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Using Corporate Tax Filing Data to Measure Business Dynamism

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Abstract

In this short article, using the corporate tax filing data in Japan, we examine the two items accounting for Japanese business dynamism (i.e., entry-exit and concentration) over the periods from 2014 to 2020. The annual-frequency data comprehensively accounting for the business activity (i.e., sales) of all the business enterprises in Japan suggest the following: First, both the entry and exit rates have been low and exhibiting stable dynamics although the COVID-19 pandemic resulted in a slight hike in the exit rate. Second, the business concentration has been also stable and even showed slight decline. These empirical patterns are consistent with the theoretical exposition in Miyakawa et al. (2022). Higher metabolism accompanied by the growth of a certain number of firms would be beneficial for Japanese economy.

Keywords: Tax filing data, business dynamism, entry and exit, concentration
JEL classification: D22, L11, L25

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1. Introduction

Many developed countries have been experiencing stagnated economic conditions. To precisely characterize its status, recent studies have been employing multiple measures of business dynamism. Those description of economy from muti-angles allow us to theorize what is going on in each economy and think systematically about, for example, appropriate policy interventions (Philippon 2019; Akcigit and Ates 2021). The present paper aims to contribute to this discussion.

Precisely speaking, in this short article, we use the corporate tax filing data in Japan to examine the two major metrics accounting for business dynamism (i.e., entry-exit and concentration). Using the data recently available for researchers, we first examine the entry and exit rates. Along this examination, we also highlight the value of this newly available data and the widely used proprietary data provided by a credit rating agency in Japan. Second, we also examine the evolution of business concentration in Japan. These empirical patterns allow us to theorize the current Japanese economy as suggested by, for example, Miyakawa et al. (2024).

2. Data

The data we use for our empirical exercise is the corporate tax records collected by the National Tax Agency and provided by the National Tax College. In the process of the corporate tax filing in Japan, all the enterprises are required to report the amounts of their sales in addition to the taxable income and other tax-related information such as a unique firm identifier. The data which we can get an access to cover the periods from 2014 to 2020.

Some additional details are provided as follows: First, the data cover the registered business enterprises and thus do not necessarily account for sole proprietors. Second, the data are accompanied by each firm's active/non-active status, which we can use to precisely measure the firms' exit. As widely known, the majority of firm exit in Japan is voluntary exit without any default events (Hong et al. 2020; Miyakawa et al. 2021). Unlike the defaults which tend to be visible due to the necessity of debt collection, such voluntary exits are not easily identified and thus require some efforts to identify it. In this regard, the information on each firm's active/non-active status helps us to overcome this problem. Third, we should highlight the fact that the data frequency is annual. It is in general difficult to ensure both the comprehensiveness (i.e., all the

registered business enterprises are recorded) and such annual frequency. For example, census statistics has the five-year gap between the consecutive surveys and thus is exposed to the time-aggregation problem, which makes it difficult to correctly measure the entry and exit rates in each year. Reflecting this point, as in Figure 1, the number of firms in the data have been increasing over years. This increasing trend is partly due to a time lag between the time when the firms actually exit and when National Tax Agency recognizes that exit.

3. Empirical Findings

3.1. Entry and exit

Figure 2 depict the evolution of the number of entrants (i.e., the bar chart) and the entry rates (i.e., the two line-plots). We show the two lines accounting for the entry rates because we use the two different denominators to compute the entry rates. The first choice is the number of firms we observe as of the end of the previous year while the second choice is the average of the numbers of firms as of the end of and the beginning of the previous year. We can see that the entry rates have been stably moving between 4.3% and 4.5%, which is quite low in the comparison to that in other developed countries (Zhu 2024).

Figure 3 depict the evolution of the number of exits (i.e., the bar chart) and the exit rates (i.e., the two line-plots). As in Figure 2, we show the two lines accounting for the exit rates because we use the two different denominators to compute the exit rates. The first choice is the number of firms we observe as of the end of the previous year while the second choice is the average of the numbers of firms as of the end of and the beginning of the previous year. We can see that the exit rates had been stably moving around 3.1% and 3.2% before the COVID-19 pandemic. The exit rates slightly increased in 2020 (i.e., the first year of the pandemic) to 3.5%. Again, these numbers are quite low in the comparison to that in other developed countries (Zhu 2024).

As a small but important exercise, in Figure 4, following Miyakawa et al. (2022), we show the results of a regression accounting for the dynamics of firm sales up to their exits from economy. We estimate the following equation (1) by using the entire dataset.

$$\log(sales_{i,t}) = \alpha + \sum_{\tau=0}^{5} \beta_\tau \mathbf{1}(exit_{i,t+\tau}) + \varepsilon_{i,t} \quad (1)$$

Here, $sales_{i,t}$ denotes the amounts of sales of firm i in year t and $\mathbf{1}(exit_{i,t+\tau})$ is the dummy variable taking the value of one if firm i exits in year $t+\tau$. The estimated coefficients $\hat{\beta}_\tau$ thus accounts for the difference in the sales size of exits and non-exits, which have never experienced exits in the data, as of τ years prior to their exits. The estimated coefficient $\hat{\alpha}$ accounts for the average sales size of the non-exits. The solid bold line in Figure 4 is the series of estimated $\hat{\beta}_\tau$ and show the similar pattern presented in Miyakawa et al. (2022). The firm size tends to be continuously decreasing toward their exits, which is called as the shadow of death in literature (e.g., Kiyota and Takizawa 2007; Blanchard et al. 2014; Coad and Kato 2021)

Based on this formulation, we further estimate the following equation (2) which augments the equation (1) by introducing $\mathbf{1}(Data_{i,t+\tau})$, which is the dummy variable taking the value of one if the sales data of (exit) firm i as of τ years prior to their exits are not only in the corporate tax filing data but also available in the proprietary dataset owned by one of the largest Japanese credit rating agency (i.e., TSR Inc.). Given the fact that the corporate tax filing data covers the entire business enterprises while the proprietary data covers a significant but not necessarily entire population of the business enterprises, we aim to see how the dynamics obtained from the equation (1) is changed over the data in the proprietary data and that only available in the corporate tax filing data.

$$\log(sales_{i,t}) = \gamma + \sum_{\tau=0}^{5} \delta_\tau \mathbf{1}(exit_{i,t+\tau}) + \sum_{\tau=0}^{5} \theta_\tau \mathbf{1}(exit_{i,t+\tau}) \times \mathbf{1}(Data_{i,t+\tau}) + \varepsilon_{i,t} \qquad (2)$$

The bold dashed line in Figure 4 is the series of estimated $\hat{\delta}_\tau$ while the thin dashed line in Figure 4 is the series of estimated $(\hat{\delta}_\tau + \hat{\theta}_\tau)$. By construction, the series of estimated $\hat{\delta}_\tau$ correspond to the dynamics of sales in the comparison with surviving firms toward exit in the case that the exit firms are only available in the corporate tax filing data but not in the proprietary data. In the similar fashion, the series of estimated $(\hat{\delta}_\tau + \hat{\theta}_\tau)$ correspond to the dynamics of sales in the comparison with surviving firms toward exit in the case that the exit firms are available both in the corporate tax filing data and the proprietary data.

First, we notice that the sales size of exit firms are likely to be large in the case that the exit firms are available both in the corporate tax filing data and the proprietary data (i.e., the thin dashed line). This suggests the value of the corporate tax filing data that incorporate smaller firms compared to the proprietary data. Therefore, we can see the merit of using the corporate

tax filing data to examine the business dynamism. Second, nonetheless, we can also confirm the pattern observed from the thin solid line in Figure 4, that the sales gradually decreases toward exit, can be confirmed regardless of whether the data are only in the corporate tax filing data or not. This finding suggests the value of the proprietary data to examine business dynamism as Miyakawa et al. (2022) and other recent studies do (e.g., Hong et al. 2020).

3.2. Concentration

Figure 5 depicts the Herfindahl-Hirschman Index (HHI) defined in the equation (3).

$$HHI_t = \sum_{i \in I_t} \left(\frac{sales_{i,t}}{\sum_{i \in I_t} sales_{i,t}} \right)^2 \tag{3}$$

In this computation, we pool all the firms belonging to all the industries. This suggest that the business concentration in Japan has been stable and even showed slight decline in the recent years. Figure 6 depicts the same HHIs computed independently for each industry by the equation (4). The industries consist of manufacturing, wholesale, retail, construction, transportation, service 1 that includes most of the service industries, service 2 that includes repairing businesses, hotel and restaurant, and others. As summarized in Table 1, we can find that the concentration has been lower in 2020 compared to 2015 in many industries (i.e., manufacturing, wholesale, construction, transportation, service 2 that includes repairing businesses, and others).

$$HHI_t = \sum_{i \in I_{j,t}} \left(\frac{sales_{i,t}}{\sum_{i \in I_{j,t}} sales_{i,t}} \right)^2 \text{ for industry } j \tag{4}$$

To summarize, through the documentation based on the corporate tax filing data, we obtain the following implications. First, the entry and exit rates in Japan have been stably moving around the relatively low levels as discussed in the extant studies. Second, the corporate tax filing data help us to study the business dynamism in Japan with taking into account the wide range of firm size although the proprietary data used in the firm dynamics study still work as appropriate alternative source to the corporate tax filing data. Third, in many industries, the concentration measured by sales amounts has been decreasing over the past few years. In the next section, we discuss how to interpret these facts and what we should attempt in the future studies.

4. Discussion

4.1. Theoretical exposition

The documented business dynamism provides us the sources to characterize Japanese economy. One important fact is that the concentration has been even decreasing under the stably low metabolism. These empirical patterns are consistent with, for example, the theoretical exposition in Miyakawa et al. (2024). Based on the standard firm dynamics models embedded to the general equilibrium framework (e.g., Hopenhayn and Rogerson 1993), they develop an endogenous growth model incorporating firms' innovative activities and further introduce the friction associated with firm exits (e.g., subsidy programs for small and medium-sized enterprises). In their analysis, the exit rates become lower due to such a friction hindering exits. The entry rate and the market concentration become lower along with this lower exit rate. Although the quantitative size is not necessarily large, the welfare loss due to such a friction is also confirmed. This suggests that higher metabolism accompanied by high growth of a certain number of firms would be beneficial for Japanese economy.

4.2. Possible future works

While we have successfully showed the value of the corporate tax filing data in the context of the study on business dynamism, there are several important directions for future research using this data. First, in the present study, we are only allowed to use the limited range of the corporate tax filing data. In fact, we cannot get an access to any information regarding the inputs of firms' production activities (e.g., labor, capital, and other intangibles). Given there are a rich set of information stored in the corporate tax filing data, it should be recognized as an important next step to fully utilize those data so that, for example, we can use the data to compute productivity and markup, which are the most important measures accounting for business dynamism. Second, after expanding those uses of the corporate tax filing data, we should use it for various policy evaluation in the context of EBPM (evidence-based policy making). Using standard causal inference techniques, wide range of policies have been analyzed from the viewpoint of its effectiveness as a policy intervention. The usual difficulty in this task is to ensure the data, which can be largely resolved by using the corporate tax filing data.

5. Conclusion

Using the corporate tax filing data in Japan, we find the following: First, both the entry and exit rates have been low and exhibiting stable dynamics although the COVID-19 pandemic resulted in a slight hike in the exit rate. Second, the business concentration has been also stable and even showed slight decline. These empirical patterns are consistent with the theoretical exposition in Miyakawa et al. (2024). Higher metabolism accompanied by the growth of a certain number of firms would be beneficial for Japanese economy.

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Figure and Table

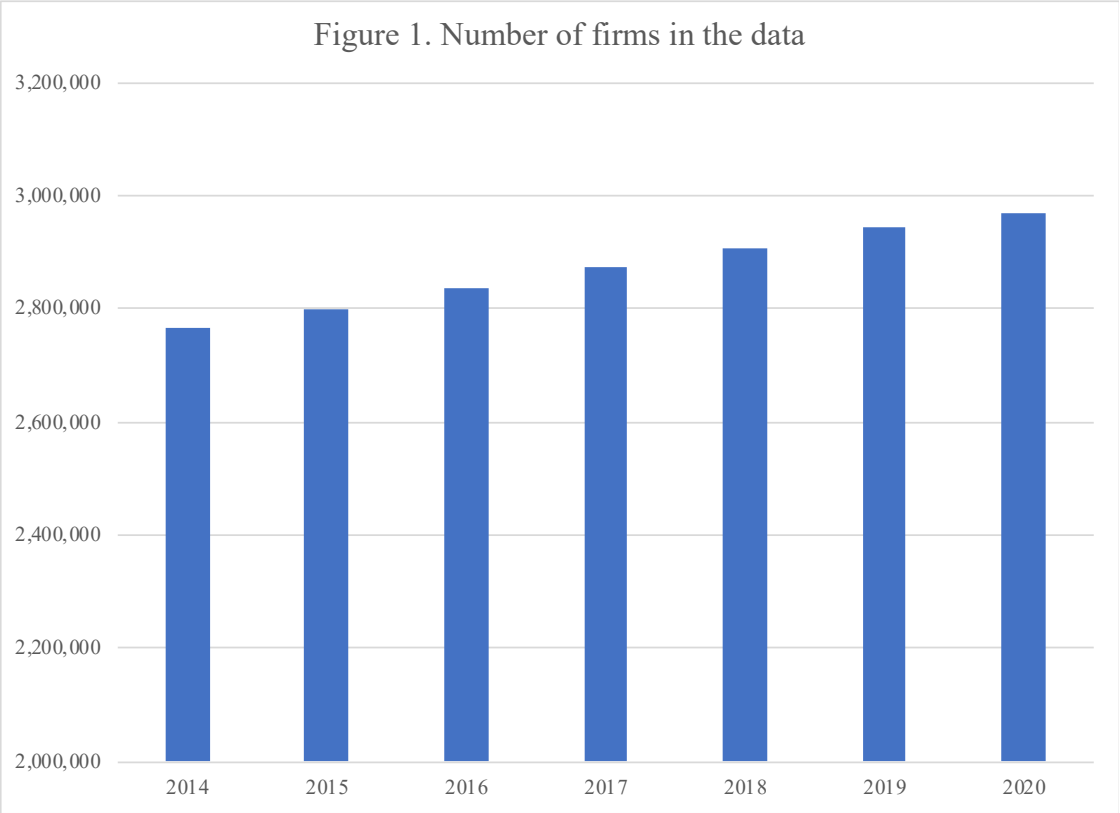

Figure 2. Number of entrants and entry rate

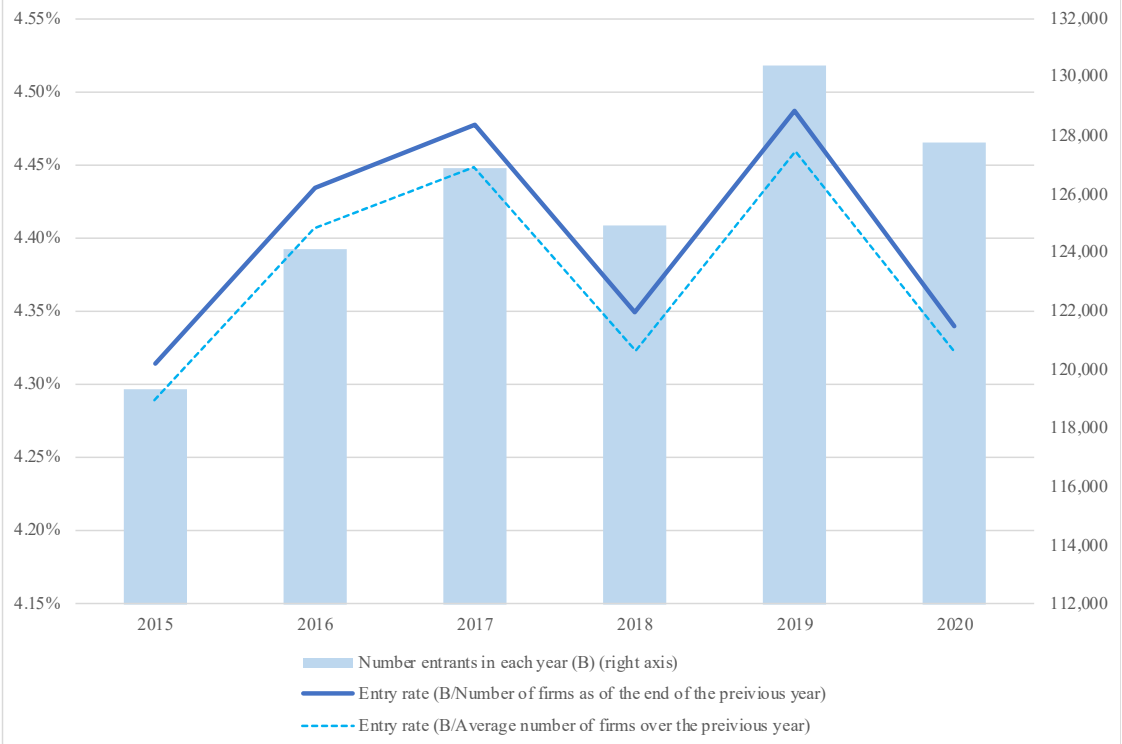

Figure 3. Number of exits and exit rate

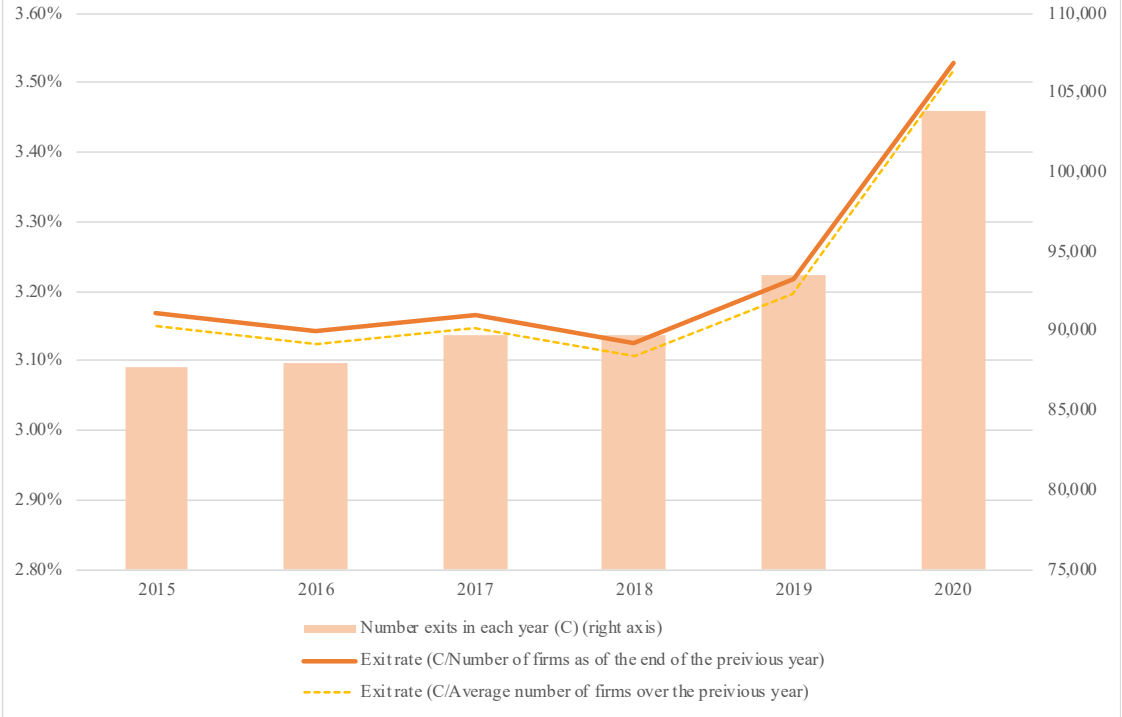

Figure 4. Data coverage

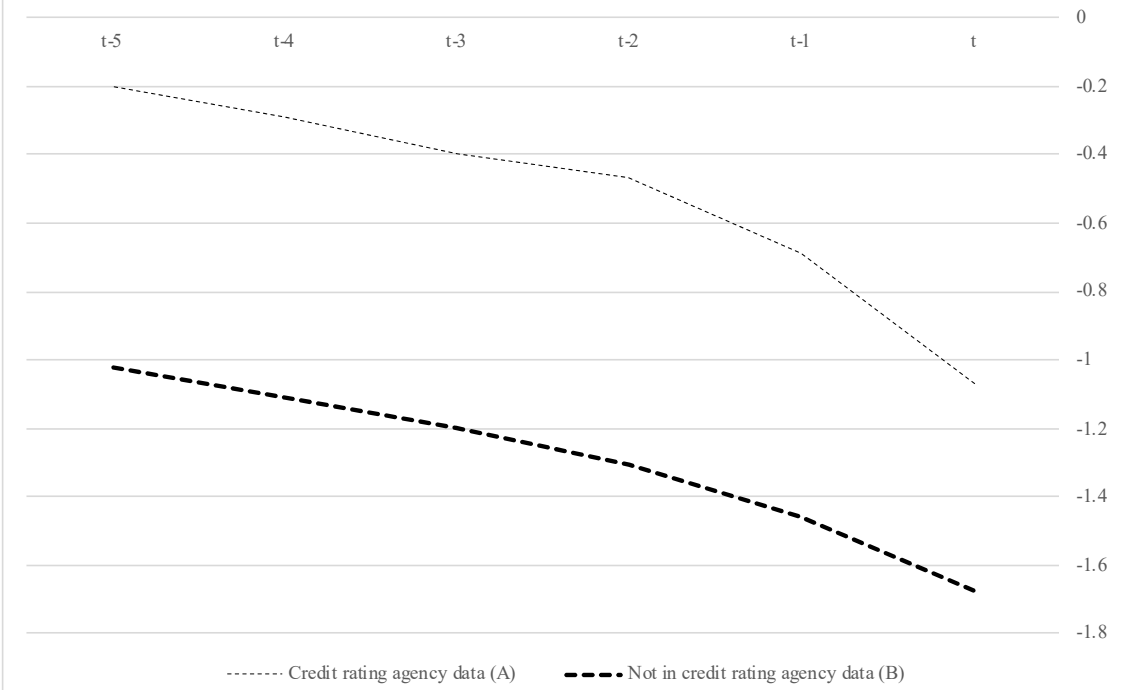

Figure 5. HHI (all industries)

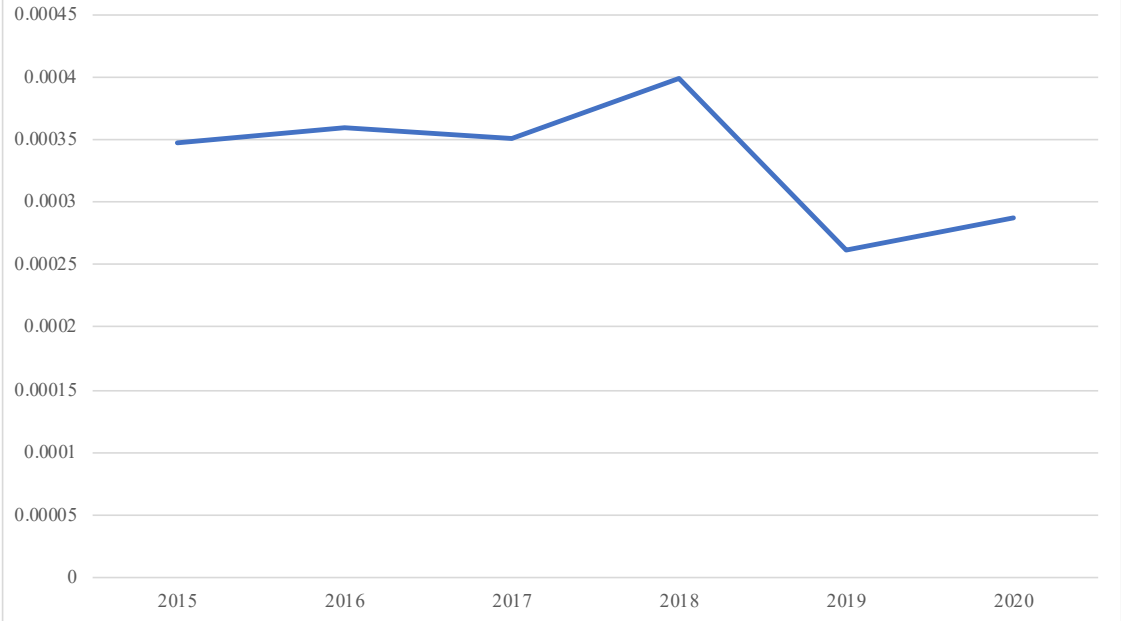

Figure 6. HHI (each industry)

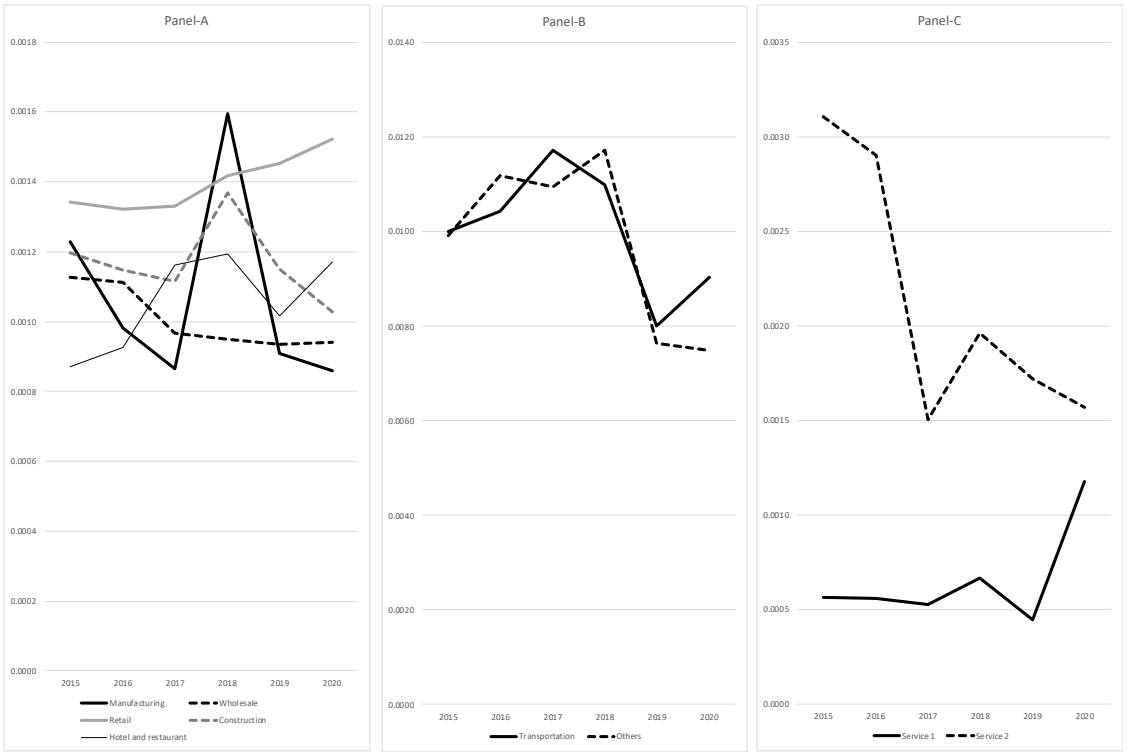

Table 1. HHI (each industry)

Manufacturing	Wholesale	Retail	Construction	Transportation	Service 1	Service 2	Hotel and restaurant	Others	Note
0	0	0	0	1	0	0	1	1	1 if HHI in 2016 > HHI in 2015
0	0	0	0	1	0	0	1	1	1 if HHI in 2017 > HHI in 2015
1	0	1	1	1	1	0	1	1	1 if HHI in 2018 > HHI in 2015
0	0	1	0	0	0	0	1	0	1 if HHI in 2019 > HHI in 2015
0	0	1	0	0	1	0	1	0	1 if HHI in 2020 > HHI in 2015