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Hiroyuki Okamuro
(Hitotsubashi University, TDB-CAREE)

Yasushi Hara
(Hitotsubashi University, TDB-CAREE)

Yunosuke Iwaki
(Teikoku Databank, TDB-CAREE)

Naka 2-1, Kunitachi, Tokyo 186-8601, Japan
Phone: +81-42-580-9129
E-Mail: caree@econ.hit-u.ac.jp
URL: http://www7.econ.hit-u.ac.jp/tdb-caree/index.html

# Impact of consumer awareness and behavior on business exit in hospitality, tourism, entertainment, and culture industries under the COVID-19 pandemic

Hiroyuki OKAMURO*
Graduate School of Economics and TDB-CAREE, Hitotsubashi University
Yasushi HARA
Graduate School of Economics and TDB-CAREE, Hitotsubashi University
Yunosuke IWAKI
Teikoku Databank and TDB-CAREE, Hitotsubashi University

* Corresponding author: okamuro@econ.hit-u.ac.jp

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Abstract:
COVID-19 has a negative impact on business performance through anti-contagion regulations. It is especially serious in specific service industries such as hospitality, tourism, entertainment, and cultural industries. Contrary to several countries and regions in Europe and North America where economic and social activities were restricted, a more sophisticated regulation, "emergency status declaration," was announced in Japan four times from April 2020 to date because of legal constraints. Empirical studies have been carried out on the effects of COVID-19 (including those of anti-contagion measures and support policies) on business performance, but most of them rely on one-shot survey data on firms; thus, they do not consider consumer awareness and do not target specific service sectors that are most directly damaged by anti-contagion regulations. Therefore, this study uses our original monthly survey data on consumers and telephone directory monthly data to investigate empirically the effects of consumer awareness and attitudes on business exits at the prefecture-level, focusing on specific service sectors including hospitality, tourism, entertainment, and cultural industries. Based on panel fixed-effect estimation, our preliminary results show that an increase in consumers' risk aversion, sympathy for self-restraint from going out, and a decrease in going out with family members significantly increases the exit ratio in specific service industries in the same prefecture. Moreover, these effects vary depending on consumer types.

## 1. Introduction

Since early 2020, the COVID-19 pandemic has spread worldwide. At the end of February 2020, in Japan, the government requested all schools to close and declared the first "state of emergency" in early April 2020 that continued until May 2020. Since then, the number of cumulative infections increased with subsequent waves, and it exceeded one million in early August 2021. Six prefectures (Tokyo Metropolitan, Kanagawa, Chiba, Saitama, Osaka, and Okinawa) were under the fourth "state of emergency" in early August 2021, confronting the fifth wave of infections.

Since Spring 2020, the early stage of the pandemic, the Japanese government has tried to balance anti-contagion and economic policies under legal and fiscal constraints. Central or regional governments in some countries ordered "lockdown" of the entire country, a specific region, or a large city for some duration to restrain personal mobility, whereas the Japanese government could not do it because of legal constraints. Instead, it only "requested" prevention measures such as wearing masks and disinfection, staying at home, teleworking, online classes and meetings, temporary business suspension of pubs and restaurants, shorter opening hours, no provision of alcohol drinks, and so on. Based on original survey data for small business owners, self-employed, and freelancers in Japan collected in May 2020, Kawaguchi et al. (2021) estimated that firm sales dropped by 8%–9% from March to April 2020 compared to the same month in the previous year regardless of business suspension status, and that sales of the firms subject to business suspension request decreased further by 9%–11%.

Demand shocks caused by the COVID-19 pandemic concentrate on specific hospitality and tourism industries. According to the inbound tourist statistics of the Japan National Tourism Organization (JNTO), the number of inbound foreign tourists drastically reduced in February and March 2020, and has continued to be almost zero since then (Small and Medium Enterprise Agency 2021). Despite the historically low level of bankruptcy in fiscal year 2020, the accommodation industry (hotels) recorded a rapid increase in bankruptcy, according to the *Teikoku Databank Bankruptcy Report*.

Hospitality industries, including the food and drink industries, have also suffered seriously from this pandemic through business suspension requests and related anti-contagion measures. According to the *Monthly Survey on Service Industries* by the Ministry of Internal Affairs and Communications (MIAC), sales of the hospitality industries (food, drink, and accommodation) declined in April and May 2020 by 61% and 59%, respectively, compared to the same month of the previous year. The lifestyle and entertainment industries show a similar trend, but we observe another drastic decline in sales only in the hospitality industry since December 2020 (Small and Medium Enterprise Agency 2021). Therefore, this study focuses on this sector.

Since the outbreak of the COVID-19 pandemic, numerous studies have been conducted worldwide using simulations (e.g., Miyakawa et al. 2021) or original surveys for business owners (e.g., Kawaguchi et al. 2021). However, most of them do not focus on the hospitality and tourism industries, which, in many countries and regions, suffered the most during the pandemic, nor do they explicitly consider and measure the effects of changing consumer awareness and behavior, which may provide significant demand shocks to some fields in consumer service industries. This study aims to close this research gap by matching unique business registration data and original consumer survey data at the prefecture and monthly levels and conducting panel fixed-effect estimations on the hospitality and tourism industries.

Our empirical research targets 32 business fields in the hospitality, tourism, entertainment, and cultural industries that experienced severe COVID-19 infections from June 2000 to March 2021 in all prefectures. The dependent variable, the business closure ratio, was calculated from the *NTT Townpage* (business telephone directory) database. Independent variables cover various factors of consumer awareness and behavior—derived from our original consumer survey—conducted monthly from June 2020 to March 2021. An important reason for using the *NTT Townpage* data is that we can obtain monthly data of business registrations of specific service industries in each prefecture, including sole proprietors and self-employed.

Our major findings are as follows. First, we find distinct differences in the ratio of business closures across target industries, which are larger than regional variations across prefectures. Second, risk tolerance, sympathy for self-restraint from going out, and certain behavior of local consumers, especially the frequency of going out for dinner with family members, significantly affect local business closures. Third, the effects of local consumer awareness and behavior differ significantly according to consumer type.

The rest of this paper is organized as follows. The following section summarizes recent empirical studies on the effects of the COVID-19 pandemic and related policies. Section 3 explains our dataset and data sources and shows the aggregated trends of business closures in some target industries and consumer survey data. Section 4 provides estimation models and presents the estimation results, and discusses these results. Finally, in Section 5, we conclude this study, showing some limitations of this study and future research agenda.

## 2. Literature review

Numerous empirical studies on business exits or failures have been carried out to date, but most focus on industry, firm, and entrepreneurial factors of business exits (See

Parastuty 2018 and Cefis et al. 2021 for recent systematic literature reviews). Relatively few studies have investigated the effects of macroeconomic demand shocks on business exits.

We regard economic and social changes under COVID-19 as an exogenous demand shock, especially in the hospitality and tourism industries. Some empirical studies have investigated the impact of such exogenous demand shocks on business exits. As a seminal paper, Campbell and Lapham (2004) examined local demand shocks on retailers' business closures in cross-border counties in the United States and Canada because of exchange rate fluctuations. Kumar and Zhang (2019) compared the determinants of firms' investment and exit decisions using firm-level inventory data and found that unexpected demand shocks, rather than productivity, determine firm exit. Marin and Modica (2020) estimated the impacts of local demand shocks in Italy under the Lehman shock across industries using both regional and micro data. However, these studies do not consider the worldwide pandemic that has lasted for a long period of time, nor do they focus on the industries that suffer the most from the pandemic, the hospitality and tourism industries.

Since the outbreak of the COVID-19 pandemic in early 2020, the effects of various anti-contagion (public health) and economic policies on the business performance of small firms have been researched worldwide. For example, in the USA, Bartik et al. (2020) reported, in an early study, that mass layoffs and closures have already occurred among small U.S. businesses at the end of March 2020. Bloom et al. (2021) report significant and persistent heterogeneity in the impact of COVID-19 among U.S. firms; while sales dropped by 29% on average in the second quarter of 2020, the smallest offline firms experienced a sales drop of over 40% compared to less than 10% for the largest online firms.

Gourinchas et al. (2020) estimated a large impact of the COVID-19 crisis on the business failures of SMEs in 17 countries, nearly nine percentage points, without government support. Accommodation and food services, arts, entertainment and recreation, and education are among the most affected sectors. Using comprehensive administrative data from California, Fairlie and Fossen (2021) reported that while the sales loss in the second quarter in 2020 was 17% on average, it was the largest in businesses affected by mandatory lockdowns such as accommodations (91%). They found correlations between firms' sales losses and COVID-19 cases per capita across counties, suggesting a correlation between anti-contagion measures against and voluntary reactions to COVID-19.

Regarding regional differences, Brown and Cowling (2021) examined the effects of the COVID-19 pandemic on firm failures and job losses across the largest 100 cities in the UK, based on a survey of 1,500 firms. They found higher business failure risk in poorer

and peripheral areas—indicating the importance of targeted regional policies.

Several studies empirically discuss the impact of COVID-19 and public support on the exit or survival of SMEs. For example, Belghitar et al. (2021) investigated the impact of COVID-19 on firms' survival using a sample of approximately 42,000 UK firms. They also estimated that the government support scheme significantly reduced the number of SMEs with negative earnings and extended the residual life of these firms. Dörr et al. (2021) point out the problem of the insolvency gap that public policy for firms under the COVID-19 crisis helps survive inefficient firms that would not survive without support. However, according to Muzi et al. (2021), who examined firm exits in 31 countries with firm micro data, low-productivity firms tend to exit under the COVID-19 crisis. Zhang et al. (2021) found that "working from home" increased SMEs' performance as a whole, which suggests natural selection and "creative destruction."

The COVID-19 pandemic has drastically changed individual risk awareness and preventive behavior. Muto et al. (2020) use large-scale survey data to report Japanese citizens' behavioral changes and preparedness against COVID-19 at an early stage of the pandemic, in March 2020. Bundorf et al. (2021), considering their heterogeneity, confirmed a positive relationship between individual risk perceptions and protective behaviors based on a survey of U.S. citizens. Konishi et al. (2021) investigated the changes in purchasing activities using point-of-sales (POS) micro data and examined individual preventive activities. Thus, the risk perception and preventive behavior of local consumers may directly affect local firms' performance through changes in local demand, which we will investigate in this study.

The impact of the COVID-19 pandemic on business exits and survival has also been empirically estimated for Japan. In early work, Miyakawa et al. (2021) constructed a simple model of the optimal timing of firm exits using firm-level micro data before COVID-19 and simulated potential firm exit during the pandemic based on original survey data. They found considerable differences in exit rates across industries and regions and calculated the extent to which firm exits would increase under different assumptions. Kawaguchi et al. (2021) investigated the impact of COVID-19 and business suspension requests in April 2020 on firm sales using original survey data and found that firm sales dropped by 8%–9% from March to April 2020 compared to the same month in the previous year, and the sales of the firms that were subject to the business suspension request further decreased by 9%–11%. While business continuation subsidy increased the perceived probability of survival by 20%, short-time work compensation was not effective.

Most recently, Tagashira (2021) investigated the effect of the public travel promotion called the "go-to-travel" campaign, using the consumer micro data from the survey on

which the current study also depends. He found that this policy motivated people who were not eligible for travel subsidies to travel. A very recent study by Takaku et al. (2021) found that the official request for early closure of bars and restaurants in February 2021 indeed decreased the utilization ratio of young people and early visitors, but did not suppress infections among these people.

Despite numerous recent empirical studies on the effects of the COVID-19 pandemic on small business performance, especially business exits, previous studies either employed simulations based on pre-pandemic economic models, used cross-sectional data from a one-shot survey, focused on the manufacturing sector, or targeted all sectors without detailed classification because of data constraints. In Japan, the government could not order lockdown because of legal restraints but instead used an "emergency declaration" with regional variations in concrete measures and regulations. The anti-contagion measures under the "emergency declaration" and similar regulations targeted specific hospitality and entertainment industries in which public agencies suspected potential outbreak of the pandemic, such as bars, pubs, nightclubs, diners, *karaoke* singing rooms, comic strip cafés, cabarets, and theaters. However, previous studies do not differentiate between service sectors in detail.

Previous studies on the impact of the pandemic on business performance directly analyze the impact of infections, anti-contagion measures, or rescue policies, without considering consumer awareness and behavior that mediate between anti-contagion measures and business performance. Contrastingly, this study focuses on the relationship between changes in local consumer awareness and behavior and local business closures in specific personal service industries.

Thus, this study contributes to closing this research gap by targeting and differentiating between various hospitality, tourism, and entertainment industries that suffer most under the COVID-19 pandemic, using monthly panel survey data on consumer awareness and behavior and monthly business directory data, and employing standard empirical methods (panel fixed-effect estimations) to control for any time-invariant, idiosyncratic, regional, and industry characteristics.

## 3. Data

### 3-1. Original survey on consumer awareness and behavior

Independent variable data for our empirical study was collected from our original survey data on consumer awareness and behavior. *TDB-CAREE* (Teikoku Databank Center for Advanced Empirical Research on Enterprise and Economy) at the Graduate

School of Economics, Hitotsubashi University, to which the authors are affiliated, conducted a series of consumer surveys that were repeated every month from June 2020 to March 2021. The survey aimed to systematically explore the changes in consumer awareness and behavior during the COVID-19 pandemic and to complement TDB company data with these local consumer data.

This survey began shortly after the first wave of infections and the first nationwide "state of emergency declaration" in Japan and ended with the third wave of infections and the second "state of emergency declaration." At the end of July 2020, the Japanese government started the "Go-to-travel Campaign" to support the tourism industry, which ended at the end of December 2020, in light of the third wave of infections (Tagashira 2021).

The surveys were contracted to *Macromill*, a major online survey service company in Japan. It targeted at least 3,600 people above 18 years of age in each survey round, covering all prefectures in Japan with the same number of respondents (at least 77 people in each prefecture)[1]. Respondents who stopped replying to the survey were immediately replaced by new respondents, and therefore we had a constant number of respondents throughout the surveys. It is noteworthy that approximately half of the initial respondents (53%) continued to respond to the survey until the final wave. Moreover, to secure plausible responses, Macromill collects six percent more responses than the target number for each prefecture and cuts off two percent of the responses for each prefecture as outliers or incorrect answers. See Tagashira (2021) for more details on this consumer panel survey.

This survey service company holds approximately 10 million monitors in the whole country as potential respondents, representing 10 percent of the Japanese adult population. Despite potential response biases that the respondents are limited to those who often use IT devices such as smartphones and recruited among eligible monitors by the "first come, first served" principle, we cannot expect a more representative sample for such online surveys.

We checked the representativeness of the survey respondents by comparing the aggregated survey data from June 2020 to March 2021 with the *2015 Population Census* data—the most recent available: the ratio of females is 47.4% in our survey data and 51.3% according to the Population Census; the ratio of senior people is 24.3% in the survey data (60 or older) and 26.6% in the census data (65 or older); the ratio of married

[1] This is important because otherwise the respondents would be concentrated in Tokyo and some other metropolitan areas and thus we would have no response data from some prefectures. Consequently, our sample would lose regional variation.

people was 65.1% and 58.5%, and the ratio of single households was 16.6% and 34.5%[2]. This simple comparison suggests that, despite the overall similarity between these data sources, our survey sample is *less* likely to live alone (more likely to live with family members). Thus, our survey respondents may not be representative of household structure, but people living alone have a smaller weight in the survey sample. We should be aware of this potential bias.

This panel survey comprises several questions about the behavior and awareness of the respondents regarding risk tolerance, preventive measures such as self-restraint from going out, behavioral changes in going out, fear of infection, and fear of serious illness. We asked for household structure (the people with whom they lived in the same household) and income levels in each survey. Macromill provided basic information about the respondents, such as gender and age groups.

In the second half of every month, we asked the same questions. Regarding feelings, risk tolerance, and expected length of the pandemic, we asked for their current opinions. We asked for changes in the previous month compared to the same month the previous year for behaviors such as the frequency of going out to dinner or to drink. Most questions are based on five- or seven-point Likert scales, while we have different categories for the questions about the expected length of the pandemic and the risk tolerance, as we explain later in more detail.

We demonstrate some trends in consumer awareness and behavior from the survey results. First, in June 2020, 50% of the respondents expected that it would take at least 11 months for the pandemic to end, but this ratio increased to 70% in February 2021. Second, after the first "emergency declaration" and the government's "go-to-travel" and "go-to-eat" campaigns, the proportion of respondents who sympathize with the idea that "I should self-restrain from going out" gradually decreased from June to October 2020, but has since increased with the pandemic's extension. Third, risk aversion or risk tolerance, measured from the answers to the questions about the willingness to pay for a lottery and the experience of gamblers, does not seem to change during the survey period. Fourth, consumer behaviors of going out, compared to the same month in the previous year, do not seem to have changed since June 2020.

### 3-2. "Townpage" Business Telephone Directory database

The dependent variable for our empirical analyses is the business closure ratio in

[2] With the continuous trend of aging, the ratio of senior people above 65 and that of the single households would be even higher according to *2020 Population Census* data.

selected service industries that mostly suffered from the COVID-19 pandemic. We calculate business closure ratio from business registration data, which we derive from the "*Townpage*" Business Telephone Directory database compiled by *NTT Townpage*. This database covers information about all registrations in local business telephone directories in Japan, including business field, name, telephone number, and postal address. We purchased the anonym "pinpoint" version—containing the business field and postal address, but not the business name and telephone number[3]. Overall, our dataset covers registration data of over 200,000 businesses each month in business telephone directories in 32 business fields in hospitality, tourism, entertainment and cultural industries from all prefectures in Japan.

There are some important reasons for using *NTT Townpage* data instead of TDB company data. First, *NTT Townpage* data is renewed and released every month, so that we can match them with our monthly survey data. Second, *NTT Townpage* data cover sole proprietors and the self-employed that may be dominant in hospitality and tourism industries, while TDB data comprise incorporated firms. Third, we can capture voluntary business closures from *NTT Townpage* data, which occur much more often than bankruptcies or mergers and acquisitions (M&As) that TDB data can capture. Fourth, by using *NTT Townpage* data, we can easily select very specific business fields that may not be found in TDB industry classification codes, such as karaoke cafés, piano classes, or musicians. However, a major disadvantage of *NTT Townpage* data is that we cannot obtain detailed information about each business.

The following 32 business fields—comprising many small businesses and sole proprietors and may have been most seriously damaged by this pandemic, were selected according to the NTT business classification codes: restaurant (general), traditional Japanese-style restaurant (*Kappo/Ryotei*), manga (comic book) café, karaoke café, internet café, Japanese pub (*Izakaya*), snack, pub-bistro, beer hall, bar and club, and cabaret (11 hospitality industries); traditional Japanese-style hotel (*Ryokan*), B&B (*Minshuku*), sightseeing bus service, and travel agent (four tourism and travel industries); pachinko and slot machine parlor, live house, dance hall, mah-jong parlor, billiards hall, karaoke room, show business, theatrical company, musician, music class, piano class, dancing class, singing class, and other culture class (14 entertainment and cultural industries); and supermarket and bakery (retail shop as the baseline reference).

[3] This constraint makes it difficult to match business registrations in different editions (months) of telephone directories. We matched the registrations using postal addresses and NTT industry code, but we cannot exclude the possibility that different businesses be regarded as the same one if they have the same address and the same NTT code.

*NTT Townpage* data were edited and provided for each month. The deadline for the edition of a certain month is the first Saturday of this month, according to *NTT Townpage*. For example, the March 2021 edition reflects the registration of businesses in the telephone directory as of March 6, 2021. By comparing business registrations in the February 2021 and March 2021 editions, we can identify new registrations and de-registrations between February 7 and March 6 for each prefecture and industry. We regard business de-registrations in the telephone directory as business closures and calculate the business closure ratio by dividing the number of business closures by the number of registered businesses.

We purchased the *NTT Townpage* "pinpoint" data from May 2020 to March 2021 (for 11 months), but we used ten editions from June 2020 to March 2021 to calculate the business closure ratio for nine periods from June-July 2020 to February-March 2021. This is because the independent variables from the survey data should precede the dependent variables from the *Townpage* data.

The number of business registrations differs across business fields (industries). Among 242,610 businesses registered in *NTT Townpage* in May 2020, 56,187 (23.2%) were Japanese pubs (*Izakaya*) and 46,818 (19.3%) were snacks, while each of the six fields (musician, theatrical company, show business, cabaret, beer hall, dance hall) covered less than 300 businesses in the whole country. Business registrations of the target industries are not evenly distributed across prefectures, but agglomerations can be observed in some industries in metropolitan areas, such as Tokyo and Osaka. Among 242,610 businesses registered in *NTT Townpage* in May 2020, 26,269 (10.8%) were concentrated in Tokyo Metropolitan Prefecture, and 54,071 (22.3%) were concentrated in the Tokyo Metropolitan Area, including Kanagawa, Chiba, and Saitama Prefectures.

It is noteworthy that the business registrations in the 32 target industries in the *Townpage* database drastically decreased by 30% from 348,796 in May 2012 to 242,610 in May 2020. This trend continued during the study observation period; business registrations in these industries further declined by 7% to 225,591 in March 2021. This long-term trend is in line with the overall decline of the number of firms according to the *Economic Census*: the number of firms (including sole proprietors) in Japan continuously declined by 25% from 4.85 million in 1999 to 3.59 million in 2016 (Small Business Agency 2020). However, the speed of decline appears much faster after the pandemic outbreak (7% within 10 months) than before (30% within 8 years).

We find distinct differences in the decline in business registrations across industries. The simple mean of the decline in business registrations of all industries from May 2020 to March 2021 was 7.4%, while the standard deviation was 3.7%. The decline during this period is distributed from a maximum of 17.8% (manga café) to a minimum of 1.3%

(supermarkets). Figure 1 shows the comparison between some major industries, taking the level of May 2020 as 100%. The industries with large declines in business registrations are 1) manga cafés (17.8%), 2) karaoke rooms (15.9%), 3) cabarets (12.5%), 4) beer halls (10.3%), and 5) dance halls and karaoke café (10.0%).

Contrastingly, regional variation in the decline of business registrations is much smaller than the inter-industry variation; while the simple mean value of all prefectures is 6.5%, the standard deviation is only 1.0%. The maximum was 10.0% in Tokyo and Osaka, and the minimum was 4.5% in Tottori Prefecture.

### 3-3. Panel dataset for empirical estimation

We constructed a panel dataset by matching the consumer survey data and the business telephone directory data for each month and prefecture. Because we cannot know the address of each respondent in our survey, we cannot match these data at a narrower geographical level. Our unit of observation is a combination of prefecture, industry, and month, for example, the business closure ratio of Japanese-style pubs ("Izakaya") in Tokyo Metropolitan Prefecture in June-July 2021. It is noteworthy that the dependent variable (business closure ratio) has variations in three dimensions (prefecture, industry, and month), while independent variables (consumer awareness and behavior) have variations in two dimensions (prefecture and month).

It is also important to match the timing of the data collection between different data sources. As mentioned above, *NTT Townpage* data in the March 2021 edition reflect business registrations as of March 6, 2021. We then compare the March 2021 and February 2021 editions as business closures (de-registrations) between February 7 and March 6, 2021. Then, we match the consumer survey data of February 2021 with the *Townpage* data. In this survey wave, we asked the respondents about their current feelings (as of February 2021) and their behavior in the previous month (January 2021) as compared to that in the same month of the previous year (January 2020).

Therefore, we have theoretically 13,536 observations for our empirical estimations (47 prefectures × 32 industries × 9 periods), but because of several missing values (no business registrations in a certain industry in a certain prefecture), our basic sample reduces to 12,346 observations with 1,380 prefecture-industry units.

## 4. Empirical estimation

### 4-1. Empirical strategy and models

We employ panel fixed-effect (FE) estimation to control for any time-invariant, unobservable, and idiosyncratic factors regarding prefectures and business fields (industries). This is important because prefecture- and industry-specific factors may often correlate with other independent variables. The unit of observation regarding the dependent variable is a combination of industry *i* in prefecture *j* in period *t*. The unit of observation for the independent variables is a combination of prefecture *j* and period *t*. The estimation model is specified as follows:

$$
\begin{aligned}
Business\ Closure\ Ratio_{ijt} &= constant_{ijt} + \beta_1\,(Income)_{it} + \beta_2\,(Expected\ Length)_{it} \\
&+ \beta_3\,(Risk)_{it} + \beta_4\,(Sympathy)_{it} + \beta_5\,(Drinking)_{it} \\
&+ B_6\,(Family)_{it} + B_7\,(Apologetic)_{it} + B_8\,(Motivated)_{it} \\
&+ \beta_9\,(Fear)_{it} + \gamma_i + \delta_j + \varepsilon_{ijt} \quad (1),
\end{aligned}
$$

where $\beta_1$ to $\beta_9$ are parameters to be estimated, $\gamma$ and $\delta$ are prefecture- and industry-fixed effects, respectively, and $\varepsilon$ is the error term. i, j, and t are subscripts for prefecture, industry, and period, respectively. We use prefecture and industry dummies to control for fixed effects. Tokyo Metropolitan Prefecture and bakery are used as baseline references for prefecture and industry dummies.

The dependent variable *Business Closure Ratio* is defined as the ratio of business closures (de-registrations) in period *t* in prefecture *i* and industry *j* to the number of registered businesses in the same prefecture and industry at the beginning of this period. Independent variables for consumer awareness (*Expected Length*, *Risk*, *Sympathy*, *Apologetic, Motivated*, and *Fear*) and consumer behavior (*Income*, *Drinking*, and *Family*) are derived or calculated from the original survey data. From among several questions from the panel survey, we selected questions that may strongly affect local demand for target industries. All independent variables, including *Income*, *Expected Length*, and *Risk* are measured using five- or seven-point Likert scales. It is noteworthy that we do not have any industry or regional (prefecture) variables in the estimation model due to data constraints; we can only control for them using dummy variables.

*Expected Length* is the expectation of the respondent, how long (at least) it will take until the COVID-19 pandemic comes to an end—defined as the state where there are no new infections for four weeks). The options range in eight stages from "within two weeks" to "over 11 months."[4] *Risk* measures the degree of risk tolerance of consumers as the

[4] A majority of respondents choose "more than 11 months," suggesting that they expect a

maximum reservation price that the respondent is willing to pay for an instant lottery. We asked how much the respondent would pay for a lottery that yields a prize of 100,000 yen with a probability of 50%. A risk-neutral and rational individual will pay 50,000 yen for this lottery. The more risk-averse (risk-tolerant) the respondent is, the lower (higher) price he or she chooses from the given options.

*Sympathy* measures the degree to which the respondent sympathizes with the idea of self-restraint from going out for any reason. *Fear* captures the degree to which the respondent is "always afraid of being infected with COVID-19" We measure them by five-point Likert scales that range from "It does not apply at all" (1) to "It applies very much" (5). *Apologetic* and *Motivated* measure the feelings regarding self-restraint from going out on a five-point Likert scale that ranges from "I want to apologize" (1) to "I do not want to apologize" (5), and from "We should do it" (1) to "We should not do it" (5), respectively.

*Income* denotes the evaluation of household income change compared to the same month in the previous year, which varies in nine stages from "50% or larger decrease" to "50% or larger increase." This is neither the variable for consumer awareness nor consumer behavior, but we regard it as a behavioral variable as a condition for behavioral changes. *Drinking* and *Family* are variables for actual behavioral change. They measure the changes in "go out for meetings and parties with alcoholic drinks" and "go out for lunch or dinner with the family members in the same household" respectively[5], compared to the same month in the previous year in seven-point Likert scales ranging from "decreased" (1) to "increased" (7).

The basic statistics of these variables are listed in Table 1. The data of the independent variables—measured by the original survey, are normalized in the range of 0 to 100 because the scales for the measurement differ across questions (five-point, seven-point, and others). The mean and median of the dependent variable, business closure ratio, were 0.8% and 0.0%, respectively. Thus, in a majority of observations, there have been no business closures since the previous month. As mentioned before, we can observe distinct differences in the decline of business registrations across service industries, where the decline is the largest among the hospitality industries with alcoholic drinks (bars, night clubs, cabarets, etc.) and the smallest for retail shops for every day (supermarkets and bakeries). The correlation matrix of the dependent and independent variables (without prefecture and industry dummies) is provided in Appendix Table A1.

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long-lasting pandemic.

[5] If the respondent lives alone (single household), this would be "go out *alone* for lunch or dinner".

The unit of observation for the dependent variable (business closure ratio) is an industry in a prefecture. Here, we find that in a majority of the observation units, the number of business registrations in an industry in a prefecture is less than ten. In some industries, there are no business registrations in several prefectures. These cases automatically drop from our original sample because we cannot calculate the business closure ratio, but even in the remaining observations, the business closure ratio may become outliers if the denominator (the number of business registrations in the previous month) is very small. Thus, in the next section, we provide the estimation results using the full sample as well as those using the reduced sample, excluding the observation units with fewer than ten business registrations.

As mentioned before, we can identify some basic characteristics of the survey respondents, such as gender, age group, household structure (with whom they live in the same household), and income levels. Thus, we classified the respondents into 1) males and females, 2) young (under 30), middle-age (between 30 and 59) and senior (over 60) groups, 3) those who live with spouse and others, those who live with parents and others, and those who live with small children under 12 and others; and 4) those with low (under four million yen), middle (between four and eight million yen), and high (above eight million yen) household income levels. Then, we calculate the independent variables of consumer awareness and behavior in each prefecture and month separately for these sub-groups and compare the effects of these independent variables based on these sub-groups. In this way, we can consider if and how the effects of local consumers' awareness and behavior on the local business closure ratio may differ across consumer types. This is a specific advantage of our analysis.

Table 2 summarizes the structure of respondents as shares of each type as the total average of all survey units. Male and female respondents accounted for 53% and 47%, respectively. The percentage of young respondents under 30 was 8%, while senior respondents over 60 are 24%. Two-thirds of the respondents lived with spouses in the same household, while 25% lived with their father and/or mother and 30% raised small children to 12 (elementary school) at home. Only 17% of the respondents live as "singles" which is not presented in this table. "High-income" people with an annual household income of over eight million yen are 20% of the respondents.

### 4-2. Estimation results with the full and limited samples

Table 3 presents the estimation results obtained using the full sample. The dependent variable is the business closure ratio—defined as the number of gross business deregistration relative to the number of businesses in the previous month in each

prefecture and industry (business field). The unit of observation is a certain industry in a certain prefecture in a certain month. We control for prefecture and industry-fixed effects by including prefecture dummies (baseline: Tokyo Metropolitan Prefecture) and industry dummies (baseline: bakery).

Column 1 shows the results for the entire sample (using all respondents' data). This suggests that three factors significantly reduce the business closure ratio: 1) the expected shortest period until the settlements of the COVID-19 crisis, 2) risk tolerance measured by the reservation price for an instant lottery, and 3) fear of infection. The only factor that significantly (though weakly) increases the business closure ratio is sympathy for self-restraint from going out. The other variables for local consumers' behavior and feelings regarding go-outs do not have significant effects on local business closures.

The first result means that when people expect *a longer-duration* for the pandemic to end, the business closure ratio will be *lower*. This contradicts the plausible mechanism that when people expect *a longer* pandemic period, they will be more careful to go out; thus, the business closure ratio becomes *higher*. Our interpretation of this interesting result is that when people expect *a longer* pandemic period, they tire of self-restraint and go out—making more businesses survive. Another puzzle is the fear of infection—implying a *negative* impact of the fear of infection on the business closure ratio. We expected a positive (or little) effect on business closure, therefore we have no plausible explanation for this puzzle. The results of the other variable appear plausible and consistent in that the local consumers' higher risk tolerance stimulates local consumption and thus reduces business closures, and that sympathy for self-restraints from going out increases business closures by reducing local demand.

Columns 2 and 3 compare the results using variables from the male and female respondents, respectively. Interestingly, we find no major differences between males and females, except for fear of infection, which significantly affects business closure only when we use male respondents' data.

Columns 4 to 6 compare the results using the same models based on the respondents' different age classes: young (under 30 years), middle (30 to 59 years), and senior (over 60 years). It is common to all age groups that the degree of risk tolerance has negative and significant effects on the local business closure ratio. The minimum expected length of the pandemic of young and middle-aged people have a negative and significant effect, but not on senior people. Sympathy for self-restraint from going out increases the business closure ratio only for young people, while increased going out for lunch and dinner with family members decreases the business closure ratio only for the middle-aged group.

Columns 7 to 9 demonstrates how the estimation results differ according to household (family) structures of the respondents: married (live with a spouse) (Column 7), live with

parents (Column 8), and live with children up to 12 years old (elementary school) (Column 9), respectively. We find no significant differences across these household structures, except that the negative effect of the expected length is not significant for those living with small children.

Moreover, we find some common results for households without spouses, parents, or children—not shown in Table 3. Sympathy for self-restraint from going out significantly increases the local business closure ratio for the respondents without spouses, parents, or children, and thus for the singles living separately from their parents. Going out *alone* for lunch or dinner by singles living separately from parents significantly decreases the business closure ratio.

We find some differences according to household income groups in Columns 10 to 12: under four million yen (low-income), four to eight million yen (middle-income), and above eight million yen (high-income), respectively. The effect of *Expected Length* is not significant only for the middle-income group, while that of risk tolerance is not significant only for the low-income group. Going out with family members does not significantly decrease business closures for the high-income group. However, we cannot find any effects of consumer awareness and behavior that are common to all income groups.

We used Stata xttest3 to calculate the modified Wald statistics for group-wise heteroskedasticity in the residuals of panel FE regression models (Baum, 2001). Since they are all significant at the one percent level, we can reject group-wise heteroskedasticity. We also checked the cross-sectional dependence in panel estimations using the Pesaran test (Stata xtcd2) (De Hoyos and Sarafidis 2006). We can confirm the cross-sectional independence of panel data since the test statistics are significant at the one percent level in all estimations.

It is difficult to discuss the scale of the impact of consumer behavior and awareness on business closure ratio because independent variables are measured using Likert scales or in different orders (expected length of the pandemic, risk tolerance). The estimated parameters in absolute values are all smaller than 0.001, even when they are highly significant, consequently their impacts may be quite small. The value of R-squared is at most 0.006, including prefecture and industry-fixed effects, suggesting that omitted (missing) variables, especially those of the characteristics of each business, may have large effects on business closures.

We then check how the estimation results may (not) change if we exclude those observations (industry-prefecture) units with fewer than ten registrations. Table 4 provides the estimation results of the same model using a limited (reduced) sample. The number of industry-prefecture units reduced from 1,380 to 652; thus, the number of

observations also reduced from 12,346 to 5,841.

Column 1 shows the main estimation results of the limited sample (observations with at least ten businesses) reflecting all types of respondents. We found that four factors significantly reduced the business closure ratio: 1) the expected length of the COVID-19 crisis, 2) risk tolerance, 3) the frequency of going out for lunch or dinner with live-in family members, and 4) fear of infection. The other variables for local consumers' behavior and feelings regarding go-outs do not have significant effects on local business closures. Comparing these results with those in Table 3 (full sample), we find that the effect of going out for lunch or dinner becomes significant, but the (weakly) significant effect of sympathy for self-restraint from going out disappears.

Columns 2 and 3 present the results for male and female respondents, respectively. Interestingly, in contrast to previous results, we found some major differences between males and females. First, the negative effect of risk tolerance on business closures (positive effect on business survival) is significant only for men. Second, the positive effect of sympathy for self-restraint from going out is significant only for women. Third, we found no differences between males and females regarding the effects of the expected length of the pandemic, the changes in frequency of going out for lunch or dinner with family members, and the fear of infection.

Columns 4 to 6 compare the results reflecting the responses of different age classes: young, middle, and senior respondents. It is common to all age groups that risk tolerance has negative and significant effects. Sympathy for self-restraint from going out increases the business closure ratio only for young people, while increased going out for lunch and dinner with family members decreases the business closure ratio for the middle-aged and senior groups.

Columns 7 to 9 show the results considering the differences in household (family) structure: married (live with spouse) (Column 7), living with parents (Column 8), and living with children up to 12 years old (elementary school) (Column 9), respectively. Again, we confirm the negative and significant effect of the expected length of the pandemic and risk tolerance of those living with spouses and parents—like those in Table 3. Moreover, we find that sympathy for self-restraint and going out for lunch or dinner with family members become partially significant—differing from the results in Table 3.

Finally, Columns 10 to 12 show the results reflecting the low, middle, and high household income classes, respectively. We find negative and significant effects of risk tolerance and going out for lunch or dinner with family members for all income classes. It is noteworthy that the sympathy for self-restraint from going out has a positive and significant effect for the low- and high-income groups, but not for the middle-income group. Finally, motivation for self-restraint from going out increases business closure

only for the low-income group.

Summing up the above results, we can confirm the overall negative and significant effects of risk tolerance and fear of infection on the business closure ratio—consistent with the full sample results presented in Table 3. Contrastingly, we find significant effects of going out for lunch or dinner with family members—common to most consumer types but unlike those in Table 3. The values of R-squared are all higher than 0.01 (and 0.02 for the main estimation in Column 1), and even higher than those for the full sample in Table 3.

We again calculated the modified Wald statistics to check the group-wise heteroskedasticity in the residuals of the panel FE regression models using Stata xttest3. Since they are all significant at the one percent level, we can reject group-wise heteroskedasticity. We also checked the cross-sectional dependence in panel estimations using the Pesaran test (Stata xtcd2). We can confirm the cross-sectional independence of panel data since the test statistics are significant at the one percent level in all estimations.

### 4-3. Additional estimations and discussion

In this subsection, we provide some additional estimation results as robustness checks. First, we exclude from the dataset the industry-prefecture units that contain fewer than ten business registrations. Second, we focus on specific regions (such as the prefectures that experienced "emergency declaration"). Third, we put a longer time lag between the dependent and independent variables to check the reaction speed. Fourth, we include month dummies (or a time trend variable) in the estimation model to control for macroeconomic conditions that affect all prefectures and industries.

Table 5 shows the results based on the reduced sample after excluding the industry-prefecture units with less than 10, 20, 50, 200, and 1,000 business registrations. By excluding these units, we may focus on the impact on the regional agglomeration of hospitality industries. It is noteworthy that the mean and median number of business registrations in the total sample are 156 and 37, respectively. The results suggest that the expected length until the end of the pandemic, risk tolerance, and going out for lunch or dinner with family members may all significantly decrease the business closure ratio. Sympathy for self-restraint from going out has a positive and significant effect only with the sub-sample excluding the units with less than 10 and less than 200 registrations. These results are like the main results for the full sample presented in Table 3, suggesting that business closures may increase as local consumers' sympathy for self-restraint increases.

The overall results in Table 5 are like those for the full sample in Table 3, except for the

negative and significant effect of going out with family members. This difference suggests that visits to restaurants and pubs with family members may mitigate demand shocks, especially in the agglomeration of hospitality industries.

Next, we restricted the sample regions to 1) seven prefectures that were the *first* targets of the first "emergency declaration" (April - May 2020) (Saitama, Chiba, Tokyo Metropolitan, Kanagawa, Osaka, Hyogo, and Fukuoka), 2) 13 prefectures that were designated to "Special caution prefectures" during the first "emergency declaration" (Hokkaido, Ibaraki, Saitama, Chiba, Tokyo Metropolitan, Kanagawa, Ishikawa, Gifu, Aichi, Kyoto, Osaka, Hyogo, and Okinawa), 3) four prefectures that were the targets of the second "emergency declaration" (January-March 2021) (Saitama, Chiba, Tokyo Metropolitan and Kanagawa), and 4) 11 prefectures that were subject to the expanded scope of the second "emergency declaration," and conduct the same regressions as before (in the same models as Table 3).

Table 6 presents the results for the restricted prefectures. This shows that the effects of consumer awareness and behavior differ significantly between the groups of prefectures that were the targets of the "emergency declaration." In the prefectures that were the initial targets of the first and second declarations ((1) and (3)), hardly any variables have significant effects on the business closure ratio. Contrarily, in the prefectures on "specific alert" for the first declaration (2) and those subject to the expanded scope of the second emergency declaration (4), risk tolerance significantly decreases, and sympathy for self-restraints significantly increases local business closures. These results differ considerably from those in Table 3, which may be because of reduced regional heterogeneity (smaller sample size).

Then, we take a time lag between the dependent and independent variables in the same model with the full sample. This means that we match the business closure ratio between July and August 2020 with consumer awareness measured in June 2020 and consumer behavior as of May 2020 (both are derived from the June 2020 survey). Thus, the number of observation periods was reduced from nine to eight. The results are shown in Table 7; for most consumer types, no variable but the fear of infection (negative) have significant coefficients, suggesting that consumer awareness and behaviors do not affect local business closures with more time lag.

These results are not consistent with the argument that most business closures occur at the end of a long struggle for survival after a decrease in local demand. Rather, they may suggest that business owners react very quickly to demand shocks without any time lag. We may argue that our findings are consistent with the story of the natural selection in that business owners who were considering whether to close the business (regardless of negative or positive reasons) decide to close it immediately under the demand shock of

COVID-19.

We include month dummies in the estimation model to control for any macro shocks in each month—common to all prefectures and industries. Surprisingly, all variables show significant effects before becoming insignificant. The only significant factor is the change in household income compared to the same month in the previous year. This surprising result may be explained as follows: What we estimate using a FE model is the effect of *within* the variation of each variable, that is, time-series variations within each prefecture-industry unit. If the time-series variation is similar across prefecture-industry units, the effects of the independent variables may be absorbed in the effects of the month dummies.

## 5. Concluding remarks

The COVID-19 pandemic has caused serious demand shocks to economic activities, especially in the hospitality, tourism, entertainment, and cultural industries, by changing consumer awareness and behavior. However, there is little evidence of this negative shock for these selected business fields because of data constraints. Therefore, this study aims to close this gap and to estimate the effects of consumer awareness and behavior on business closure in these service industries, using a unique panel dataset that combines monthly consumer survey data and business telephone directory data.

We assume that even when controlling for prefecture- and industry-fixed effects, consumer awareness and behavior may affect business closures in target industries, while the effects may depend on consumer characteristics. We confirmed these assumptions using prefecture-industry-level panel data and FE panel estimations. More concretely, we found that, while the number of registered businesses decreased in the whole country to a larger extent in specific hospitality industries such as cabarets, snacks, bars, clubs, and dance halls than in other service industries, more (less) sympathy among local consumers to self-restraints from going out significantly increases (decreases) the business closing ratio in the same prefecture. An increase (decrease) in risk tolerance among local consumers significantly lowers (enhances) the business closure ratio in the same prefecture. An increase (decrease) in going out for meals with family members significantly decreases (increases) business closures. We also found that consumer awareness and behavior affect business closures differently according to consumer types, such as gender, household structure, and income levels.

The present study had some limitations. First, since we could match consumer survey data and business directory data only at the prefecture-level, we do not match the consumers and businesses at the local market level, which would usually be narrower

than the prefecture. Second, we measured business closures from the telephone directories deregistration. The identified problem is: we cannot distinguish business closures from business relocations or changes in major business fields. However, we do not believe that relocations may occur often in our target industries, or more often than in other industries. Third, our sample of the consumer survey comprised only 77 or 78 people in each prefecture. Although our entire sample looks representative of Japanese consumers, it may not be appropriate to further differentiate these prefecture sub-samples. Therefore, we used only rough classifications of the respondents' characteristics.

However, despite these limitations due to data constraints, our current study contributes to finding empirical evidence on business closures in specific service industries under the COVID-19 pandemic in Japan, where a soft anti-contagion policy (emergency declaration) was used instead of a hard policy (lockdown). In future research, we will focus on business closures under agglomerations in downtown areas by utilizing geocoding data.

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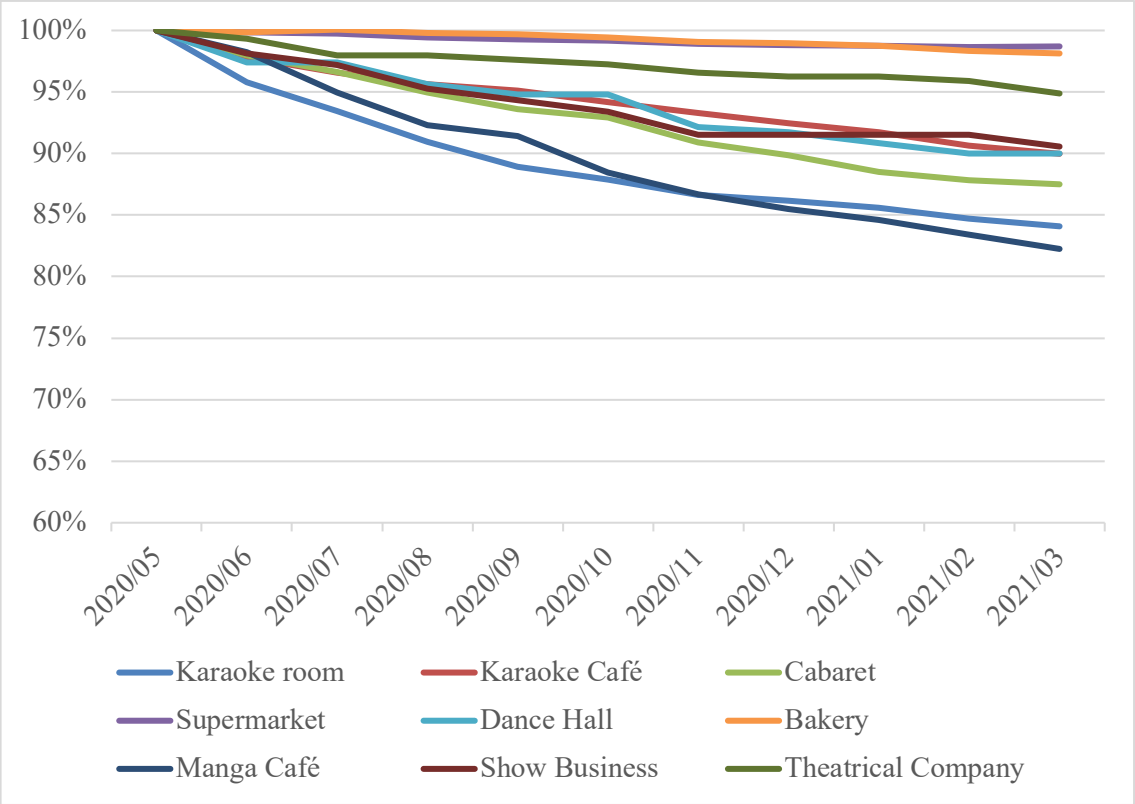
Figure 1: Decline of business registrations in selected service industries in the NTT Business Telephone Directory from May 2020 to March 2021 (May 2020 =1)




Source: *NTT "Townpage"* Business Database, own calculation.

Table 1: Basic statistics of the variables

| Variables | mean | median | std. dev. | minimum | maximum | obs. |
|---|---|---|---|---|---|---|
| Business closure ratio | 0.008 | 0.000 | 0.02 | 0.000 | 0.500 | 12,346 |
| Income | 43.46 | 50.00 | 16.42 | 0.00 | 100.00 | 13,728 |
| Expected length | 85.14 | 100.00 | 22.77 | 0.00 | 100.00 | 13,728 |
| Risk | 39.79 | 37.50 | 25.76 | 0.00 | 100.00 | 13,728 |
| Sympathy | 70.06 | 75.00 | 23.47 | 0.00 | 100.00 | 13,728 |
| Drinking | 15.53 | 0.00 | 21.32 | 0.00 | 100.00 | 13,728 |
| Family | 24.39 | 16.67 | 22.32 | 0.00 | 100.00 | 13,728 |
| Apologetic | 63.75 | 50.00 | 23.97 | 0.00 | 100.00 | 13,728 |
| Motivated | 30.93 | 25.00 | 24.01 | 0.00 | 100.00 | 13,728 |
| Fear | 43.03 | 50.00 | 26.29 | 0.00 | 100.00 | 13,728 |

Source: TDB Consumer Surveys, own calculation.

Table 2: Structure of respondents

| characteristics | definition | share | count |
|---|---|---|---|
| male | male respondents | 0.526 | 19,667 |
| female | female respondents | 0.474 | 17,743 |
| young | under 30 years old | 0.084 | 3,126 |
| middle | 30 - 59 years old | 0.674 | 25,208 |
| senior | over 60 years old | 0.243 | 9,076 |
| spouse | living with a spouse | 0.651 | 24,344 |
| parents | living with the father and/or mother | 0.252 | 9,413 |
| children | living with child(ren) up to 12 | 0.298 | 11,158 |
| low income | household income under 4 million yen | 0.355 | 10,514 |
| middle income | household income between 4 and 8 million yen | 0.448 | 13,245 |
| high income | household income over 8 million yen | 0.197 | 5,835 |

Source: TDB Consumer Surveys, own calculation.

Table 3: Estimation results with full sample

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Variables | all | male | female | young | middle | senior |
| Income | 3.08e-05 | 0.000107 | -0.000115 | 1.76e-05 | -8.19e-06 | -0.000141 |
| | (0.000165) | (0.000123) | (0.000105) | (2.57e-05) | (0.000144) | (8.93e-05) |
| Expected Length | -0.000466*** | -0.000216*** | -0.000407*** | -7.68e-05*** | -0.000349*** | -6.74e-05 |
| | (0.000107) | (8.32e-05) | (7.86e-05) | (2.25e-05) | (9.29e-05) | (5.99e-05) |
| Risk | -0.000386*** | -0.000200** | -0.000304*** | -4.99e-05** | -0.000264*** | -0.000107* |
| | (0.000114) | (8.23e-05) | (9.27e-05) | (2.18e-05) | (9.37e-05) | (6.28e-05) |
| Sympathy | 0.000169* | 8.83e-05 | 0.000115 | 5.12e-05** | 4.68e-05 | 0.000121** |
| | (0.000102) | (7.39e-05) | (7.66e-05) | (2.53e-05) | (8.53e-05) | (5.64e-05) |
| Drinking | 0.000162 | -1.80e-05 | 0.000110 | -1.84e-06 | 9.86e-05 | 0.000110 |
| | (0.000140) | (0.000110) | (9.05e-05) | (2.30e-05) | (0.000117) | (7.27e-05) |
| Family | -0.000157 | -9.64e-05 | -0.000117 | 1.54e-05 | -0.000163* | -8.69e-05 |
| | (0.000104) | (8.39e-05) | (7.80e-05) | (2.34e-05) | (8.87e-05) | (6.53e-05) |
| Apologetic | 5.98e-05 | 7.30e-05 | 5.36e-05 | 1.36e-05 | 0.000102 | -5.89e-05 |
| | (0.000103) | (7.47e-05) | (7.07e-05) | (2.18e-05) | (8.63e-05) | (4.81e-05) |
| Motivated | 5.98e-05 | -2.55e-07 | 8.30e-05 | 1.19e-05 | -4.85e-06 | 1.81e-05 |
| | (0.000106) | (7.85e-05) | (7.12e-05) | (2.36e-05) | (9.12e-05) | (4.81e-05) |
| Fear | -0.000178** | -0.000240*** | -6.09e-05 | 2.38e-05 | -0.000163** | -0.000160*** |
| | (8.60e-05) | (6.37e-05) | (6.48e-05) | (1.97e-05) | (7.21e-05) | (4.77e-05) |
| Constant | 0.0540*** | 0.0336** | 0.0476*** | 0.00912*** | 0.0498*** | 0.0252*** |
| | (0.0171) | (0.0132) | (0.0120) | (0.00352) | (0.0149) | (0.00828) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 12,346 | 12,346 | 12,346 | 12,190 | 12,346 | 12,346 |
| Number of Units | 1,380 | 1,380 | 1,380 | 1,380 | 1,380 | 1,380 |
| R-squared | 0.006 | 0.004 | 0.005 | 0.002 | 0.005 | 0.003 |
| Wald Test | 1.7e+08*** | 6.0e+08*** | 3.0e+08*** | 6.2e+36*** | 3.0e+08*** | 1.5e+10*** |
| Pesaran Test | 76.482*** | 30.200*** | 41.683*** | 33.239*** | 70.003*** | 19.048*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3: Estimation results with full sample (cont.)

| | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|
| Variables | spouse | parents | children | low income | middle income | high income |
| Income | -0.000178 | 1.94e-05 | -6.59e-05 | 3.57e-05 | -0.000165* | -1.43e-05 |
| | (0.000136) | (7.99e-05) | (8.25e-05) | (7.03e-05) | (8.53e-05) | (0.000102) |
| Expected Length | -0.000287*** | -0.000187*** | -2.08e-05 | -9.56e-05* | -7.68e-05 | -0.000138** |
| | (9.23e-05) | (5.39e-05) | (6.01e-05) | (4.96e-05) | (6.23e-05) | (6.90e-05) |
| Risk | -0.000197** | -0.000242*** | -0.000234*** | -5.49e-05 | -0.000159** | -0.000220*** |
| | (0.000100) | (5.43e-05) | (6.32e-05) | (5.20e-05) | (6.27e-05) | (7.15e-05) |
| Sympathy | 0.000131 | 5.99e-05 | 5.46e-05 | 2.49e-05 | 5.14e-05 | 3.72e-05 |
| | (8.39e-05) | (5.56e-05) | (6.13e-05) | (5.27e-05) | (5.87e-05) | (6.05e-05) |
| Drinking | 0.000159 | 2.03e-05 | 3.42e-05 | 8.90e-05 | 8.13e-05 | -1.08e-05 |
| | (0.000115) | (7.45e-05) | (7.80e-05) | (6.49e-05) | (6.68e-05) | (8.26e-05) |
| Family | -0.000117 | -5.38e-05 | -7.14e-05 | -0.000127** | -0.000138** | -9.21e-05 |
| | (8.52e-05) | (5.76e-05) | (6.65e-05) | (5.02e-05) | (6.31e-05) | (6.77e-05) |
| Apologetic | 0.000110 | 7.93e-06 | 1.83e-05 | 6.84e-05 | -1.45e-05 | 8.12e-05 |
| | (8.48e-05) | (4.73e-05) | (5.32e-05) | (4.47e-05) | (5.36e-05) | (6.02e-05) |
| Motivated | 0.000117 | -5.03e-05 | -3.70e-05 | 7.93e-05* | 6.79e-05 | 3.31e-05 |
| | (8.69e-05) | (5.13e-05) | (5.77e-05) | (4.75e-05) | (5.07e-05) | (5.77e-05) |
| Fear | -0.000199*** | -8.54e-05* | -0.000136*** | -3.05e-05 | -0.000132*** | -7.52e-05 |
| | (7.61e-05) | (4.76e-05) | (5.12e-05) | (4.37e-05) | (4.98e-05) | (5.58e-05) |
| Constant | 0.0381*** | 0.0347*** | 0.0249*** | 0.0116 | 0.0305*** | 0.0269*** |
| | (0.0139) | (0.00885) | (0.00942) | (0.00773) | (0.00959) | (0.0103) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 12,346 | 12,346 | 12,346 | 12,346 | 12,346 | 12,346 |
| Number of Units | 1,380 | 1,380 | 1,380 | 1,380 | 1,380 | 1,380 |
| R-squared | 0.004 | 0.004 | 0.002 | 0.002 | 0.003 | 0.002 |
| Wald Test | 4.4e+08*** | 7.1e+08*** | 1.2e+09*** | 1.8e+09*** | 1.9e+09*** | 1.4e+09*** |
| Pesaran Test | 57.127*** | 16.459*** | 27.763*** | 40.447*** | 28.742*** | 32.270*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4: Estimation results with limited sample

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Variables | all | male | female | young | middle | senior |
| Income | 0.000148 | 0.000221** | -0.000161* | -7.64e-06 | 0.000113 | -7.52e-05 |
| | (0.000151) | (0.000112) | (9.53e-05) | (2.36e-05) | (0.000130) | (8.23e-05) |
| Expected Length | -0.000283*** | -0.000147* | -0.000303*** | -3.90e-05* | -0.000155* | -7.90e-06 |
| | (9.78e-05) | (7.57e-05) | (7.23e-05) | (2.04e-05) | (8.48e-05) | (5.48e-05) |
| Risk | -0.000422*** | -0.000375*** | -0.000123 | -4.20e-05** | -0.000298*** | -0.000199*** |
| | (0.000104) | (7.52e-05) | (8.29e-05) | (2.00e-05) | (8.54e-05) | (5.71e-05) |
| Sympathy | 0.000147 | 1.74e-05 | 0.000196*** | 5.12e-05** | 0.000107 | 7.69e-05 |
| | (9.26e-05) | (6.77e-05) | (6.98e-05) | (2.33e-05) | (7.73e-05) | (5.19e-05) |
| Drinking | 0.000188 | 1.27e-05 | 0.000111 | 1.42e-06 | 5.56e-05 | 0.000142** |
| | (0.000128) | (0.000100) | (8.28e-05) | (2.11e-05) | (0.000107) | (6.63e-05) |
| Family | -0.000371*** | -0.000261*** | -0.000217*** | -1.81e-05 | -0.000312*** | -0.000213*** |
| | (9.49e-05) | (7.63e-05) | (7.10e-05) | (2.13e-05) | (8.07e-05) | (5.92e-05) |
| Apologetic | -7.89e-05 | -6.58e-05 | 6.97e-05 | -1.96e-05 | 3.54e-05 | -8.82e-05** |
| | (9.44e-05) | (6.91e-05) | (6.40e-05) | (2.00e-05) | (7.90e-05) | (4.42e-05) |
| Motivated | -2.21e-05 | -7.48e-05 | 6.51e-05 | 2.22e-06 | -8.73e-06 | -2.25e-05 |
| | (9.73e-05) | (7.20e-05) | (6.55e-05) | (2.20e-05) | (8.38e-05) | (4.37e-05) |
| Fear | -0.000299*** | -0.000239*** | -0.000183*** | -1.88e-05 | -0.000281*** | -0.000151*** |
| | (7.87e-05) | (5.86e-05) | (5.93e-05) | (1.81e-05) | (6.61e-05) | (4.31e-05) |
| Constant | 0.0589*** | 0.0519*** | 0.0372*** | 0.0132*** | 0.0400*** | 0.0302*** |
| | (0.0156) | (0.0120) | (0.0111) | (0.00324) | (0.0137) | (0.00760) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 5,841 | 5,841 | 5,841 | 5,751 | 5,841 | 5,841 |
| Number of Units | 652 | 652 | 652 | 652 | 652 | 652 |
| R-squared | 0.020 | 0.016 | 0.013 | 0.003 | 0.017 | 0.010 |
| Wald Test | 8.7e+06*** | 2.4e+06*** | 3.2e+06*** | 2.9e+36*** | 1.9e+06*** | 3.4e+06*** |
| Pesaran Test | 18.135*** | 14.634*** | 11.978*** | 48.084*** | 15.873*** | 24.706*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4: Estimation results with limited sample (cont.)

| | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|
| Variables | spouse | parents | children | low income | middle income | high income |
| Income | -4.67e-05 | 1.62e-05 | 5.04e-05 | -8.60e-05 | 2.68e-05 | 6.67e-05 |
| | (0.000124) | (7.18e-05) | (6.45e-05) | (7.88e-05) | (9.34e-05) | (6.99e-05) |
| Expected Length | -0.000198** | -0.000155*** | -3.48e-06 | -4.80e-05 | -9.51e-05 | -1.81e-05 |
| | (8.40e-05) | (4.84e-05) | (4.53e-05) | (5.66e-05) | (6.34e-05) | (3.85e-05) |
| Risk | -0.000230** | -0.000163*** | -0.000126*** | -0.000183*** | -0.000201*** | -0.000200*** |
| | (9.08e-05) | (4.91e-05) | (4.73e-05) | (5.73e-05) | (6.49e-05) | (3.87e-05) |
| Sympathy | 0.000142* | 8.93e-05* | 5.11e-05 | 0.000128** | -6.40e-06 | 5.91e-05* |
| | (7.69e-05) | (5.03e-05) | (4.78e-05) | (5.36e-05) | (5.55e-05) | (3.38e-05) |
| Drinking | 0.000169 | -4.57e-05 | 2.47e-06 | 2.95e-05 | 0.000113 | 0.000106** |
| | (0.000105) | (6.83e-05) | (5.94e-05) | (6.11e-05) | (7.58e-05) | (4.45e-05) |
| Family | -0.000297*** | -7.38e-05 | -0.000171*** | -0.000163*** | -0.000216*** | -0.000114*** |
| | (7.79e-05) | (5.19e-05) | (4.58e-05) | (5.75e-05) | (6.20e-05) | (4.09e-05) |
| Apologetic | 8.09e-06 | -4.61e-05 | 6.65e-05 | -4.21e-05 | -7.66e-07 | -7.41e-08 |
| | (7.80e-05) | (4.24e-05) | (4.05e-05) | (4.88e-05) | (5.54e-05) | (3.36e-05) |
| Motivated | 3.72e-06 | -2.93e-05 | 6.71e-05 | 0.000120*** | -6.20e-05 | -3.86e-05 |
| | (7.99e-05) | (4.63e-05) | (4.36e-05) | (4.63e-05) | (5.28e-05) | (3.31e-05) |
| Fear | -0.000301*** | -0.000155*** | -0.000116*** | -0.000151*** | -0.000118** | -9.23e-05** |
| | (6.97e-05) | (4.28e-05) | (4.00e-05) | (4.51e-05) | (5.10e-05) | (3.59e-05) |
| Constant | 0.0448*** | 0.0355*** | 0.0119* | 0.0238*** | 0.0359*** | 0.0198*** |
| | (0.0128) | (0.00799) | (0.00705) | (0.00883) | (0.00943) | (0.00642) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 5,841 | 5,841 | 5,841 | 5,841 | 5,841 | 5,841 |
| Number of Units | 652 | 652 | 652 | 652 | 652 | 652 |
| R-squared | 0.015 | 0.008 | 0.010 | 0.010 | 0.008 | 0.011 |
| Wald Test | 2.5e+06*** | 1.9e+07*** | 6.1e+06*** | 6.5e+06*** | 9.4e+06*** | 3.2e+36*** |
| Pesaran Test | 12.209*** | 21.423*** | 26.887*** | 24.467*** | 26.692*** | 23.828*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5: Comparison between different sample limitations

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Variables | >10 | >20 | >50 | >200 | >1000 |
| Income | 0.000148 | 0.000192 | 0.000159 | 7.27e-05 | 7.94e-05 |
| | (0.000151) | (0.000125) | (0.000109) | (9.13e-05) | (0.000159) |
| Expected Length | -0.000283*** | -0.000140* | -0.000206*** | -9.09e-05 | -0.000229** |
| | (9.78e-05) | (8.14e-05) | (7.03e-05) | (5.94e-05) | (0.000105) |
| Risk | -0.000422*** | -0.000337*** | -0.000239*** | -5.98e-05 | -0.000105 |
| | (0.000104) | (8.62e-05) | (7.49e-05) | (6.25e-05) | (0.000106) |
| Sympathy | 0.000147 | 0.000103 | 0.000110 | 0.000178*** | -2.89e-05 |
| | (9.26e-05) | (7.71e-05) | (6.73e-05) | (5.63e-05) | (0.000101) |
| Drinking | 0.000188 | 0.000229** | 6.44e-05 | 0.000174** | 0.000206 |
| | (0.000128) | (0.000106) | (9.27e-05) | (7.71e-05) | (0.000132) |
| Family | -0.000371*** | -0.000267*** | -0.000248*** | -0.000198*** | -0.000363*** |
| | (9.49e-05) | (7.88e-05) | (6.86e-05) | (5.75e-05) | (0.000100) |
| Apologetic | -7.89e-05 | -0.000218*** | -0.000156** | -0.000122** | -0.000135 |
| | (9.44e-05) | (7.83e-05) | (6.83e-05) | (5.75e-05) | (0.000107) |
| Motivated | -2.21e-05 | -0.000165** | -3.66e-05 | -4.62e-05 | -0.000239** |
| | (9.73e-05) | (8.05e-05) | (7.08e-05) | (6.01e-05) | (0.000113) |
| Fear | -0.000299*** | -0.000431*** | -0.000291*** | -0.000256*** | -0.000234** |
| | (7.87e-05) | (6.55e-05) | (5.72e-05) | (4.84e-05) | (9.06e-05) |
| Constant | 0.0589*** | 0.0597*** | 0.0499*** | 0.0250*** | 0.0643*** |
| | (0.0156) | (0.0130) | (0.0113) | (0.00953) | (0.0164) |
| Prefecture Dummies | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES |
| Observations | 5,841 | 5,124 | 4,130 | 2,101 | 319 |
| Number of Units | 652 | 575 | 467 | 238 | 37 |
| R-squared | 0.020 | 0.029 | 0.028 | 0.045 | 0.152 |
| Wald test | 8.7e+06*** | 4.8e+05*** | 2.5e+05*** | 3.7e+30*** | 908.93*** |
| Pesaran test | 18.135*** | 14.152*** | 13.928*** | 12.560*** | 6.996*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: Estimation results with limited prefectures (full sample)

| Variables | (1) 7 prefectures initially subject to the 1st declaration of emergency [2020.04-06] | (2) 13 prefectures on specific alert for the first declaration of emergency [2020.04-06] | (3) 4 prefectures initially targeted by the 2nd declaration of emergency [2021.01-03] | (4) 11 prefectures subject to the expanded scope of the 2nd emergency declaration [2021.01-03] |
|---|---|---|---|---|
| Income | 0.000293 | 9.23e-05 | -0.000109 | -2.38e-05 |
| | (0.000365) | (0.000267) | (0.000413) | (0.000309) |
| Expected Length | -0.000297 | -0.000238 | -0.000529 | -0.000402* |
| | (0.000270) | (0.000175) | (0.000404) | (0.000206) |
| Risk | -0.000257 | -0.000472*** | -0.000199 | -0.000363* |
| | (0.000253) | (0.000182) | (0.000319) | (0.000204) |
| Sympathy | 0.000459* | 0.000490*** | 0.000285 | 0.000452** |
| | (0.000240) | (0.000175) | (0.000344) | (0.000204) |
| Drinking | 0.000339 | 6.48e-05 | -3.91e-05 | 0.000263 |
| | (0.000335) | (0.000240) | (0.000488) | (0.000263) |
| Family | -1.62e-05 | 8.92e-05 | 0.000193 | -0.000214 |
| | (0.000217) | (0.000176) | (0.000263) | (0.000193) |
| Apologetic | 8.37e-05 | 0.000103 | 0.000135 | 0.000259 |
| | (0.000244) | (0.000183) | (0.000280) | (0.000212) |
| Motivated | 0.000185 | 0.000267 | -1.15e-05 | 0.000428** |
| | (0.000260) | (0.000184) | (0.000329) | (0.000216) |
| Fear | -0.000518** | -0.000319** | -0.000358 | -0.000254 |
| | (0.000219) | (0.000160) | (0.000280) | (0.000187) |
| Constant | 0.0104 | 0.00731 | 0.0525 | 0.0113 |
| | (0.0364) | (0.0296) | (0.0488) | (0.0340) |
| Prefecture Dummies | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES |
| Observations | 2,001 | 3,644 | 1,143 | 3,102 |
| Number of Units | 223 | 447 | 127 | 356 |
| R-squared | 0.009 | 0.010 | 0.008 | 0.009 |
| Wald test (xttest3) | 6.5e+06*** | 2.0e+07*** | 2.3e+06*** | 1.1e+07*** |
| Pesaran test (xtcd2) | 10.684*** | 3.212** | 6.040*** | 10.634*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7: Estimation results with a time lag

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Variables | all | male | female | young | middle | senior |
| Income | -3.65e-05 | -1.53e-05 | -6.10e-05 | -9.19e-06 | -9.33e-05 | -2.81e-06 |
| | (0.000174) | (0.000123) | (0.000115) | (2.71e-05) | (0.000150) | (8.75e-05) |
| Expected Length | 7.62e-05 | 8.47e-05 | -3.96e-05 | -1.69e-05 | 4.02e-05 | 3.69e-05 |
| | (0.000115) | (8.61e-05) | (8.38e-05) | (2.30e-05) | (9.77e-05) | (5.13e-05) |
| Risk | -2.08e-05 | -2.88e-05 | 3.27e-05 | 1.56e-05 | -5.83e-05 | -6.22e-05 |
| | (0.000121) | (8.57e-05) | (9.51e-05) | (2.30e-05) | (9.91e-05) | (6.00e-05) |
| Sympathy | 0.000128 | 1.94e-05 | 0.000114 | 3.01e-05 | 4.99e-05 | 4.83e-05 |
| | (0.000103) | (7.43e-05) | (7.75e-05) | (2.61e-05) | (8.55e-05) | (5.40e-05) |
| Drinking | 0.000126 | -1.01e-05 | 0.000131 | 2.46e-05 | 8.39e-05 | 8.43e-06 |
| | (0.000143) | (0.000112) | (9.42e-05) | (2.54e-05) | (0.000120) | (6.92e-05) |
| Family | 7.90e-05 | 1.08e-05 | 8.05e-05 | -2.87e-05 | 0.000124 | -6.98e-05 |
| | (0.000107) | (8.44e-05) | (8.20e-05) | (2.46e-05) | (9.10e-05) | (6.13e-05) |
| Apologetic | -6.34e-05 | 6.60e-05 | -9.72e-05 | -4.00e-06 | -9.05e-05 | -1.87e-05 |
| | (0.000104) | (7.53e-05) | (7.14e-05) | (2.32e-05) | (8.83e-05) | (4.82e-05) |
| Motivated | -1.64e-05 | 6.07e-05 | -7.62e-05 | 3.11e-05 | -8.60e-05 | 1.46e-05 |
| | (0.000108) | (7.96e-05) | (7.18e-05) | (2.39e-05) | (9.17e-05) | (4.88e-05) |
| Fear | -0.000236*** | -0.000113* | -0.000165** | -4.73e-05** | -0.000164** | -0.000113** |
| | (8.90e-05) | (6.49e-05) | (6.71e-05) | (2.19e-05) | (7.32e-05) | (4.38e-05) |
| Constant | 0.00518 | -0.00101 | 0.0161 | 0.00808** | 0.0182 | 0.00996 |
| | (0.0183) | (0.0137) | (0.0127) | (0.00369) | (0.0153) | (0.00751) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 10,956 | 10,956 | 10,956 | 10,956 | 10,956 | 10,956 |
| Number of Units | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 |
| R-squared | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Wald Test | 5.4e+09*** | 2.1e+10*** | 4.7e+09*** | 3.1e+08*** | 1.7e+10*** | 1.9e+08*** |
| Pesaran Test | 74.797*** | 98.181*** | 41.912*** | 44.253*** | 39.457*** | 69.992*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7: Estimation results with a time lag (cont.)

| Variables | (7) spouse | (8) parents | (9) children | (10) low income | (11) middle income | (12) high income |
|---|---|---|---|---|---|---|
| Income | 9.68e-05 | -0.000110 | 3.37e-05 | -8.88e-05 | -6.48e-05 | -3.23e-06 |
| | (0.000140) | (8.40e-05) | (7.30e-05) | (8.83e-05) | (0.000105) | (7.49e-05) |
| Expected Length | 2.10e-05 | 0.000110** | -3.00e-05 | 9.73e-05 | -4.92e-05 | 6.03e-05 |
| | (9.63e-05) | (5.49e-05) | (5.16e-05) | (6.53e-05) | (7.22e-05) | (4.22e-05) |
| Risk | -0.000146 | -3.77e-05 | -3.36e-05 | 3.84e-05 | -0.000118 | -1.93e-05 |
| | (0.000103) | (5.67e-05) | (5.50e-05) | (6.38e-05) | (7.26e-05) | (4.00e-05) |
| Sympathy | 9.89e-05 | 1.24e-05 | 1.71e-05 | 4.08e-05 | 3.85e-05 | 8.96e-05** |
| | (8.44e-05) | (5.65e-05) | (5.37e-05) | (6.06e-05) | (6.18e-05) | (3.80e-05) |
| Drinking | -1.06e-05 | 4.98e-05 | 3.97e-05 | 0.000112* | -0.000116 | 3.16e-05 |
| | (0.000115) | (7.73e-05) | (6.66e-05) | (6.75e-05) | (8.48e-05) | (4.97e-05) |
| Family | 8.48e-05 | 6.18e-05 | 7.75e-06 | -3.44e-05 | 9.81e-05 | -1.09e-05 |
| | (8.57e-05) | (6.11e-05) | (5.29e-05) | (6.46e-05) | (6.96e-05) | (4.00e-05) |
| Apologetic | -9.61e-05 | -6.79e-06 | -3.60e-05 | 3.39e-05 | -2.05e-05 | -3.96e-05 |
| | (8.56e-05) | (4.82e-05) | (4.73e-05) | (5.45e-05) | (6.16e-05) | (3.83e-05) |
| Motivated | -1.02e-05 | -1.19e-05 | -3.51e-05 | -7.36e-06 | 5.11e-05 | 3.66e-05 |
| | (9.01e-05) | (5.15e-05) | (4.88e-05) | (5.07e-05) | (5.91e-05) | (3.72e-05) |
| Fear | -0.000185** | -0.000127*** | -1.05e-05 | -0.000165*** | -3.78e-05 | -0.000110*** |
| | (8.00e-05) | (4.87e-05) | (4.52e-05) | (5.10e-05) | (5.83e-05) | (3.78e-05) |
| Constant | 0.0129 | 0.00726 | 0.0118 | 0.00268 | 0.0173 | 0.00302 |
| | (0.0147) | (0.00902) | (0.00791) | (0.00992) | (0.0107) | (0.00659) |
| Prefecture Dummies | YES | YES | YES | YES | YES | YES |
| Industry Dummies | YES | YES | YES | YES | YES | YES |
| Observations | 10,956 | 10,956 | 10,956 | 10,956 | 10,956 | 10,956 |
| Number of Units | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 |
| R-squared | 0.001 | 0.001 | 0.000 | 0.002 | 0.001 | 0.002 |
| Wald Test | 3.4e+11*** | 5.2e+09*** | 1.4e+11*** | 4.0e+09*** | 1.1e+11*** | 1.3e+08*** |
| Pesaran Test | 29.493*** | 41.457*** | 22.798*** | 34.495*** | 31.129*** | 32.969*** |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

## Appendix

Table A1: Correlation matrix of the variables

| | Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Business closure ratio | 1.00 | | | | | | | | | |
| 2 | Income | -0.03 | 1.00 | | | | | | | | |
| 3 | Expected length | -0.01 | -0.07 | 1.00 | | | | | | | |
| 4 | Risk | -0.02 | 0.03 | 0.05 | 1.00 | | | | | | |
| 5 | Sympathy | -0.01 | 0.02 | 0.10 | -0.04 | 1.00 | | | | | |
| 6 | Drinking | 0.00 | 0.15 | -0.06 | 0.18 | -0.24 | 1.00 | | | | |
| 7 | Family | -0.02 | 0.19 | -0.14 | 0.17 | -0.30 | 0.50 | 1.00 | | | |
| 8 | Apologetic | 0.01 | 0.01 | -0.04 | 0.03 | -0.18 | 0.03 | -0.05 | 1.00 | | |
| 9 | Motivated | 0.02 | -0.08 | 0.03 | 0.03 | -0.49 | 0.18 | 0.22 | 0.00 | 1.00 | |
| 10 | Fear | -0.01 | -0.13 | 0.03 | -0.02 | 0.19 | -0.07 | -0.15 | -0.06 | -0.08 | 1.00 |