The Short- and Long-run Employment Impact of Covid-19 through the Effects of Real and Financial Shocks on New Firms

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The views expressed in this presentation are those of the authors and **do not** *necessarily represent the views of the Bank of Spain and the Eurosystem.*

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- What are the **most effective policy responses**?

This Paper

This paper focuses on the impact of the COVID-19 shock on the **type** of firm entry, and on its short- and long-run employment implications.

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- We evaluate the effectiveness of alternative policies to promote the entry and growth of new firms.

Preview of the findings (1)

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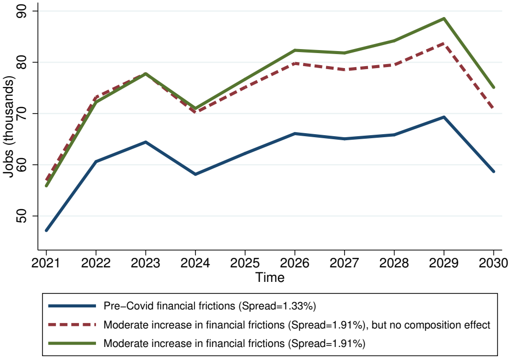
Predicted job losses for cohort of firms born in 2020 in Spain



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- Wage subsidy most effective in the short run, but negligible effect in the long run.
- Loan subsidy much more efficient than investment grant in stimulating entry.
- Loan subsidy largest overall employment effect among the three alternatives.
  - Intuition: gives endogenously more support to "marginal" entrepreneurs.

Related literature

- Economic consequences of Covid-19 for small businesses (with emphasis on financial factors): Bartik et al. (2020), Fairlie (2020), Schivardi and Romano (2020), Ferrando and Ganoulis (2020), Buera et al. (2020), Alfaro et al. (2020), Gobbi et al, 2020, Gonzalez-Uribe and Wang, 2020, Humphries et al (2020), Bennedsen et al., (2020), Juergensen et al. (2020), Zoller-Rydzek and Keller (2020).
- Young fast growing firms: Haltiwanger et al. (2016); Pugsley et al. (2018), Sedlacek (2020), Sedlacek and Sterk (2017),(2020).
- Financial frictions and firm dynamics: Buera et al. (2011), Cole et al. (2016), Midrigan and Xu (2014), Christoph and Caggese (2020).

Empirical Analysis

Empirical Analysis: Overview

1. Latest data about Covid-19 shock and firm entry.

2. Predictions on Entry and its Composition (ES, DE, FR, IT).

3. Prediction on short- and long-run implication on cohort employment (ES).

Empirical Analysis

1- Covid-19 Economic Shock

Covid-19 Economic Shock

Massive expected decrease in GDP in 4 largest economies in EU...

Projected GDP growth

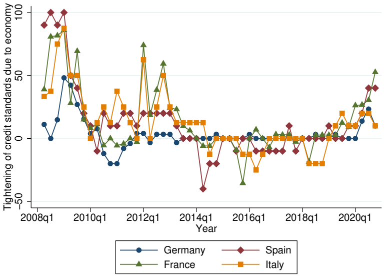
	GDP growth 2019	Projected GDP growth 2020
France	1.5	-9.1
Germany	0.6	-5.5
Italy	0.3	-9.1
Spain	2.0	-11.6

Notes: The projected levels of GDP growth for 2020 are taken from the December 2020 OECD Economic Outlook

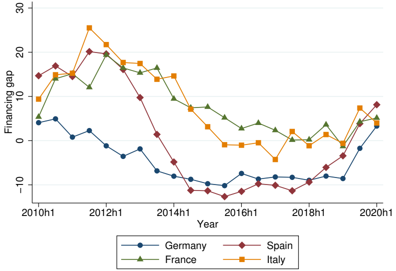
Covid-19 Economic Shock

... and a worsening of credit conditions for SMEs

A. Tightening of credit standards to SMEs due to economic conditions (Banks)



B. Change in financing gap (SMEs)



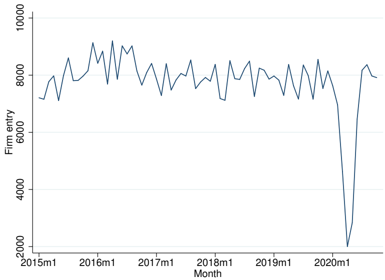
Notes: **Panel A:** Shows the frequency of surveyed banks answering the general economic outlook considerably contributed to a tightening of credit standards minus the frequency answering it considerably contributed to an easing. **Last data available for Q4 2020**.

Panel B: The figure shows the difference between the change in demand for and the change in the availability of external finance for surveyed SMEs. Source: SAFE. **The last survey in the series was conducted between April 2020 and September 2020**.

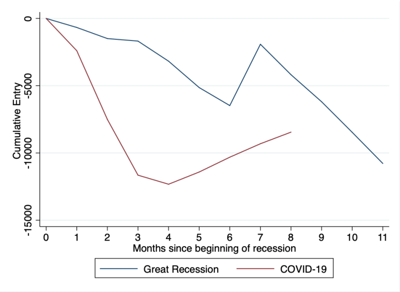
Early data on firm entry from Spain

April and May 2020: entry drops around 75%. It rebounds afterwards, but gap still large.

A. Firm entry in Spain



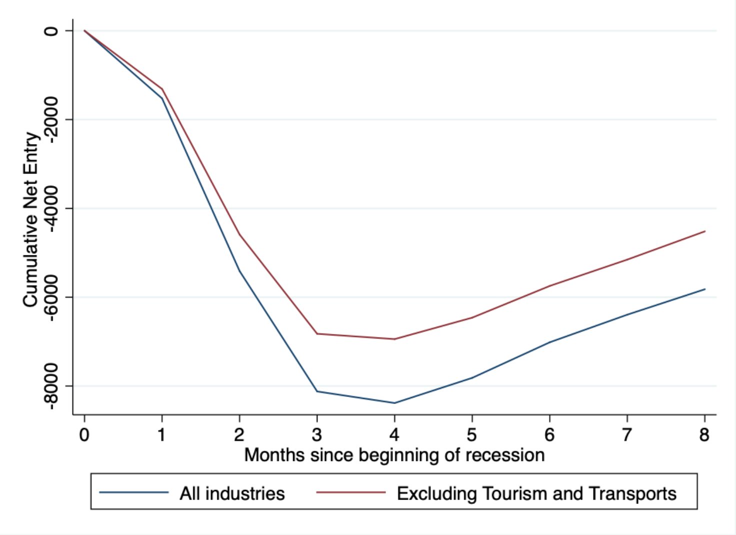
B. Cumulative drop in firm entry in Spain



Notes: Data at monthly frequency from INE. Panel A shows the deseasonalized number of new firms entering ("Constituidas"), which only includes firms recognized as independent legal entities (Last month is October 2020). Panel B shows the cumulative deviations from the trend since the beginning of the crisis for the Great Recession (month 0 is April 2008) and the beginning of the Covid-19 shock (month 0 is Februrary 2020).

Early data on firm entry from Spain - Net Entry

B. Cumulative drop in NET firm entry in Spain



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Empirical Analysis

2- Predictions on Entry and its Composition

Identifying heterogeneous startup decisions

- **Data:** Global Entrepreneurship Monitor (GEM) 2003-16 Surveys for Spain, France, Germany and Italy (more than 350k observations).
- Identify Nascent entrepreneur (2.1% of all respondends) and High-Growth startups (31% of new entrepreneurs).

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- Identify Nascent entrepreneur (2.1% of all respondends) and High-Growth startups (31% of new entrepreneurs).
- **Validation exercise** For Spain, we match each firm with the share of high-growth startups in the 2-digit sector in the year they were born (2,686,508 firm-year observations).[More]
  - High-growth startups on average 13% smaller at birth, but 23% larger at year 9, relative to low-growth startups (controlling for sector and year fixed effects, and for demand proxies)

Business cycles, financial shocks, and startup decisions

$$Pr(start^s_{i,j,t} = 1|X_{i,j,t}) = \Phi(\beta^s_0 + \beta^s_1 bus_{j,t} + \beta^s_2 spread_{j,t} + \beta^s_3 bus_{j,t} \cdot spread_{j,t} + \sum_{k=0}^{K} \gamma^s_k X^k_{i,j,t} + \varepsilon_{i,j,t}). \quad (1)$$

- $start^s_{i,j,t}$: dummy individual i in country j in year t is starting a firm of type $s \in (a, h, l)$ (a indicates all startups and h and l startups with high and low growth potential, respectively).
- $bus_{j,t}$: real GDP growth in terms of ppp in country j at time t.
- $spread_{j,t}$: corporate bond spreads from Gilchrist and Mojon (2016).
  - Instrumented using exogenous monetary policy shocks identified by Jarocinski and Karadi (2020).
- $X^k_{i,j,t}$: controls - country dummies, individual characteristics (gender, age, educational level, income category), and proxies of demand effects.

A decline in GDP growth decreases entry, while spreads have a negative and significant effect only for high-growth startups

	IV		
	(4) All	(5) Low growth	(6) High growth
GDP growth	4.838**	4.419**	3.879
	(2.2594)	(1.8838)	(2.3678)
GZ spread	-0.007	0.064	-0.192**
	(0.0599)	(0.0438)	(0.0869)
GZ spread x GDP growth	4.826	2.675	7.938***
	(3.0224)	(2.8518)	(2.2418)
Observations	359791	359791	359791
R-squared	0.128	0.110	0.122
P-value for $\beta_2^{low} = \beta_2^{high}$		0	
P-value for $\beta_3^{low} = \beta_3^{high}$		0	

Notes: The dependent variable is a dummy that is equal to one if an individual is a nascent entrepreneur in the respective category. Columns 1-3 show OLS results. Column 4-6 are estimated with the GZ spread predicted by the IV specification described in the online Appendix. Standard errors are clustered at the country level. Significance levels: * p$<$0.1, ** p$<$0.05, *** p$<$0.01.

Predictions on Entry Margin

Analysis for FR, DE, IT and ES

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- Two scenarios for **GDP growth**:
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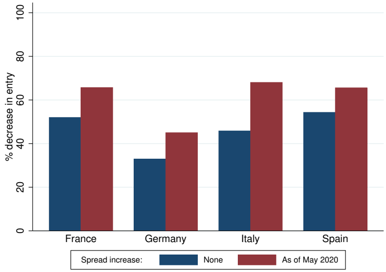
  - Realistic: Half of the decrease of projected GDP growth by European Commission, July 2020.
- For each GDP growth scenario, we consider two scenarios for **financial conditions**:
  - Increase in spreads as of May 2020 (Between 0.4% and 0.8%),
  - No change.

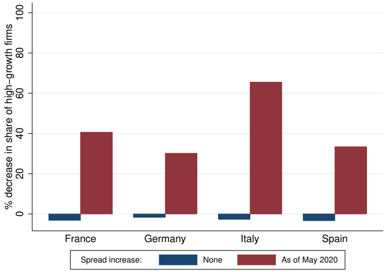
Realistic Scenario

- Drop in GDP predicts a decrease in entry that ranges from 35% in DE to 55% in ES.
- If accompanied by worsening of financial conditions entry drops even further, accompanied with a lower share of high-growth firms.

A. Predicted fall in firm creation



B. Predicted fall in high-growth share

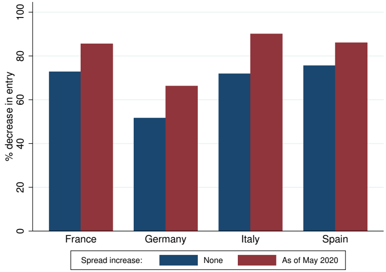


Notes: The fall in firm creation and the share of high-growth firms are predicted using the IV estimates in columns 5-6 of Table 1 and half of the decrease of the European Commision GDP forecasts depending on the assumed increase in the spread.

Pessimistic Scenario

- *Entry* and the *share of high growth* firms decreases even further.
  - Predicted decrease in entry that ranges from 55% in DE to 75% in ES.

A. Predicted fall in firm creation



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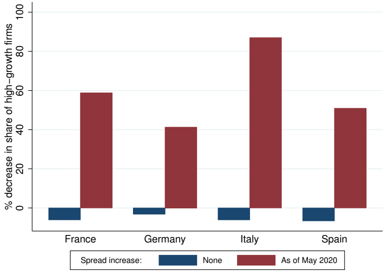

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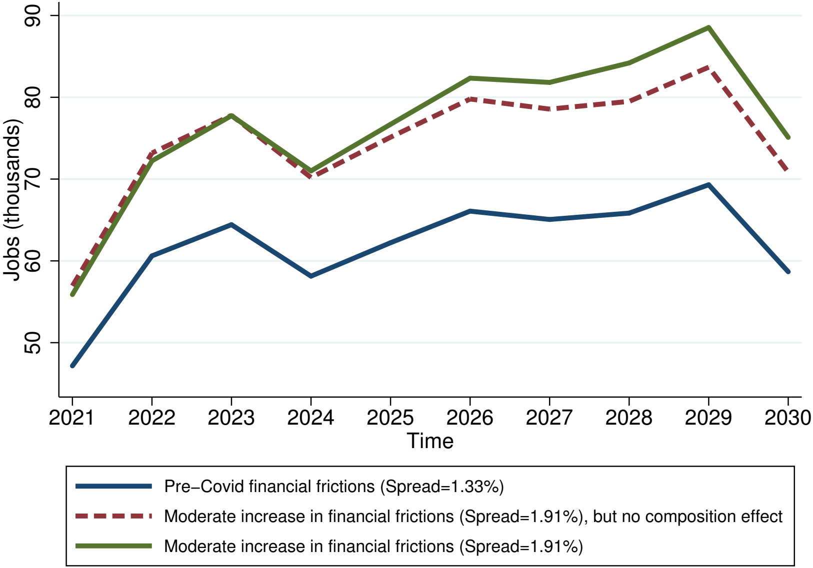
Empirical Analysis

3- Predictions on Short and Long-Run Employment Effects for Spain

1. For Spain, we use the MCB dataset to:
   - estimate the effect of entry on long run aggregate employment at the cohort level. [More]
   - estimate the impact of the composition channel on employment. [More]
2. We combine these estimates with the predicted fall in entry, and the predicted composition of entry (low/high growth) to predict the long run employment effects of the Covid-19 shock.
3. Caveats:
   - We do not consider spillovers and general equilibrium effects.

Jobs lost: Realistic GDP scenario



Model

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- An increase in the spread penalises more high growth startups, because they take longer to repay the debt, and suffer a larger increase in interest payments.
- $\Rightarrow$ The share of high-growth startups falls.
  - Some entrepreneurs switch from a High- to a Low-growth startup.
  - Some entrepreneurs switch from a High-growth startup to not starting the business.

Policy Analysis

The Covid-19 Shock in the model:

- Demand shock for new businesses: 50% fall on impact, AR(1) with $\rho = 0.5$.
- Wealth shock for potential entrepreneurs: 60% fall in own resources usable to finance startups.
- Spread increases by 1.5ppt.

Combined shocks generate 40% fall in entry, and a big reduction in high growth startups, as predicted by the empirical model.

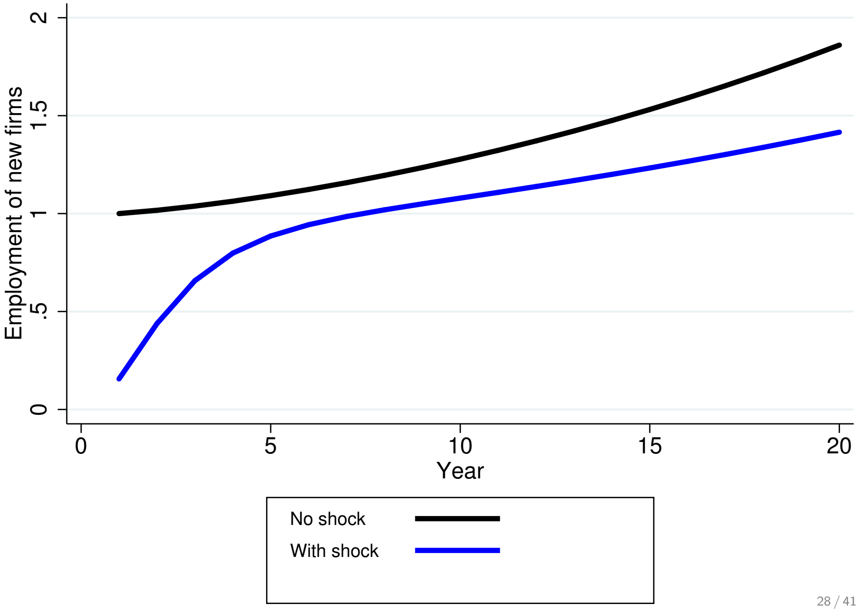
Policy responses we look at in our model

We consider three alternative policies:

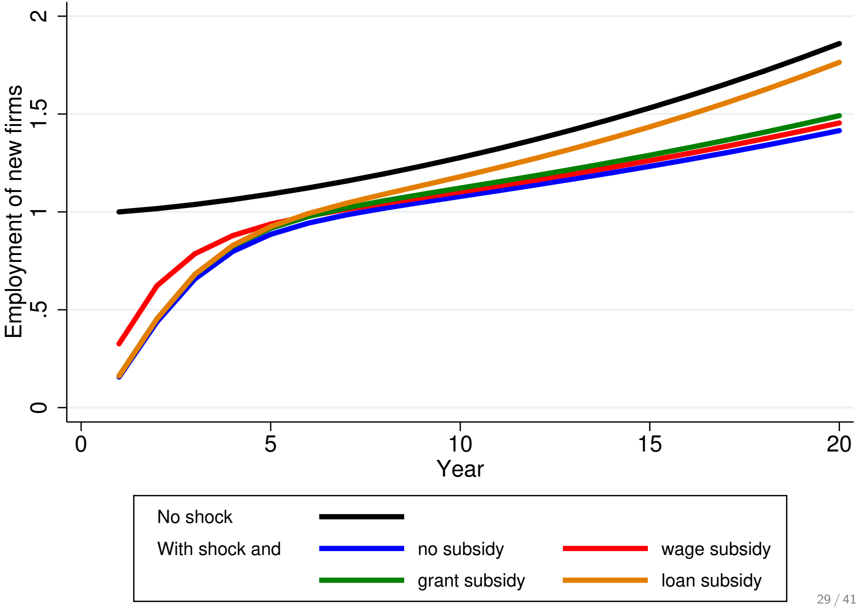
1. **Wage subsidy** that counteracts 50% of the employment loss due to the demand shock;
2. **Grant on initial investment** that covers a fraction of 6% of the initial startup investment;
3. **Subsidized loan** to reduce the spread paid on debt by 61%.

- **All the alternative policies amount to the same total overall cost.**
- **The per capita subsidy is around 10% of the yearly revenues of a startup when it reaches five years of age.**

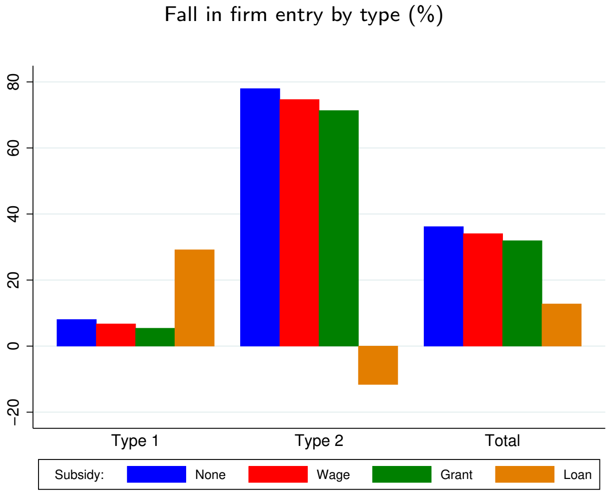
Impact on Cohort Employment, no policy intervention



Impact on Cohort Employment, alternative policy interventions



%Drop in Entry. Type 1=low-growth; Type 2=high-growth



Loan subsidy is the most effective because it endogenously gives more support to "marginal" entrepreneurs.

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1. Covid-19 shock & recession will likely cause a large drop in firm entry with significant long term employment losses.
2. Employment losses very sensitive to financial conditions for small businesses: For Spain, an increase in the spread from 1.33 to 1.91 implies 30% larger employment losses after 10 years.
3. Use a simple model that matches the characteristics of the data to understand which policy would be more effective to promote employment via the entry margin and its composition.
   - **Wage subsidy** is more effective in the short run.
   - **Subsidized loan** more effective in the long run.
   - The loan subsidy has two advantages:

     i) best at targeting high-growth firms.

     ii) Overall more efficient (endogenously lower subsidy for more productive entrepreneurs).

Appendix

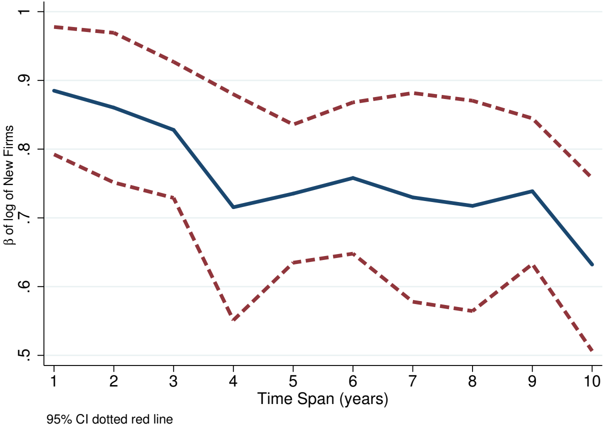
Entry and long run aggregate employment at the cohort level
[Back]

$$\log \mathit{Employment\_cohort}_{k,s,t} = \gamma_{0,k} + \gamma_{1,k} \log \text{New\_firms}_{s,t-k} + \phi_{t,k} + \psi_{s,k} + \epsilon_{k,s,t} \quad (2)$$

- $\mathit{Employment\_cohort}_{k,s,t}$: aggregate employment of the cohort of firms born k years ago, belonging to industry s at time t.
- $\text{New\_firms}_{s,t-k}$: Number of new firms that started k years ago, belonging to industry s at time t.

We perform one regression for each time horizon $k \in [1, 10]$

An increase of 1% in firm entry will increase the employment of that cohort by nearly 0.9% in the first period, and the impact is long-lived, decreasing the employment of the cohort 0.63% in 10 years.



The figure plots the coefficients γ_1^k for each time horizon k from regression (2) in solid blue, with 95% CI in dashed red lines.

Do high-growth startups become high-growth firms?

[Back][Back to Validation]

$$\log Employment_{i,s,t} = \beta_0 + \sum_{k=0}^{K} \beta_{1,k} age^{k}_{i,s,t} + \sum_{k=0}^{K} \beta_{2,k} age^{k}_{i,s,t} Share\_growth^{t-k}_{i,s} + \phi_t + \psi_s + \epsilon_{s,t} \quad (3)$$

- $Employment_{i,s,t}$: employment of firm i belonging to industry s at time t.
- $age^{k}_{i,s,t}$: dummy equal to 1 if the firm is k years old at time t.
- $Share\_growth^{t-k}_{i,s}$: high-growth startups in Spain from GEM data in the 2-digit sector s in year the firm was created $t-k$.

Firms in high growth sectors start smaller, but they grow faster and are already larger than their low-growth counterparts by the age of 4.

	(1) log(Employment)	(2) log(Employment)
Age 0 x share	**-0.129****	-0.052
	(0.0499)	(0.0457)
Age 1 x share	**-0.089****	-0.022
	(0.0357)	(0.0339)
Age 2 x share	**-0.060****	0.001
	(0.0305)	(0.0231)
Age 3 x share	-0.002	0.030
	(0.0272)	(0.0224)
Age 4 x share	**0.044***	**0.043***
	(0.0267)	(0.0245)
Age 5 x share	**0.083*****	**0.065****
	(0.0319)	(0.0285)
Age 6 x share	**0.130*****	**0.094*****
	(0.0385)	(0.0341)
Age 7 x share	**0.163*****	**0.094****
	(0.0548)	(0.0430)
Age 8 x share	**0.228*****	**0.141****
	(0.0775)	(0.0562)
Age 9 x share	**0.230****	**0.154****
	(0.0912)	(0.0688)
Age 10 x share	**0.204****	**0.156***
	(0.0997)	(0.0853)
Year FE	Yes	No
Sector FE	Yes	No
Year-sector FE	No	Yes
Observations	2066938	2066938
R-squared	0.396	0.399

Significance levels: * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Calibration

[Back]

Model Calibration

Parameter	Value	Description
d	0.07	Exit probability
α	0.60	Labor share
κ_1	1.00	Cost of starting Type 1
κ_2	1.25	Cost of starting Type 2
g^{low}	0.00	Initial growth Type 2
g^{med}	0.02	Growth of Type 1
g^{high}	0.06	Growth Type 2 after switching
γ	0.20	Prob. of changing to g^{high} for Type 2
r_b	0.05	Financial Spread
a	0.50	Initial endowment
$\bar{p}$	1.00	Mean price of final good
Covid-19 shock		
Δp	-0.5	Temporary demand change
Δr_b	0.015	Change in financial costs
Δa	-0.3	Change in initial endowment.

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- Exogenous liquidation probability d.

Financing

- Initial endowment of $a \leq \kappa_j$.
- Need to borrow $b_j = \kappa_j - a$
- Debt is repaid using firms' profits π.
- One unit of debt implies a repayment of $\frac{1+r^b}{1-d}$ next period.

$$b_{1,t+1} = \left(\frac{1+r^b}{1-d}\right) b_{1,t} - \pi(p_t, \theta_{j,t}) \tag{4}$$

Mechanism

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$\Rightarrow$ The share of high-growth startups falls.

  - Some entrepreneurs switch from a high- to a low-growth startup.
  - Some entrepreneurs switch from a high-growth startup to not starting the business.

[Calibration]