Do Rare Disasters Infect the Cross-Section of U.S. Stock Returns? The Case of COVID-19

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Motivation

- **Rare disasters**: Events with low probability and significant negative impact on the economy & financial markets

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  1. The risk of a rare disaster should be **negatively cross-sectionally priced**
     - Firms that hedge disasters should earn lower expected returns $\Rightarrow$
     - Going long in high positive disaster-beta stocks & short low negative disaster-beta stocks $\Rightarrow$ Negative disaster risk premium
  2. The disaster risk premium should **vanish** when uncertainty about the duration & severity of the rare disaster is resolved (Ghaderi et al., 2022; Pagano et al., 2023)

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- Limited literature on the cross-sectional pricing of the rare disaster's risk
  - Types of rare disasters: Wars, International political crises, & COVID-19

This paper and contributions

- Use COVID-19 as a type of rare disaster & test theoretical predictions
- **Direct proxy of disaster intensity:** Daily changes in newly reported COVID-19 infections (deaths)
  - Capture the severity of the disaster & the speed at which it unfolds

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- Questions:
  1. Was COVID-19 cross-sectionally negatively priced in U.S. & Europe?
  2. Did the COVID-19 premium vanish as uncertainty was resolved?
  3. Economic insights:
     - Sources of the COVID-19 risk premium
     - Explain the heterogeneity in COVID-19 betas
     - Explore conflating risks

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     - Explore conflating risks
- Temporal prediction: Study the pricing of COVID-19 risk during two phases
  1. January 22, 2020, to June 30, 2020
     - Turbulent period, Fed intervention, stock recovery
  2. July 1, 2020, to December 31, 2021
     - Lift of social distancing measures, vaccinations

COVID-19 as a rare disaster

- **Timeline:**
  - Dec 2019: First cases in Wuhan, China
  - Jan 20, 2020: First cases in U.S.
  - Jan 30, 2020: WHO emergency declaration
  - Mar 11, 2020: Pandemic declared
  - Mar–Apr 2020: Global lockdowns
  - April 2021: 194 out of 220 countries had started vaccination

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- **Macroeconomic impact:**
  - U.S. unemployment: 3.5% (February 2020) $\rightarrow$ 14.8% (April 2020)
  - Real GDP: -9% (Q2 2020, q/q)
  - Real consumption (PCE): -10.8% in Q2 2020 (quarter-on-quarter)

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- **Financial markets:**
  - S&P 500: -34% between 19 February and 23 March 2020
  - March 2020: $VIX > 80\%$
  - Rapid recovery beginning in late March

Related Literature

1. **Empirical rare-disaster literature**
   - Cross-sectional effects: Berkman et al. (2011), Siriwardane (2015), Hirshleifer et al. (2025), Baron et al. (2026)
   - Rare disaster models with learning (Ghaderi et al., 2022)

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2. **COVID-19 and pandemic stock-market effects:** Aggregate & cross-sectional effects
   - Firm-level measures (Alfaro et al., 2020; Baker et al., 2020; Cox et al., 2020; Topcu and Gulal, 2020; Zhang et al., 2020; Giglio et al., 2021; Arteaga-Garavito et al., 2024)
   - Market-wide measures (Cakici and Zaremba, 2021; Arteaga-Garavito et al., 2024)

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3. **Firm resilience during COVID-19** (Albuquerque et al., 2020; Ding et al., 2021; Fahlenbrach et al., 2021)

Data: Jan 22, 2020-Dec 31, 2021

- # of new COVID-19 infections & deaths in U.S. & 14 European countries
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  - Intensity of government's response to COVID-19 through lockdown policies
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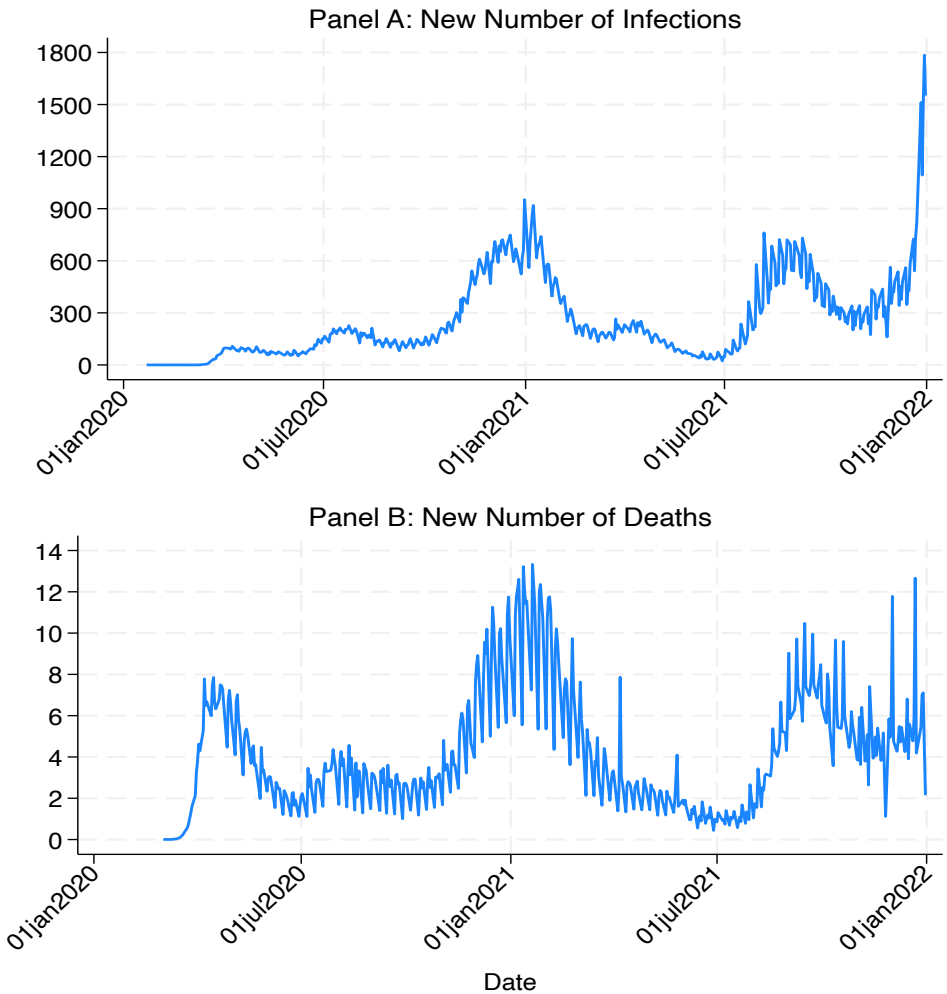
- **CRSP & Compustat:** Stock returns & firm characteristics for NYSE, AMEX, & NASDAQ common stocks
- **Kenneth French data library:** Risk-free rate and factor portfolio returns
- ESG scores from LSEG & Baker et al. (2016) EPU index

COVID-19 Infections and Deaths



- Mid-March 2020: Infections increased as U.S. testing capacity increased
- Mid-June 2020: Second surge of infections after lifting "stay-at-home" restrictions

Is COVID-19 risk priced? Univariate portfolio sorts

- **COVID-19 risk measure:** *Changes* in new infections (deaths)

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- For each stock i and day t, estimate **COVID beta** ($\beta_{i,t}^{COVID}$)

$$R_{i,t} - R_{f,t} = \beta_{i,t}^{0} + \beta_{i,t}^{COVID} COVID_t + \beta_{i,t}^{MKT} MKT_t + \beta_{i,t}^{SMB} SMB_t + \beta_{i,t}^{HML} HML_t + \beta_{i,t}^{UMD} UMD_t + \beta_{i,t}^{RMW} RMW_t + \beta_{i,t}^{CMA} CMA_t + \varepsilon_{i,t}$$

  - $\beta^{COVID} > 0$: *safer* assets
  - $\beta^{COVID} < 0$: *riskier* assets
  - Daily rolling regressions (window size: 22 days)

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  - $\beta^{COVID} > 0$: *safer* assets
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  - Daily rolling regressions (window size: 22 days)
- **Main asset pricing test: Portfolio sorts**
  1. Sort stocks in portfolios based on $\beta_{i,t}^{COVID}$
  2. Compute daily post-ranking portfolio returns for each (equal/value-weighted) portfolio
  3. Compute daily post-ranking returns for the spread portfolio
  4. Estimate average return & alpha of the spread portfolio

Decile Portfolios Sorted by $\beta^{\Delta NInfections}$

- Changes in COVID-19 infections are negatively priced $\rightarrow$ Prediction 1 confirmed

Decile Portfolios Sorted by $\beta^{\Delta NInfections}$

- Changes in COVID-19 infections are negatively priced → Prediction 1 confirmed

	Low	2	3	4	5	6	7	8	9	High	**High–Low**
Average $\beta^{\Delta NInfections}$	−0.40	−0.15	−0.08	−0.05	−0.02	0.01	0.04	0.08	0.14	0.40	
Equal-weighted portfolios											
Average Return	0.42	0.21	0.15	0.07	0.02	0.08	−0.02	−0.01	0.07	−0.03	−0.46***
	(0.92)	(0.46)	(0.38)	(0.19)	(0.04)	(0.21)	(−0.05)	(−0.03)	(0.17)	(−0.08)	(−2.96)
Four-factor alpha	0.52***	0.27**	0.23***	0.16**	0.08	0.16**	0.06	0.05	0.12	−0.05	−0.57***
	(3.11)	(2.09)	(2.70)	(2.07)	(1.18)	(2.20)	(1.46)	(0.71)	(1.38)	(−0.33)	(−3.13)
Five-factor alpha	0.52***	0.29***	0.23***	0.16***	0.08	0.15**	0.07*	0.08	0.18**	0.07	−0.45**
	(3.73)	(2.69)	(3.38)	(2.75)	(1.37)	(2.52)	(1.91)	(1.27)	(2.06)	(0.42)	(−2.63)
Six-factor alpha	0.52***	0.27**	0.24***	0.16**	0.09	0.16**	0.06*	0.05	0.13	−0.05	−0.57***
	(3.62)	(2.46)	(3.25)	(2.62)	(1.45)	(2.55)	(1.72)	(0.83)	(1.56)	(−0.31)	(−3.10)
Value-weighted portfolios											
Average Return	0.30	0.03	0.10	−0.01	−0.02	0.02	−0.03	−0.07	−0.15	−0.20	−0.50**
	(0.62)	(0.07)	(0.30)	(−0.03)	(−0.07)	(0.06)	(−0.10)	(−0.24)	(−0.44)	(−0.46)	(−2.35)
Four-factor alpha	0.40*	0.12	0.18*	0.04	−0.04	0.04	−0.03	−0.13**	−0.16*	−0.22*	−0.62***
	(1.96)	(1.08)	(1.85)	(0.74)	(−0.89)	(0.77)	(−0.67)	(−2.34)	(−1.75)	(−1.76)	(−2.71)
Five-factor alpha	0.34*	0.05	0.10	−0.00	−0.02	0.02	−0.01	−0.07	−0.10	−0.13	−0.47**
	(1.80)	(0.59)	(1.14)	(−0.01)	(−0.54)	(0.51)	(−0.20)	(−1.06)	(−1.24)	(−1.11)	(−2.10)
Six-factor alpha	0.41**	0.12	0.18*	0.04	−0.04	0.04	−0.03	−0.13**	−0.16*	−0.21*	−0.62***
	(2.17)	(1.12)	(1.84)	(0.68)	(−0.84)	(0.82)	(−0.73)	(−2.32)	(−1.73)	(−1.77)	(−2.75)

Decile Portfolios Sorted by $\beta^{\Delta NDeaths}$

- Changes in COVID-19 deaths are *not* priced – Not surprising

Decile Portfolios Sorted by $\beta^{\Delta NDeaths}$

- Changes in COVID-19 deaths are *not* priced – Not surprising

	Low	2	3	4	5	6	7	8	9	High	**High–Low**
Average $\beta^{\Delta NDeaths}$	−0.65	−0.40	−0.24	−0.13	−0.04	0.03	0.12	0.22	0.38	1.14	
Equal-weighted portfolios											
Average Return	0.45	0.33	0.24	0.12	0.14	0.11	0.09	0.13	0.16	0.28	−0.17
	(0.88)	(0.71)	(0.57)	(0.30)	(0.38)	(0.29)	(0.22)	(0.29)	(0.38)	(0.61)	(−0.92)
Four-factor alpha	0.37*	0.30**	0.22**	0.11	0.13**	0.09	0.06	0.09	0.11	0.16	−0.21
	(1.92)	(2.45)	(2.40)	(1.59)	(2.35)	(1.32)	(0.85)	(0.93)	(1.06)	(1.09)	(−1.23)
Five-factor alpha	0.44**	0.30***	0.24***	0.11*	0.12***	0.09	0.08	0.12	0.16	0.30*	−0.14
	(2.56)	(3.05)	(3.06)	(1.95)	(2.73)	(1.53)	(1.13)	(1.44)	(1.63)	(1.75)	(−0.85)
Six-factor alpha	0.40**	0.31***	0.23***	0.12*	0.13***	0.09	0.07	0.09	0.12	0.18	−0.22
	(2.39)	(2.91)	(2.82)	(1.99)	(2.98)	(1.47)	(0.97)	(1.09)	(1.22)	(1.25)	(−1.30)
Value-weighted portfolios											
Average Return	0.08	0.10	0.12	0.09	0.13	−0.01	0.16	0.07	0.02	0.27	0.19
	(0.18)	(0.24)	(0.33)	(0.30)	(0.47)	(−0.02)	(0.54)	(0.22)	(0.06)	(0.61)	(0.70)
Four-factor alpha	0.05	0.03	0.05	0.04	0.05	−0.06*	0.05	−0.02	−0.07	0.14	0.09
	(0.22)	(0.28)	(0.52)	(0.66)	(0.79)	(−1.81)	(0.92)	(−0.35)	(−0.55)	(0.73)	(0.33)
Five-factor alpha	−0.02	0.02	0.01	−0.00	0.05	−0.09***	0.08	0.01	0.01	0.27	0.29
	(−0.10)	(0.23)	(0.16)	(−0.05)	(0.05)	(2.78)	(1.52)	(0.25)	(0.07)	(1.53)	(1.18)
Six-factor alpha	0.07	0.03	0.06	0.04	0.05	−0.06*	0.05	−0.03	−0.07	0.15	0.08
	(0.38)	(0.32)	(0.54)	(0.59)	(0.82)	(−1.99)	(0.86)	(−0.38)	(−0.53)	(0.81)	(0.26)

- Results are robust for
  - Quintile portfolios
  - Subsample analysis splitting by size & liquidity

Fama–MacBeth (1973) two-step regressions

	(1)	(2)	(3)
Panel A: Individual Stocks as Test Assets			
Constant	0.14	0.15	0.13
	(0.49)	(0.50)	(0.46)
ΔNInfections	−0.36**	−0.31**	−0.34**
	(-2.51)	(-2.03)	(-2.43)
$R_m - R_f$	-0.06	-0.07	-0.06
	(-0.41)	(-0.45)	(-0.39)
SMB	0.04	0.04	0.04
	(1.14)	(0.69)	(0.66)
HML	-0.01	-0.01	-0.01
	(-0.08)	(-0.11)	(-0.09)
UMD	0.03		0.03
	(0.22)		(0.18)
RMW		-0.03	-0.04
		(-1.08)	(-1.24)
CMA		-0.03	-0.02
		(-1.51)	(-1.33)

Panel B: Equity Portfolios as Test Assets

	Test portfolio		
Price of risk	100 size and B/M portfolios	25 size and B/M portfolios	48 industry portfolios
$\lambda_{\Delta NInfections}$ | FF4	-1.36**	-2.30***	-0.96**
	(-2.05)	(-3.37)	(-2.32)
$\lambda_{\Delta NInfections}$ | FF5	-0.73	-1.80**	-0.90*
	(-1.04)	(-2.06)	(-1.87)
$\lambda_{\Delta NInfections}$ | FF6	-1.50**	-1.46	-1.08**
	(-2.33)	(-1.66)	(-2.57)

Gradual resolution of uncertainty: July 2020–December 2021

- COVID-19 is no longer being priced $\rightarrow$ Prediction 2 confirmed

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Decile portfolio	Low	2	3	4	5	6	7	8	9	High	High-Low
Panel A: Equal-weighted portfolios											
Average Return	0.14	0.14*	0.15**	0.17***	0.14**	0.14**	0.17***	0.18**	0.16*	0.12	-0.02
	(1.28)	(1.79)	(2.31)	(2.79)	(2.52)	(2.44)	(2.60)	(2.54)	(1.93)	(1.02)	(-0.62)
Four-factor alpha	-0.00	0.00	0.01	0.04**	0.02	0.01	0.03	0.04*	0.01	-0.01	-0.01
	(-0.08)	(0.06)	(0.62)	(2.25)	(1.14)	(0.88)	(1.61)	(1.85)	(0.48)	(0.33)	(-0.47)
Five-factor alpha	0.04	0.03	0.03*	0.05***	0.03*	0.02*	0.05***	0.06***	0.04*	0.04	-0.00
	(1.02)	(1.37)	(1.92)	(3.33)	(1.89)	(1.76)	(2.91)	(3.37)	(1.96)	(0.83)	(-0.16)
Six-factor alpha	0.04	0.03	0.03*	0.05***	0.02*	0.02*	0.05***	0.05***	0.04*	0.04	-0.00
	(0.94)	(1.30)	(1.83)	(3.32)	(1.83)	(1.66)	(2.82)	(3.33)	(1.86)	(0.78)	(-0.13)
Panel B: Value-weighted portfolios											
Average Return	0.09	0.13**	0.11**	0.13***	0.11**	0.11**	0.10**	0.11*	0.15**	0.04	-0.05
	(0.97)	(1.97)	(2.08)	(2.87)	(2.18)	(2.38)	(2.18)	(1.94)	(2.02)	(0.42)	(-0.67)
Four-factor alpha	-0.03	0.02	-0.00	0.03	0.00	-0.00	-0.02	-0.02	0.02	-0.07	-0.04
	(-0.65)	(0.64)	(-0.13)	(1.60)	(0.03)	(-0.01)	(-0.77)	(-1.15)	(0.50)	(-1.30)	(-0.63)
Five-factor alpha	-0.00	0.03	-0.00	0.03	-0.01	-0.00	-0.02	-0.02	0.03	-0.04	-0.04
	(-0.03)	(0.91)	(-0.13)	(1.48)	(-0.30)	(-0.27)	(-0.88)	(-0.76)	(0.78)	(-0.80)	(-0.61)
Six-factor alpha	-0.00	0.03	-0.00	0.03	-0.01	-0.00	-0.02	-0.02	0.03	-0.04	-0.04
	(-0.03)	(0.96)	(-0.10)	(1.53)	(-0.31)	(-0.28)	(-0.96)	(-0.91)	(0.82)	(-0.76)	(-0.57)

Drivers of the COVID-19 risk premium: Stock characteristics?

- Do the stocks in the two legs of the spread portfolio have different characteristics?
- Both extreme portfolios have similar stock characteristics

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Decile portfolio	$\beta^{\Delta NInfections}$	Price ($)	Size	Book to Market	Market Beta	Idiosyncratic Volatility	Illiquidity	Leverage	Cash	Profitability	R&D
Low	−0.40	13.04	11.87	1.24	1.01	0.06	0.45	0.32	0.27	−0.10	0.06
2	−0.15	26.89	12.85	0.88	1.01	0.04	0.33	0.30	0.25	−0.05	0.05
3	−0.08	39.15	13.46	0.80	1.01	0.04	0.26	0.28	0.22	−0.03	0.04
4	−0.05	45.97	13.86	0.74	1.00	0.03	0.23	0.27	0.20	−0.02	0.04
5	−0.02	47.38	13.97	0.74	0.96	0.03	0.25	0.26	0.18	−0.02	0.03
6	0.01	47.34	13.98	0.73	0.95	0.03	0.33	0.25	0.18	−0.01	0.03
7	0.04	47.19	13.92	0.76	0.99	0.03	0.28	0.26	0.19	−0.02	0.03
8	0.08	42.02	13.67	0.80	1.01	0.03	0.23	0.26	0.20	−0.02	0.04
9	0.14	32.92	13.16	0.88	1.02	0.04	0.37	0.26	0.22	−0.04	0.04
High	0.40	16.48	12.05	1.33	1.00	0.05	0.62	0.30	0.25	−0.04	0.06

Drivers of the COVID-19 risk premium: Sectoral effects?

- Certain sectors of the economy may have been more vulnerable (tourism, traveling)
- Sectoral Composition of $\beta^{\Delta NInfections}$ Decile Portfolios based on GICS
- Portfolios are populated by all sectors

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- Sectoral Composition of $\beta^{\Delta NInfections}$ Decile Portfolios based on GICS
- Portfolios are populated by all sectors

	Low	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**High**
Energy & Materials	11.46	9.59	8.63	8.29	7.83	7.75	7.83	8.30	8.94	10.48
Industrials	11.77	12.39	13.50	15.32	16.00	15.29	15.29	14.39	14.18	12.60
Consumer Discretionary and Staples	17.66	16.42	14.95	14.23	14.68	15.48	15.42	16.05	16.03	16.31
Health Care	26.90	22.58	19.34	18.10	18.24	18.41	19.42	21.52	25.31	33.22
Financials	14.44	19.27	21.27	21.85	20.98	20.67	19.95	18.91	15.89	9.86
Information Technology and Communication Services	15.51	16.73	18.27	17.97	17.94	18.15	17.86	17.60	17.59	16.21
Other	2.26	3.01	4.04	4.25	4.34	4.24	4.23	3.24	2.06	1.32

Drivers of the COVID-19 risk premium: Sectoral effects? (cont'd)

- **Sector-level** portfolio sorts by $\beta^{\Delta NInfections}$
- COVID-19 premium is not driven by a single sector
- Heterogeneity of COVD-betas even within the same sector
- It is driven by the heterogeneity of firms within each sector

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Panel A: Equal-weighted portfolios

Portfolio	Energy and Materials		Industrials		Consumer Discretionary and Staples		Health Care		Financials		Information Technology and Communication Services		Other	
	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha	Avg. $\beta^{\Delta NInfections}$	Six-factor alpha
Low	-0.28	0.08	-0.24	0.19	-0.24	0.35	-0.32	0.22	-0.15	0.07	-0.27	0.19	-0.14	0.13
2	-0.08	0.06	-0.07	0.21	-0.07	0.25	-0.07	0.12	-0.05	0.13	-0.08	0.17	-0.01	-0.18
3	0.00	0.04	-0.01	0.05	0.00	0.11	0.02	0.09	-0.01	0.10	-0.01	0.05	0.02	-0.03
4	0.08	-0.05	0.05	0.05	0.06	0.16	0.11	0.00	0.03	0.08	0.05	-0.02	0.05	-0.02
High	0.28	-0.28	0.20	-0.01	0.22	0.11	0.37	-0.21	0.12	0.10	0.23	-0.03	0.16	-0.13
High-Low		-0.36^{**} (-2.36)		-0.20 (-1.38)		-0.24^{*} (-1.67)		-0.43^{***} (-4.37)		0.03 (0.23)		-0.22^{**} (-2.41)		-0.26 (-1.42)

Panel B: Value-weighted portfolios

Portfolio	Energy and Materials	Industrials	Consumer Discretionary and Staples	Health Care	Financials	Information Technology and Communication Services	Other
	Six-factor alpha	Six-factor alpha	Six-factor alpha	Six-factor alpha	Six-factor alpha	Six-factor alpha	Six-factor alpha
Low	0.44	-0.06	0.37	0.31	0.05	0.36	-0.06
2	0.09	0.05	0.28	0.16	0.02	0.05	-0.08
3	-0.02	-0.03	0.19	-0.04	-0.01	0.04	-0.12
4	-0.14	-0.01	-0.17	-0.09	0.12	-0.04	-0.17
High	-0.29	-0.16	-0.22	-0.28	0.24	-0.01	-0.09
High-Low	-0.73^{***} (-3.17)	-0.10 (-0.48)	-0.59^{**} (-2.29)	-0.59^{**} (-2.60)	0.19 (0.96)	-0.37^{*} (-1.80)	-0.03 (-0.21)
N	325	496	568	825	642	620	114

Heterogeneity in COVID-19 beta distribution: Firm's business model

- Differences in firms' COVID-19 betas in the same sector reflect differences in their business

- Examples from the healthcare sector:
  1. **Myomo Inc. ($\bar{\beta}^{\Delta NInfections} = -2.50$):**
     - A manufacturer of powered robotic arm braces for patients with upper-limb paralysis requiring in-person clinical contact
     - "*the in-person contact required as part of the fabrication and delivery process is being impacted [. . .] by COVID-19-related public health restrictions on travel and personal interaction*"

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  2. **Vaxart Inc. ($\bar{\beta}^{\Delta NInfections} = +1.30$):**
     - A clinical-stage biotechnology company developing oral COVID-19 vaccines.
     - Profits rose with rising infections

Firm's exposure to pandemic risk: Economic channels

- Heterogeneity in COVID-19 betas
- Do pre-pandemic firm characteristics affect COVID-19 beta?

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$$R_{i,t} = \beta_0 + \beta_1 \Delta NInfections_t + \beta_2 X_{i,pre2020} \times \Delta NInfections_t + \delta_i + \varepsilon_{i,t}, \quad (1)$$

- More resilient firms: With higher profitability, less leverage, & less reliance on face-to-face communication
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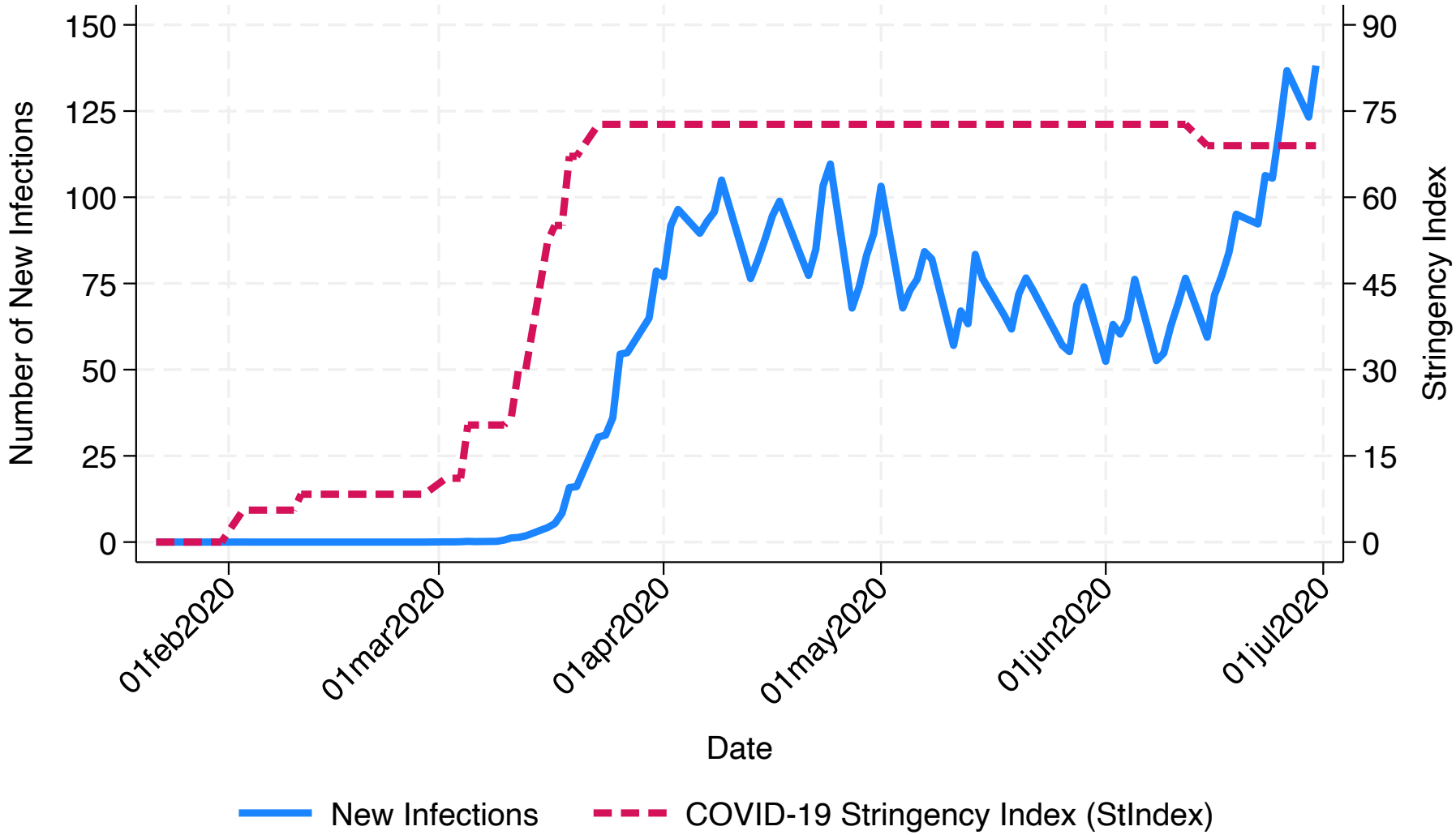
	Dependent variable: Daily stock return											
	Panel A: Financial Conditions		Panel B: WFH Resilience		Panel C: CSR Activities							
					ESG Score		Environmental		Social		Governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔNInfections	−1.94***	−1.77***	−2.04***	−1.85***	−2.38***	−1.53***	−2.05***	−1.51***	−2.08***	−1.55***	−2.34***	−1.60***
	(0.11)	(0.60)	(0.27)	(0.57)	(0.26)	(0.52)	(0.15)	(0.55)	(0.24)	(0.52)	(0.27)	(0.55)
Firm Size × ΔNInfections		0.03		−0.01		0.00		0.01		0.02		0.03
		(0.06)		(0.06)		(0.06)		(0.07)		(0.07)		(0.06)
Leverage × ΔNInfections		−1.19**		−1.27**		−1.32***		−1.31***		−1.32***		−1.31***
		(0.59)		(0.61)		(0.51)		(0.51)		(0.51)		(0.50)
Cash Ratio × ΔNInfections		0.94		0.77		0.13		0.17		0.13		0.18
		(0.80)		(0.82)		(0.50)		(0.50)		(0.51)		(0.50)
ROA × ΔNInfections		4.14***		4.52***		4.00***		4.01***		4.01***		4.00***
		(0.88)		(1.51)		(0.81)		(0.81)		(0.81)		(0.81)
WFH Index × ΔNInfections			1.20***	1.13***								
			(0.40)	(0.40)								
ESG Score × ΔNInfections					1.65***	0.44						
					(0.54)	(0.58)						
Environmental × ΔNInfections							1.20***	0.18				
							(0.35)	(0.42)				
Social × ΔNInfections									0.81*	0.20		
									(0.46)	(0.49)		
Governance × ΔNInfections											1.23***	0.11
											(0.47)	(0.45)

COVID-19 premium: Conflating mechanisms

Health Risks and Regulatory Risks



COVID-19 premium: Conflating mechanisms

Health Risks and Regulatory Risks

- Fama and MacBeth (1973) regressions on changes in # daily new infections & changes in the daily level of *StIndex*
  1. COVID-19 remains negatively priced
  2. Lockdown stringency is not priced

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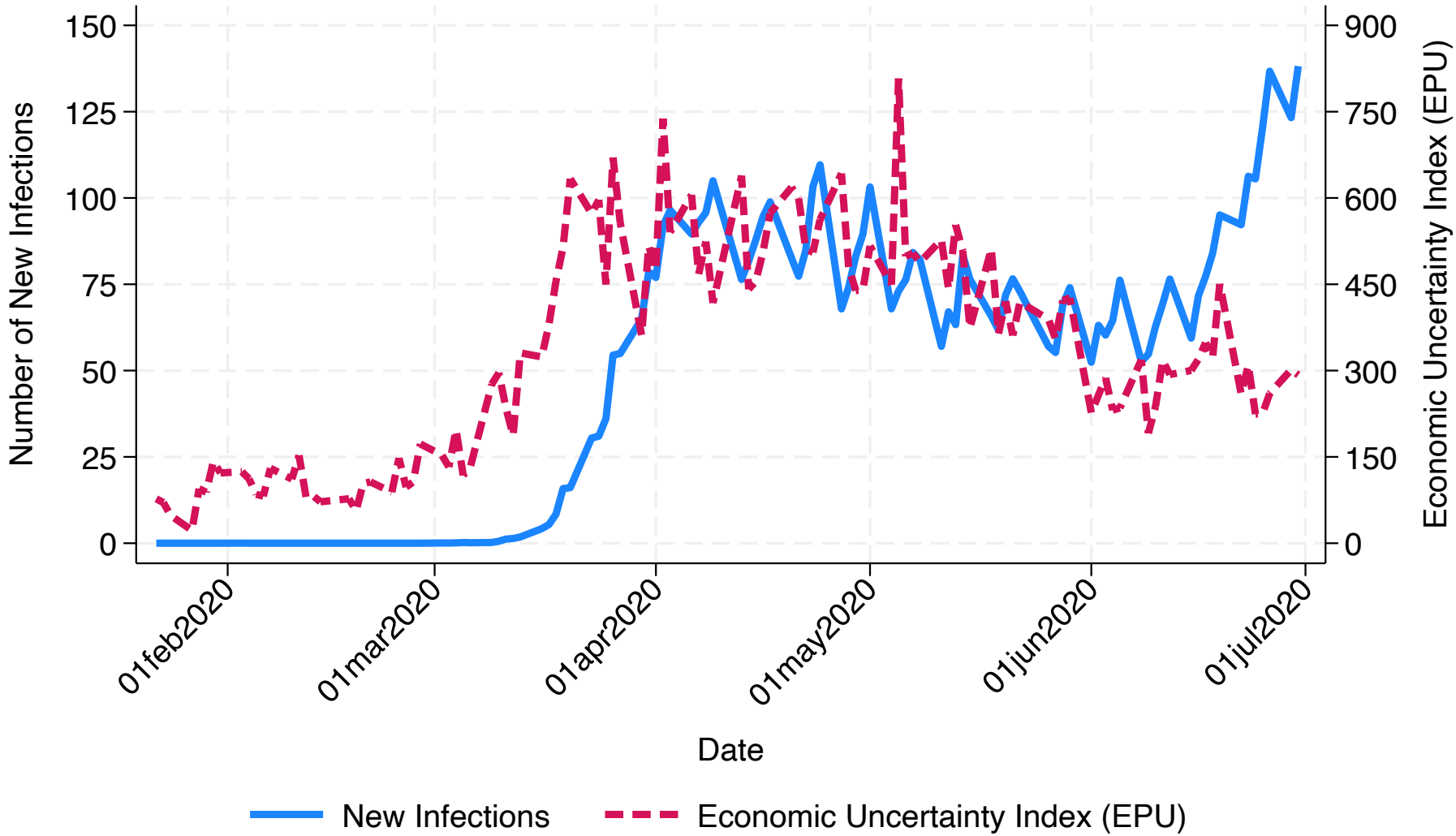
	FF4	**FF5**	**FF6**
	(1)	(2)	(3)
Constant	0.13	0.12	0.12
	(0.43)	(0.42)	(0.42)
ΔNInfections	-0.36^{**}	-0.32^{**}	-0.36^{**}
	(-2.47)	(-2.06)	(-2.48)
ΔStIndex	0.01	0.00	0.00
	(0.05)	(0.03)	(0.02)
$R_m - R_f$	-0.08	-0.08	-0.08
	(-0.52)	(-0.50)	(-0.50)
SMB	0.04	0.05	0.04
	(1.11)	(0.73)	(0.65)
HML	-0.01	-0.00	-0.01
	(-0.05)	(-0.01)	(-0.04)
UMD	0.03		0.02
	(0.19)		(0.14)
RMW		-0.04	-0.04
		(-1.19)	(-1.29)
CMA		-0.03	-0.02
		(-1.52)	(-1.48)

COVID-19 premium: Conflating mechanisms

Economic policy uncertainty and new infections



COVID-19 premium: Conflating mechanisms

Economic Policy Uncertainty (EPU) and changes in new infections

- Estimate rolling EPU and COVID-19 betas
- Bivariate sorts on EPU and COVID-19 betas
- COVID-19 is priced regardless of the EPU exposure

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- Bivariate sorts on EPU and COVID-19 betas
- COVID-19 is priced regardless of the EPU exposure

	β^{EPU} **Quintile**				
	Low	Q2	Q3	Q4	High
Panel A: Equal-weighted spread portfolios					
Average Return	-0.28	-0.23***	-0.21**	-0.16	-0.31**
	(-1.28)	(-2.74)	(-2.40)	(-1.51)	(-2.40)
Four-factor alpha	-0.44**	-0.22**	-0.22**	-0.10	-0.38***
	(-2.00)	(-2.51)	(-2.47)	(-0.92)	(-2.83)
Five-factor alpha	-0.29	-0.19**	-0.20**	-0.10	-0.32**
	(-1.27)	(-2.25)	(-2.21)	(-0.97)	(-2.38)
Six-factor alpha	-0.44**	-0.22**	-0.22**	-0.10	-0.39***
	(-2.02)	(-2.55)	(-2.45)	(-0.86)	(-2.84)
Panel B: Value-weighted spread portfolios					
Average Return	-0.25	-0.21**	-0.18**	-0.14	-0.25**
	(-1.22)	(-2.55)	(-2.17)	(-1.44)	(-2.10)
Four-factor alpha	-0.41**	-0.21**	-0.19**	-0.09	-0.32**
	(-2.00)	(-2.41)	(-2.28)	(-0.85)	(-2.58)
Five-factor alpha	-0.26	-0.17**	-0.16*	-0.09	-0.26**
	(-1.20)	(-2.09)	(-1.98)	(-0.93)	(-2.12)
Six-factor alpha	-0.41**	-0.21**	-0.19**	-0.09	-0.32**
	(-2.02)	(-2.49)	(-2.27)	(-0.81)	(-2.58)

Is COVID-19 priced? Evidence from 16 European stock markets

- For each country, we perform univariate portfolio sorts
- For each decile portfolio, we average post-ranking returns across countries
- Results are similar to U.S.

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	Panel A: Equal-weighted portfolios				**Panel B: Value-weighted portfolios**			
Decile Portfolio	Average Return	Four-factor alpha	Five-factor alpha	Six-factor alpha	Average Return	Four-factor alpha	Five-factor alpha	Six-factor alpha
Low	0.25	0.30	0.37	0.34	0.08	0.15	0.17	0.17
2	-0.01	0.08	0.11	0.13	-0.05	0.03	0.06	0.06
3	0.03	0.09	0.11	0.11	0.06	0.09	0.14	0.13
4	-0.01	0.03	0.05	0.04	-0.07	-0.06	-0.00	-0.01
5	-0.03	0.03	0.05	0.05	-0.09	-0.03	-0.01	-0.00
6	0.03	0.09	0.09	0.11	0.02	0.02	0.06	0.04
7	-0.05	0.00	0.03	0.03	-0.02	-0.00	0.04	0.03
8	-0.03	-0.00	0.05	0.04	-0.09	-0.12	-0.02	-0.08
9	0.04	0.11	0.13	0.12	0.03	0.03	0.11	0.04
High	0.03	0.09	0.09	0.05	-0.17	-0.15	-0.11	-0.16
High-Low	-0.22*	-0.21*	-0.28**	-0.29**	-0.25**	-0.30**	-0.28**	-0.33**
	(-1.72)	(-1.80)	(-2.61)	(-2.43)	(-2.01)	(-2.35)	(-2.33)	(-2.49)

Conclusions

- Limited literature on whether rare disaster risks are priced cross-sectionally
- Use COVID-19 as a natural laboratory to extend this literature & test theoretical predictions
  - COVID-19 market-wide risks: Daily change in the number of new infections & deaths
  - Infections are priced in U.S. (but not deaths)
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