

At What Population Does a Trade Appear? The 50% Threshold Population for 433 Industrial Subcategories

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Abstract

For 1,889 Japanese municipalities, I measured, for each industrial subcategory, the population at which establishments of that subcategory begin to appear.

Ordering municipalities by population and sliding a window of 101 municipalities, I define the **50% threshold population** as the population at which the share of municipalities having at least one establishment first exceeds 50%.

Of the 433 subcategories examined, a threshold was obtained for **390**. Barbers, beauty salons, confectionery and bakery shops and medical clinics are present in more than half of municipalities even at the smallest population (155).

Motor vehicle repair appears at **970**, dental clinics at **1,033**, cram schools at **3,107**, judicial scriveners at **5,238**, and certified tax accountants at **11,775**.

In the eight municipalities of the Kushiro Subprefecture, of the subcategories whose threshold their population exceeds, between **64.2% and 89.0%** are actually present.

The resulting table of 433 subcategories applies to any municipality and is provided in full as an appendix.

1. Introduction

An earlier report (R001) showed that the **number** of industrial subcategories present in a municipality is almost fully determined by the common logarithm of population ($R^2 = 0.925$).

What remains is **which** subcategories.

At what population does each trade appear?

Because this concerns order rather than count, each subcategory must be given a single number.

2. Data

Establishments	Statistics Bureau of Japan and METI, 2021 Economic Census for Business Activity (1 June 2021). 526 subcategories × municipality
Population	Ministry of Internal Affairs and Communications, Basic Resident Register population, 1 January 2026

Municipalities number **1,889** after excluding aggregate rows (unit A of R001).

Of the 526 subcategories, 93 are "establishments engaged in administrative or ancillary economic activities", and these were excluded.

They denote head-office functions rather than operating shops or plants. This leaves **433 subcategories**.

3. Defining the threshold — the naive definition fails

I first defined the threshold as the smallest population T such that, among municipalities with population $\geq T$, more than half have the subcategory.

Under that definition every familiar trade collapses onto the smallest population (155). Taken over the whole country, barbers, cram schools and tax accountants are all already present in more than half of municipalities.

The definition was therefore changed so that **municipalities are compared with others of similar size.**

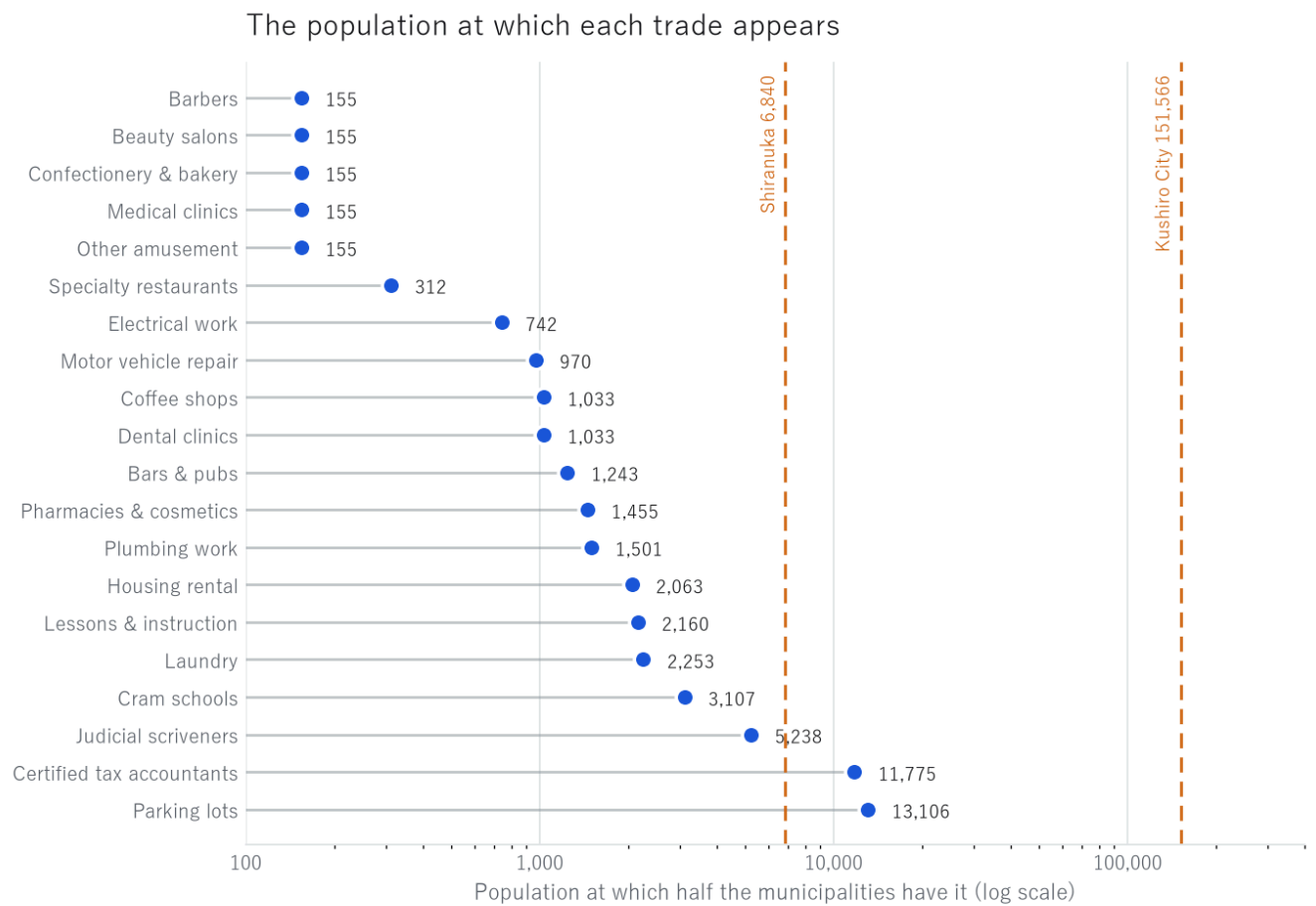
Order municipalities by population and slide a window of **101 municipalities**; within the window, measure the share having at least one establishment of the subcategory.

The **50% threshold population** is the population at which that share first exceeds 50%.

A value was obtained for **390** of the 433 subcategories. The remaining 43 never reach half of any window.

4. Results

4-1 A ladder of familiar trades



Sources: Economic Census 2021; Basic Resident Register, 1 Jan 2026. Sliding window of 101 municipalities ordered by population; the population at which the share having at least one establishment first exceeds 50%.

Figure 1. The population at which each trade appears (twenty familiar subcategories).

Dots are the 50% threshold population. The orange dashed lines mark Shiranuka (6,840) and Kushiro City (151,566). The horizontal axis is on a common-logarithmic scale.

Threshold	Subcategory
155	Barbers; beauty salons; confectionery and bakery; medical clinics; other amusement
312	Specialty restaurants
742	Electrical work
970	Motor vehicle repair
1,033	Coffee shops; dental clinics
1,243	Bars and pubs
1,455	Pharmacies and cosmetics
1,501	Plumbing work
2,063	Housing rental
2,160	Lessons and instruction
2,253	Laundry
3,107	Cram schools
5,238	Judicial scriveners and land surveyors
11,775	Certified public accountants and tax accountants
13,106	Parking lots

Barbers, beauty salons and medical clinics are present in municipalities of 155 residents.

Tax accountants appear only at 76 times that population.

4-2 Present in small towns / only in large ones

Subcategories crossing 50% at 155 include municipal agencies (present in 1,888 municipalities), post offices (1,887), primary schools (1,883), civil engineering work (1,879), fuel retailing (1,877), other

food and beverage retailing (1,876), welfare and care for the elderly (1,865) and lower secondary schools (1,864).

At the other end, manufacturing dominates: boilers and prime movers (652,241), animal and vegetable oils and fats (479,587), industrial transport vehicles (470,718), silk reeling and spinning (441,947).

Administration and everyday necessities reach the smallest towns; the manufacture of materials and components concentrates in large ones.

4-3 Applied to the Kushiro Subprefecture

Of the subcategories whose threshold a municipality's population exceeds, how many are actually present?

Municipality	Population	Thresholds exceeded	Present	Share
Kushiro City	151,566	320	273	85.3%
Kushiro Town	18,021	177	142	80.2%
Akkeshi	7,976	118	105	89.0%
Hamanaka	5,172	96	74	77.1%
Shibechea	6,698	114	93	81.6%
Teshikaga	6,327	112	97	86.6%
Tsurui	2,368	67	43	64.2%
Shiranuka	6,840	115	95	82.6%

Shiranuka (6,840), for example, exceeds the threshold for cram schools (3,107), yet no cram school establishment is recorded there.

Subcategories that are absent despite the threshold being exceeded are what to examine next for that municipality.

5. Discussion

5-1 Order, not count

R001 explained the **number** of subcategories by population. This paper goes inside that number and assigns each subcategory a single population at which it appears.

Together they answer both "how many kinds should there be" and "which ones should there be" for a municipality of a given size.

5-2 A benchmark, not a condition

The 50% threshold population is a position in a cross-section of similarly sized municipalities. **It does not mean that a trade is viable at that population.**

Road and rail connections, the size of neighbouring municipalities, and industrial history all differ at the same population.

5-3 The definition determines the result

As Section 3 shows, the first definition collapsed every familiar trade onto 155. **The population over which "more than half" is measured determined the entire result.**

The reference population must be fixed and stated before counting.

6. Limitations

- Establishments are as of 1 June 2021 and population as of 1 January 2026: a **five-year gap**
- The window width (101 municipalities) trades smoothness against resolution; other widths shift the values somewhat
- "Present" means at least one establishment of that subcategory is recorded. Suppressed and non-responding cells follow the source tables

- Industrial subcategories are an administrative classification and do **not** map one-to-one onto trades as practised
 - The 93 head-office subcategories are excluded
 - Nothing is claimed about the 43 subcategories for which no threshold was obtained
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7. Reproduction

1. Obtain establishments by industrial subcategory and municipality (2021 Economic Census) from e-Stat
2. Obtain Basic Resident Register population by municipality as of 1 January 2026
3. Exclude aggregate rows and join on the municipality code
4. Exclude the head-office subcategories
5. Order by population and find, with a sliding window of 101 municipalities, where the share present first exceeds 50%

All values are the output of a single script (`kensan_185`). No intermediate value was transcribed by hand.

Appendix: table of 433 subcategories

The threshold population, the number of municipalities where present, the median population of municipalities with and without it, and the national establishment count are tabulated for all 433 subcategories (`kensan_185_分類ごとの人口の目安.csv`).

References and data sources

1. Statistics Bureau of Japan and METI, 2021 Economic Census for Business Activity, establishments by industrial subcategory and municipality.

2. Ministry of Internal Affairs and Communications, Population Based on the Basic Resident Register, 1 January 2026.

3. Y. Yamagishi, "Population and the Number of Industrial Subcategories Present in Japanese Municipalities" (R001). Zenodo. <https://doi.org/10.5281/zenodo.22872218>

Items 1 and 2 are published on e-Stat and on the ministries' websites.

Version history

Version	Date	Change
1	2026-09-21	First release