# Business Demography of Sole Proprietorships in Japan

Mikio Suga

*Hosei University, Tokyo, Japan.*

## Abstract

At first sight, the idea of basing business demography statistics on the Labour Force Survey (LFS) seems strange because the LFS is a survey of households and is not a longitudinal survey. However, its use is possible because self-employed workers are also sole proprietors and entry and cessation can be identified using items from the special questionnaire of the LFS. In this study, business demography indicators such as entry and cessation rates were calculated using custom-made tables supplied by the LFS and were compared with accounting data on sales or profits from the Unincorporated Enterprise Survey.

*Keywords*: Labour Force Survey, sole proprietorships, self-employed worker, entry rate, cessation rate, Unincorporated Enterprise Survey.

## Introduction

Eurostat-OECD (2008) noted the growing demand for data on business demography from a wide range of users both at European and OECD level. This growing demand stemmed from the Lisbon Strategy, which was launched in 2005 with the main objectives of ensuring sustainable growth and creating more and better jobs in the EU. These goals were to be attained by supporting entrepreneurship and entrepreneurial dynamism, the health of which could be tracked by the longitudinal monitoring of business demography.

At this time, there was great concern in Japan about the long period of economic stagnation that was

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**Corresponding author:**

Mikio Suga, Hosei University, Tokyo. E-mail: msuga@hosei.ac.jp.

followed by the crash of the bubble economy in the early 1990s, and the EU initiative was viewed as a way to help revitalize Japanese industry. However, the production of business demography statistics similar to those of the EU countries proved to be a difficult task. Data on sole proprietors were crucial because the birth and death rates in this segment were relatively large. However, it was challenging for the Japanese statistical agencies to obtain data on sole proprietorships. While the number of sole proprietorships was large, their shipments and sales were very small, making the financial cost of conducting a detailed survey burdensome. Moreover, their ability to accurately report statistical data was weak because of their undeveloped management; thus, careful follow-ups by the staff of the statistical agencies were necessary. Statistical surveys of sole proprietorships were difficult to conduct with an accuracy considering their little macroeconomic importance.

The US Census Bureau solved this problem using administrative records as a substitute for survey data. The Bureau's non-employer statistical data are obtained from business income tax records collected  by the Internal Revenue Service and passed on to the Census Bureau.[1] The term ''non-employers'' refers to self-employed individuals operating unincorporated businesses, otherwise known as sole proprietorships.[2] The statistical agencies of Canada, Australia, and the European countries use administrative records in a similar manner.

In Japan, the Bureau of Statistics (BOS) uses administrative records to maintain the Statistical Business Register (SBR). The statistics are obtained from two sources: the Commercial Register (the administrative register of businesses), to cover incorporated businesses, and Labor Insurance records (consisting of Labor Accident Compensation Insurance and Employment Insurance records), to cover employers. However, unincorporated sole proprietorships with no employees do not maintain either of these administrative record types, and the statistical use of tax records is not officially authorized in Japan. The BOS conducts its Economic Census for Business Frame (ECBF)[3] surveys every five years, the most recent having been conducted in July 2014. To collect the ECBF data, survey enumerators travel around the enumeration districts under their jurisdictions. If a new business establishment is spotted, the

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[1] US Census Bureau, Nonemployer Statistics,

hhttps://www.census.gov/econ/nonemployer/overview.htm access date: July 18, 2015

[2] US Census Bureau, Nonemployer Statistics,

https://www.census.gov/econ/nonemployer/index.html access date: July 18, 2015

[3] The first ECBF was conducted in 2009. It is a successor to the Establishment and Enterprise Census (EEC). It should be noted that ECBF and EEC are not official abbreviations.

business owner will be asked to complete a questionnaire. In this way, the BOS collects data on the name of a new business, its ownership, and the number of employees.

This survey method was effective prior to the internet age, since most businesses had to advertise their presences in order to attract customers. Today, however, business owners no longer need to advertise in this manner. Instead, they use homepages in the virtual space of the internet, and customers find them using search engines. Consequently, it is becoming more difficult to identify new sole proprietors by physical inspection. A source of secondary information to verify the coverage of the ECBF data would be of great advantage in building an accurate picture of Japanese business demography.

A strong candidate is the LFS, a monthly survey of households used to track the current state of employment and unemployment. The population covered by LFSs includes neither enterprises nor establishments, and LFSs are not longitudinal surveys. However, they do ask respondents to report their employment statuses, and the choices include "self-employed." As most self-employed workers are also sole proprietors, conducting such surveys provides a simple means of collecting data on these entrepreneurs. Entry and cessation rates can be tracked by adding special questionnaire items to LFS, making such surveys potentially useful for collecting business demography statistics on sole proprietorships. In this research, a custom-made table, based on the special LFS questionnaire, was used to produce entrepreneurship indicators for sole proprietorships.

## Literature on Entrepreneurship Measurement

Parker (2008) identified two major datasets used to define entrepreneurship for the purpose of making international comparisons: the Global Entrepreneurship Monitor (GEM), and the OECD LFS.

The GEM defines entrepreneurship as new venture creation and publishes an annual assessment of the national level of "early-stage" entrepreneurial activity and its institutional environment across a large number of sectors (Hessels and van Stel, 2008). The people who qualify as early-stage entrepreneurs are identified by means of a telephone survey of 2,000 adults per country. The advantage of the GEM is that it focuses specially on new entries, so that it can generate a Total Early-stage Entrepreneurial Activity index. A disadvantage is that, because many start-ups have very limited growth potentials, and because they are not tracked over time, GEM cannot identify the types and characteristics of the business that succeed (Ahmad, 2008).

The major role of the OECD LFS is to measure unemployment. Bregger (1996) wrote that the

Current Population Survey (CPS), the US version of LFS, "came into being as a basis for determining how many people were unemployed at a time when the United States was still suffering the effects of the Great Depression of the 1930s."[4] The LFS classifies employment in three principal ways: by industry, by occupation, and by class of worker. The "self-employed" constitute one class of worker, allowing the LFS to be used for entrepreneurship research, by defining the self-employed as entrepreneurs. The advantage  of the LFS is its long time series, which includes established workers as well as new entrepreneurs (Parker, 2008). For example, Branchflower (2000) was based on time-series data from 1966 to 1969. The disadvantage of the LFS is that the data on the self-employed are not strictly comparable across countries, so it is necessary to harmonize the self-employment data before  making  international comparisons (Stel, 2008). Another disadvantage is that sampling errors are nonnegligible when the data are  disaggregated.  In the  Japanese LFS, the standard error for 2009 for the whole population of Japan (detailed tabulation) is 0.4% if the estimate is 50 million persons, but it rises to 7.1% if the estimate is 100 thousand persons.

In addition to the two datasets identified by Parker (2008), OECD now maintains a Business Demography (BD) database, which records information on variables such as birth rates (business entries), death rates (business exits), and survival rates, or high-growth enterprises. The BD database is mainly compiled  from  SBR  data  and reflects a recent multifunctional expansion of the SBR. UNECE (2015) noted that

> "traditionally the function of the SBR has been to provide a population of statistical units from which frames and samples for economic surveys can be drawn, also to provide the tools for monitoring survey samples and response burden. Today, however SBR fulfills two other important roles. First, it is crucial in the integration and use of data from administrative and other sources. Second, a well-developed SBR with comprehensive list of enterprises and other statistical units, and information about their characteristics, can be used as a source of economic statistics in its own right."

The OECD BD is the outcome of two new features of the SBR: data integration and register statistics.

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[4]  LFS was introduced to Japan under the technical guidance of the US government in 1946, during the period of occupation by the US military. At that time, the name of US CPS was the Monthly Report on the Labor Force. The name was changed 1948. It is said that Japanese officers learned sampling theory though its implementation.

The advantage of OECD BD data is that they cover the universe of businesses, so can provide information on births, deaths, and survivability at a relatively detailed level, without sampling errors. Therefore, business demography based on the SBR is superior to that obtained using other sources.

In 2014, the BOS formally launched the Japanese SBR, raising the question of whether it is still necessary to produce statistics on sole proprietorships using the LFS. To answer this question, Parker (2008) argued that "the existence of more than one practical entrepreneurship measure is an advantage rather than a limitation. The researcher has greater choice to employ an empirical measure that relates more closely to their theoretical construct, whatever that may be." Moreover, as long as the statistical use of tax records is not officially authorized in Japan, business demography statistics on sole proprietorships produced by the LFS are a useful source of complementary information to those from the SBR.

# Data: LFS

## LFS Coverage

Table 1 shows the number of self-employed workers, based on LFS data. Here the "self-employed" include owners of both unincorporated and incorporated enterprises.[5] Self-employed workers are broadly divided into "with employee" (employer) or "without employee" (non-employer). Self-employed workers without employees are further divided into "doing piece work at home" (home worker) or "ordinary without employee" (other than home worker). Since there is only one, self-employed worker in a sole proprietorship, Table 1 also shows the number of sole proprietors.

To make these figures comparable with the number of sole proprietorships in the 2006 Establishment and Enterprise Census(EEC) and 2009 ECBF data shown in the next table, the number of self-employed in Table 1 excludes those who work in agriculture and forestry. The number of self-employed decreases by 1,430,000 between 2006 and 2009. Much of this decrease is accounted for by the self-employed without employees (1,150,000).

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[5] Bregger (1996) wrote that the number of incorporated self-employed, who claimed to be self-employed but responded that their businesses were incorporate, were available since 1989 in the CPS of the United States. In the Japanese LFS, there are not such items.

**Table 1.** Self-employed workers in non-agricultural industries from 2006 to 2009 LFSs (in thousands)

|  | 2006 | 2009 | Change |
|---|---|---|---|
| Self-employed workers | 5,120 | 3,690 | -1,430 |
| With employee | 1,510 | 1,230 | -280 |
| Without employee | 3,610 | 2,460 | -1,150 |
| Ordinary without employee | 3,390 | 2,440 | -950 |
| Doing piecework at home | 220 | 20 | -200 |

Source) Bureau of Statistics, Labour Force Survey (LFS)

Note) Self-employed workers who worked at agriculture and forestry industry are excluded.
The rounded total is not equal to the sum of rounded items.

Table 2 shows the number of individual proprietorships excluding branch offices from EEC and ECBF data. Here, "individual proprietorships" are unincorporated sole proprietorships. The "individual proprietor" is the owner of an individual proprietorship. One individual proprietor may own more than one business; this can be safely disregarded as the two numbers are almost the same. The term "incorporated" means that the enterprise is incorporated at the Commercial Register. The number of head offices of multi-unit enterprises can be used as a proxy for the number of multi-unit enterprises. A "multi-unit enterprise" is an enterprise that controls more than one establishment.

**Table 2.** Establishments of individual proprietorships excluding branch offices and individual proprietors from 2006 EEC and 2009 ECBF data (in thousands)

|  | 2006 | 2009 | Change |
|---|---|---|---|
| Establishments of individual proprietorships excluding branch offices | 2,705 | 2,426 | −279 |
| Single unit enterprise | 2,698 | 2,405 | −293 |
| Head office of multi-unit enterprise | 6 | 22 | 16 |
| Individual proprietors | 2,700 | 2,437 | −263 |
| One or more employee | 1,208 | 1,124 | −84 |
| No employee | 1,493 | 1,314 | −179 |

Source) Bureau of Statistics, 2006 Establishments and Enterprises Census (EEC),
Bureau of Statistics, 2009 Economic Census for Business Frame (ECBF).

Note) Establishments classified as agriculture and forestry industry are excluded.
Public owned enterprises are excluded.
Individual proprietors who worked at agriculture and forestry industry are excluded.

The rounded total is not equal to the sum of rounded items.

The difference between the number of self-employed (Table 1) and the number of individual proprietors (Table 2) is about 2.4 million in 2006 and 1.3 million in 2009. The difference between the number of self-employed with employees (Table 1) and individual proprietors with one or more employees (Table 2) is much smaller: about 300 thousand in 2006 and 100 thousand in 2009. This difference suggests that there are missing "non-employer" enterprises, which are not accounted for in the EEC and ECBF data.

These differences could have three main explanations. First, home workers not regarded as entrepreneurs could have been included in the self-employed worker category. However, as the number of home workers is small, this factor could only account for a small part of the differences. Second, incorporated sole proprietors are excluded from the individual proprietor category by definition. Third, unincorporated sole proprietorships without employees, which do not advertise externally, are not surveyed by the EEC and ECBF.

## LFS Questionnaire Items

The LFS surveys about 40 thousand households in about 2,900 enumeration districts, which are selected from approximately one million Population Census Enumeration Districts. Those 40 thousand households include 10 thousand that are asked to complete the special questionnaire. Surveys using the basic questionnaire are conducted in the same two months in two successive years, whereas the special questionnaire is distributed only in the second month of the second year.

Item 9 of the basic questionnaire asks about "Employment status." Response choices include "Self-employed worker with employee(s)" and "Self-employed worker." This item allows the two types of self-employed worker mentioned above to be disaggregated.

Item A3 of the special questionnaire asks "When did you take up your present job?" The responses to this item allow self-employed workers who started a sole business in the last year of the survey to be identified.

Item 5 of the basic questionnaire asks "Were you engaged in work at all during the last seven days of the month (for December 20–26)?" Choices include "Absent from work," allowing self-employed workers who ceased trading to be identified.

Item A1 of the special questionnaire asks "Why did you work less than 35 hours during the survey week?" Choices include "Reasons of business or the employer, due to slackness in business" and "Reasons

of business or the employer, other." The reason for cessation of business by the self-employed can therefore be identified.

To identify specific types of self-employed listed above, it was necessary to use LFS micro data. The National Statistics Center provides a custom-made tabulation service, which allows research agencies to create and provide new tabulations at the request of an applicant, using questionnaire data from existing statistical surveys.

Such tabulations are provided only to those whose purpose is to "contribute to the development of academic research" or to "contribute to the development of advanced education." The analysis in this paper is based on custom-made tables from the LFS.

## Entrepreneurship Indicators based on Custom-Made Tables from the LFS

### Entry Rates

The LFS special questionnaire asks "When did you take up your present job?" Respondents who reported being "Self-employed" and who took up their present job "Last year" are defined as "Entry." Table 3 shows entry rates by industry and age of the sole proprietor in 2009. The definition of "sole proprietor" here is a respondent who reported "Self-employed" in the LFS. The number of sole proprietors and entries are annual averages, since Japanese the LFS is a monthly survey. "Entry rate" is defined as the number of entries divided by the number of total sole proprietors.

Table 3 shows the numbers of sole proprietors, numbers of entries, and entry rates. The numbers were rounded to the nearest 10 thousand by BOS's custom-made tabulation rule. The entry rate for respondents 15 years old and over varies from 3% to 5% by industry, excluding the outlying "Services, N.E.C." (13%). The entry rate declines with advancing age," except in this outlying category.

**Table 3.** Entry rate by industry and age of sole proprietor (2009)

|  | Age of sole proprietors | | | |
|---|---|---|---|---|
|  | 15 and over | 15–39 | 40–59 | 60 and over |
| Sole proprietors (10 thousands) |  |  |  |  |
| Construction | 80 | 18 | 39 | 23 |
| Manufacturing | 46 | 6 | 15 | 25 |
| Wholesale and Retail Trade | 84 | 11 | 30 | 43 |
| Accommodations, Eating and Drinking Services | 47 | 6 | 20 | 21 |
| Living Related and Personal Services and Amusement Services | 46 | 7 | 17 | 23 |

| | | | | |
|---|---|---|---|---|
| Services, N.E.C. | 39 | 7 | 13 | 19 |
| **Entries (10 thousands)** | | | | |
| Construction | 2 | 1 | 1 | 0 |
| Manufacturing | 2 | 1 | 1 | 0 |
| Wholesale and Retail Trade | 4 | 3 | 1 | 0 |
| Accommodations, Eating and Drinking Services | 2 | 1 | 1 | 0 |
| Living Related and Personal Services and Amusement Services | 2 | 1 | 1 | 0 |
| Services, N.E.C. | 5 | 1 | 1 | 3 |
| **Entry rate (%)** | | | | |
| Construction | 2.5% | 5.6% | 2.6 | 0.0% |
| Manufacturing | 4.3% | 16.7% | 6.7 | 0.0% |
| Wholesale and Retail Trade | 4.8% | 27.3% | 3.3 | 0.0% |
| Accommodations, Eating and Drinking Services | 4.3% | 16.7% | 5.0 | 0.0% |
| Living Related and Personal Services and Amusement Services | 4.3% | 14.3% | 5.9 | 0.0% |
| Services, N.E.C. | 12.8% | 14.3% | 7.7 | 15.8% |

Source) Bureau of Statistics, Labour Force Survey (LFS), custom-made table.

Note) The rounded total is not equal to the sum of rounded items.

## Cessation Rates

Since the LFS is not a longitudinal survey, the numbers of exits cannot be directly observed. However, since the numbers of entries were surveyed, the numbers of exits could be indirectly estimated by the following equation:

the number of exits in the last year

= the number of entries in the last year

– the number of sole proprietors in the current year

+ the number of sole proprietors in the last year.

The numbers of exits was estimated by applying this equation to the data in the custom-made table. However, the estimated numbers of exits became negative, which was not acceptable. This behavior was thought to be due to rounding errors.

As a next step, a proxy indicator for the numbers of exits was sought. It was noted that the LFS asked "Were you engaged in work at all during the last seven days of the month?," and that "Absent from work" appeared in the response choices. Respondents who answered "Self-employed" or "Absent from work" were categorized as "Cessation." Many businesses temporarily close prior to going permanently out of business. The numbers of cessations can therefore be used as proxies for the numbers of exits.

Table 4 shows the cessation rates by industry and age of sole proprietor in 2009. The cessation rates

in "Construction" and "Manufacturing" are three times higher than those in the other sectors. The cessation rate in "Manufacturing" among those aged 15–39 is relatively high, at 16.4%. It is assumed that the numbers for cessations in the other industrial sectors were rounded to zero, so that the cessation rates of those industries were underestimated. The cessation rate for "Construction" among those aged 60 and over is also relatively high, at 17.4%. It is assumed that these were independent carpenters who retired due to old age. The cessation rates tend to rise with advancing age in sectors other than ."the manufacturing sector.

**Table 4.** Cessation rates by industry and age of sole proprietors (2009)

|  | Age of Sole Proprietors | | | |
| --- | --- | --- | --- | --- |
|  | 15 and over | 15–39 | 40–59 | 60 and over |
| Sole proprietors (10 thousands) | | | | |
| Construction | 80 | 18 | 39 | 23 |
| Manufacturing | 46 | 6 | 15 | 25 |
| Wholesale and Retail Trade | 84 | 11 | 30 | 43 |
| Accommodations, Eating and Drinking Services | 47 | 6 | 20 | 21 |
| Living Related and Personal Services and Amusement Services | 46 | 7 | 17 | 23 |
| Services, N.E.C. | 39 | 7 | 13 | 19 |
| Cessations (10 thousands) | | | | |
| Construction | 8 | 0 | 3 | 4 |
| Manufacturing | 4 | 1 | 1 | 2 |
| Wholesale and Retail Trade | 2 | 0 | 1 | 2 |
| Accommodations, Eating and Drinking Services | 1 | - | 0 | 1 |
| Living Related and Personal Services and Amusement Services | 1 | 0 | 0 | 1 |
| Services, N.E.C. | 1 | 0 | 1 | 1 |
| Cessation rate (%) | | | | |
| Construction | 10.0% | 0.0% | 7.7% | 17.4% |
| Manufacturing | 8.7% | 16.7% | 6.7% | 8.0% |
| Wholesale and Retail Trade | 2.4% | 0.0% | 3.3% | 4.7% |
| Accommodations, Eating and Drinking Services | 2.1% | - | 0.0% | 4.8% |
| Living Related and Personal Services and Amusement Services | 2.2% | 0.0% | 0.0% | 4.3% |
| Services, N.E.C. | 2.6% | 0.0% | 7.7% | 5.3% |

Source) Bureau of Statistics, Labour Force Survey (LFS), custom-made table.

Note) The rounded total is not equal to the sum of rounded items.

## Time Series of Entry Rates and Cassation Rates

Table 5 shows the time series of entry and cessation rates by industry (2003–2011). Three of the six industries were selected for comparison with the Unincorporated Enterprise Survey (UES) data: "Manufacturing," "Wholesale and Retail Trade", and "Accommodations and Eating and Drinking Services".

The entry and cessation rates in "Manufacturing" change in line with business fluctuations. In 2008, the entry rate is 5.9% and the cessation rate is 3.9%. In 2009, the entry rate decreases to 4.3% and the cessation rate rises to 8.7%. The impact of the global financial crisis of September 2008 hit the Japanese manufacturing industry in the following year. The Index of Industrial Production (IIP) decreased from 103.8 in 2008 to 81.1 in 2009.

The entry rate for "Wholesale and Retail Trade" also changes in line with business fluctuations, but the change occurs a year earlier. It decreases from 3.3% in 2007 to 2.2% in 2008, and then rises to 4.8% in 2009.

The correlation between entry rates and cessation rates for "Accommodations and Eating and Drinking Services" is very high, with a correlation coefficient of 1, but it should be borne in mind that the numbers for entries and cessations were rounded to the nearest 10 thousand. Both the entry rates and cessation rates show increasing time trends and high autocorrelation coefficients (both at 0.8). This similarity suggests that business fluctuations had negligible effects on entry and cessation.

**Table 5.** Time series of entry and cessation rates by industry (2003–2011)

| Year | Entry rate | | | Cessation rate | | |
|---|---|---|---|---|---|---|
| | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking |
| 20 | 6.8% | 3.8% | 3.8% | 3.4% | 2.9% | 1.9% |
| 20 | 6.6% | 4.0% | 3.6% | 3.3% | 3.0% | 1.8% |
| 20 | 5.1% | 4.1% | 3.7% | 5.1% | 2.1% | 1.9% |
| 20 | 6.9% | 3.4% | 3.7% | 5.2% | 2.3% | 1.9% |
| 20 | 5.2% | 3.3% | 4.0% | 3.4% | 2.2% | 2.0% |
| 20 | 5.9% | 2.2% | 4.3% | 3.9% | 2.2% | 2.1% |
| 20 | 4.3% | 4.8% | 4.3% | 8.7% | 2.4% | 2.1% |
| 20 | 5.0% | 3.7% | 4.2% | 5.0% | 2.4% | 2.1% |
| 20 | 5.4% | 2.8% | 4.7% | 5.4% | 2.8% | 2.3% |
| Auto correlation coeff. | −0.02 | −0.21 | 0.80 | 0.00 | 0.24 | 0.80 |

Source) Bureau of Statistics, Labour Force Survey (LFS), custom-made table.

## Comparison with UES Data

Branchflower (2000) examined the influence of self-employment across the OECD countries by using times-series data on 23 countries for the period 1966–1996 and found that increases in the self-employment ratio appeared to produce lower rather than higher GDPs. This result is interesting and

needs to be discussed in more detail. We initially assumed that the relationship between self-employment and the economy varied by industry and that the entry and cessation rates would be more appropriate measures of entrepreneurships among the self-employed.

We therefore looked for correlations between entrepreneurship indicators (entry and cessation rates) and accounting figures (sales and profit). Since accounting items are not surveyed in the LFS, alternative information sources were sought. The UES is a quarterly sample survey of unincorporated small enterprises. In this study, the sample size was about 4,000, so that sampling error could not be ignored at the disaggregated classification level. The UES was originally designed to estimate System of National Accounts data from the production side, and it surveys accounting items such as "Sales," "Net operating profit," "Inventories of products, commodities, and primary materials," and "Cash flow." Table 6 shows the percentage changes of sales and net operating profits per establishment for unincorporated enterprises from the UES data (2003–2011).

**Table 6.** Percentage changes of sales and net operating profits per establishment of unincorporated enterprise by industry (2003–2011)

| Year | Percentage change of sales (change over the previous period) | | | Percentage change of net operating profit (change over the previous period) | | |
|---|---|---|---|---|---|---|
| | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking Services | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking Services |
| 2003 | 23.5% | 4.6% | −10.1% | 24.3% | −9.0% | −4.1% |
| 2004 | −1.5% | 1.2% | 5.8% | −12.2% | 5.7% | 7.3% |
| 2005 | −19.6% | −2.3% | −14.2% | −5.3% | −1.0% | −17.0% |
| 2006 | 9.8% | 1.6% | 15.6% | 7.7% | −5.2% | 7.6% |
| 2007 | −1.8% | −0.1% | −3.4% | −11.9% | −4.3% | −1.3% |
| 2008 | −4.5% | −11.1% | 3.4% | −1.7% | −9.9% | 4.4% |
| 2009 | −14.4% | −10.6% | −7.2% | −28.9% | −2.3% | −11.3% |
| 2010 | −2.6% | 8.9% | −4.1% | 6.0% | −4.0% | −11.3% |
| 2011 | 20.2% | −4.5% | −8.1% | 5.6% | −13.6% | −10.4% |

Source) Bureau of Statistics, Unincorporated Enterprise Survey (UES).

Table 7 shows the correlation coefficients between entrepreneurship indicators and accounting figures. These could be analyzed in two directions: from entrepreneurship indicators to accounting figures or *vice versa*. We assumed no particular direction of causation, since the data were too sparse for time-series regression.

In "Manufacturing," the correlation coefficients between the entry rates and the accounting figures are positive (0.613, 0.617), and those between the cessation rates and the accounting figures are negative (−0.364, −0.51). These trends suggest that sole proprietors start businesses when sales and net operating profits increase and cease trading when sales or profits decrease. These conclusions are consistent with general assumptions.

With respect to the "Wholesale and Retail Trade," there is little correlation between the entry rates and sales (0.169), but there is a positive correlation between the entry rates and the net operating profits (0.667). In contrast, there is no significant correlation between the cessation rates and the percentage changes in operating profits (0.04).

In "Accommodations and Eating and Drinking Services," the correlation coefficients between the entrepreneurship indicators and the accounting figures are low (−0.269, −0.353). These low figures are evident because the entry and cessation rates increase with time, as shown in Table 6.

**Table 7.** Correlation coefficients between entrepreneurship indicators and accounting figures

| | accounting figures | | | | | |
|---|---|---|---|---|---|---|
| | Percentage change of sales (change over the previous period) | | | Percentage change of net operating profit (change over the previous period) | | |
| Entrepreneurship indicators | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking | Manufac. | Wholesale and Retail Trade | Accommod., Eating and Drinking Services |
| Entry rate | 0.613 | 0.169 | −0.269 | 0.617 | 0.667 | −0.353 |
| Cessation rate | −0.364 | 0.279 | −0.269 | −0.510 | 0.040 | −0.353 |

Source) Bureau of Statistics, Labour Force Survey (LFS), custom-made table.

Bureau of Statistics, Unincorporated Enterprise Survey (UES).

## Conclusion

The main conclusions are as follows.

The number of self-employed workers from the LFS data was compared with the number of establishments of sole proprietorship from the 2006 EEC and 2009 ECBF data. The difference between the two figures suggests that there were missing "non-employer" enterprises that were not included in the EEC and ECBF data. Therefore, business demography statistics of sole proprietorships based on LFS data should be used to provide information complementary to that from the SBR, which is based on the ECBF.

Entrepreneurship indicators, such as entry and cessation rates, of sole proprietors were calculated using custom-made tables generated from LFS data. It was found that entry rates tended to decline with advancing age, other than in the outlying "Services, N.E.C.," figures, and that cessation rates tended to rise with advancing age other than in "Manufacturing."

The time series (2003–2011) of entry and cessation rates was compared with accounting figures from UES data, including changes in sales and net operating profits. The entry and cessation rates of "Manufacturing" showed strong correlations with the accounting figures. In contrast, the entry and cessation rates of "Accommodations and Eating and Drinking Services" showed increases with time and no significant correlations with the accounting figures.

The idea of producing business demography statistics for sole proprietorships using LFS data inspired discussion of how much coverage can be achieved through industry statistics. Some sole proprietorships are run part-time or as hobbies. Such proprietorships are not entrepreneurial and have little macroeconomic importance. It seems unnecessary to include them at high cost in the industry statistics. In the ECBF, all incorporated proprietorships, or all that display external signs, are covered, and part-time or hobby enterprises are included. However, including these proprietorships places burdens on both researchers and the BOS itself. The Nonemployer Statistics of the US Census Bureau include only businesses that have no paid employment or payroll, are subject to federal income taxes, and have receipts of $1,000 or more ($1 or more for the Construction sector).[6] This threshold of receipts should exclude part-time or hobby businesses effectively. In our opinion, sole proprietorships in the broad sense, including part-time or hobby enterprises, should be covered by LFS data, whereas the industry survey should focus on sole proprietorships in the narrow sense. However, identifying an effective threshold remains a challenge, as long as Japanese statistical agencies cannot access tax records for statistical use.

## Acknowledgment

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[6] US Census Bureau, Nonemployer Statistics,
hhttps://www.census.gov/econ/nonemployer/overview.htm, last access date: July 29, 2015

# References

[1]. Ahmad, Nadim "A Proposed framework for Business Demography Statistics," In: Emilio Congregado (ed), Measuring Entrepreneurship: 113-174, Springer.

[2]. Branchflower, David G. (2000) "Self-employment in OECD countries," Labour Economics, 7(2000): 471:505.

[3]. Bregger John E. (1996) "Measuring self-employment in the United States," Monthly Labor review, 119:3-9.

[4]. European Union (2010) Business registers. Recommendations manual.

[5]. Eurostat-OECD (2008) Eurostat-OECD Manual on Business Demography Statistics.

[6]. Hessels, Jolanda and Andre van Stel (2008) "Global Entrepreneurship Monitor and Entrepreneurs' Export Orientation," In: Emilio Congregado (ed), Measuring Entrepreneurship: 265-278, Springer.

[7]. Parker, Simon C. (2008) "Statistical Issues in Applied Entrepreneurship Research: Data, Methods and Challenges," In: Emilio Congregado (ed), Measuring Entrepreneurship: 9-20, Springer.

[8]. Stel, André van (2008) "The COMPEDIA Data Base: COMParative ENtreprenership Data for International Analysis," In: Emilio Congregado (ed), Measuring Entrepreneurship: 65-84, Springer.

[9]. United Nations Economic Commission for Europe (2015) Guidelines on Statistical Business Register.