

Small Business under the COVID-19 Crisis: Expected Short- and Medium-Run Effects of Anti-Contagion and Economic Policies

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As of June 2020, COVID-19 pandemic has already resulted in 13 million confirmed cases and 570,000 deaths worldwide.

Most governments around the world are responding by a combination of

- Anti-contagion policies: lockdown, businesses suspension...
 - In short run, infection \downarrow & economy \downarrow (?)
 - In medium run, infection $\downarrow \Rightarrow$ economy \uparrow (?)
- Economic policies to soften the economic damage: subsidies to firms and individuals...

We evaluate some key parameters needed for designing these policies

- Short-run trade-off between anti-contagion and economics
- Effectiveness of subsidies to firms
- Potential medium-run economic benefits of containing infections

- We focus on small businesses: most vulnerable to the economic crisis
- Japan
 - ↑ new infections in March ⇒ Emergency declaration and business suspension requests in April-May
 - Subsidies to small businesses
 - Possibility of hosting Tokyo Olympic Games: anti-contagion policies are tied to a longer-term economic goal
- We conducted a large-scale survey to small business managers asking managers' **expectations** about COVID-19 related events (e.g. timing of containment), plan to utilize subsidies, and business performance
 - Expectation and uncertainty are drivers of firms' important dynamic decisions such as investment
 - Policymakers do not have time to wait until economic outcomes are realized for designing the policies

1. Impacts of emergency declaration & business suspension requests (DID/survey date randomization)

- Monthly sales ↓ by 2-3 pp in April 2020 compared to March
- Over a week when emergency declaration was lifted partially, expected sales in Q2 2020 ↑ by 4 pp & investment plan ↑

2. Effectiveness of subsidies to firms (RDD)

- Business continuation subsidy: prospects of business continuation ↑ by 19 pp
- Short-time work compensation: eligibility has insig. effect on prospective use the subsidy

3. Expected long-run gains of infection containment (DID)

- Expected sales ↑ by 3.2 pp in the quarter when the number of daily new infections becomes zero for the first time in Japan
- Expected sales ↑ by 6 pp in Q4 2020 if Japan hosts the Tokyo Olympic Games in 2020–2021

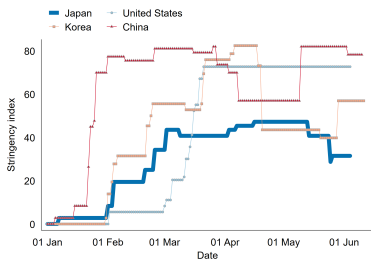
- **Economic impact of anti-contagion policies under COVID-19:** Chetty et al. (2020), Kong & Prinz (2020), Barrot et al. (2020), Kikuchi et al. (2020), Baker et al. (2020), Kahn et al. (2020), Beland et al. (2020)
 - New: Using detailed survey responses at the firm level, we estimate causal impact of anti-contagion policies on firm performance.
- **COVID-19 related subsidies & stimulus package:** Baker et al. (2020), Granja et al. (2020), De Marco (2020)
 - New: We identify the causal effect of such subsidies
- **Empirical studies on managers' expectations:** Coibion & Gorodnichenko (2012,2015), Massenet & Pettinicchi (2018), Bachmann Elstner (2015), Coibion et al (2018), Bloom et al. (2017, 2019), Baker et al (2020)
 - New: Our survey obtains forecasts of not only economic variables, but government policies and the exogenous business environment, enabling us to examine their relationships

- **Impact of anti-contagion policies on infections:** Hsiang et al (2020), Imperial College COVID-19 Response Team, et al (2020), Zhang et al (2020), Fang et al (2020), Chernozhukov et al (2020), Kasahara & Hoshi (2020)
 - Major non-pharmaceutical anti-contagion policies such as lockdowns and requirements of masks have had a large effect on reducing transmission.

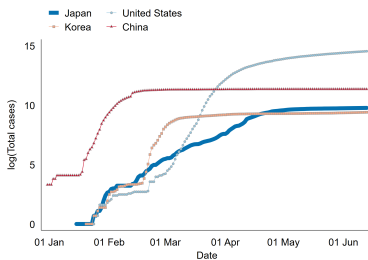
1. Policy responses of the government
2. Survey design and data
3. Effects of emergency declaration and business suspension requests
4. Effects of subsidies
5. Medium-run effects of infection containment

Anti-contagion policies around the world: some examples

- China: lockdown of province, national-level mobility restrictions, etc.
- US: travel restriction, business/school closures, emergency declaration, etc.
- Korea: quickly reduced new infections, minimizing mobility restrictions
- Japan: similar, but all measures are based on requests, rather than orders for legal enforcement



(a) Stringency index



(b) Infection

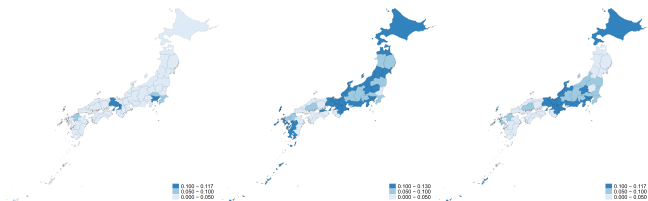
Anti-contagion policies in Japan

- Before April
 - February: Government requested the cancellation of unnecessary large-scale gatherings
 - February: Emergency declaration declared by Hokkaido prefecture
 - March: Temporary closures of public schools
- April
 - On April 7, government declared a state of emergency until May 6 for seven prefectures
 - It gave local governments the legal basis for prefectures to issue business suspension requests and stay-at-home requests
 - These prefectures started business suspension requests at several facilities
 - On April 16, coverage of the emergency declaration was extended to all prefectures in Japan
 - On April 30, PM Abe informally announced that the period of the state of emergency would be extended beyond original plan of ending on May 6.

Anti-contagion policies in Japan in May

- On May 4, government extended emergency declaration to May 31
 - Adding that it could be lifted earlier depending on the situations, with a review due around May 14.
- On May 10, a minister stated that 34 prefectures may have their emergency declaration lifted on May 14
- On May 14, the government lifted emergency declaration in 39 prefectures (including 34 above)
 - For remaining prefectures, government indicated that the possibility of lifting would be re-examined on May 21
- On May 21, the emergency declaration was lifted in Osaka, Hyogo, and Kyoto.
- On May 25, the government declared the end of the emergency declaration for all of remaining prefectures.

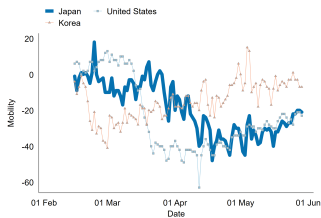
Share of industries under suspension requests and mobility index



(c) April 17

(d) May 1

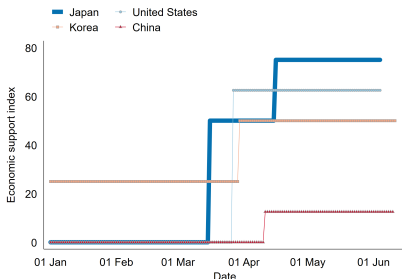
(e) May 15



(f) Retail mobility

Economic support index was relatively high in Japan

- Direct payments to every individual
- Business continuation subsidy for firms
- Short-time work compensation scheme for firms
- Business suspension subsidy for firms
- Low-interest-rate non-collateral special credit lines for firms



- Newly introduced in April 2020 to help small/medium firms survive.
- Max amount: JPY 1 million to the self-employed and JPY 2 million to small corporations (lower if the sales decline is less)
- Eligibility criteria
 1. One of monthly sales in 2020 declined more than 50% from the same month in the previous year
 - The sales decline must be proven based on the sales ledger, which is the basis for the tax on profits.
 2. The firm is operating business since before 2019
 3. Capital below JPY 1 billion or having employment fewer than 2,000 employees in the case of corporations.
- Simple online application process to upload the form, the copy of its sales ledger, and its identity certificate

Short-time work compensation scheme

- Existed since 1975 to help firms maintain employment during recessions & scaled up for the COVID-19 crisis.
- The subsidy compensates for a part of the payment of the leave allowance up to JPY 15,000 per day-employee (scheme after COVID)
- Eligibility criteria (scheme after COVID)
 1. Sales in the last month declined more than 5% from the same month in the previous year
 2. Management and union must agreed on the leave plan.
 3. The firm granted leave to employees and paid employees the leave allowance during leave.
- Complicated application process and uncertainty
 - During May 2-15: Only 53% of applications were granted the subsidy
 - May 21: process was simplified and made online

1. Policy responses of the government
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- We conducted online survey in May 2020 with a survey company
- Sampling frame
 - 18,759 individuals registered as top managers
 - 8,230 individuals registered as freelancers
- We randomly divided the sampling frame into two groups and sent the questionnaire on different dates
 - May 8 (Friday)
 - May 15 (Friday)
 - We closed the collection when the sample size reached 6,000 in each week.
- In the end, we collected answers from 12,364 respondents.
- We validated the data and focused on 6,135 small business managers whose answers were consistent and non-contradictory.

Sample representativeness

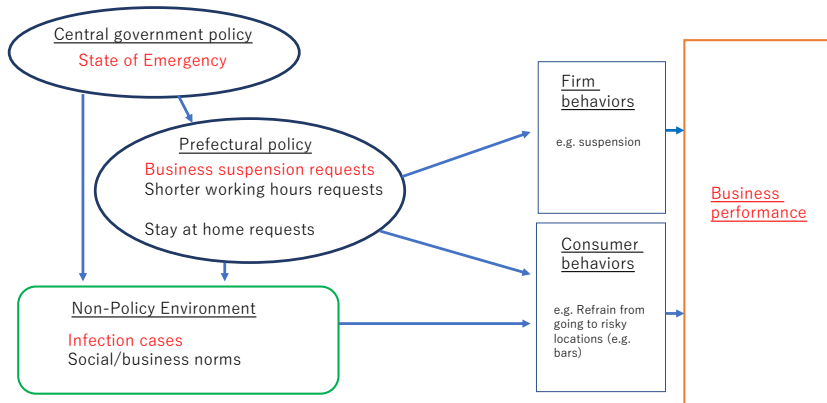
- Firm's business conditions and expectations
 - Sales growth relative to the same period in the last year (realized monthly values for Jan.-Apr. 2020 & quarterly expected values for the rest of 2020)
 - Employment (realized for Q1 and expected for Q2)
 - Investment and dis-investment (realized for Q1 and expected for Q2)
 - Probability of business continuation until Dec. 2020
- Expectations about COVID-19 related events
 - When the government's emergency declaration would be lifted in all prefectures (month-day)
 - When the number of daily new infections in Japan would drop to zero for the first time (year-month)
 - When vaccination against COVID-19 would be used at mass scale in Japan (year-month)
 - How likely it would be that the Tokyo Olympics would be held in 2020-2021
- Expectation about receiving government subsidies

Summary statistics

	mean	sd	min	max
Number of employees	1.86	3.04	0	19
20s	0.00	0.07	0	1
30s	0.05	0.21	0	1
40s	0.21	0.41	0	1
50s	0.40	0.49	0	1
60s	0.26	0.44	0	1
70s	0.08	0.27	0	1
Male	0.88	0.33	0	1
Age	55.45	9.68	21	89
Business-to-Consumer service industry	0.53	0.50	0	1
Prefectures where emergency state was lifted on May 14	0.48	0.50	0	1
Realized sales growth in Jan 2020 compared to the last year	-0.04	24.20	-100	200
Realized sales growth in Feb 2020 compared to the last year	-3.04	27.95	-100	180
Realized sales growth in March 2020 compared to the last year	-10.42	38.17	-100	160
Realized sales growth in April 2020 compared to the last year	-18.63	47.53	-100	160
Realized sales growth in 1Q 2020 compared to the last year	-4.50	24.97	-100	127
Expected sales growth in 2Q 2020 compared to the last year	-19.94	46.96	-100	120
Expected sales growth in 3Q 2020 compared to the last year	-12.21	42.40	-100	180
Expected sales growth in 4Q 2020 compared to the last year	-8.36	41.49	-100	180
Realized investment in Q1 \geq 10,000 JPY	0.27	0.44	0	1
Realized disinvestment in Q1 \geq 10,000 JPY	0.05	0.21	0	1
Expected investment in Q2 \geq 10,000 JPY	0.24	0.43	0	1
Expected disinvestment in Q2 \geq 10,000 JPY	0.06	0.24	0	1
Probability of business survival	81.59	24.81	1	100
Probability of receiving the continuation subsidy	36.78	41.82	0	100
Probability of receiving the short-time work compensation	14.79	30.10	0	100
Probability of receiving the business suspension subsidy	16.27	31.62	0	100
Probability of hosting olympic in 2020-2021	41.16	29.74	0	100
Observations	6108			

1. Policy responses of the government
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Effects of emergency declaration and business suspension request: Conceptual diagram



In April, compared to March,

- State of emergency started in all prefectures & suspension was requested in some prefectures/industries
- Increasing infections, changing social/business norms

We start by estimating the following equation:

$$\begin{aligned}\Delta(\text{Sales})_i &= \beta_1(\text{Some suspension})_i \\ &+ \beta_2(\text{BtoC Service})_i + \beta_3(\text{Infection risk})_i \\ &+ \beta_4\Delta(\text{New infection})_i + \epsilon_i,\end{aligned}$$

- $\Delta(\text{Sales})_i$: firm-level changes in monthly sales from March to April
 - Note: monthly sales here is measured as % *change* from the same month in the last year
- “(Some suspension) $_i$ ”: indicates that the industry was subject to a business suspension request in the prefecture during April
- “(BtoC Service) $_i$ ”: Business to Consumer service
- “(Infection risk) $_i$ ”: proxy of infection risk of the firm’s industry from Benzell et al. (2020), defined for BtoC service industries by “– decline of visitors from Feb to March in US”.

Effects of business suspension request on April sales

	(1) Sales change Mar-to-Apr	(2) Sales change Mar-to-Apr	(3) Sales change Mar-to-Apr	(4) Sales change Mar-to-Apr
Some suspension	-5.281*** (0.836)	-2.003** (0.998)	-1.999** (0.998)	-2.739** (1.358)
New infection change Mar-to-Apr	-0.000361 (0.000361)	-0.000609* (0.000363)	-0.000493 (0.000473)	-0.000530 (0.000475)
BtoC service		-3.124*** (1.029)	-3.127*** (1.029)	-2.385* (1.348)
Infection risk		-1.677*** (0.505)	-1.681*** (0.505)	-1.677*** (0.506)
Early emergency declaration			-0.402 (1.048)	-0.0746 (1.377)
Early emergency declaration × Some suspension				1.600 (1.925)
Early emergency declaration × BtoC service				-1.627 (1.855)
Constant	-6.007*** (0.573)	-5.335*** (0.745)	-5.236*** (0.789)	-5.391*** (0.910)
Observations	6108	6108	6108	6108

Notes: “(Infection risk)_{*i*}” is normalized to mean 0 and standard deviation 1 and takes 0 for industries other than BtoC Service. “Early emergency declaration” takes 1 if the emergency declaration was declared at the prefecture on April 7 and 0 if it was on April 16.

- Business suspension request reduced sales.
- But the magnitude is not huge (roughly around 2-3 pp), after controlling for industry characteristics regarding infection risk.
- Consumers might have voluntarily avoided business associated with high infection risks, and this seems to have reduced firm sales.
- It may be difficult to pin down the effect of emergency declaration in this setting
 - Possible endogeneity: prefectures of “early emergency declaration” are all big cities, Tokyo, Kanagawa, Chiba, Saitama, Osaka, Hyogo, Fukuoka
 - Next, we try to overcome this issue by using randomized survey dates.

Effects of partially lifting the emergency declaration on managers' expectations

We randomly divided the sampling frame into two groups that differ by the week of the survey

- Baseline characteristics are balanced between the two groups of respondents

5 May 2020

SUN	MON	TUE	WED	THU	FRI	SAT
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Japan looks to lift coronavirus emergency in some areas ahead of May 31



People take a walk near the Imperial Palace in Tokyo on Saturday under an extended state of emergency over the coronavirus pandemic. | TOKYO

REUTERS

Economy minister Yasutoshi Nishimura said on Sunday the government is looking to lift the state of emergency in “many of 34 prefectures” that are not

MAY 10, 2020

Japan to lift coronavirus state of emergency in 39 prefectures

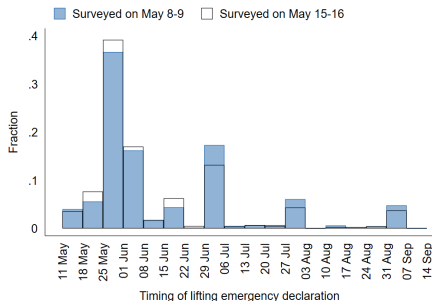
The nation's capital and seven prefectures will maintain emergency measures for now.



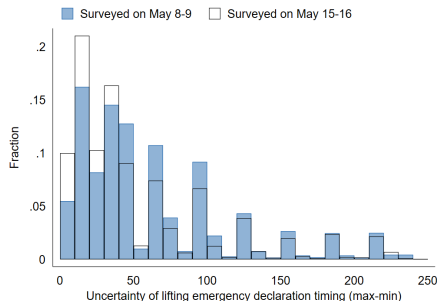
Hope for return to normal as Japan partially lifts virus emergency



“On which day do you expect the state of emergency to be lifted in all prefectures? Please answer the most likely, the earliest, and the latest expected dates.”



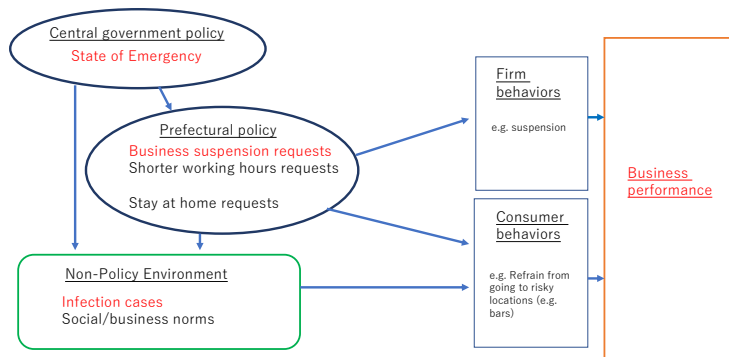
(g) Most likely expected date



(h) Uncertainty (latest - earliest)

Effects of lifting state of emergency and business suspension requests

- Respondents in the later week knew that the state of emergency would end sooner.
- After controlling for the number of infection cases, we assume that other things related to business performance (e.g. social/business norms) did not change just over one week.



Effects of new information over May 8-15 on expectations

VARIABLES	(1) Expected duration of emergency declaration	(2) Uncertainty about duration of emergency declaration	(3) Expected duration of COVID-19 in Japan	(4) Expected sales growth Q2	(5) Expected employment growth Q2	(6) Expected investment Q2
Later group	-5.23*** (1.53)	-9.19*** (1.74)	0.12 (0.30)	-1.08 (1.29)	0.27 (0.63)	0.023** (0.011)
Later group × Suspension	-1.83 (2.36)	-2.85 (2.80)	-0.35 (0.48)	5.94*** (2.22)	-0.97 (1.05)	-0.022 (0.019)
Suspension	-0.24 (1.74)	0.55 (1.98)	0.36 (0.33)	-8.37*** (1.53)	-0.99 (0.70)	0.016 (0.013)
Observations	6,066	5,873	6,095	5,971	6,108	6,056
Ealier group mean	48.18	61.19	9.793	-20.62	-2.838	0.235

Notes: All regressions additionally control for the log of the number of new infections in the prefecture over the past 7 days and its growth rate over the past two weeks. Column 4 additionally controls for sales growth in Q1. Column 5 additionally controls for employment growth in Q1. Column 6 additionally controls for investment in Q1.

- "Expected duration of emergency declaration" is the number of days from May 8 until the expected date of the lifting the emergency declaration in all prefectures.
- "Uncertainty about duration of emergency declaration" is maximum - minimum number of days from May 8 until the expected timing of the lifting .
- "Expected duration of COVID-19 in Japan" is the number of months from May until the expected month when the number of new infections on a day becomes zero for the first time in Japan.

Effects of new information over the week on expectations

VARIABLES	(1) Expected duration of emergency declaration	(2) Uncertainty about duration of emergency declaration	(3) Expected duration of COVID-19 in Japan	(4) Expected sales growth Q2	(5) Expected employment growth Q2	(6) Expected investment Q2
Later group	-4.97** (1.99)	-8.09*** (2.34)	0.14 (0.40)	-1.48 (1.82)	-0.51 (0.88)	0.014 (0.015)
Later group × Suspension	-2.05 (2.87)	-1.11 (3.31)	-0.18 (0.59)	4.25* (2.51)	-0.89 (1.16)	-0.022 (0.023)
Later group × Infection risk	0.38 (1.35)	-0.22 (1.64)	-0.09 (0.30)	0.37 (1.35)	-0.91 (0.68)	-0.011 (0.011)
Later group × BtoC service	-0.36 (3.07)	-3.37 (3.42)	-0.15 (0.60)	1.74 (2.53)	1.39 (1.22)	0.018 (0.024)
Infection risk	-1.99** (0.99)	-1.08 (1.19)	-0.03 (0.19)	-3.02*** (0.88)	-0.20 (0.39)	0.013* (0.007)
Suspension	0.64 (2.19)	1.28 (2.47)	0.27 (0.41)	-3.62** (1.77)	-0.07 (0.78)	0.021 (0.017)
BtoC service	2.15 (2.27)	0.77 (2.47)	0.23 (0.42)	-2.83 (1.77)	-1.27 (0.82)	-0.033** (0.016)
Observations	6,066	5,873	6,095	5,971	6,108	6,056
Ealier group mean	48.18	61.19	9.793	-20.62	-2.838	0.235

Notes: All regressions additionally control for the log of the number of new infections in the prefecture over the past 7 days and the growth rate of it over the past two weeks. Column 4 additionally controls for sales growth in Q1. Column 5 additionally controls for employment growth in Q1. Column 6 additionally controls for investment in Q1.

Sub-sample analysis by prefectures: whether emergency declaration in the prefecture was lifted on May 14 or not

Lifted on May 14	(1)	(2)	(3)	(4)	(5)	(6)
	Expected duration of emergency declaration	Uncertainty about duration of emergency declaration	Expected duration of COVID-19 in Japan	Expected sales growth Q2	Expected employment growth Q2	Expected investment Q2
VARIABLES						
Later group	-3.87 (2.42)	-6.05** (2.62)	-0.19 (0.44)	-1.46 (1.83)	0.08 (0.89)	0.049*** (0.017)
Later group × Suspension	1.11 (3.88)	-0.46 (4.33)	-0.59 (0.75)	5.98* (3.27)	-2.15 (1.60)	-0.035 (0.028)
Suspension	-1.25 (2.70)	-1.21 (2.91)	0.35 (0.51)	-9.84*** (2.27)	-0.02 (1.02)	0.024 (0.019)
Observations	2,884	2,799	2,901	2,847	2,907	2,881
Ealier group mean	50.05	61.93	10.35	-20	-2.452	0.223
Note lifted on May 14	(1)	(2)	(3)	(4)	(5)	(6)
	Expected duration of emergency declaration	Uncertainty about duration of emergency declaration	Expected duration of COVID-19 in Japan	Expected sales growth Q2	Expected employment growth Q2	Expected investment Q2
VARIABLES						
Later group	-5.66*** (2.05)	-11.17*** (2.58)	0.49 (0.43)	-0.39 (2.00)	0.30 (0.97)	0.006 (0.017)
Later group × Suspension	-3.39 (2.92)	-3.95 (3.69)	-0.22 (0.64)	5.70* (3.05)	-0.07 (1.41)	-0.010 (0.025)
Suspension	0.19 (2.25)	1.52 (2.70)	0.39 (0.43)	-7.08*** (2.08)	-1.81* (0.96)	0.007 (0.018)
Observations	3,182	3,074	3,194	3,124	3,201	3,175
Ealier group mean	46.47	60.52	9.280	-21.20	-3.191	0.246

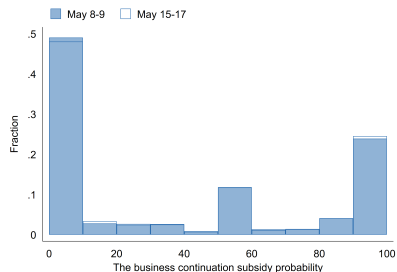
Quick summary of main results: Effects of new information over May 8-15 on expectations

Over May 8-15

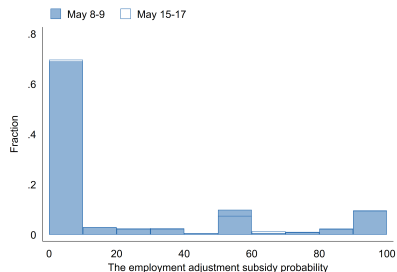
- Firms expected 5 days earlier nationwide ending of emergency declaration
- Uncertainty about the timing of ending emergency declaration also declined
- Expected sales in Q2 2020 \uparrow by 6 pp only among firms that were requested business suspensions
- After controlling for infection risks of the industry, the estimated effect of business suspension requests on Q2 2020 sales is 4.2 pp.
- Investment plan \uparrow among firms in prefectures where emergency declaration was lifted on May 14
 - Consistent with \downarrow uncertainty about the duration of emergency declaration in own prefecture as well as other prefectures.

1. Policy responses of the government
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4. **Effects of subsidies**
5. Medium-run effects of infection containment

Distribution of the subjective probability of receiving the subsidy by end-June 2020

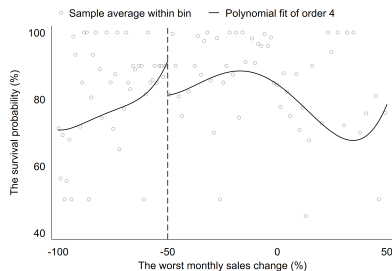
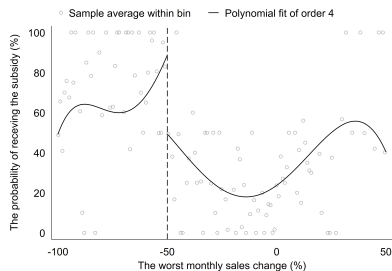


(i) Business continuation subsidy



(j) Short-time work compensation

Business continuation subsidy: Discontinuities at the worst monthly sales decline of 50%



(k) Probability of business continuation subsidy

(l) Survival probability

Taking out -50%

Effect of the probability of receiving the business continuation subsidy

	(1) Survival probability	(2) Employment growth	(3) Investment	(4) Disinvestment
Subsidy probability	0.198* (0.116)	0.000848 (0.00105)	-0.141 (0.223)	-0.0532 (0.138)
Observations	5691	6108	6086	6081

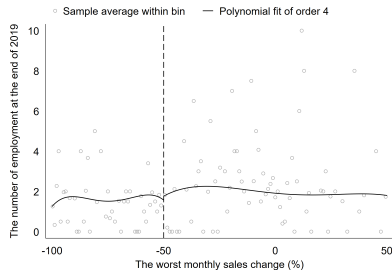
Notes: This table was estimated by a fuzzy RD design using the discontinuity of probability of receiving business continuation subsidy at -50% of the worst monthly sales change in January–April 2020. It uses bias-corrected local-polynomial regression-discontinuity estimation.

Effect of the probability of receiving the business continuation subsidy

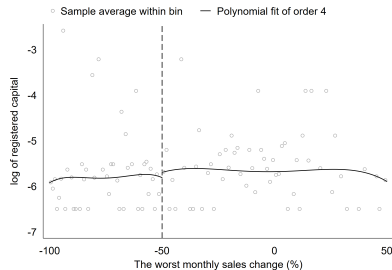
	(1)	(2)	(3)	(4)	(5)
	Business suspension	Establishment closure	Employment suspension	Closure of under-performing sections	Cutting suppliers and buyers
Subsidy probability	-0.334* (0.190)	-0.0708** (0.0292)	0.0562 (0.180)	-0.118** (0.0559)	0.270 (0.186)
Observations	6108	6108	6108	6108	6108

Notes: This table was estimated by a fuzzy RD design using the discontinuity of probability of receiving business continuation subsidy at -50% of the worst monthly sales change in January–April 2020. It uses bias-corrected local-polynomial regression-discontinuity estimation.

Robustness check: Smoothness of baseline characteristics at -50%



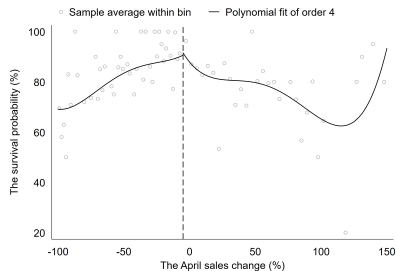
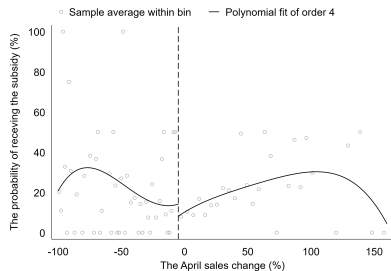
(m) Employment in Dec. 2019



(n) Capital at registration

	(1) Employment Dec. 2019	(2) ln(capital) at registration	(3) ln(sales) at registration
Discontinuity	0.106 (0.578)	0.180 (0.227)	0.162 (0.155)
Observations	6108	4886	5256

Short-time work compensation: discontinuities at the cutoff of April sales decline of 5%



(o) Probability of short-time work compensation

(p) Survival probability

Notes: The sample is restricted to firms hiring at least one worker.

Effect of the probability of receiving short-time work compensation at the cutoff of April sales decline of 5%

	Survival probability	Employment growth	Investment	Disinvestment	Employment suspension
Subsidy probability	-3.071 (5.928)	-0.00286 (0.0121)	3.151 (5.558)	1.151 (1.553)	0.145 (1.732)
Observations	3148	3385	3374	3371	3385

Notes: This table was estimated by a fuzzy RD design using the discontinuity of probability of receiving short-time work compensation at -5% of sales change in 2020. It uses bias-corrected local-polynomial regression-discontinuity estimation. The sample is restricted to firms hiring at least one worker.

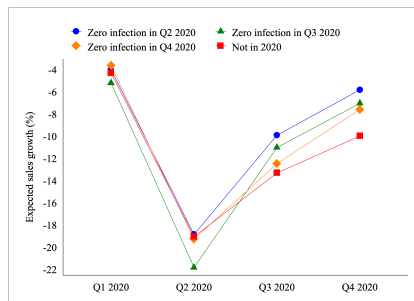
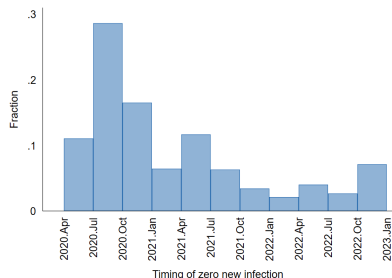
Who has higher prospect for receiving the subsidy?

- Managers have higher prospect for receiving the continuation subsidy if they regularly consult:
 - Accountants, Family, Managers in the same sector, Financial intermediaries, Commercial association, Local governments.
- Managers have higher prospect for receiving the short-time work compensation if they regularly consult:
 - Accountants, Employees, Financial intermediaries, Commercial association.

1. Policy responses of the government
2. Survey design and data
3. Effects of emergency declaration and business suspension request
4. Effects of subsidies
5. **Medium-run effects of infection containment**

Expectations about timing of infection containment and sales recoveries

- When the number of daily new infections in Japan would drop to zero for the first time (year-month)

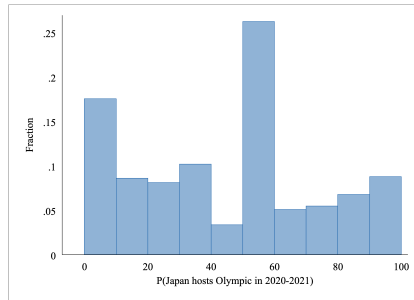
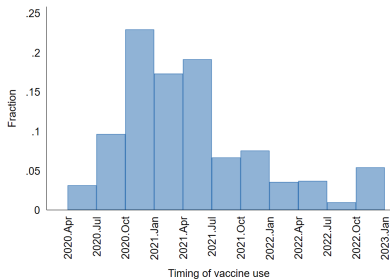


(q) Expected month of the first zero infection

(r) Quarterly sales by timing of zero new infections

Expectations about vaccine and the Olympic

- When vaccination against COVID-19 would be used at mass scale in Japan (year-month)
- How likely it would be that the Tokyo Olympics would be held in 2020-2021



(s) Expected month when a vaccine is used at mass scale in Japan

(t) Probability that Japan hosts the Olympics in 2020–2021

Firm-quarter panel: DID

VARIABLES	(1)	(2)	(3)	(4)	(5)
Sample period	Sales growth Q1-Q4	Sales growth Q1-Q4	Sales growth Q1-Q4	Sales growth Q2-Q4	Sales growth Q2-Q4
After zero new infection	3.04*** (0.72)	2.63*** (0.72)	2.29*** (0.72)	3.22*** (0.83)	2.93*** (0.83)
After mass use of vaccine		0.73 (0.74)	0.34 (0.75)	0.68 (0.81)	0.22 (0.82)
After mass use of vaccine (t+1)		2.69*** (0.69)	2.39*** (0.69)	2.25*** (0.82)	1.94** (0.83)
P(Olympic) × Q3			3.60** (1.42)		3.57** (1.66)
P(Olympic) × Q4			6.14*** (1.57)		6.19*** (1.91)
Observations	24,125	24,125	24,125	18,017	18,017
Firm FE	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES
Mean dep var	-11.21	-11.21	-11.21	-13.49	-13.49

Notes: All regressions additionally control for firm fixed effects and quarter fixed effects. Standard errors are clustered at firm level.

- “After zero new infection” takes 1 from the quarter when the number of daily new infection becomes zero for the first time in Japan, and 0 prior to it.
- “After mass use of vaccine” takes 1 from the quarter when vaccine is used in mass scale in Japan, and 0 prior to it.
- “After mass use of vaccine (t+1)” takes 1 from the quarter prior to the time when vaccine is used in mass scale in Japan, and 0 prior to it.

- Anti-contagion policies
 - Short-run effects of emergency declaration and businesses suspension request
 - Monthly sales ↓ by 2-3 pp in April 2020 compared to March
 - Over a week when emergency declaration was lifted partially, expected sales in Q2 2020 ↑ by 4 pp & investment plan ↑
 - Medium-run effects of containing infections
 - Expected sales ↑ by 3 pp in the quarter when the number of new infections becomes zero in Japan
 - Expected sales ↑ by 6 pp in Q4 2020 if Japan hosts the Tokyo Olympic Games in 2020–2021
- Economic policies to soften the economic damage: subsidies to firms
 - Business continuation subsidy seems to work, but no effect found for short-time work compensation
 - The scheme should be simple and transparent to be effective
- On-going work: to follow up these firms and examine realized performance

Crowd Funding at Academist for follow-up surveys

We appreciate contribution and information sharing!

日本の新型コロナ対策は経済状況にどう影響を及ぼしているか？

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支援総額: 766,400 円
目標金額: 2,000,000 円

達成率	サポーター	残り時間
38 %	47 人	41 日

支援する

プロジェクト コメント 25 進捗報告 0

academist スタッフからの一言

① このプロジェクトは、2020年06月25日 10時00分 から 2020年08月27日 17時 00分 までの間に目標金額 2,000,000円を達成した場合のみ、決済が確定します。

<https://academist-cf.com/projects/181?lang=ja>

Appendix

Firm-quarter panel: belief about COVID-related events × quarter dummies

VARIABLES	(1)	(2)
	Sales growth	Sales growth
Zero new infection in 2020Q2 × Q2	-0.42 (2.08)	-0.84 (2.13)
Zero new infection in 2020Q2 × Q3	3.09 (1.97)	2.40 (2.02)
Zero new infection in 2020Q2 × Q4	3.74* (1.98)	2.54 (2.02)
Zero new infection in 2020Q3 × Q2	-2.08 (1.44)	-2.29 (1.47)
Zero new infection in 2020Q3 × Q3	3.17** (1.37)	2.68* (1.39)
Zero new infection in 2020Q3 × Q4	3.85*** (1.36)	3.24*** (1.37)
Zero new infection in 2020Q4 × Q2	-0.92 (1.74)	-1.13 (1.75)
Zero new infection in 2020Q4 × Q3	0.25 (1.59)	-0.40 (1.60)
Zero new infection in 2020Q4 × Q4	1.66 (1.62)	0.94 (1.62)
Mass use of vaccine from 2020Q2 × Q2		0.82 (3.95)
Mass use of vaccine from 2020Q2 × Q3		0.13 (3.89)
Mass use of vaccine from 2020Q2 × Q4		3.63 (3.80)
Mass use of vaccine from 2020Q3 × Q2		3.77* (2.15)
Mass use of vaccine from 2020Q3 × Q3		3.79* (2.06)
Mass use of vaccine from 2020Q3 × Q4		5.19** (2.18)
Mass use of vaccine from 2020Q4 × Q2		-0.17 (1.51)
Mass use of vaccine from 2020Q4 × Q3		3.35** (1.39)
Mass use of vaccine from 2020Q4 × Q4		3.01** (1.39)
Observations	24.125	24.125
R-squared	0.725	0.726
Firm FE	YES	YES
Quarter FE	YES	YES
Mean dep var	-11.21	-11.21

VARIABLES	(1) ln(firm emp)	(2) ln(estab emp)	(3) ln(caiptal)	(4) ln(sales)	(5) age	(6) male
respondent	-0.10*** (0.02)	-0.09*** (0.01)	-0.09*** (0.02)	-0.10*** (0.02)	3.06*** (0.14)	0.11*** (0.00)
Observations	26,561	26,556	20,067	20,877	28,169	28,169
R-squared	0.001	0.001	0.001	0.001	0.017	0.016
Mean dep var	1.501	1.415	1.524	3.924	52.04	0.775

(a) Comparing the sampling frame and respondents

VARIABLES	(1) ln(firm emp)	(2) ln(estab emp)	(3) ln(caiptal)	(4) ln(sales)	(5) age	(6) male
satisfying criteria	0.09*** (0.02)	0.07*** (0.02)	0.16*** (0.04)	0.17*** (0.03)	0.54** (0.22)	0.03*** (0.01)
Observations	9,219	9,176	7,173	7,710	9,224	9,224
R-squared	0.002	0.002	0.003	0.004	0.001	0.001
Mean dep var	1.236	1.196	1.306	3.684	55.30	0.872

(b) Comparing the sample used in this analysis vs. dropped among respondents

Comparison of respondents and economic census

No. of workers	Survey in May	Economic census
1	0.45	0.22
2	0.22	0.21
3	0.10	0.13
4	0.06	0.09
5-9	0.11	0.22
10-19	0.05	0.13

Notes: No. of workers includes top managers. [Back](#)

Balancing test: earlier vs. later weeks

VARIABLES	(1) ln(firm emp)	(2) ln(estab emp)	(3) ln(caiptal)	(4) ln(sales)	(5) age	(6) male
later group	-0.01 (0.01)	-0.01 (0.01)	-0.05 (0.03)	-0.02 (0.02)	0.10 (0.25)	0.00 (0.01)
Observations	6,108	6,086	4,886	5,256	6,108	6,108
R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Mean dep var	1.079	1.067	1.191	3.528	55.45	0.879

VARIABLES	(1) self-employed	(2) lifted on May 14	(3) expected sales growth in Jan 2020 compared to the last year	(4) expected sales growth in Feb 2020 compared to the last year	(5) expected sales growth in March 2020 compared to the last year	(6) expected sales growth in April 2020 compared to the last year	(7) investment in Q1>0
later group	0.00 (0.01)	-0.00 (0.01)	0.67 (0.62)	0.11 (0.72)	0.05 (0.98)	1.68 (1.22)	0.00 (0.01)
Observations	6,108	6,108	6,108	6,108	6,108	6,108	6,076
R-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean dep var	0.802	0.476	-0.0359	-3.040	-10.42	-18.63	0.269

Average effects of new information over one week

VARIABLES	(1) Day when Emergency State is lifted	(2) Range of days when Emergency State is lifted	(3) Month when infection is contained	(4) Most likely sales growth Q2	(5) Employment growth Q2	(6) Investment Q2
Later group	-5.91*** (1.17)	-10.25*** (1.36)	-0.00 (0.24)	1.01 (1.07)	-0.11 (0.51)	0.015* (0.009)
Observations	6,066	5,873	6,095	5,971	6,108	6,056
Earlier group mean	48.18	61.19	9.793	-20.62	-2.838	0.235

Notes: All regressions additionally control for the log of the number of new infections in the prefecture over the past 7 days and the growth rate of it over the past two weeks. Column 4 additionally controls for sales growth in Q1. Column 5 additionally controls for employment growth in Q1. Column 6 additionally controls for investment in Q1.

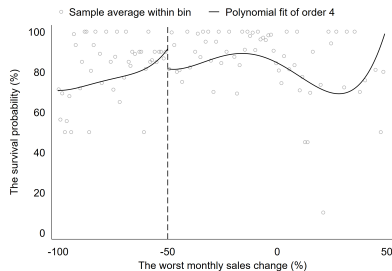
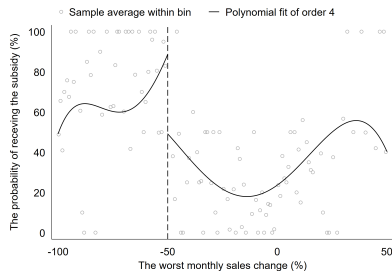
Effects of new information over May 8-15 on expectations: Weighted by Economic Census (size × corporation/sole proprietor)

VARIABLES	(1) Expected duration of emergency declaration	(2) Uncertainty about duration of emergency declaration	(3) Expected duration of COVID-19 in Japan	(4) Expected sales growth Q2	(5) Expected employment growth Q2	(6) Expected investment Q2
Later group	-5.25*** (1.85)	-10.15*** (2.34)	-0.13 (0.38)	-1.27 (1.64)	-0.35 (0.92)	0.032* (0.016)
Later group × Suspension	-3.44 (2.89)	-2.51 (3.87)	0.28 (0.64)	6.94** (2.81)	-0.18 (1.65)	-0.038 (0.028)
Suspension	1.38 (2.17)	0.67 (2.70)	-0.02 (0.43)	-8.23*** (1.86)	-1.10 (1.08)	0.020 (0.020)
Observations	6,066	5,873	6,095	5,971	6,108	6,056
Ealier group mean	48.18	61.19	9.793	-20.62	-2.838	0.235

Notes: All regressions additionally control for the log of the number of new infections in the prefecture over the past 7 days and its growth rate over the past two weeks. Column 4 additionally controls for sales growth in Q1. Column 5 additionally controls for employment growth in Q1. Column 6 additionally controls for investment in Q1. Regressions are weighted by the number of firms in national economic census by employment size and the distinction between corporations and sole proprietors.

[Back](#)

Robustness check: Taking out mass point at -50%



(u) Receiving business continuation subsidy

(v) Survival probability

Back

Firm-quarter panel: DID Weighted by Economic Census (size × corporation/sole proprietor)

VARIABLES	(1) Sales growth	(2) Sales growth	(3) Sales growth	(4) Sales growth	(5) Sales growth
After zero new infection	2.89*** (0.93)	2.44*** (0.94)	2.19** (0.94)	2.84*** (1.05)	2.58** (1.05)
After mass use of vaccine		1.26 (0.97)	0.92 (0.99)	1.54 (1.04)	1.09 (1.05)
After mass use of vaccine (t+1)		2.71*** (0.91)	2.51*** (0.92)	2.96*** (1.08)	2.68** (1.10)
P(Olympic) × Q3			2.21 (1.93)		3.20 (2.25)
P(Olympic) × Q4			5.18** (2.11)		6.19** (2.57)
Observations	24,125	24,125	24,125	18,017	18,017
Firm FE	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES
Mean dep var	-11.21	-11.21	-11.21	-13.49	-13.49

Notes: All regressions additionally control for firm fixed effects and quarter fixed effects. Standard errors are clustered at firm level. Regressions are weighted by the number of firms in national economic census by employment size and the distinction between corporations and sole proprietors.

[Back](#)