the elasticity of y with respect to changes in x is

$$\gamma_k = \frac{\partial \ln y}{\partial \ln x_k} = \beta_k \left(\frac{x_k}{y} \right).$$

These values can be estimated at the sample means as

$$\lambda_k = \beta_k \left(\frac{\overline{x_k}}{\overline{y}} \right).$$

The standard error of the elasticity of y, γ_k, can be calculated by the delta method (Greene 1997, pp. 278-280).

rate was examined. On the other hand, human capital is thought to influence social trust (Knack & Keefer, 1997; Huang, van den Brink, & Groot, 2009). The direction of causality is ambiguous. Hence, potential reverse causation should be controlled for. I employed the GMM 2SLS method rather than the simple 2SLS method because the GMM estimator produces efficiency gains in the presence of heteroscedasticity, (Greene, 1997, pp. 757-759). Bjørnskov (2009) used a measure of absence of corruption as an instrumental variable for social trust when human capital growth was examined. Previous works have suggested that absence of corruption may be associated with social trust (Uslaner, 2002) but not with human capital formation. I chose the instrumental variables based on this line of thinking.

The disclosure of official information allows citizens to keep a close eye on corruption, resulting in a reduction in corruption. In Japan, prior to the 1980s, official information was not disclosed[14]. According to Jiyukokuminsha (2010), the town of Kanayama, located in Yamagata prefecture, was the first to enact a disclosure of official information ordinance in 1982, triggering a surge in enactments of such ordinances. Since then, cities and towns have actively issued disclosure of official information ordinances. As a consequence, the number of cities, towns, and villages issuing ordinances has reached 1,795, with an enactment rate of 99.7%. Enactment of the ordinances seems to be positively associated with the relative absence of corruption. Hence, the rate[15] of towns and villages that had issued the disclosure of official information ordinance (OINF) was used as an instrumental variable. This rate was calculated by each prefecture.

Apart from OINF, this paper used additional instrumental variables. People are more likely to trust each other if there is a place where they can communicate with each other and if the

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[14] Here official information is considered information such as official documents, which the local government retained and has not disclosed.

[15] This rate is measured as (number of towns and villages that have issued the disclosure of official information ordinance) / (total number of towns and villages).

society is well organized. In Japan, the number of community centers is positively related to trust (Yamamura, 2008). Hence, number of community centers (CCENT) for each prefecture was used as an instrumental variable. In addition, not meeting friends (NOFRD) was also used as an instrumental variable. One question included in JGSS was "How often do you meet or dine with friends?" There were 7 choices for respondents from 1 (almost every day) to 7 (never).[16] NOFRD was the rate of "never" of each prefecture. The heterogeneity of society is negatively associated with social trust in studies in the United States (Alesina & La Ferrara, 2002) and in cross-country studies (Leigh, 2006). Yamamura (2008) presented evidence that income inequality is associated with low trust while generational heterogeneity is associated with high trust in Japan. Hence, this paper used the Herfindahl-type index of age heterogeneity[17] (AGHET) and Gini coefficient of income (GINI) of each prefecture as instrumental variables.

4. Results and discussion

4.1. Results

The estimation results of the OLS model for primary school and junior high school, the key variable for examining the effect of social trust on long-term truancy, are shown in Table 2 and Table 3, respectively. Table 2 uses TRUST1 as a proxy for social trust while Table 3 uses TRUST2 as a proxy for social trust. The number of observations is 47, equivalent to the

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[16] Choices were 1 (almost every day), 2 (several times a week), 3 (about once a week), 4 (about once a month), 5 (several times a year), 6 (once a year), and 7 (never).
[17] Following Yamamura (2008), generational 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 generational group i, and N is the number of groups.

number of Japanese prefectures. The sample size was small. Therefore, the jackknife method was used to calculate the standard error to make sure that results were not spurious. With respect to Table 2, the coefficients of TRUST take the negative sign and are statistically significant at the 5% level in column (1) and at the 1% level in column (2). Its absolute value is 4.13 in column (1); it is 1.97 in column (2). This implies that social trust plays a significant role in reduction of long-term truancy in primary and junior high school. Further, the social trust effect in primary school is almost two times larger than that in junior high school. SPEPR and SPEJH take the positive sign. However, SPEPR is statistically significant at the 5% level, whereas SPEJH is not significant. It follows from this that public spending increases long term truancy in primary school but not in junior high school. Theoretical studies suggest that public spending on education decreases incentives for student achievement (Blankenau & Camera, 2009). The cross-country study by Yamamura (2010b) presented evidence that public spending on education increases the rate of students skipping school. The primary school results in this study are consistent with these works.

Results of the GMM 2SLS estimation are exhibited in Tables 4 and 5. Table 4 and Table 5 use TRUST1 and TRUST2 as proxies for social trust, respectively. In each table, primary school results are shown in columns (1)–(3). Junior high school results are shown in columns (4)–(6). OINF, NOFRED, CCENT, AGHET and GINI are used as instrumental variables in columns (1) and (4). OINF, NOFRED, CCENT and AGHET are used as instrumental variables in columns (2) and (5). OINF, NOFRED and CCENT are used as instrumental variables in columns (3) and (6). Results of a test of endogeneity and results for under-identification and over-identification are reported in Tables 4 and 5. In each table, a test of endogeneity rejected the null hypothesis that TRUST is exogenous in column (3), but did not reject it in other columns. TRUST is considered an endogenous variable in column (3), whereas TRUST is

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treated as an exogenous variable in other columns. Hence, the GMM 2SLS was, to a certain extent, valid for primary school estimation, but not for junior high school estimation. The OLS results were not biased and were appropriate for junior high school estimation. Hereafter, I have concentrated focus on the results of the primary school estimation. A specification error occurs if the instrumental variables are correlated with the error term. An over-identification test provides a method of testing for exogeneity of instrumental variables. Test statistics are not significant in column (1) –(3) and thus do not reject the null hypothesis that the instrumental variables are uncorrelated with the error term. This suggests that the instrumental variables are valid. Further, the under-identification test was also passed in most cases with the exception of column (3) of Table 5.

TRUST yielded significantly negative signs in column (1)–(3) of Tables 4 and 5, providing evidence that TRUST deters long-term truancy in primary school students. As shown in Table 4, the absolute value of TRUST1 is approximately 8.5 in columns (1)–(2) and 14 in column (3). The effect of TRUST1 is two or three times larger than that of column (1) in Table 2. Turning to Table 5, TRUST2 is about 1.5 in columns (1)–(2) and 3 in column (3). The effect of TRUST2 is also two or three times larger than that of column (1) of Table 3. Additionally, it is surprising that the absolute value of TRUST1 (and TRUST2) in Table 4 (and Table 5) is from four to seven times larger than that of column (2) of Table 2 (and Table 3). This means that social trust has a four to seven times greater effect on reduction of long-term truancy in primary school than in junior high school. Hence, I argue that social trust makes a more important contribution in earlier stages of child growth.

As for other variables, SPEPR and SPEJH continue to take the positive sign in Tables 4 and 5. SPEPR is statistically significant for primary school with the exception of column (1) of Table 5 while SPEJH is not significant. The absolute value of SPEPR is around 1 for primary

school, which is the same level in column (1) of Tables 2 and 3. In my interpretation, if public spending on education increases, parents' cost for education decreases and in turn reduces parents' incentives to gain the benefit of education. Parents seem to have a greater influence on primary school students than on junior high school students. If this is true, primary school students have a lower incentive to learn than junior high school students. AGRI is negative in all estimations and statistically significant in columns (1)–(3) of Table 4, although AGRI is not statistically significant in Table 5. In rural areas where the share of workers belonging to the agricultural sector is higher than in other areas, population mobility seems to be low, and thus interpersonal relationships are thought to be stronger. Therefore, AGRI captures the effect of social networks on long-term truancy, that is, preventing students from truanting. Other variables were not statistically significant. This was probably because of small sample size and omitted variable bias. If more abundant and precise data such as individual level data were used, estimation results might change.

4.2. Discussion

As briefly stated in Section 2, there are demand-side and supply-side viewpoints regarding the effect of social trust on accumulation of human capital. In the Japanese education system, primary school students are age 6–12 and junior high school students are age 13-15. Both primary school and junior high school educations are compulsory.[18] The reason that demand-side effect is more appropriate than supply side is that the direct information gathered from trustworthy sources is more important for employers than formal qualifications such as education in societies where interpersonal trust is low (Bjørnskov, 2009).[19] Nonetheless, the

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[18] See HP of Ministry of Education, Culture, Sports, Science and Technology.
http://www.mext.go.jp/b_menu/toukei/001/04073001/001.htm (accessed October 22, 2010).
[19] In developed countries such as Japan, the supply of unskilled low wage labor is dependent on immigrants from underdeveloped countries. In addition, firms relocate their production

quantitative supply of compulsory education is completely inelastic with respect to social capital. Demand for compulsory education does not affect quantity of compulsory education. All Japanese job searchers have formal compulsory education through primary and junior high school at least. Hence, the basic setting in Bjørnskov (2009) is not suitable to this study.

Before entering high school, basic knowledge needed to lead a daily life is learned, especially in primary school. For instance, a full-time housewife is required to do addition, subtraction, and multiplication when she sets herself up with everything necessary for daily life. To put it in another way, people face difficulties in everyday life if they are not well educated in primary school. Furthermore, in the workplace, workers need to master the four basic operations of arithmetic as well as basic Japanese reading and writing. This leads me to argue that individuals seeking a job need to be properly educated through primary school at least.[20] The estimation results show that social trust makes a greater contribution to reducing long-term truancy in primary school than in junior high school. This suggests that social trust affects the supply side of education rather than the demand side.

What can be seen from the discussion above is that the supply-side effect seems to be more important than the demand-side effect when compulsory education, especially primary school education, is examined in the context of real-life situations in Japan. However, the data set of this study does not directly examine whether the demand- or supply-side effect is larger when the influence of social trust on long-term truancy is considered. That is, this study does not effectively exclude demand-side effects. Thus, results obtained through regression estimation reflect not only supply side but also demand-side effects. Therefore, it is necessary to examine

bases to underdeveloped countries where wages are lower than those for domestic Japanese labor (Yamamura, Sonobe, & Otsuka, 2003). Hence, demand for low-wage educated domestic labor is small in Japan.

[20] High school education is not formally compulsory, but most students go to high school after graduating from junior high school. The percentage of students enrolled in high school was 97.6% in 2004.

which hypothesis is supported using a micro-data set.

5. Conclusions

Previous studies using cross-country data have provided evidence that social trust is positively associated with quantity of education such as school enrollment rate. In developed countries like Japan, quantity of education is sufficiently supplied. Thus, quality of education is more important in increasing the human capital effect on economic growth. However, little is known about how social trust influences quality of education. Long-term truancy can be considered one of the proxies for educational quality, despite not being reflected in school enrollment rate. This paper constructed a proxy for prefectural level social trust to examine the effect of social trust on long-term truancy in Japan.

The main findings of the regression analysis after controlling for endogeneity bias and socio-economic factors are as follows. I found that social trust plays an important role in decreasing long-term truancy in primary and junior high school. Further, the effect of social trust on reducing long-term truancy in primary school was four to seven times larger than in junior high school. This indicates that social trust improves the quality of education, especially for more fundamental and basic levels of education. Primary school students learn the minimum knowledge needed for not only work, but also for everyday life. There is an assertion that the search cost for workers with social skills is very large in societies where level of social trust is low. Inevitably, employers put more emphasis on direct information obtained from trustworthy sources than on formal qualifications such as education (Bjørnskov, 2009). However, results obtained in this study lead me, to a certain extent, to argue that the effect of social trust can be more reasonably explained in terms of the supply side rather than the demand side of education partly because primary and junior high school educations are

compulsory in Japan.

Due to data limitations, this study used prefecture level aggregated data. Therefore, I could not examine directly whether the relationship between social trust and human capital formation can be more appropriately explained from the viewpoint of supply side. Individual level data allowed me to examine the social capital effect on human capital formation more precisely. Further, this paper shed light on student truancy related to investigating the social capital influence on quality of education. However, examination scores rather than student truancy can reflect more directly the quality of education. For example, Anderson (2008) used rich individual level data to assess the social capital effect on examination scores. An examination of the social capital effect on examination scores using individual level data in Japan is recommended in future studies.

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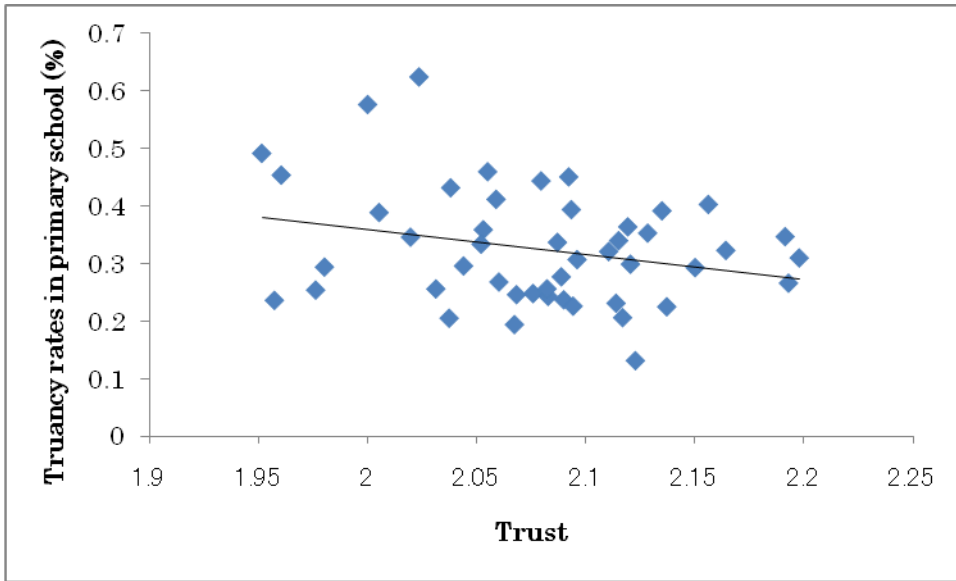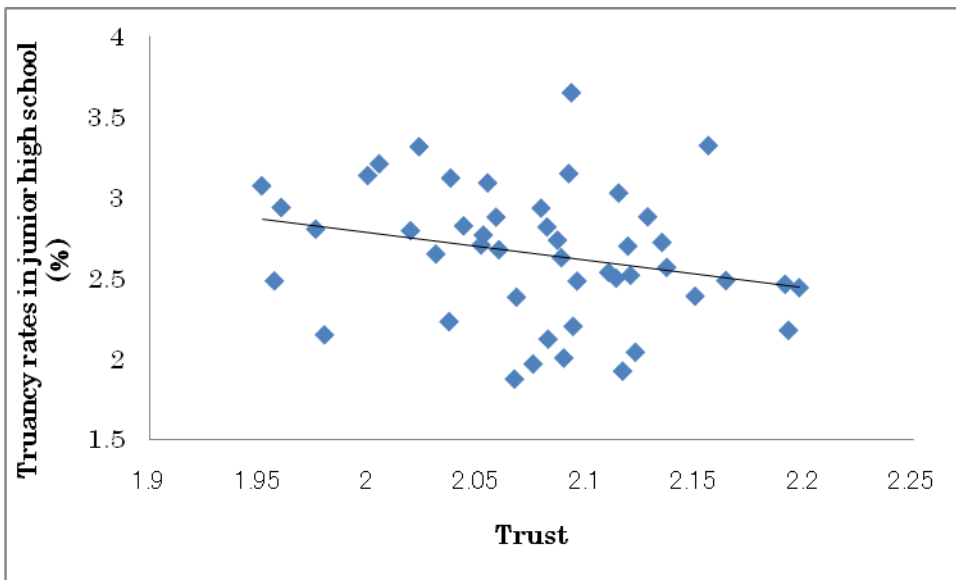Zak, P.J., & Knack, S. (2001). Trust and growth. *The Economic Journal*, *111*, 295–321.
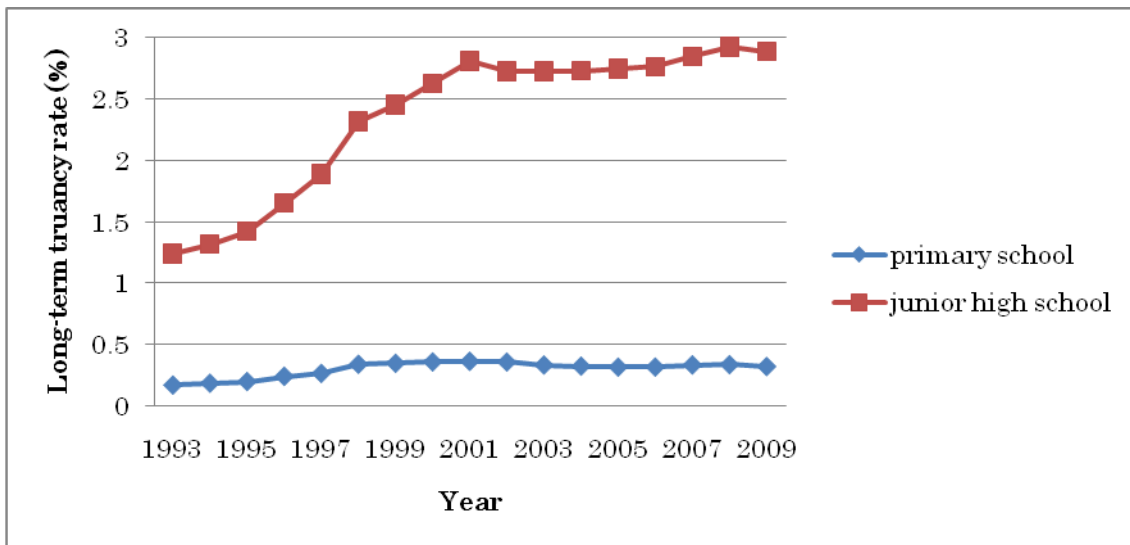
Fig. 1. Change in long-term truancy rate.

Source: Ministry of Education, Culture, Sports, Science and Technology (2009).

Note: Truancy rate is defined as: (Students who play truant over 30 days)/ (total number of students).

(a) Primary school

(b) Junior high school

Fig. 2. Relationship between long-term truancy and trust in 2004.

Table 1.

Variable definitions and basic statistics

Variables	Definition	Mean	Standard deviation	Max	Min
PRSKIP	Percentage of students who skipped primary school more than 30 days in 2004 (%).	0.32	0.10	0.62	0.13
JHSKIP	Percentage of students who skipped junior high school more than 30 days in 2004 (%).	2.64	0.41	3.61	1.81
TRUST1	Average value of the proxy for generalized trust (2000-2003).	2.07	0.06	2.19	1.95
TRUST2	Percentage of people who thought most people could be trusted when the "depends" response was excluded (2000-2003; %).	61.7	9.19	82.0	42.8
SPEPR	Public spending per primary school student in 2004 (thousands of yen).	946.7	115.1	1292.4	726.3
SPEJH	Public spending per junior high school student in 2004 (thousands of yen).	1045.6	127.4	1570.6	904.8
HC	Index of human capital in 1995.	1.07	0.02	1.14	1.02
INCOM	Per capita income in 2004 (thousands of yen).	2706	425	4559	1987
UNEMP	Unemployment rate in 2004 (%).	4.47	0.96	7.60	3.00
AGRI	(Number of workers in agricultural sector in 2004) / (number of workers in 2004) (%).	6.41	3.35	12.2	0.41
DIV	(Number of divorces in 2004) / (population in 2004) (%).	0.20	0.02	0.26	0.15
	Instrumental variables				
OINF	Rate of towns and villages that had issued the disclosure of official information ordinance (%).	92.7	8.76	100	61.5
NOFRD	Rate of respondents who never meet or dine with friends.	9.88	2.89	18.6	3.37
CCENT	Number of community centers per population in 2004 (population in thousands).	0.21	0.15	0.84	0.07
AGHET	Herfindahl-type index of age heterogeneity.	0.91	0.005	0.92	0.90
GINI	Gini coefficient of income.	0.30	0.01	0.34	0.27

Table 2.

Dependent variable: Rate of long-term truancy (%; OLS model)

Variables	Primary school	Junior high school
	(1)	(2)
TRUST1	-4.13**	-1.97***
	(-2.48)	(-2.86)
SPEPR	1.05*	
	(1.79)	
SPEJH		0.29
		(0.73)
HC	0.71	1.02
	(0.24)	(0.52)
INCOM	-0.04	-0.005
	(-0.05)	(-0.01)
UNEMP	-0.61	-0.30
	(-1.61)	(-1.20)
AGRI	-0.25	-0.11
	(-1.26)	(-0.96)
DIV	0.13	0.19
	(0.24)	(0.59)
CONSTANT	13.5	49.9
	(0.92)	(0.62)
Adjusted R^2	0.34	0.25
Observations	47	47

Note. Values are elasticity evaluated at the sample means (Greene, 1997, pp. 278-280). Values in parentheses are t-statistics calculated by standard errors obtained by the jackknife method. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3.

Dependent variable: Rate of long-term truancy (%; OLS model)

Variables	Primary school	Junior high school
	(3)	(4)
TRUST2	-0.81**	-0.38***
	(-2.41)	(-2.85)
SPEPR	1.05*	
	(1.79)	
SPEJH		0.30
		(0.72)
HC	0.46	0.90
	(0.16)	(0.72)
INCOM	-0.05	-0.009
	(-0.06)	(-0.01)
UNEMP	-0.61	-0.29
	(-1.63)	(-1.20)
AGRI	-0.26	-0.12
	(-1.27)	(-0.98)
DIV	0.12	0.19
	(0.24)	(0.59)
CONSTANT	3.52	11.2
	(0.28)	(0.15)
Adjusted R^2	0.34	0.25
Observations	47	47

Note. Values are elasticity evaluated at the sample means (Greene, 1997, pp. 278-280). Values in parentheses are t-statistics calculated by standard errors obtained by the jackknife method. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4.

Dependent variable: Rate of long-term truancy (%; GMM 2SLS model)

Variables	Primary school			Junior high school		
	(1)	(2)	(3)	(4)	(5)	(6)
TRUST1	-8.41*	-8.82*	-14.0*	-3.33	-4.69	-5.09
	(-1.89)	(-1.80)	(-1.86)	(-1.27)	(-1.30)	(-1.40)
SPEPR	1.01*	1.07*	0.99*			
	(1.68)	(1.96)	(2.08)			
SPEJH				0.41	0.33	0.32
				(1.01)	(0.77)	(0.76)
HC	-0.64	-1.14	-1.28	1.37	0.96	0.82
	(-0.15)	(-0.25)	(-0.20)	(0.61)	(0.34)	(0.29)
INCOM	0.14	0.12	0.10	0.13	0.05	0.06
	(0.18)	(0.16)	(0.16)	(0.27)	(0.09)	(0.11)
UNEMP	-0.58	-0.58	-0.82	-0.39	-0.38	-0.38
	(-1.39)	(-1.46)	(-1.46)	(-1.31)	(-1.32)	(-1.41)
AGRI	-0.31*	-0.35*	-0.36*	-0.08	-0.12	-0.12
	(-1.92)	(-1.87)	(-1.92)	(-1.02)	(-0.97)	(-1.03)
DIV	-0.17	-0.19	-0.10	-0.16	0.07	0.07
	(-0.26)	(-0.30)	(-0.11)	(-0.44)	(0.18)	(0.19)
CONSTANT	32.4	35.1	53.9*	72.7	125.8	140.5
	(1.41)	(1.43)	(1.69)	(0.64)	(0.79)	(0.91)
Wald chi-square	49.8	46.7	34.2	43.1	35.0	18.6
Test of endogeneity	1.37	1.20	3.31	0.38	0.88	1.03
	$p = 0.24$	$p = 0.27$	$p = 0.06$	$p = 0.53$	$p = 0.34$	$p = 0.30$
Under-identification test	39.9	39.2	13.7	41.6	40.5	17.9
	$p = 0.00$	$p = 0.00$	$p = 0.00$	$p = 0.00$	$p = 0.00$	$p = 0.00$
Over-identification test	3.20	2.46	0.74	2.99	0.95	0.74
	$p = 0.52$	$p = 0.48$	$p = 0.68$	$p = 0.55$	$p = 0.81$	$p = 0.68$
Instrumental variables	OINF NOFRD CCENT AGHET GINI	OINF NOFRD CCENT AGHET	OINF NOFRD CCENT	OINF NOFRD CCENT AGHET GINI	OINF NOFRD CCENT AGHET	OINF NOFRD CCENT
Observations	47	47	47	47	47	47

Note. Values are elasticity evaluated at the sample means (Greene, 1997, pp. 278-280). Values in parentheses are t-statistics calculated by standard errors obtained by the jackknife method. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Values for the test of endogeneity were obtained using the Durbin-Wu-Hausman chi-square test. Under-identification test values were obtained using the Anderson canonical correlation LM statistic. Over-identification test values were obtained using Hansen's J chi-square statistic.

Table 5.

Dependent variable: Rate of long-term truancy (%; GMM 2SLS model)

Variables	Primary school			Junior high school		
	(1)	(2)	(3)	(4)	(5)	(6)
TRUST2	-1.52*	-1.64*	-3.36*	-0.61	-0.88	-1.13
	(-1.98)	(-1.77)	(-1.68)	(1.35)	(1.18)	(1.33)
SPEPR	0.99	1.05*	0.94*			
	(1.56)	(1.85)	(1.70)			
SPEJH				0.43	0.36	0.34
				(0.95)	(0.77)	(0.72)
HC	-1.05	-1.65	-2.53	1.09	0.66	0.26
	(-0.26)	(-0.38)	(-0.37)	(0.51)	(0.24)	(0.09)
INCOM	0.17	0.13	0.13	0.12	0.04	0.06
	(0.20)	(0.16)	(0.21)	(0.23)	(0.07)	(0.11)
UNEMP	-0.53	-0.55	-0.87	-0.38	-0.39	-0.39
	(-1.34)	(-1.47)	(-1.56)	(-1.29)	(-1.28)	(-1.41)
AGRI	-0.31	-0.35	-0.38	-0.09	-0.12	-0.14
	(-1.58)	(-1.61)	(-1.60)	(-1.01)	(-0.98)	(-1.05)
DIV	-0.24	-0.21	-0.21	0.14	0.08	0.06
	(-0.39)	(-0.39)	(-0.21)	(0.41)	(0.20)	(0.16)
CONSTANT	11.4	13.6	24.0	8.17	32.9	51.0
	(0.70)	(0.79)	(1.05)	(0.10)	(0.33)	(0.48)
Wald chi-square	57.4	52.5	22.9	45.2	37.3	14.2
Test of endogeneity	0.88	0.74	4.33	0.24	0.71	1.25
	$p = 0.34$	$p = 0.38$	$p = 0.03$	$p = 0.61$	$p = 0.39$	$p = 0.26$
Under-identification test	14.5	11.0	5.38	16.0	12.4	7.46
	$p = 0.01$	$p = 0.02$	$p = 0.14$	$p = 0.00$	$p = 0.01$	$p = 0.05$
Over-identification test	4.25	3.28	0.39	3.29	1.39	0.64
	$p = 0.37$	$p = 0.34$	$p = 0.82$	$p = 0.50$	$p = 0.70$	$p = 0.72$
Instrumental variables	OINF NOFRD CCENT AGHET GINI	OINF NOFRD CCENT AGHET	OINF NOFRD CCENT	OINF NOFRD CCENT AGHET GINI	OINF NOFRD CCENT AGHET	OINF NOFRD CCENT
Observations	47	47	47	47	47	47

Note. Values are elasticity evaluated at the sample means (Greene, 1997, pp. 278-280). Values in parentheses are t-statistics calculated by standard errors obtained by the jackknife method. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Values for the test of endogeneity were obtained using the Durbin-Wu-Hausman chi-square test. Under-identification test values were obtained using the Anderson canonical correlation LM statistic. Over-identification test values were obtained using Hansen's J chi-square statistic.