Firms' financial vulnerabilities during COVID-19: Was the French policy support package efficient?

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MULTIPURPOSE DATA-ANALYSIS TO DETECT FIRM-LEVEL
CAPABILITIES AND THEIR REACTIONS TO SHOCKS
Evidence from cross-countries studies
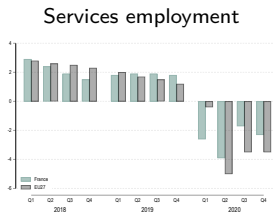Rome, 27 April 2023
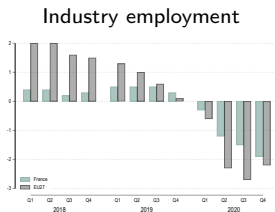
Introduction
COVID-19 in France

Incidence rates · Death rates
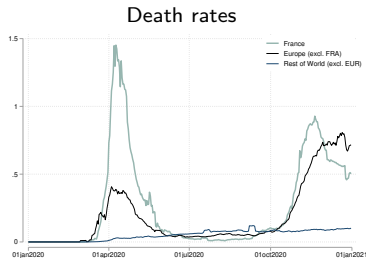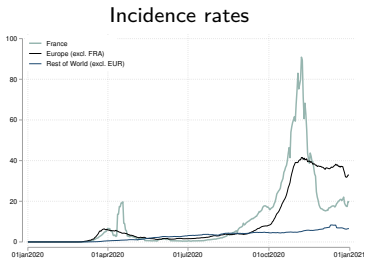
Source: Incidence and death rates relative to population size at WDI online database.

Introduction

Economic performance before and during the pandemic, EU27 and France

GDP growth

Industry production

Industry employment

Services employment
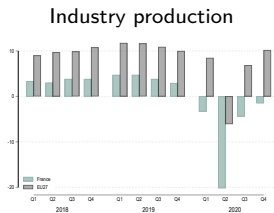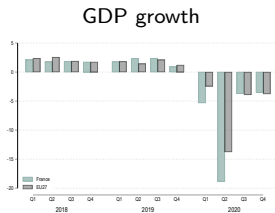
Source: Authors' calculations; data from Eurostat, yoy%-changes.

Introduction

Policy responses in France

Lockdown stringency index — Economic support index
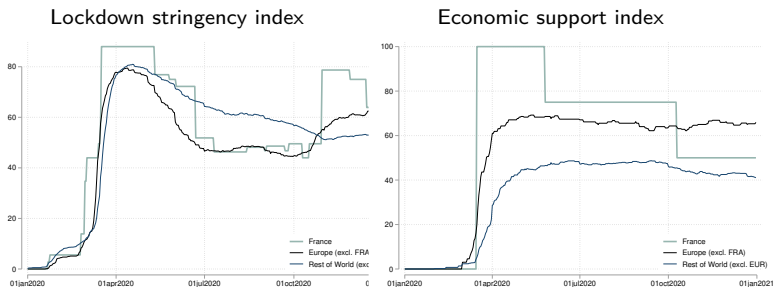
Source: Authors' calculations; data from Oxford database.

Introduction

Part-time employment (Activité Partielle - AP)

- ▶ Part-time work scheme; initially for >8m workers, 70% of gross wage

Solidarity fund (Fonds de solidarité - FSE)

- ▶ 20bn €in 2020, for firms below 10 employees

Guaranteed loan scheme (Prêt garanti par l'État - PGE)

- ▶ Total: 300bn €until Dec 2021, Used by 30-40% of companies, esp. in constrained sectors (Bach et al., 2021a,b)
- ▶ Loans: up to 3 months of 2019-sales or 24 months of wage bill (for innovating or new firms) with
- ▶ Interest rates: 1-2.5% (max 5 years)
- ▶ State guarantee for 70% of capital/interests for large firms, 90% for other firms

Introduction

   i. Postponement of social security contribution payments (few exemptions); advanced reimbursement of tax credit

  ii. Further aids mixing equity and loan support for specific sectors
   - Aerospace, airlines, tourism, culture, retail stores

 iii. Recovery plan (launched end-2020)
   - Participatory loan scheme and subordinated loans for SMEs and mid-size companies (20bn €of quasi-equity to sustain investment)
   - Envisaged (production) tax cuts

Introduction

Nb. of beneficiaries

Total monthly number of firms receiving government support, million

Source: data.gouv.fr.
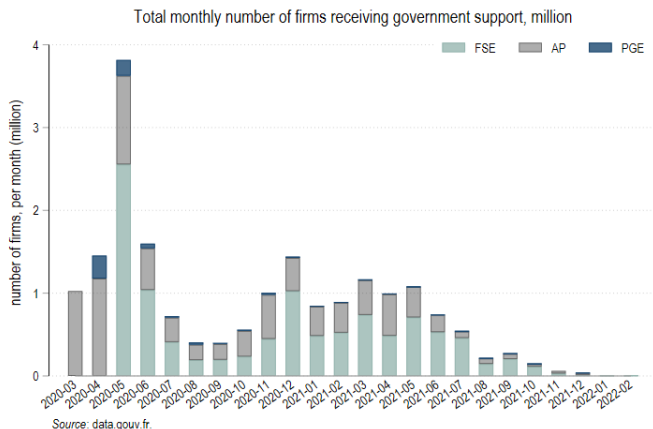
Note: Authors' calculations

Introduction

Amount

Total monthly payout of government support, bn EUR
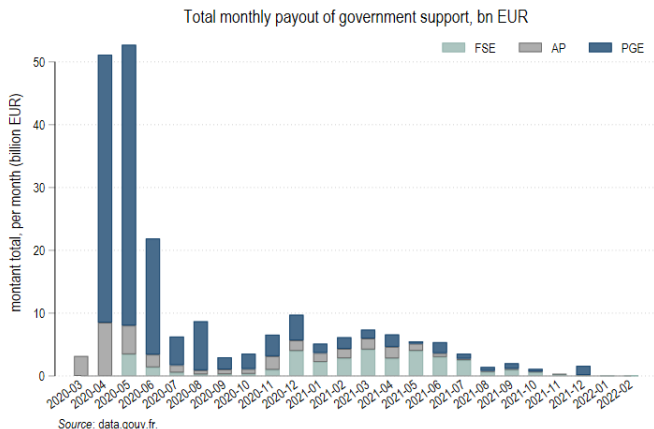
Note: Authors' calculations

Introduction
Research questions

1. What was the impact of COVID-19 support policies on French firms' liquidity?

2. Which firms benefited the most from the policy package?

Outline

Contribution

Data and variables

Microsimulation exercise

Generosity

Conclusion

Outline

Contribution

Data and variables

Microsimulation exercise

Generosity

Conclusion

Related literature

Why focus on the impact of the crisis on liquidity?

▶ Several studies focus on bankruptcy risk (Gourinchas et al., 2021; Guerini et al., 2020; Hadjibeyli et al., 2021)

▶ But liquidity problems also affect cash flow constraints, and therefore investment and ultimately hiring plans (Hoshi et al., 1991; Bond and Van Reenen, 2007)

▶ Liquidity losses not only a risk for firms that were already vulnerable (creative destruction) but for economic dynamism in general

Policy evaluation exercises

▶ Cross-country studies (Ebeke et al., 2021; Demmou et al., 2021)

▶ Studies on French firms (Bureau et al., 2021; Hadjibeyli et al., 2021)

Main contributions

▶ We evaluate the liquidity risks faced by French firms during the first year of the Covid-19 pandemic.

▶ Heterogeneity arises from the composition of their (international) customer base, as well as their financial vulnerability before the crisis

▶ We also evaluate the impact of three policies on firms' outcomes:
  1. the unemployment subsidy scheme (AP)
  2. the loan guarantee (PGE)
  3. the solidarity fund (FSE)

▶ We highlight three dimensions of heterogeneity for policy efficiency:
  ▶ sectors
  ▶ size
  ▶ labor productivity

Main findings

▶ We find that the total simulated liquidity loss turns to match very well to the total support, and it helped firms improve their liquidity position.

▶ But the aggregated result hides **heterogeneous policy efficiency**:
  ▶ the firms that suffered the highest liquidity losses did not receive enough
  ▶ productivity and size differences do not explain the overall level of policy efficiency across firms
  ▶ by construction, the solidarity fund (FSE) benefited the smallest firms
  ▶ larger and less productive firms benefited the most from the subsidized loan programme (PGE)

Outline

Data
Main data sources

Firm level data

▶ Customs data (DGDDI): trade partner info for demand shock
  ▶ Export shares by partners years 2017-2019

▶ Balance-sheet data (FARE); comprehensive firm-level statistics from INSEE
  ▶ Universe of French firms
  ▶ Used for several variables from the balance sheet (sector, wages, sales, financial variables)
  ▶ Matched with firms in customs data to calculate firm-specific demand shocks

Country-level data

▶ OECD, EUROSTAT, IMF
  ▶ Calculate GDP growth rates in 2020

Data
Cleaning

- ▶ *Sectoral cleaning* We keep the non-financial and non-agricultural business sectors. We remove oil and refining, and the health sector.

- ▶ *Firm cleaning* We drop firms whose main variables are missing,

Variables

Financial variables - before the crisis

$$Liquidity_{i,2019} = CF_{i,2019} - DIV_{i,2019} - INV_{i,2019} - BT_{i,2019} + LA_{i,2019}$$

$$CF_{i,2019} = [Sales_{i,2019} - Mat_{i,2019}] - Wages_{i,2019} + FinRev_{i,2019}$$
$$- FinExp_{i,2019} - OtherCost_{i,2019} - Amort_{i,2019}$$
$$- Taxes_{i,2019} - [TradeCredits_{i,2019} - ShtDebt_{i,2019}]$$

$$LA_{i,2019} = Cash_{i,2019} + FinAss_{i,2019} + Stocks_{i,2019} + TradeCredits_{i,2019}$$
$$- ShtDebt_{i,2019} + OthersLA_{i,2019}$$

Variables
Categories of size and productivity

Size

Standard categories:

- ▶ TPE [N<10]
- ▶ SME [N=10-249, Sales €2-50M]
- ▶ ITE [N=250-5000, Sales €50M-1.5 Bn]
- ▶ BE [N>5000 or Sales>€1.5Bn]

Productivity

- ▶ labor productivity (i.e., value added divided by number of workers)
- ▶ relative to max within size/2-digit sector category
- ▶ deciles

Outline

Simulation
Firm-specific COVID-19 shock

The firm-level shock β_i is composed of two elements:

▶ *Domestic component*: sector-level shock (change in value added, 13 sectors, A21, INSEE)

▶ *Foreign component*: GDP growth shock per country, weighted by export sales in 2017-2019 in each destination country

▶ *Total firm shock*: weighted average of domestic (sales in France) and foreign (export sales) shocks

Simulation

Policy support per firm

▶ **Part-time employment (AP)**

$$AP_{i,s} = \rho_{i,s} \times AP_s$$

where:

$$\rho_{i,s} = \frac{Wages_i}{\sum_{k \in s} Wages_k}$$

▶ **Loan guarantee scheme (PGE)**
What firms were eligible to (max value they could ask):

$$PGE_i^{max} = Sales_i / 4$$

Actual value was much lower, so we limit to value observed per sector:

$$PGE_i = Min[PGE_i^{max} \; ; \; \sigma_{i,s} \times PGE_s]$$

where:

$$\sigma_{i,s} = \frac{Debt_i}{\sum_{k \in s} Debt_k}$$

Guillou, Mau, Treibich   Firms during Covid-19   27 April 2023   22 / 41

Simulation
Policy support per firm

▶ **Solidarity fund (FSE)**

Eligibility:
- ▶ Size category $= 1$
- ▶ Sector under lockdown

Value:

$$FSE_{i,s} = \chi_{i,s} \times FSE_s$$

where:

$$\chi_{i,s} = \frac{Sales_{loss,i}}{\sum_{k \in s} Sales_{loss,k}}$$

Simulation
Simulated financial performance in 2020

$$Liquidity_{i,2020} = CF_{i,2020} + LA_{i,2020}$$
$$- DIV_{i,2020} - INV_{i,2020} - BT_{i,2020}$$
$$+ P2 \times PGE_{i,2020}$$

$$CF_{i,2020} = (1 + \beta_{i,2020}) \times [Sales_{i,2019} - Mat_{i,2019} - TrCredits_{i,2019} + ShtDebt_{i,2019}]$$
$$+ P1 \times APi, 2020$$
$$- P2 \times r^{PGE} \times PGE_{i,2020}$$
$$+ P3 \times FSE_{i,2020}$$
$$+ FinRev_{i,2019} - FinExp_{i,2019} - OthCost_{i,2019} - Tax_{i,2019} - Amort_{i,2019}$$

$$LA_{i,2020} = Cash_{i,2019} + FinAss_{i,2019} + Stocks_{i,2019} + OthersLA_{i,2019}$$
$$+ (1 + \beta_{i,2020}) \times [TrCredits_{i,2019} - ShtDebt_{i,2019}]$$

COVID-19 shock
Policy support

Variables

Liquidity loss

$$Loss_i = Liquidity_{i,2019} - Liquidity_{i,2020}$$
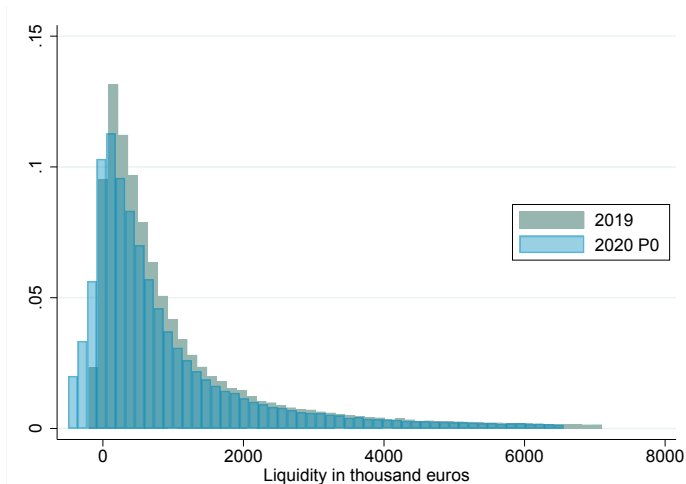
Heterogeneity in policy effect on liquidity

I   Pos-lessPos   :   Remained liquid but had a lower buffer= 70%.

II   Pos-Neg   :   Became illiquid = 13%

III   Neg-Neg   :   Remained illiquid=10%

IV   Pos-MorePos   :   Improved liquidity = 7%

Simulated losses - liquidity and size groups

Groups	%Firms	Loss	Total Aid	AP	FSE	PGE
All	**100**	**132.6**	**138.4**	**24.1**	**7.9**	**106.4**
Pos-Less Pos	70	87.5	91	14.2	5.2	71.7
Pos-Neg	13	40.2	13.2	5.4	1.7	6.2
Neg-More Neg	10	13	16.9	2.9	0.8	13.2
Pos-More Pos	7	-8.1	17.3	1.6	0.2	15.3
VSE	86.5	28.7	26.8	5.4	7.9	13.4
SME	12.9	44.3	39.2	8.9	0	30.3
ISE	0.6	33.2	46.6	6.1	0	40.5
BE	0.02	26.5	25.8	3.6	0	22.1

Source: FARE 2019, own computations

Simulated losses - by sector

Groups	%Firms	Loss	Total Aid	AP	FSE	PGE
All	**100**	**132.6**	**138.4**	**24.1**	**7.9**	**106.4**
Manufacturing	8.6	22.8	24.8	3.4	0.3	21.1
Elect.& Water. Prod. Dist.	0.5	1.6	0.9	0.1	0	0.7
Construction	18.5	19.9	13.2	2.1	0.1	11.1
Wholesale & Retail	25.4	11.7	36.2	4.3	1.9	30.0
Transport	5.4	30.0	11.7	2.1	1	8.6
Hotels & Restaurants	14.6	34.5	15.9	4.9	2.2	8.8
Info. & Commun.	4.1	-2.2	5.4	0.9	0.2	4.3
Real estate	3.6	0.3	2.0	0.3	0	1.6
Scien. and techn. serv.	11.7	6.4	16.3	2.2	1.0	13.1
Administr. serv.	5.7	5.8	7.4	1.8	0.5	5.1
Culture and leisure	1.8	1.8	4.6	1.9	0.5	2.0

Source: FARE 2019, own computations

Simulated losses - by productivity decile

Groups	%Firms	Loss	Total Aid	AP	FSE	PGE
All	**100**	**132.6**	**138.4**	**24.1**	**7.9**	**106.4**
LP decile 1	10	25.1	30.8	5.5	0.3	25.0
LP decile 2	10	16.6	13.1	3.2	0.47	9.5
LP decile 3	10	11.8	9.9	2.3	0.48	7.2
LP decile 4	10	7.3	7.5	1.4	0.61	5.5
LP decile 5	10	6.2	5.4	1.1	0.7	3.6
LP decile 6	10	5.3	4.4	1.0	0.74	2.7
LP decile 7	10	5.4	6.6	1.2	0.70	4.7
LP decile 8	10	6.3	8.3	1.1	0.70	6.5
LP decile 9	10	7.2	5.6	1.3	0.72	3.6
LP decile 10	10	35.8	32.4	5.0	0.87	26.5

Source: FARE 2019, own computations

Outline

Simulation

Generosity measures

Extensive margin: Overcompensated firms

$$OVER_i = 1 \text{ if } Aid_i > Loss_i$$

Simulation
Generosity measures

Extensive margin: Overcompensated firms

$$OVER_i = 1 \text{ if } Aid_i > Loss_i$$

Intensive margin: Generosity

$$\gamma_i \equiv -\frac{Loss_i - Aid_i}{Loss_i}$$

If Loss >0:

- *Perfect compensation*: $Loss = Aid \ \gamma = 0$
- *No compensation*: $Aid = 0 <=> \gamma = -1$
- *Undercompensation*: $Aid < Loss <=> -1 < \gamma < 0$
- *Overcompensation*: $Aid > Loss <=> \gamma > 0$

Overcompensation - by liquidity and size

Groups	Over-compensated Firms		Over-compensation		Average
	AP+FSE	AP+FSE+PGE	AP +FSE	PGE	γ
	%	%	bn€	bn€	
All	**24.5**	**38.7**	**7.5**	**73.4**	**0.5**
Pos-Less Pos	19.9	37.1	4.3	47.4	0.8
Pos-Neg	6.8	10.6	0.4	1.0	-0.4
Neg-More Neg	26.5	42.8	0.9	9.7	1.3
Pos-More Pos	100	100	1.8	15.3	-2.5
VSE	25.7	38.8	4.9	7.4	0.5
SME	16.3	37.4	1.2	19.9	0.3
ISE	22.3	49.9	0.9	31.3	0.6
BE	26.1	46.3	0.5	14.8	-0.2

Source: FARE 2019, own computations.

Aid intensity γ by liquidity group

excludes outside values

Aid intensity γ by size group

excludes outside values
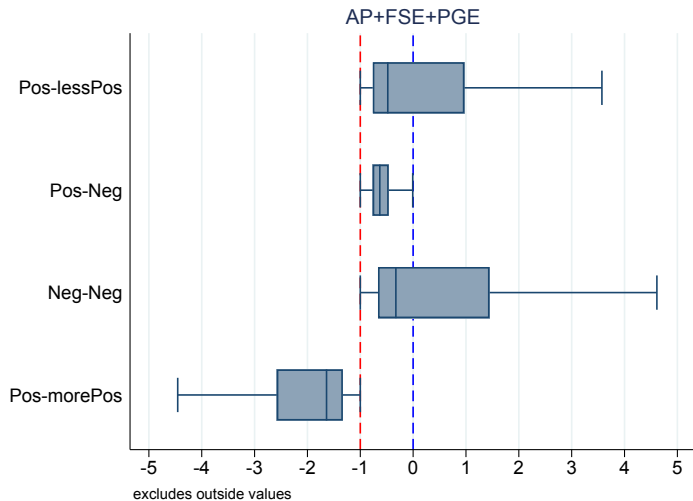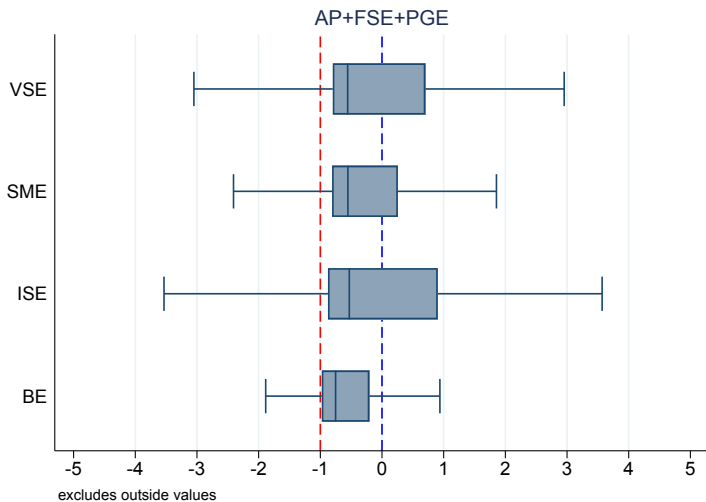
Note: VSE ($<$10), PME (10-250); ISE (250-5000), 4: BE ($>$5000)

Overcompensation - by sector

Groups	Over-compensated Firms		Over-compensation		Average
	AP+FSE	AP+FSE+PGE	AP +FSE	PGE	γ
	%	%	bn€	bn€	
All	**24.5**	**38.7**	**7.5**	**73.4**	**0.5**
Manufacturing	31.2	44	0.7	14.2	1.4
Elect.& Water	7.5	24	0.02	0.5	-0.2
Construction	3.2	8.4	0.7	7.7	-0.6
Wholesale & Retail	21.7	58.7	2.2	23.3	1.7
Transport	52.8	53.3	0.5	2.8	0.1
Hotels & Restaurants	1.1	7.1	0.4	2.3	-0.5
Info. & Commun.	96.9	97.9	1.1	4.2	-1.7
Real estate	56.9	74.1	0.1	1.4	1.5
Scien. & techn. serv.	25.8	31.8	1.0	11.9	0.5
Administr. serv.	32.7	38.8	0.4	4.0	0.3
Culture & leisure	95.8	97.8	1.4	1.3	3.3

Source: FARE 2019, own computations.

Aid intensity γ by sector

excludes outside values
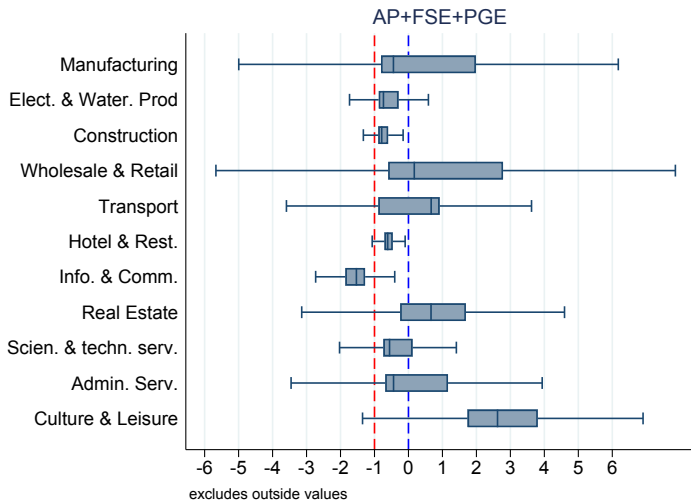
Overcompensation - by productivity decile

Groups	Over-compensated Firms		Over-compensation		Average
	AP+FSE	AP+FSE+PGE	AP +FSE	PGE	γ
	%	%	bn€	bn€	
All	**24.5**	**38.7**	**7.5**	**73.4**	**0.5**
LP decile 1	28.7	41.5	0.9	19.1	0.6
LP decile 2	20.8	38.6	0.7	5.9	0.5
LP decile 3	23.2	44.5	0.6	4.3	0.8
LP decile 4	24.9	45.8	0.6	3.7	0.8
LP decile 5	24.1	41.8	0.6	1.9	0.7
LP decile 6	21.6	37.1	0.5	1.5	0.5
LP decile 7	19.8	33.9	0.6	3.2	0.4
LP decile 8	17.9	30.6	0.4	5.0	0.3
LP decile 9	17.2	29.0	0.4	1.9	0.2
LP decile 10	16.4	27.7	0.9	16.7	0.2

Source: FARE 2019, own computations.
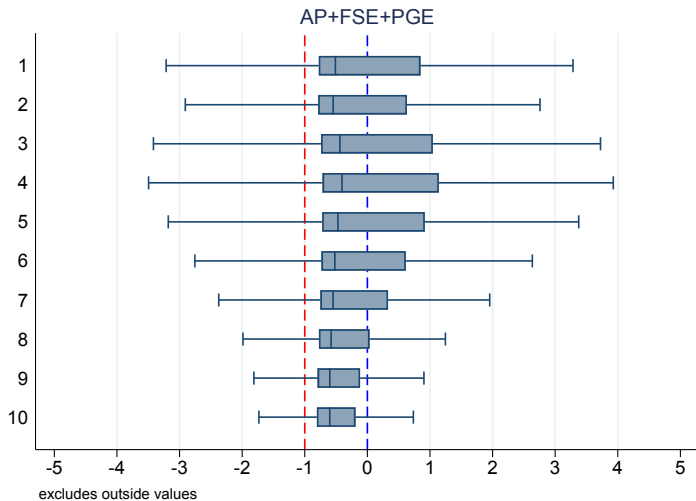
Aid intensity γ by productivity decile

AP+FSE+PGE

excludes outside values

Outline

Conclusions

Results

- ▶ Results show large support to firms during COVID-19
- ▶ Over-compensation for most firms, yet and under-shooting was also observed for 13% of firms, especially those who suffered highest liquidity losses (Pos-neg group)
- ▶ Policy efficiency was stronger for larger and less productive firms.

Next steps

- ▶ Ex-post evaluation using PGE and AP administrative firm-level data
- ▶ 2021 evaluation when 2020 balance-sheet data becomes available
- ▶ Impact on solvency and other firm-level performance variables
- ▶ Modelling import shock

References

Bach, L., Ghio, N., Guillouzouic, A., and Malgouyres, C. (2021a). Les prêts garantis par l'etat vont-ils pouvoir être remboursés? Rapport pour le Sénat 32, IPP.

Bach, L., Ghio, N., Guillouzouic, A., and Malgouyres, C. (2021b). Rapport d'évaluation de la contrainte pour les entreprises du remboursement des prêts garantis par l'État. Note 70, IPP.

Bond, S. and Van Reenen, J. (2007). Microeconometric models of investment and employment. *Handbook of econometrics*, 6:4417–4498.

Bureau, B., Duquerroy, A., Giorgi, J., Lé, M., Scott, S., and Vinas, F. (2021). *Une année de crise COVID: impact sur la dynamique de l'activité des entreprises en France: une évaluation sur données individuelles.* INSEE, Institut national de la statistique et des études économiques.

Demmou, L., Franco, G., Calligaris, S., and Dlugosch, D. (2021). Liquidity shortfalls during the covid-19 outbreak: Assessment and policy responses.

Ebeke, M. C. H., Jovanovic, N., Valderrama, L., and Zhou, J. (2021). Corporate liquidity and solvency in Europe during COVID-19: The role of policies. IMF Working Paper WP/21/56, International Monetary Fund.

Gourinchas, P.-O., Kalemli-Özcan, S., Penciakova, V., and Sander, N. (2021). COVID-19 and SME Failures. NBER Working Papers 27877, National Bureau of Economic Research, Inc.

Guerini, M., Nesta, L., Ragot, X., Schiavo, S., et al. (2020). Dynamique des défaillances d'entreprises en france et crise de la covid-19. *OFCE Policy brief*, (73):19.

Hadjibeyli, B., Roulleau, G., and Bauer, A. (2021). Live and (don't) let die: The impact of covid-19 and public support on french firms. Working Paper 2021–2, French Treasury.

Hoshi, T., Kashyap, A., and Scharfstein, D. (1991). Corporate structure, liquidity, and investment: Evidence from japanese industrial groups. *the Quarterly Journal of economics*, 106(1):33–60.