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THE CREATIVE CLASS AND SOCIAL CAPITAL

- civil society, regional development and high-tech employment in Japan

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THE CREATIVE CLASS AND SOCIAL CAPITAL: CIVIL SOCIETY, REGIONAL DEVELOPMENT AND HIGH-TECH INDUSTRY IN JAPAN

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ABSTRACT

Do the social and cultural environments have any impact on regional development, expressed in terms of e.g. entrepreneurship, innovations and growth of new industries? A rapidly increasing field of research has found many indications on that such an impact of the civil society exists. In the literature, two partly contradicting hypotheses can be discerned: 1. Florida's hypothesis, saying that a heterogeneous civil society with diverse values combined with tolerance is influencing regional growth in a positive way, and 2. Putnam's hypothesis, saying that a homogenous civil society with common norms and values and trust between its citizens is having a positive impact on regional development.This paper studies the validity of these two hypotheses on the current regional development in Japan, measured in four alternative ways: population growth, the high-tech sector's and high-tech services' regional distribution, and the net growth of enterprises. As determining variables, we use data from the Japanese General Social Surveys' International Comparative Survey on Values and Behavioral Patterns, Non-Profit Organizations per capita and share of the population being born abroad, plus control variables in the form of market accessibility and human capital. On detailed regional level (46 prefectures) the analysis does not give any significant support to any of the civil society hypotheses. However, on large-region level (8 regions) the civil society measure gives a significant result for high-tech industry and services.

Keywords: Regional development, Social capital, Creative class, Civil society, Japan, High-tech industry.

1. INTRODUCTION

What is the key to regional development? The traditional answer has come from scholars of the predominant mainstream economics: access and accessibility to the factors of production, i.e. land, labor and capital, and the optimum combination of them. The contributions of Schultz (1961) and Becker (1964) conduced to the understanding that labor as such was not a sufficient factor and that the human capital embodied in labor must be brought into consideration.

However, the question has also been answered in other ways, by scholars that not have stayed wholly in the mainstream. Ever since Adam Smith (1776) the concept of *specialization* forms a fundamental explanation to economic growth. Specialization and division of work has been a main method in organization and streamlining of industrial production. Also in space, on local and regional level, corresponding specialization of production can be found throughout history. In many cases, spatial specialization have been based on specific natural assets, but already Marshall (1880) stressed the specific knowledge that seemed to be in "the air" in specialized industrial districts and that contributed to raised productivity and competitiveness. Porter (e.g. 1990) and Krugman (e.g. 1991) have developed theories of regional specialization and thereby contributed to the currently very popular cluster policies. Other scholars have stressed not only co-location but have emanated from Marshall's "air" and developed concepts like "learning regions" (e.g. Florida 1995; Asheim 1996) and "localized learning" (e.g. Maskell and Malmberg 1995) as sources for regional development.

A third answer has been offered by scholars like Schumpeter (1911/1934) and Knight (1921), which focused on entrepreneurship and risktaking as fundamental factors of economic development. Even if their works did not contain any explicit spatial dimensions, the spatial implications of their theories are obvious (see e.g. Westlund and Bolton 2003).

The focus on factors like learning, entrepreneurship and risktaking can be regarded as expressions of an undercurrent of thought in economics that for a long time was hardly visible, but now has gained a great interest in both research and policymaking. The common denominator of this line of thought is that intangible factors as culture, norms, values, tacit knowledge, informal networks, etc are having an impact on economic development. Beside the classics mentioned above, Weber's (1904/05) work on the ethics of Protestantism and its spatial impact on capitalism's development in Europe from the 16th century is a classical contribution.

With the growth of the knowledge economy, this broad school of thought has experienced a strong growth in the social sciences. In this paper we focus on the currently two most well-known expressions of this tradition, Richard Florida's *creative class* and Robert Putnam's *social capital*.

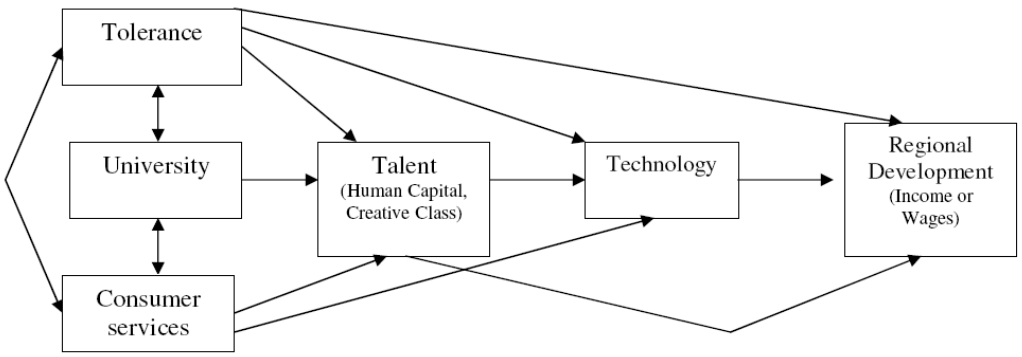
The Creative Class

Florida's ideas about the creative class are well-known and we only make a brief summary of the most important points for our study. According to Florida, the driving force in the knowledge economy is the "creative class" comprising more than 30 percent of the American population. It is where the members of this class chose to settle that decides where regional growth is taking place. Florida (2002) presents a number of factors which he considers to be important for the creative class' choice of region:

- A large, dense labor market that facilitates job mobility
- A lifestyle with a broad supply of leisure activities
- Cafes and other meeting places for social interaction
- Diversity and tolerance of different ideas, lifestyles, cultures and ethnicity
- The regions'/place's authenticy in the form of own culture
- The region's/place's identity which have increased in importance when other forms of identity have decreased

By constructions of regional indexes over creativity and various lifestyle variables (gays, bohemians), Florida shows the existence of covariation between growth of high-tech industries, creativity and modern lifestyles. These factors are summarized under the "3T" concept (Technology, Talent and Tolerance). It does not seem as Florida considers one T being the cause of the others: "To attract creative people (…) a place must have all three" (Florida 2003, p. 10). On the other hand, he does suggest a cause and effect: "… talent or creative capital is attracted to places that score high on our basic indicators of diversity" (Florida 2003, p. 10), which can be interpreted as that tolerance is being an attracting force for talent (as Florida defines diversity as one component part of tolerance). The special role of tolerance in the cause-and-effect chain of regional development is also explicitly stated in Florida, Mellander and Stolarick (2007) as shown in Figure 1.

Figure 1. "Path model of the regional development system"



Source: Florida, Mellander and Stolarick (2007)

Irrespective of the directions of the mutual influence between the three T:s, Florida's emphasis on tolerance and diversity can be interpreted as an expression of the importance of *civil society* in regional development.

Civil society

As is the case with many other concepts, "civil society" has a number of various definitions.[1] A usable working definition has been formulated by the Centre of Civil Society of the London School of Economics:

"Civil society refers to the arena of uncoerced collective action around shared interests, purposes and values. In theory, its institutional forms are distinct from those of the state, family and market, though in practice, the boundaries between state, civil society, family and market are often complex, blurred and negotiated. Civil society commonly embraces a diversity of spaces, actors and institutional forms, varying in their degree of formality, autonomy and power. Civil societies are often populated by organisations…"

(http://www.lse.ac.uk/collections/CCS/what_is_civil_society.htm 2006-02-01).

The civil society is often measured in quantitative terms, e.g. the number of Non-Profit Organizations (NPOs) or Non-Governmental Organizations (NGOs) and their number of members. However, another way to investigate the civil society is to focus on its qualitative aspects, i.e. the norms, values and attitudes.

Could it be that creativity, entrepreneurship and innovations to a certain extent are depending on norms, attitudes and values of the civil society? Schumpeter's entrepreneur did not only create new growth, but did as well ruin the prerequisites for the old production. The entrepreneur did not only create new, more efficient firms, but also bankruptcies, unemployment and other problems when old firms could not survive. This double role of the entrepreneur makes it possible to realize why entrepreneurship often is met by resistance:

"In the breast of one who wishes to do something new, the forces of habit rise up and bear witness against the embryonic project (...) the reaction of the social environment against one who wishes to do something new (...) any deviating conduct by a member of a social group is condemned (...) Even mere astonishment at the deviation, even merely noticing it, exercises a pressure on the individual. The manifestation of condemnation may even come to social ostracism and finally to physical prevention or to direct attack...." (Schumpeter 1934, p. 86f).

An entrepreneur of Schumpeter's type is not only threatening economic competitors but also the relative safety of a strong local community, be it a village,

[1] For a comprehensive discussion of the concept, see Ehrenberg (1999).

an industrial town or an administration city. Thus, it is hardly surprising if the values of civil society have prevented entrepreneurship throughout history.

The various values of groups and individuals, as well as their organized expressions, are accommodated in the civil society. Old and new ideas and interests are confronted with each other, but normally there are during an era certain values being predominating in the civil society.[2] In general it is reasonable to assume some kind of interaction between the economic structures and civil society's predominating values. To start with, civil society's prevalent values are preventing new features, but if they slowly break through, civil society adapts. In this way it is possible to explain why the values of civil society have first resisted innovations, but after their breakthrough they have supported existing specialization, and prevented entrepreneurship in competing industries and other potential changes. This slowed down the pace of change during periods of transformation - but during industrial society's stabile growth periods it was contributing to increased growth.

Thus, when the industrial society was established and the wheels were rolling it was "more of the same" and no new entrepreneurship that favored growth at the most. However, when the crisis of the 1970s came, the industrial regions were equipped with obsolete trades and industries and a civil society lacking the creativity, entrepreneurship and capacity to innovate which would have been able to contribute to structural renewal.

The growth having occurred in the OECD countries after the 1970s has primarily taken place in regions where the manufacturing industrial "spirit" never prevailed, i.e. in metropolitan regions with universities and diverse business structures, and a number of medium-sized university cities. The established explanations to their growth, supported by a large amount of research in this field, is that the growing industries have been more knowledge intense and therefore easier developed in regions with a large supply of high educated labor, and that the larger labor markets of the metropolitan regions acted like a magnet, as they facilitate for people to change job without having to move. There is no doubt that these explanations have a large validity.

However, as discussed above, there are good reasons to investigate a complimentary explanation to the growth of these regions, viz. their - in a broad meaning - civil societies. There are many observations of regional variations of the civil society within a country, both in terms of predominating values, the diversity of values and the organized expressions of this. The industrial town and the metropolitan city show up considerable differences in these respects.

Putnam's social capital and Florida's criticism

Florida formulated his hypothesis on the three T:s and the creative class in explicit opposition to another hypothesis on impact of civil society on regional development, viz. Putnam's social capital hypothesis. According to Putnam, it is

[2] Hegel's concept *Zeitgeist* might be considered a denomination for these predominating values, at least in the modern use of the concept.

not primarily a diversified community with many, loose networks where various lifestyles are tolerated that support regional development, but a community with strong social networks with homogenous norms and values. One of the key factors of a well-functioning community is *trust* between its actors. It can be argued that trust lowers transaction costs and thereby improves industry's conditions, as well as that trust creates a "good" community which attracts people – both factors having a positive impact on regional development. This is in this paper referred to as "the Putnam hypothesis".

There are large and important differences between Florida's and Putnam's theoretical approaches, questions of issue, methods and conclusions. Of course it should also be underlined that their hypotheses include other active factors than the civil society. But they have in common the thesis that factors of a region's civil society are having an impact on the region's economic development.[3]

The difference between the two scholars is reflected in their use of concepts. As noted, neither of them uses the term civil society, although both of them are discussing the norms, values and social networks of the civil society. Also, Florida raises strong criticism against Putnam's view that social capital is a factor contributing to current regional development: "Where strong ties among people were once important, weak ties are now more effective. Those social structures that historically embraced closeness may now appear restricting and invasive" (Florida 2003, p 6). Florida (2002, 2003) also refers to unpublished statistical analyses of US regions which show negative correlations between social capital variables of Putnam's type and growth of among others population and high-tech industry. Based on the differences between his measures of diversity and tolerance and Putnam's measures of social capital, Florida dissociates himself from Putnam's social capital by using the term "creative capital" instead.

However, in our opinion both Florida and Putnam are dealing with civil society's norms, values and the networks that these values and norms are distributed in, i.e. what usually is defined as "social capital". The difference is that, while Putnam is relating to a homogeneous civil society with common norms and networks, Florida refers to an individualized, heterogeneous one with divergent norms and separate networks – i.e. a civil society with a completely different social capital. Westlund (2006) has suggested that Putnam mainly is referring to the relatively stabile civil society which (after it had been established) was adapted to the industrial epoch's production and decision environments, while Florida is basing his reasoning on central characteristics of the knowledge economy's expanding regions. In line with this, in terms of economic renewal, it can be argued that Florida's perspective seems connected to path-breaking innovations of the Schumpetarian type, while Putnam's approach has couplings to marginal routine improvements of the Kirznerian type.[4]

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[3] It should be noted that neither Putnam nor Florida uses the concept of civil society. Putnam mostly used the term "civic community" and Florida talks of "creative centres", equipped with technology, talent and tolerance, as opposed to other community types.

[4] The differences between Florida and Putnam can also be connected to a discussion among American sociologists. While Putnam takes his theoretical base in Coleman's (1998) view that delimitation or enclosure is a source of social capital,

In the following we denominate the two approaches "the Florida hypothesis" and "the Putnam hypothesis" and use them as starting points for our study. The aim of the study is to investigate the possible validity of the two, partly contradicting, hypotheses on the impact of civil society on regional development in Japan, the world's second largest economy. Section 2 summarizes previous research on these issues. Section 3 describes the methods and the data used. Section 4 contains the empirical results and some concluding remarks.

2. PREVIOUS RESEARCH

2.1 Research connected to Florida's and Putnam's hypotheses

As mentioned in Section 1, Florida's (2002) did not contain very thorough statistical scrutinizes of his hypothesis. However, a number of studies by Florida and associates have thereafter presented statistical analyses. Lee, Florida and Acs (2004) studied factors behind entrepreneurship in US Metropolitan Statistics Areas (MSAs), Primary Metropolitan Statistics Areas (PMSAs) and Labor Market Areas (LMAs). They found strong correlations between creativity/bohemians and entrepreneurship, but the measures of diversity (location quotients of gay population and foreign born) were in most cases non-significant. In a study of the determinants of innovation in US PMSAs, Knudsen, Florida, Gates and Stolarick (2007) did not find any statistically significant results for the bohemian and gay measures, but the measure of "creative capital", i.e. the share of the creative class was highly significant in explaining innovation.

Two other studies give support to tolerance as being a key variable for regional development. Based on the model in Figure 1, Mellander and Florida (2006) carried out "path analyses" of Sweden's labor market areas in which tolerance was shown to have a significant covariation with size of university, service diversity and human capital. The tolerance measure was here based on a municipality ranking made by the Swedish Federation for Lesbian, Gay, Bisexual and Transgender Rights.[5] The model is also used by Florida, Mellander and Stolarick

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Burt (1992) have launched the concept of "structural holes" between different groups/networks as a starting point for the emergence of new social capital, as a "broker" can create links across these holes and generate exchange between the separate groups/networks. Woolcock (1998) has classified the two types of links that Coleman and Burt respectively build their reasoning upon as bonding and bridging, a division with obvious relevance to Putnam's and Florida's divergent perspectives. Both Burt and Woolcock are probably inspired by Granovetter's (1973) distinction between strong and weak ties.

[5] The same measure was used in a report from the Swedish Center Party which presented positive (simple) correlations between the number of new enterprises per inhabitant and the share of homo-, bi- and transsexual in the Swedish regions 2005. In this study, no control variables were used.

(2007) in a study with data for all 331 US MSAs. The authors find strong significant covariations between tolerance and university faculty per capita, consumer services, human capital, the creative class and its supercreative core. In this study, tolerance was measured through a combination of Florida's gay and bohemian indexes.

It can also be added that European studies based on Florida's approach have been performed in a number of countries.

The most important critique of Florida's claims has come from Glaeser (2005) which, by using Florida's own data, show that neither the gay index nor the bohemian index remain significant if they are included in multiple regressions together with a measure of human capital, the latter being highly significant in explaining population growth in 242 US metropolitan regions 1990-2000.[6]

It should be noted that the idea that diversity is of importance for innovation-led growth has a tradition within economics, dating back to Schumpeter. In this tradition, diversity has mainly been regarded as *economic* diversity (see e.g. Glaeser et al. 1992; Feldman and Audretsch 1999; Anderson et al. 2005). When it comes to *cultural* diversity, Jacobs (1961) was the first to point out its importance. Lazear (2000) and Fujita and Weber (2003) have presented theoretical arguments for the impact of diversity on economic growth. The empirical studies are very few, but Ottaviano and Peri (2006) have found that ethnic and cultural diversity covariate with regional productivity in the US, and Niebuhr (2006) presents evidence that cultural diversity affects regional innovation activity and that differences in knowledge and capabilities of workers from divergent cultural backgrounds enhance performance of regional R&D sectors.

Research on social capital has been one of the most expanding fields of the social sciences the last 10 years. However, the empirical studies of the connections between social capital and economic development have been fairly limited, mainly due to a lack of consensus on appropriate measures (Beugelsdijk and van Schaik 2005). There are also a number of studies of regions or nations indicating a positive relationship between social capital and economic measures (e.g. Putnam 1993, Knack and Keefer 1997, Zak and Knack 2001, Beugelsdijk and Van Schaik 2005, Dincer and Uslaner 2007). On the other hand, Putnam's own observations of the United States indicate an almost opposite relationship between a main component of Putnam's social capital – trust – and regional development. Trust is highest in declining rural areas, while it is low in expanding metropolitan regions (Putnam 2001).[7] Another empirical observation which opposes Putnam's hypothesis is that economic growth boosted in the United States during the 1990s, in spite of the declining social capital of the civil society, documented in Putnam (2000).

A conclusion is that there so far are a relatively limited number of studies which empirically have tested the different connections between civil society and regional

[6] It should however be noted that Florida do not claims to explain population growth but rather the growth of the "creative class" and high-tech industries.
[7] As shown above, similar arguments have been raised by Florida (2002, 2003).

development, suggested by Florida and Putnam respectively, and that these studies have given certain support but also negative results. Putnam's hypothesis on the importance on social capital has been in focus of studies on both developed and developing countries, while the hypothesis of Florida so far seems to have been applied on studies of the United States and Europe. The world's second largest economy, Japan, has still not been the subject of any empirical studies.

2.2 The Japanese civil society[8]

A popular explanation to the remarkable economic growth in Japan up to 1990 has been the Japanese "culture". Zhang (1998) emphasizes the importance of the Japanese *group culture* and that Japan seems to have had a capacity for adapting it to societal changes. On the one hand, the Japanese group requires total devotion of its members and a high capacity for cooperation. On the other, an individual can change group when circumstances change. It is "groupism" that persists, not necessarily the particular group.

Zhang (1998) also points out the importance of Confucianism. Although both Japan and China have a strong Confucian heritage, the Confucianism of the two countries is different. While the Chinese applications of Confucianism have supported a relatively higher degree of individualism, the Japanese interpretations of Confucianism have resulted in a strong group culture and loyalty to the group. This group culture provided the basis of nationalism when the West challenged Japan in the 19th century. Catching up to the West by learning and carrying through a rapid industrialization became a matter of national pride. The traditional group culture supported the Japanese industrialization strategy extraordinary well.

A common opinion is that the development of civil society in Japan has been hampered by an unusually imperious state (Schwartz 2003). After World War II, the official nonprofit sector in Japan has consisted of legally well-defined organizations. Government at central and local level has had strong influence over these organizations and the bulk of their incomes have come from the public sector and service fees. Formally independent, these organizations have acted in symbiosis with the government. The last twenty years and in particular after the Kobe earthquake in 1995, has witnessed another type of nonprofit organizations, basically local grassroots groups, engaged in environmental issues, advocacy, community and international issues. Until 1998, these groups had no legal status and received little governmental support. However, the strict regulatory environment is still considered a major obstacle for the growth of the civil society (Schwartz 2003).

A feature of the Japanese civil society seldom mentioned or studied are the local community and residential networks operated by women while the men are at work. It is highly probable that these "invisible" woman networks have played an important role in shaping the social capital of the Japanese civil society – not least

[8] This subsection is mainly based on Westlund (2006)

due to that many Japanese men have a working situation which does not spare much time for civil activities.

The Japanese civil society is still less studied than the European and the American and there are no inquiries on its connections to economic growth. If, as suggested above, the civil society of Japan to a certain extent has been carried up by housewives, while the men were at work, this might be interpreted as an indication of a very weak relationship between civil society and the economy. On the other hand, it is possible to argue that this civil society has created very favorable conditions for the men to concentrate on their job and that it thereby has contributed to economic growth.

Thus, the connections between civil society and economic development in Japan seem unclear and contradictory. The relative smallness of civil society suggest that it cannot have contributed much to economic growth, but the homogenous group culture and its importance for economic development is well in line with the Putnam hypothesis.

Considering the Florida hypothesis, it has often been argued that Japan is in shortage of some essential features of the knowledge society, primarily creativity and individualism, both strongly connected to entrepreneurship. Japan's long-term strategy of being a follower and an improver of foreign innovations has – in combination with traditional "hierarchical groupism" and risk aversion – come to a dead end when there is no one to follow. The crucial question is how much of the relations, norms and institutions of the industrial economy that are able to contribute to the knowledge economy's growth.

Being a society considerably more culturally and ethnically homogeneous than its American and European counterparts, the Florida hypothesis would suggest severe problems for the high-tech industries in Japan. Even if the fifteen years of economic stagnation after 1990 mainly can be explained by other factors (the finance bubble, the bank system and a political volition to avoid changes) the Florida hypothesis might perhaps serve as an additional explanation.

3. METHODS AND DATA

As was shown in the previous section, most studies on the impact of civil society on spatial development have focused on quantitative aspects of civil society, such as number of organizations and members, numbers and shares of ethnic or religious groups, bohemians, gays, etc. However, a decisive question is if quantitative measures of numbers and shares always are the best measures of civil society. The number of organizations and members do not say anything about their activity. The diversity of ethnic, religious and other groups in a region does not say anything about the degree of interaction between them. The numbers and shares of organizations, members, networks and groups of different kinds, etc, do not say anything about the norms, values and attitudes within and between these groups. In principle it would be possible to find civil societies with similar quantitative

attributes, but with very different qualitative characteristics. Thus – in line with our reference to Schumpeter in Section 1 – there are good arguments to include norms, values and attitudes as explanatory variables if we want to investigate the possible influence of civil society on regional development.

Our data on civil society values are colleted from the Japanese General Social Surveys' International Comparative Survey on Values and Behavioral Patterns 2003, which consisted of 3663 valid responses. Based on the questions three indexes were constructed for 46 of Japan's 47 prefectures.[9] The construction of the indexes is presented in Appendix. It should be pointed out that the limited number of responses per prefecture means that the indexes contains a certain degree of uncertainty.

Based on our summary of the Florida hypothesis we investigate if *tolerance, diversity* and *talent* are factors that promote regional development. Based on our summary of the Putnam hypothesis we examine whether *trust* and *homogeneity* are factors behind regional development. In addition to the abovementioned qualitative measures of the civil society, two quantitative measures was tested, viz. the number of NPOs per capita[10] (one of the most often used measures of civil society) and the share of foreigners of the total population (as an additional measure of diversity). Thus, the impact of the *values of civil society* on regional development is measured by indexes of *tolerance* and *diversity* (Florida) and *trust* and *homogeneity* (Putnam). Diversity and homogeneity are considered as each others opposites and measured by a *Homogeneity/Diversity index* (see Appendix 1). Quantitative aspects of the civil society are measured by the *number of civil organizations* and the *diversity of the population*, measured by the share of foreigners.[11]

Beside these measures of civil society, two more general explanatory factors of regional development were used. Based on data on inter-regional accessibility (National Integrated Transport Analysis System- NITAS developed by Japanese Ministry of Land, Infrastructure and Transport- MLIT[12]) for 2002 a Population potential or *Aggregate Accessibility Index* was constructed for each prefecture.

$$A_i = \sum_{i=1}^{n} \frac{P_i}{D_{i,j}}$$

[9] Due to its special conditions and remote location, the prefecture of Okinawa was not included in the analysis.

[10] Data on NPOs was collected from the Japanese Research Institute of Economy, Trade and Industry, 2004 Investigation of NPO Corporate Bodies.

[11] Other measures of the civil society on prefecture level have been difficult to come across. It has not yet been possible to find data on membership in the majority of NPOs, NGOs or similar organizations. Nor has it been possible to find data to construct a regional "gay index".

[12] The Japanese Ministry of Land, Infrastructure and Transport (MLIT) has developed the National Integrated Transport Analysis System (NITAS), based on the understanding that it is important to quantitatively analyze and evaluate the status of transportation system and effects of network formulation, and then visualize these results. NITAS can search the shortest required time, cost and distance by means of transportation within any two zones in the country. For our purposes we have selected a measure of distance.

where *P* is the population of each prefecture and *D* is the average distance between prefecture *i* and prefecture *j*. The accessibility index is here used as an approximate measure of a number of variables which normally show spatial covariation: access to (spatially determined) markets for input (incl. labor) and output (incl. market segments for highly specialized products); access to university and industry R&D; access to venture capital and traditional forms of financial capital, etc.

The other general variable was human capital, measured as the share of the population having university education. This variable is different from Florida's talent as it is a measure of education and not on occupation (although Florida (2003, p.10) once defined talent as "those with a bachelor's degree and above")

As measures of the dependent variable, regional development, we use four alternative variables: *population growth* [13] 2000-2005, the share of the total workforce of the *high-tech sector* 2003/2004 and a part of that sector, the *high-tech services* 2004, and *net growth of enterprises* in percent of stock 2001-2004.[14] Moreover, we double check our results by testing *value added growth* as an alternative dependent variable.

The argument for taking high-tech services as a separate variable beside the total high-tech sector is that manufacturing, even if it is formally classified as high-tech, might contain a significant number of "non-creative" jobs in certain regions, whereas the high-tech services may be regarded as more genuinely "creative" and thus fit better into the Florida hypothesis: "People in technology business are drawn to places known for diversity of thought and open-mindedness" (Florida 2002, p. 1).

The high-tech sector has been defined by the Milken Institute (DeVol 1999, p. 34) whose definition also was used by Florida (2002).[15] Data on population and the share of foreigners are taken from Japan Statistical Yearbook edited by Statistical Research and Training Institute (MIC); while data on employment were provided by the Japanese Ministry of Economy, Trade and Industry (METI) 2003. Data on employment in service sectors defined as high-tech were available only for 2004. The sum of these two variables formed total employment in high-tech 2003/2004. As no detailed data for the service sectors' are available on regional level for earlier years, estimations of the growth of the total high-tech industry was not possible. On the whole, the limited availability of Japanese regional data has prevented construction of time series and calculation of employment changes in high-tech industries.

[13] It can of course be argued that both Florida's and Putnam's hypotheses focus more on "quality growth" than "quantity growth" and that population growth does not say much about the "quality growth" of the region. However, population growth is a very common proxy for regional development and therefore we use this variable.

[14] The available data was for the whole stock of enterprises, primary sector enterprises included.

[15] The Milken Institute's American definition was based on the US Standard Industrial Classification (SIC). This was transformed to the OECD's International Standard Industrial Classification (ISIC) which in its turn was transformed to the Japanese Standard Industrial Classification (JSIC). The appendix presents the industries and services denominated as high-tech in this study.

4. RESULTS AND INTERPRETATIONS

A first test of the covariations between the dependent and the explanatory variables is shown in Table 1. All explanatory variables except NPOs per capita show positive correlations with population growth, but there is a clear difference between the variables measuring qualitative values of the civil society and the three quantitative variables, the latter showing considerably higher correlations. Concerning employment in the total high-tech sector (industry and services) the civil society variables seem completely insignificant, while they have stronger, positive covariations when only the high-tech services are taken into account. None of the explanatory variables seem to have an impact on the growth of enterprises.[16]

It should also be noted that there are strong positive correlations between human capital, accessibility and foreigners, and to a lesser extent between the group Trust-Tolerance and the Homogeneity/Diversity Index. The highly significant *share of foreigners* is, as said above, connected to the Florida hypothesis' *diversity*, but the variable's very strong correlation with accessibility is probably an indication on a general global pattern, viz. that the biggest city-regions with the highest national accessibility have higher international interaction and exchange. Thus, the share of foreigners is mainly an expression of the prefectures' size, something which probably is positively connected to creativity, but in this relation the share of foreigners seems to be a dependent variable, and accordingly, accessibility is the basic independent variable. For this reason, we omit the variable *share of foreigners* from the further analysis.

The second step in the analysis is ordinary least square regressions. The following estimations were made:

$$\dot{Pop}_{i,t-1,t} = \alpha + \beta_1 tr_{i,t-1} + \beta_2 tol_{i,t-1} + \beta_3 ho_{i,t-1} + \beta_4 acc_{i,t-1} + \beta_5 hk_{i,t-1} + \beta_6 ngo_{i,t-1} + \mu_t$$

$$L_{i,t} = \alpha + \beta_1 tr_{i,t-1} + \beta_2 tol_{i,t-1} + \beta_3 ho_{i,t-1} + \beta_4 acc_{i,t-1} + \beta_5 hk_{i,t-1} + \beta_6 ngo_{i,t-1} + \mu_t$$

$$Lht_{i,t-1,t} = \alpha + \beta_1 tr_{i,t-1} + \beta_2 tol_{i,t-1} + \beta_3 ho_{i,t-1} + \beta_4 acc_{i,t-1} + \beta_5 hk_{i,t-1} + \beta_6 ngo_{i,t-1} + \mu_t$$

$$\dot{Est}_{i,t} = \alpha + \beta_1 tr_{i,t-1} + \beta_2 tol_{i,t-1} + \beta_3 ho_{i,t-1} + \beta_4 acc_{i,t-1} + \beta_5 hk_{i,t-1} + \beta_6 ngo_{i,t-1} + \mu_t$$

Where $\dot{Pop}_{i,t-1,t}$ is the rate of growth of population by prefecture *i* between *t-1*(2000) and *t* (2004); $L_{i,t}$ is the share of employment in high tech over total employment in each prefecture *i* at time *t*; $Lht_{i,t}$ is the share of employment in high

[16] This is probably a reflection of the insignificance of new enterprises on the regional development in Japan. In all international comparisons of entrepreneurship, Japan scores lowest (see e.g. Reynolds et. al 2002). A supplementary explanation to the non-existent connections between the explanatory variables and growth of enterprises might be that it was mot possible to exclude primary sector enterprises from the calculation. However, even if growth of enterprises is poorly connected to regional development in Japan, in the lack of alternative measures, we continue to use the variable as a measure of entrepreneurship.

tech service sectors over total employment in each prefecture i at time t; and $\dot{Est}_{i,t-1,t}$ is the rate of growth of establishments by prefecture i between t-1(2000) and t (2004). While $tr_{i,t-1}$, $tol_{i,t-1}$ and $ho_{i,t-1}$ are, the level of Trust, Tolerance and Homogeneity in 2000 respectively, as explained in Appendix 1; and $acc_{i,t-1}$, $hk_{i,t-1}$ and $ngo_{i,t-1}$ are the quantitative measures of Accessibility, Human capital and NPOs respectively.

Table1. Correlation Matrix of all variables (N= 46 prefectures)

	Population Growth 2000-04	*Employment High-tech*	*Employment HT Services*	*Growth Enterprises 2001-04*	*Trust Index*	*Tolerance Index*	*Homogeneity Index*	*Foreigners*	*Human Capital*	*NPOs per capita*	*Accessibility*
Population Growth 2000-04	1										
Employment High-tech 2003/2004	0.51	1									
Employment HT Services 2004	0.46	0.33	1								
Growth Enterprises 2001-04	0.37	0.18	-0.03	1							
Trust Index	0.13	0.01	0.25	-0.12	1						
Tolerance Index	0.17	0.06	0.25	0.16	0.26	1					
Homogeneity Index	0.11	-0.03	0.03	-0.04	0.33	-0.08	1				
Foreigners	0.64	0.56	0.31	-0.15	0.02	0.11	-0.08	1			
Human Capital	0.60	0.36	0.70	-0.06	0.17	0.26	0.00	0.55	1		
NPOs per capita	0.00	-0.12	0.05	-0.12	-0.11	-0.01	-0.08	0.22	0.21	1	
Accessibility	0.70	0.53	0.45	-0.01	0.07	0.27	-0.02	0.75	0.81	0.06	1

Table 2. OLS regressions, by prefecture (N=46).

	Population Growth 2000-2004					***Employment High-Tech 2003/2004***			
Trust	0.005 *0.28*	0.008 *0.31*	-0.003 *-0.15*	0.008 *0.42*	***Trust***	0.005 *0.09*	-0.000 *-0.21*	-0.012 *-0.21*	0.004 *0.08*
Tolerance	-0.003 *-0.15*	0.025 *1.06*	0.005 *0.25*	-0.002 *-0.14*	***Tolerance***	-0.031 *-0.62*	0.020 *0.35*	-0.010 *-0.19*	-0.031 *-0.63*
Homogeneity	0.080 *0.89*	0.081 *0.67*	0.090 *0.91*	0.079 *0.91*	***Homogeneity***	-0.071 *-0.29*	-0.064 *-0.22*	-0.041 *-0.15*	-0.056 *-0.23*
NPOs	-1.243 *-0.36*	0.448 *0.10*			***NPOs***	-8.869 *-0.95*	-8.129 *-0.78*		
Human Capital	0.046 *0.44*		0.299*** *4.57*		***Human Capital***	-0.153 *-0.53*		0.443** *2.48*	
Accessibility	0.009** *3.13*			0.010*** *6.14*	***Accessibility***	0.023** *2.79*			0.019*** *4.03*
Constant	-0.057** *-2.55*	-0.024 *-1.15*	-0.015 *-0.96*	-0.065*** *-4.21*	***Constant***	-0.021 *-0.34*	0.074 *1.49*	0.070 *1.64*	-0.018 *-0.42*
R-squared	*0.51*	*0.48*	*0.37*	*0.50*	***R-squared***	*0.32*	*0.19*	*0.13*	*0.29*
	Employment High-Tech Services 2004					***Growth of Enterprises 2001-2004***			
Trust	0.008 *0.64*	0.023 *1.34*	0.014 *1.09*	0.022 *1.43*	***Trust***	-0.012 *-1.06*	-0.013 *-1.18*	-0.011 *-1.02*	-0.012 *-1.09*
Tolerance	0.007 *0.56*	0.019 *1.23*	0.004 *0.33*	0.008 *0.56*	***Tolerance***	0.014 *1.33*	0.014 *1.32*	0.015 *1.41*	0.014 *1.34*
Homogeneity	-0.005 *-0.08*	-0.012 *-0.14*	-0.006 *0.10*	-0.014 *-0.18*	***Homogeneity***	0.010 *0.18*	0.010 *0.19*	0.011 *0.21*	0.012 *0.22*
NPOs	-2.612 *-1.16*	1.457 *0.49*			***NPOs***	-1.563 *-0.76*	-1.789 *-0.93*		
Human Capital	0.354*** *5.11*		0.233*** *5.78*		***Human Capital***	-0.020 *-0.30*		-0.022 *-0.61*	
Accessibility	-0.004* *-2.02*			0.04** *2.96*	***Accessibility***	0.000 *0.08*			-0.000 *-0.34*
Constant	0.040** *2.66*	0.006 *0.39*	0.015 *1.52*	-0.009 *-0.66*	***Constant***	-0.057*** *-4.18*	-0.055*** *-6.00*	-0.059*** *-6.96*	-0.057*** *-6.06*
R-squared	*0.56*	*0.11*	*0.51*	*0.26*	***R-squared***	*0.08*	*0.07*	*0.06*	*0.06*

*Note: t-statistic in italics. *=0.10;**=0.05;***=0.00*

The results of the regression analyses are shown in Table 2. Three results stand out as obvious: the civil society variables do not have any significant influence on any of the regional development variables, measured on Prefecture level; accessibility and human capital exert a very strong influence on population growth and employment in the high-tech sector and high-tech services, and; none of the variables are having any impact on entrepreneurship.

As mentioned in Section 3, the Japanese General Social Surveys' International Comparative Survey on Values and Behavioral Patterns contains a small number of observations per prefecture, which means that the indexes measuring various aspects of civil society to a certain extent might divide from what a larger number of observations might give. In order to diminish the possible errors from the small number of observations, regressions were also run for the 23 prefectures (i.e. half the prefectures) with the largest population. However, the results do not deviate in any significant way from those of the previous tables; each of the quantitative variables stays positively significant if being single, and the civil society variables mainly stay positive but always insignificant.

The same regressions have been run inserting the growth rate of value added between 2000 and 2004 as a fifth, alternative dependent variable. The results do not differ consistently from the previous ones.

This leaves us with the conclusion that, in form the hypotheses have been operationalized in this paper, the results so far do not give any significant support for neither the Putnam nor the Florida hypotheses, when the share of foreigners is considered being a variable dependent on accessibility.

Thus, the basic hypothesis on an impact of civil society on regional development in Japan did not find any support on the level studied. What can be the reason for that? The following explanations are possible:

1. The hypotheses might be of relevance only in a longer time perspective. The time span of this analysis is limited to a relatively short period around the year 2000, the main reason being the availability of data. However, it is not improbable that the impact of sluggish, intangible factors of the type we here have tried to analyze is discernable only in the long run. The lack of data constitutes a problem for performing such long-term analyses.

2. The civil society might have influence on regional economic development in the U.S. (and maybe Europe) but not in Japan. Japan might be a too homogeneous country to give regional differences of the civil society any impact on regional development. Due to historical reasons, the civil society of Japan is a younger, less developed feature of society – and might therefore be less connected to regions' economic performance – compared with its European and American counterparts. Instead of the social networks of the civil society, it might be the social networks of business life (see e.g. Westlund and Nilsson 2005) that, together with other factors, influence regional economic development in Japan.

3. Other aspects of the civil society than those measured in this study have an impact on regional development in Japan. Trust, tolerance and diversity are without doubt important expressions of civil society's norms and values. However,

it is possible that it is not differences in values and norms that influence regional development in Japan, but the diversity of leisure activities and opportunities for social interaction, which are aspects of "the Florida hypothesis" not being tested in this study – or it might be the strength and or/size of social networks (independently of the general trust people express) to mention an element of "the Putnam hypothesis" not being investigated here.

4. The civil society might be of some importance for regional development but other factors are more important. The assumption that a civil society with certain qualities has a positive impact on the regional economy and high-tech industries is built on some results of studies of Italy (Putnam 1993) and the U.S. (Florida 2002, 2003). However, as shown in this study, it is highly probable that high-tech industry's regional growth pattern in Japan is affected by a number of other factors, such as accessibility, existing industries, labor market's size, regional R&D capacity etc, to an extent that make the civil society insignificant.

5. The civil society might affect other aspects of regional development than those tested in this paper. In this study we have tested four (five) measures of regional development, of which two (total high-tech sector and high-tech services) are explicitly connected to the Florida hypothesis. However, it is possible that civil society might have an impact on other aspects of regional development, i.e. other economic and social factors. This remains to be investigated.

6. *The measures of trust, tolerance and diversity used in this study might deviate too much from the ideal measures to be able to exert any real influence on regional development.* Transforming theory to empirics is always a problem. The ideal measure of a factor is seldom possible to find or construct. This study is no exception. Although we think that our constructed indexes are fairly good empirical approximations of the theoretical concepts, based on the only existing compiled data in this field, it cannot be excluded that they diverge too much from the ideal to show any explanatory power.

7. *Finally, the spatial unit being used in the analysis (46 Prefectures) might be too limited to reflect differences in civil society*. Even if regional variations within the Japanese civil society exist it is not clear where the important regional borders are. It is possible that a number of adjacent prefectures have similar regional characteristics. If this is the case, the analysis should be performed on larger spatial units.

The validity of most of these possible explanations is not possible to investigate with the limited availability of regional data for Japan. However, the spatial level of the analysis can be changed. This is done in two steps, first by calculating weighted average values of each prefecture and its neighbor prefectures for each variable and testing them in various models, second by aggregating the prefectures to larger regions and using the aggregated data as variables.

The first step did not provide any results that in a considerable way distinguished themselves from the previous results as regarded the civil society variables. None of them turned significant in any of the regressions.

Table 3. Correlation Matrix, by large-region (N=8)

	Population Growth 2000-04	*Employment High-tech*	*Employment HT Services*	*Growth Enterprises 2001-04*	*Trust Index*	*Tolerance Index*	*Homogeneity Index*	*NPOs per capita*	*Human Capital*	*Accessibility*
Population Growth 2000-04	1									
Employment High-tech 2003/2004	0.69	1								
Employment HT Services 2004	0.69	0.90	1							
Growth Enterprises 2001-04	0.00	0.49	0.052	1						
Trust Index	0.44	0.85	0.85	0.51	1					
Tolerance Index	0.52	0.87	0.88	0.55	0.99	1				
Homogeneity Index	0.43	0.82	0.82	0.52	0.99	0.97	1			
NPOs per capita	0.32	-0.14	-0.22	-0.04	-0.52	-0.41	-0.50	1		
Human Capital	0.93	0.76	0.85	0.23	0.53	0.61	0.50	0.23	1	
Accessibility	0.94	0.66	0.63	0.05	0.46	0.57	0.44	0.35	0.85	1

Table 4. OLS regressions, by large-region (N=46).

	Population Growth 2000-2004					***Employment High-Tech 2003/2004***			
Homogeneity	-0.014 *-0.27*	0.172** *2.40*	-0.009 *-0.22*	0.006 *0.16*	***Homogeneity***	0.580 *1.70*	0.810*** *4.13*	0.474** *2.81*	0.530** *2.84*
NPOs	-2.968 *-0.07*	131.7** *2.18*			***NPOs***	106.98 *0.40*	252.10 *1.53*		
Human Capital	0.261* *2.01*		0.480*** *5.14*		***Human Capital***	0.795 *0.94*		0.868** *2.20*	
Accessibility	0.040 *1.87*			0.070*** *5.30*	***Accessibility***	-0.021 *-0.15*			0.104 *1.58*
Constant	-0.232** *-2.27*	-0.312** *-2.38*	-0.034 *-1.33*	-0.391*** *-5.59*	***Constant***	-0.182 *-0.27*	-0.598 *-1.68*	-0.069 *-0.63*	-0.599 *-1.73*
R-squared	*0.95*	*0.58*	*0.87*	*0.88*	***R-squared***	*0.84*	*0.78*	*0.83*	*0.78*
	Employment High-Tech Services 2004					***Growth of Enterprises 2001-2004***			
Homogeneity	0.117** *2.51*	0.244*** *3.48*	0.135*** *3.97*	0.172** *2.77*	***Homogeneity***	0.017** *2.39*	0.008 *1.60*	0.007 *1.23*	0.008 *1.50*
NPOs	-20.52 *-0.56*	55.82 *0.94*			***NPOs***	10.56 *1.85*	3.135 *0.71*		
Human Capital	0.539*** *4.68*		0.356*** *4.46*		***Human Capital***	0.008 *0.48*		-0.001 *-0.08*	
Accessibility	-0.026 *-1.38*			0.031 *1.39*	***Accessibility***	-0.005 *-1.72*			-0.000 *-0.54*
Constant	0.199** *2.19*	-0.098 *-0.77*	0.023 *1.04*	-0.136 *-1.17*	***Constant***	-0.058** *-4.11*	-0.068*** *-7.24*	-0.062*** *-17.72*	-0.058*** *-6.04*
R-squared	*0.97*	*0.72*	*0.93*	*0.76*	***R-squared***	*0.70*	*0.34*	*0.27*	*0.31*

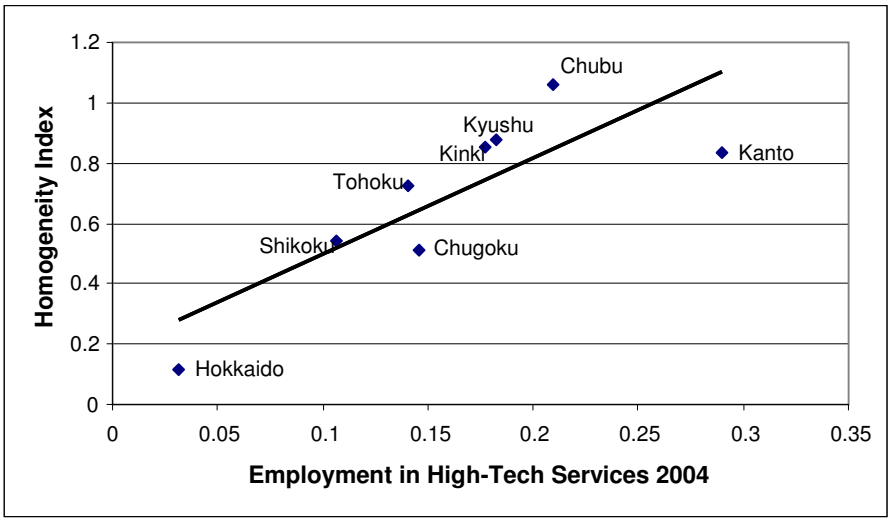
*Note: t-statistic in italics. *=0.10;**=0.05;***=0.00*

In the second step, we have aggregated the prefecture data to the eight traditional regions of Japan: Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chugoku, Shikoku and Kyushu.[17] Table 3 shows a correlation matrix for all variables on this large-region level. The simple correlations show strong positive covariations between most of the dependent and explanatory variables, with the exception of NPOs per capita.

A special circumstance, needed to be noted, is the almost identical pattern of the three indexes measuring qualitative aspects of the civil society. For this reason, only one of these indexes, the homogeneity index, was used as civil society variable in the final regression analyses. This means that it was not possible to make a difference between the Putnam and the Florida hypotheses on this level.

Table 4 shows the results of the regression analyses on large-region level. Taken as a whole, with the exception of the entrepreneurship measure (growth of enterprises) both the civil society variables and the control variables human capital and accessibility seem to exert a strong significant influence on regional development on this level. Population growth is best explained by accessibility or human capital but if these two are left out, the civil society variables (even NPOs per capita) are significant. Employment in the high-tech sector in total and in high-tech services, show a strong, significant influence from the qualitative civil society variable and the human capital variable. In these two cases, the homogeneity/diversity index even makes the accessibility variable insignificant. A graphic illustration of the relationship between the homogeneity index and employment in high-tech industries is shown in Figure 2.

Figure 2. Relationship between the homogeneity index and employment in high-tech services in the eight large-regions.



[17] Okinawa is still omitted due to its remote location. No aggregation was needed for the Hokkaido region as it is both a prefecture and a traditional region.

5. CONCLUDING REMARKS

The study has shown contradictory results. While the civil society variables seemed completely insignificant for the regional development on prefecture level, they possessed a strong explanatory power on large-region level. The strong variation between the results of the analyses of the two spatial levels indicates that analyses of the impact of the civil society are very sensitive to the level chosen.

The positive impact of civil society on regional development variables on a certain level can of course only be regarded as a first interesting indication. This has been an initial attempt to apply a hypothesis and to test two variants of it. Also, it should be clearly underlined that what has been denominated as the "Florida and Putnam hypotheses" respectively, are limited to certain aspects of the theories of Florida and Putnam and that the empirical data available itself constitute further limitations. The latter became obvious when the measures of the two hypotheses were almost identical on the higher spatial level.

With all its limitations, this study has given a certain support to the hypothesis of influence of the civil society on regional economic development. The need for further testing of the hypothesis is obvious.

APPENDIX. DATA AND INDEXES

Based on the Milken Institute's definition of American high-tech industries, the following Japanese industries and services have been defined as belonging to the high-tech sector and included in the analysis:

Industries

1731	Basic petrochemical including derivatives produced from an integrated process
1791	Explosives
1792	Agricultural chemicals
2691	Fire extinguishing equipment and its apparatus
2719	Miscellaneous industrial electrical apparatus
2741	X-ray equipment
2742	Video recording and duplicating equipment
2751	Electrical measuring instruments, except otherwise classified
2752	Industrial process controlling instruments
2753	Medical measuring instruments
2799	Electrical machinery, equipment and supplies, n.e.c.
2811	Communication equipment wired
2821	Computer, except personal computer
2822	Personal computer
2823	Storage
2824	Printer
2829	Miscellaneous peripheral equipment
2911	Electron tubes
2912	Semiconductor devices
2913	Integrated circuits
3041	Aircraft
3042	Aircraft engines
3049	Miscellaneous aircraft parts and auxiliary equipment
3099	Transportation equipment, n.e.c.
3111	Universal measures
3112	Volumeters
3113	Balances and scales
3121	Surveying instruments
3131	Medical instruments and apparatus
3152	Cameras and their parts

Services

4111	Motion picture and video production, except television program production
4112	Television program production, Teleproduction
4113	Motion picture, video and television program distribution
4159	Miscellaneous services incidental to video picture, sound information, character information production and distribution
8051	Architectural design services

8052	Surveying services
8059	Miscellaneous engineering and architectural services
8062	Mechanical design services
8070	Authors and Artists
8080	Photographic Studios
8111	Research institutes for physical sciences
8112	Research institutes for engineering
8113	Research institutes for agriculture
8114	Research institutes for medicine and pharmacy
8121	Research institutes for humanities and social sciences
1731	Basic petrochemical including derivatives produced from an integrated process
1791	Explosives
1792	Agricultural chemicals
2691	Fire extinguishing equipment and its apparatus
2719	Miscellaneous industrial electrical apparatus
2741	X-ray equipment
2742	Video recording and duplicating equipment
2751	Electrical measuring instruments, except otherwise classified
2752	Industrial process controlling instruments

Note: No regional data were available for sectors 37-38 (telecommunications and broadcasting) which in accordance with the Milken Institute definition should have been included in the high-tech sector.

The Indexes

1. **Tolerance Index**, consisting of the regional unweighted averages of the individuals' replies (1=tolerant, 0=intolerant) based on the questions:
   - ✓ **Divorce**: when a marriage is troubled and unhappy is it generally better if the couple gets divorce? (yes=1 no=0)
   - ✓ **Foreign**: are you for or against an increase in the number of foreigners in your community? (yes=1 no=0)
   - ✓ **Contfor**: have you had any contact with foreigners in Japan? (yes=1 no=0)
   - ✓ **Fjob1**: if a husband has sufficient income, is it better for his wife not to have a job? (yes=0 no=1)
   - ✓ **Fjob2**: can a working mother establish just as warm and secure a relationship with her children as a mother who does not work? (yes=1 no=0)
   - ✓ **Fjob3**: a husband's job is to earn money; a wife's job is to look after the home and family. Do you agree? (yes=0 no=1)
   - ✓ **Fjob4**: is having a job the best way for a woman to be an independent person? (yes=1 no=0)

- ✓ **Kill**: when a person has a fatal disease, do you think doctors should be allowed by law to end the patient's life by some painless means if the patient and his/her family request it? (yes=1 no=0)
- ✓ **Homo**: do you think that sexual relations between two adults of the same sex are wrong? (yes=0 no=1)

2. **Trust Index**, consisting of the regional averages unweighted of dummy variables (1=trust in people, 0= no trust) based on the questions:
   - ✓ **Trust1**: generally speaking, would you say that most people can be trusted? (yes=1 no=0)
   - ✓ **Evil**: do you think human nature is good or evil? (good=1 evil=0)

The Japanese General Social Surveys' International Comparative Survey on Values and Behavioral Patterns contains data at micro level. 3.663 yes-no answers to each of the questions above were transformed to dummy variables (0 and 1) and an average for each question and each prefecture was calculated and then aggregated to indexes.

3. **Homogeneity/Diversity Index.** The homogeneity index is based on the above 11 questions. The index is based on the assumption that a prefecture with a wholly homogeneous opinion in one question would either have the average reply 0 or 1. A prefecture with maximum heterogeneity (diversity) would have the same amount of 0 and 1 replies respectively and thus have the average reply 0.5. Hence we estimate the deviation of the real average for each question from 0.5 and summarize them for the 11 questions for each prefecture. In this way a *Homogeneity index* is obtained. Positive covariations with the dependent variables might be interpreted as support for the Putnam hypothesis, while negative covariations might be interpreted as support for the Florida hypothesis.

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