Internet Appendix:
Firm Finances and the Spread of COVID-19:
Evidence from Nursing Homes

Review of Corporate Finance Studies

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In this internet appendix, we present additional results not tabulated in the paper and further discuss the government response to the pandemic in the context of nursing home.
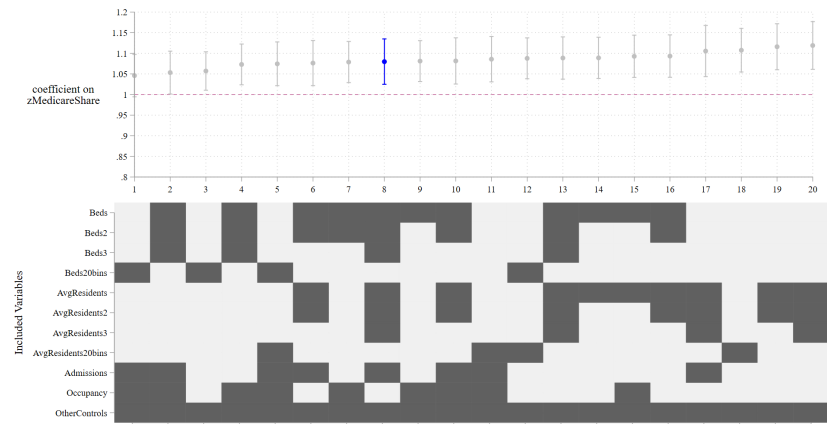
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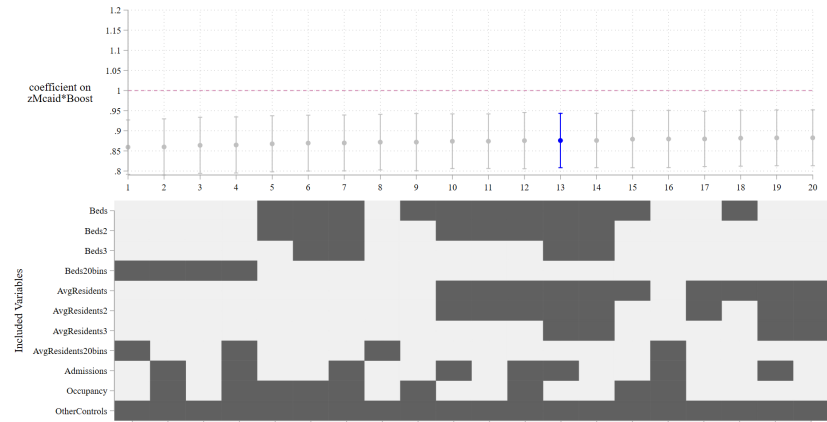[†]Georgia Institute of Technology; email: `daniel.weagley@scheller.gatech.edu`.
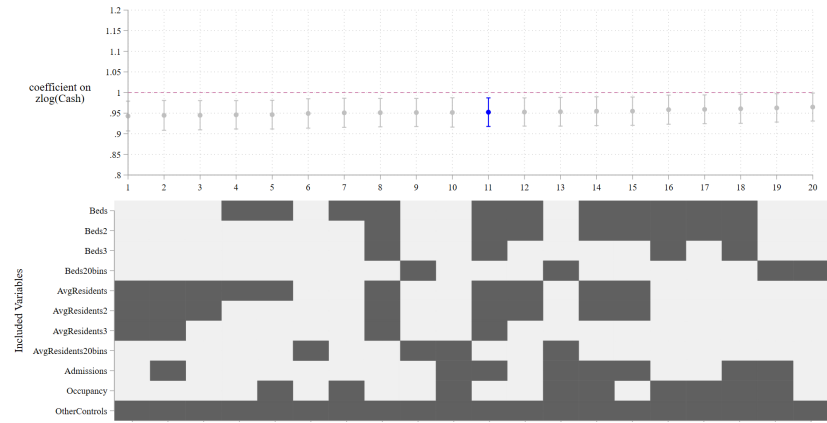
(a) zlog(Cash)

(b) zMedicareShare

(c) zMedicaidShare×MedicaidBoost

Figure IA.1: Specification Curves: Controlling for Size

This figure presents specification curves of our main negative binomial regression specification estimated in column 5 of Table 4 with the full set of controls and fixed effects. The panels show our point estimates of interest and 90% confidence intervals under a variety of different specifications for nursing home size (dark boxes indicate inclusion in the regression). The point estimates and confidence intervals that are blue represent the estimates from the main specification in the paper. All coefficient estimates are exponentiated ($e^{\hat{\beta}}$).
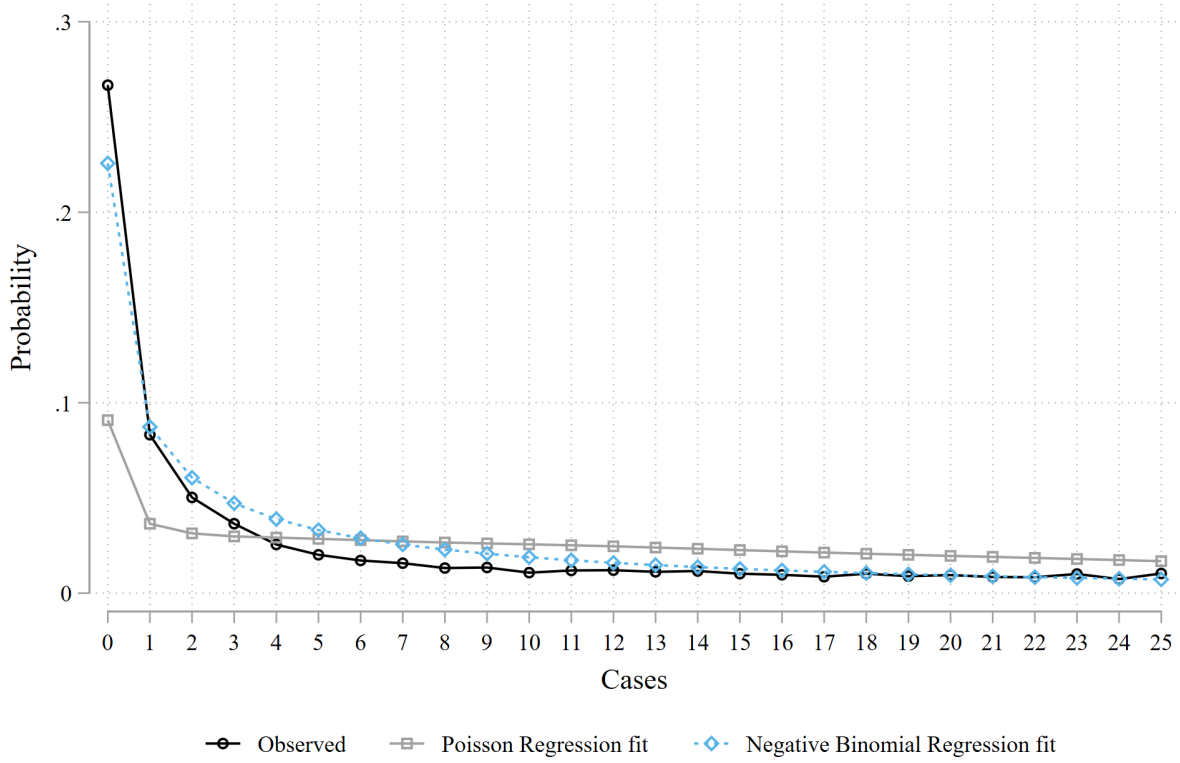
Figure IA.2: Model Fit: Negative Binomial versus Poisson
This figure presents the distribution of COVID-19 cases in our sample along with of the predicted number cases (truncated at 25) using the negative binomial and Poisson regression model estimates from column 5 of Table 4 and column 4 of Table 5, respectively.

Table IA.1: Financial Factors and COVID-19: Alternative Dates

This table presents negative binomial regression estimates of the cumulative number of COVID-19 cases a nursing home had as of September 2020 (columns 1-4) and November 2020 (columns 5-8) on the following variables: *Cash* is cash and equivalents, *DaysCashOnHand* is the number of days worth of operating expenses that can be covered by cash and equivalents, *Cash/Beds* and *Cash/NetRevenue* are *Cash* scaled by the number of beds in the facility and prior year's net revenues, respectively. *MedicareShare* is the share of overall patient days that are reimbursed through Medicare. *MedicaidShare* is the share of overall patient days that are reimbursed through Medicaid. *MedicaidBoost* is a dummy variable equal to one if the facility is in a state that increased Medicaid reimbursement rates by at least 10%/$20. Each regression also includes the following *facility control* variables: *Beds*, *Beds²*, *Beds³*, *AvgResidents*, *AvgResidents²*, *AvgResidents³*, *LPN hours*, *RN hours*, *Admissions (00s)*, *FacilityAge*, *ZipMinorityShare*, *TotalMargin*, *Leverage*, *ForProfit* and *HealthInsp Rating* fixed effects as defined in Tables 3 and 4 in the paper. All estimations include county fixed effects and health inspection rating fixed effects, and all standard errors are clustered at the county level. All coefficient estimates are exponentiated ($e^{\hat{\beta}}$).

	September				November			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
zln(Cash)	0.939***				0.968*			
	(0.022)				(0.017)			
zDaysCashOnHand		0.930***				0.964**		
		(0.025)				(0.018)		
z$\frac{Cash}{Beds}$			0.935***				0.954**	
			(0.024)				(0.019)	
z$\frac{Cash}{Net\ Revenue}$				0.920***				0.960**
				(0.024)				(0.017)
zMedicareShare	1.057*	1.054*	1.051	1.050	1.050**	1.049**	1.046**	1.047**
	(0.033)	(0.033)	(0.033)	(0.033)	(0.024)	(0.024)	(0.024)	(0.024)
zMedicaidShare	1.109***	1.111***	1.104***	1.108***	1.057**	1.059**	1.054**	1.058**
	(0.042)	(0.042)	(0.042)	(0.042)	(0.028)	(0.028)	(0.028)	(0.027)
MedicaidShare×MedicaidBoost	0.868***	0.867***	0.868***	0.866***	0.933*	0.932*	0.933*	0.931*
	(0.043)	(0.043)	(0.043)	(0.043)	(0.036)	(0.036)	(0.035)	(0.036)
Facility Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6895	6895	6895	6895	6893	6893	6893	6893
Log likelihood	-21849	-21848	-21848	-21846	-27601	-27601	-27600	-27601

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table IA.2: Alternative Ratings, Foot-traffic, and ICU Capacity

This table presents negative binomial regression estimates of the cumulative number of COVID-19 cases a nursing home had as of October 18, 2020 on the following variables: *Cash* is cash and equivalents, *MedicareShare* is the share of overall patient days that are reimbursed through Medicare. *MedicaidShare* is the share of overall patient days that are reimbursed through Medicaid. *MedicaidBoost* is a dummy variable equal to one if the facility is in a state that increased Medicaid reimbursement rates by at least 10%/\$20. Each regression also includes the following *facility control* variables: *Beds*, *Beds^2*, *Beds^3*, *AvgResidents*, *AvgResidents^2*, *AvgResidents^3*, *LPN hours*, *RN hours*, *FacilityAge*, *ZipMinorityShare*, *TotalMargin*, *Leverage*, and *ForProfit* as defined in Tables 3 and 4. *HealthInsp Rating* is the component of the CMS rating program ranging from 1-5 that comes from health inspections in which the top 10% in each state receive a top rating. *HealthInsp Rating* is the CMS "overall" rating from their five-star quality rating system ranging from 1-5. *Integra Rating* is an independent quality rating system ranging from 1-5 developed by IntegraMed aimed at removing ratings bias from self-reporting. *AveUniqueVisitors6mo* is the average number of unique visitors (using SafeGraph data) to the facility in the first six months of 2020. Column 4 excludes states who experienced 85% or greater utilization of statewide ICU beds during the sample period. "z" indicates that the variable is standardized to zero mean and unit standard deviation. All estimations include county fixed effects, and all standard errors are clustered at the county level. All coefficient estimates are exponentiated ($e^{\hat{\beta}}$).

	(1)	(2)	(3)	(4)
zln(Cash)	0.952**	0.950**	0.942**	0.960*
	(0.021)	(0.023)	(0.023)	(0.021)
zMedicareShare	1.088***	1.056*	1.078**	1.083***
	(0.031)	(0.032)	(0.035)	(0.031)
zMedicaidShare	1.101***	1.079**	1.064	1.095***
	(0.037)	(0.039)	(0.042)	(0.038)
MedicaidShare ×MedicaidBoost	0.874***	0.867**	0.898**	0.874***
	(0.041)	(0.052)	(0.048)	(0.041)
log(AveUniqueVisitors6mo)			0.991	
			(0.026)	
HealthInsp Rating FE	No	No	Yes	Yes
Overall Rating FE	Yes	No	No	No
Integra Rating FE	No	Yes	No	No
Facility Controls	Yes	Yes	Yes	Yes
Cnty FE	Yes	Yes	Yes	Yes
Observations	7045	6064	5576	6831
Log likelihood	-23978	-20376	-1899p	-23291

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table IA.3: Personal Protective Equipment Outages: Alternative Measures of Cash

This table presents regression estimates of PPE outages in nursing homes ($COVID\text{-}19_i$) as of October 18, 2020 on nursing home financial and facility characteristics. Columns 1, 3, and 5 present negative binomial (NB) regressions where the dependent variable is the number of weeks during the pandemic that the nursing home reported having no supply of the respective PPE item. Columns 2, 4, and 6 present OLS estimates where the dependent variable is an indicator ($\mathbb{1}_{>0wks}$) equal to one if the nursing home reported having no supply of the respective PPE item at least one week during the pandemic. *Cash* is cash and equivalents, *DaysCashOnHand* is the number of days worth of operating expenses that can be covered by cash and equivalents, *Cash/Beds* and *Cash/NetRevenue* are Cash scaled by the number of beds in the facility and prior year's net revenues, respectively. *MedicareShare* is the share of overall patient days that are reimbursed through Medicare. *MedicaidShare* is the share of overall patient days that are reimbursed through Medicaid. *MedicaidBoost* is a dummy variable equal to one if the facility is in a state that increased Medicaid reimbursement rates by at least 10%/\$20. Each regression also includes the following *facility control* variables: *Beds*, $Beds^2$, $Beds^3$, *AvgResidents*, $AvgResidents^2$, $AvgResidents^3$, *LPN hours*, *RN hours*, *Admissions (00s)*, *FacilityAge*, *ZipMinorityShare*, *TotalMargin*, *Leverage*, *ForProfit* and *HealthInsp Rating* fixed effects as defined in Tables 3 and 4. All estimations also include county fixed effects, health inspection rating fixed effects, *MedicareShare*, *MedicaidShare*, and *MedicaidShare×MedicaidBoost*, and all standard errors are clustered at the county level. For brevity, we only report the coefficients for the liquidity variables. Each panel is a separate set of regressions. Coefficient estimates are exponentiated ($e^{\hat{\beta}}$) in columns 1-3.

Model:	NB(#weeks); $e^{\hat{\beta}}$ reported			$\mathbb{1}[>0$ weeks]; $\hat{\beta}$ reported		
Shortage	N95 Masks (1)	Surgical Masks (2)	Eye Protection (3)	N95 Masks (4)	Surgical Masks (5)	Eye Protection (6)
Panel A:						
zln(Cash)	0.586***	0.480***	0.470***	-0.041***	-0.043***	-0.042***
	(0.040)	(0.044)	(0.043)	(0.007)	(0.007)	(0.006)
Panel B:						
zDaysCashOnHand	0.816**	0.750***	0.691***	-0.014**	-0.013**	-0.017***
	(0.072)	(0.079)	(0.078)	(0.007)	(0.005)	(0.006)
Panel C:						
$z\frac{\text{Cash}}{\text{Beds}}$	0.835*	0.745***	0.749***	-0.014**	-0.010**	-0.013**
	(0.078)	(0.075)	(0.076)	(0.007)	(0.005)	(0.005)
Panel D:						
$z\frac{\text{Cash}}{\text{Net Revenue}}$	0.854*	0.749***	0.728***	-0.013*	-0.012**	-0.016***
	(0.075)	(0.079)	(0.082)	(0.006)	(0.005)	(0.005)
Observations	7033	7033	7033	7033	7033	7033

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

IA.1 Details on Government Aid to Nursing Homes

Federal and state governments established or used several programs to help address the economic impacts of the COVID-19 pandemic. Skilled nursing facilities (nursing homes) qualified for a number of these programs. In the main text, we detailed the most relevant programs for our setting and analyses. Below we provide further details on two federal programs providing financial assistance to nursing homes.

IA.1.1 Provider Relief Fund:

Through the CARES Act and the Paycheck Protection Program and Health Care Enhancement Act (PL 116-139), Congress made $175 billion available to healthcare providers. The U.S. Department of Health and Human Services distributed the money through the Provider Relief Fund. The skilled nursing facilities in our sample qualified for some of the disbursements made through this program. Like the Paycheck Protection Program (but unlike the Medicare Accelerated and Advanced Payment Program), the Provider Relief Fund payments did not need to be repaid.

The Provider Relief Fund provided money in stages to Medicare providers. The money was allocated based on gross patient revenues with payments equal to the minimum of 2% of the provider's gross patient revenue (the revenue source was not considered) or the sum of incurred losses for March and April 2020.[1] 2% of revenues is relatively small considering the average nursing home experienced a 11% decline in residents between January and June 2020.

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[1] The timeline and calculations for the provider relief fund are provided by the HHS here: https://www.hhs.gov/coronavirus/cares-act-provider-relief-fund/general-information/index.html#eligibility. $30 billion was distributed between April 10-17 to over 300,000 Medicare Managed Fee-For-Service (MFFS) providers based on each provider's portion of the 2019 Medicare Fee-For-Service (MFFS) payments. On April 24, 2020, an additional $9.1 billion was provided to 15,000 MFFS providers based on revenues from CMS cost report data. Starting April 24, an additional $10.9 billion was made available to MFFS providers based on revenue submissions (only $2.4 billion was distributed as of June 15, 2020). On June 9, HHS expected to distribute approximately $15 billion to Medicaid providers that did not receive a payment from the initial allocation of the Provider Relief Fund, with the payment allocation equal to 2% of their revenues from patient care.

While nursing homes received some aid from these disbursements, nursing homes received less than 5% of the initial $30 billion.[2] The most direct form of aid for skilled nursing facilities came on May 22, 2020, two months after the onset of the pandemic. The Provider Relief Fund allocated $4.9 billion specifically to 13,000 skilled nursing facilities. The payment to each skilled nursing facility was based on the facility's number of certified beds. Specifically, each facility received: $50,000 plus $2,500 per certified bed. For example, a facility with 100 certified beds would receive $300,000. The main disbursements to nursing homes on May 22, 2020 came over two months after the onset of the pandemic.

IA.1.2   Paycheck Protection Program (PPP):

The PPP was established by the Coronavirus Aid, Relief, and Economic Security (CARES) ACT (PL 116-136) to help smaller businesses (fewer than 500 employees) cover their payroll costs in the initial months of the pandemic. Borrowers must certify in good faith that the "[c]urrent economic uncertainty makes this loan request necessary to support the ongoing operations of the Applicant." Eligible businesses can receive a maximum loan amount equal to 2.5 months of payroll costs (calculated based on 2019 tax filings). If the borrowing business uses the money according to certain rules (e.g., paying employees), then the cash infusion is considered a grant and does not need to be repaid. If not, then the loan must be repaid. As of January 2021, about one third of NAICS code 623100 firms, which includes nursing homes, received a loan of at least $150,000 through the paycheck protection program.[3]

While the loans came relatively early, they may not have come quick enough or been large enough to mitigate the effects of the adverse cash flow shocks nursing homes experienced. There was still significant lobbying by the nursing home industry post-April for more government assistance suggesting PPP did not solve the economic woes facing nursing homes.

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[2]https://www.foxnews.com/opinion/coronavirus-nursing-home-crisis-4-things-need-now-mark-goldfeder-ira-bedzow

[3]Data are provided by the Small Business Administration for loans above $150,000.

In addition, the size of the loans was based on payroll, not the impact of the pandemic of nursing homes' cash flows and firm value. Nursing homes hit especially hard by the pandemic received similar-sized loans as other nursing homes with similar payrolls that were not as impacted. In other words, PPP did not address important cross-sectional heterogeneity in the size of the cash flow shock across nursing homes and, therefore, the effects of PPP are unlikely to be correlated with our cross-sectional variables of interest.