## Did financial frictions stifle R&D investment in Europe during the Great Recession?

## Online Appendix

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Dependent variables:		R&D			$\frac{R\&D}{Sales}$			R&D Investment	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firms in in	ndustries v	with high d	ependence	on extern	al finance				
$Small_i \times Crisis_{t-1}$	-0.123***			-0.132***			-0.009**		
	(0.024)			(0.021)			(0.004)		
$Liquidity_i \times Crisis_{t-1}$		$-0.073^{***}$ (0.025)			$-0.050^{**}$ (0.021)			0.003 (0.016)	
$Leverage_i \times Crisis_{t-1}$		(0.020)	$-0.094^{***}$ (0.023)		(0.021)	$-0.068^{***}$ (0.019)		(0.010)	$\begin{array}{c} 0.013 \\ (0.015) \end{array}$
Observations	12,704	12,851	13,976	12,496	12,653	13,706	8,207	6,698	7,574
R-squared	0.0391	0.0301	0.0286	0.0311	0.0226	0.0197	0.419	0.587	0.549
Panel B: Firms in industries with low dependence on external finance									
$Small_i \times Crisis_{t-1}$	$0.021^{*}$			0.010			0.013		
Liquiditu: $\times Crisis_{t-1}$	(0.012)	-0.070***		(0.019)	-0.049***		(0.012)	0.012	
$Eiquinity_l \times Critic_{l=1}$		(0.012)			(0.014)			(0.023)	
$Leverage_i \times Crisis_{t-1}$			$-0.036^{**}$			$-0.019^{*}$		. ,	0.018
			(0.014)			(0.011)			(0.025)
Observations	11,703	16,446	$17,\!847$	$11,\!549$	16,277	$17,\!611$	7,921	8,773	9,773
R-squared	0.0222	0.0190	0.0193	0.0230	0.0219	0.0214	0.440	0.571	0.533
Controls:									
$Crisis_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$Small_i$	Yes			Yes			Yes		
$Liquidity_i$		Yes			Yes			Yes	
$Leverage_i$			Yes			Yes			Yes
Country-industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Table presents the estin	nates of Ea	(4) in the	naner and	corresponde	to Figure 5	The deno	ident varis	hle in col	umne

Table A1: Alternative measures of financial constraints

Table presents the estimates of Eq. (4) in the paper and corresponds to Figure 5. The dependent variable in columns (1)-(3) is the growth rate of R&D investment in year t, in columns (4)-(6) is the growth rate of the ratio of R&D to sales, while in columns (7)-(9) it is the share of R&D to total investment. Panel A includes industries with an above the median dependence on external finance, while Panel B those with a below the median dependence.  $Crisis_t$  is a dummy taking the value one in 2008-2010 and 2012-2013.  $Small_i$  is a dummy that takes the value of 1 if a firm is in the 25<sup>th</sup> percentile of the distribution of firms by total assets in a given industry and 0 if it is in the 75<sup>th</sup> percentile.  $Liquidity_i$  is a dummy that takes the value of 1 if a firm is in the 25<sup>th</sup> percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25<sup>th</sup> percentile of the distribution of firms by liquidity in a given industry in 2007 and 0 if it is in the 75<sup>th</sup> percentile. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Table A2:	Alternative	measures	of	financial	constraints:	including	country-by-industry-by-
year fixed e	effects						

Dependent variables:		R&D			$\frac{R\&D}{Sales}$			R&D Investmen	at .
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firms in indus	stries with	high depe	ndence on	external f	inance				
$Small_i \times Crisis_{t-1}$	-0.086***			-0.111***			-0.001		
	(0.029)			(0.027)			(0.005)		
$Liquidity_i \times Crisis_{t-1}$		-0.073***			-0.057***			0.004	
		(0.010)	0.005***		(0.010)	0 100***		(0.012)	0.007
$Leverage_i \times Crisis_{t-1}$			$-0.097^{***}$			$-0.103^{+++}$			0.007
			(0.004)			(0.007)			(0.012)
Observations	12.704	12.851	13.976	12.496	12.653	13,706	8.207	6.698	7.574
R-squared	0.105	0.0860	0.0794	0.0940	0.0799	0.0722	0.494	0.647	0.614
1									
Panel B: Firms in indus	stries with	low depen	dence on e	external fit	nance				
Small × Crisis,	0.015			-0.012			0.007		
Small $\land$ Cristst=1	(0.024)			(0.012)			(0.014)		
$Liquidity_i \times Crisis_{t-1}$	(0.0-1)	-0.090***		(01011)	-0.071***		(01011)	-0.001	
		(0.002)			(0.002)			(0.003)	
$Leverage_i \times Crisis_{t-1}$		· · · ·	-0.037***		· · · ·	-0.030***		· /	0.010***
			(0.001)			(0.001)			(0.003)
	11 709	10 440	17.047	11 540	10.077	17 011	7 001	0 779	0 779
Observations Descriptions	11,703	16,446	17,847	11,549	16,277	17,011	1,921	8,113	9,113
R-squared	0.0855	0.0549	0.0598	0.0857	0.0587	0.0055	0.008	0.009	0.040
Controls:									
$Crisis_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$Small_i$	Yes			Yes			Yes		
$Liquidity_i$		Yes			Yes			Yes	
$Leverage_i$			Yes			Yes			Yes
Country-industry-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table presents the estimates of Eq. (4). The dependent variable in columns (1)-(3) is the growth rate of R&D investment in year t, in columns (4)-(6) is the growth rate of the ratio of R&D to sales, while in columns (7)-(9) it is the share of R&D to total investment. Panel A includes industries with an above the median dependence on external finance, while Panel B those with a below the median dependence.  $Crisis_{t-1}$  is a dummy taking the value one in 2008-2010 and 2012-2013.  $Small_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by total assets in a given industry and 0 if it is in the 75th percentile.  $Liquidity_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in a given industry in 2007 and 0 if it is in the 75th percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in 2007 and 0 if it is in the 75th percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in 2007 and 0 if it is in the 75th percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in 2007 and 0 if it is in the 75th percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in 2007 and 0 if it is in the 75th percentile. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Dependent variables:	R&	zD	$\frac{R\delta}{Sa}$	$\frac{dzD}{des}$	$\frac{R\&D}{Investment}$		
	(1)	(2)	(3)	(4)	(5)	(6)	
Panel A: Firms in	industries	with high	dependenc	e on exter	nal financ	e	
$Private_i \times Crisis_{t-1}$	-0.075***	-0.082***	-0.101***	-0.106***	-0.026**	-0.027***	
	(0.026)	(0.029)	(0.030)	(0.035)	(0.010)	(0.011)	
Observations	41,801	40,614	41,294	40,119	29,838	28,773	
R-squared	0.0226	0.0330	0.0178	0.0247	0.366	0.399	
Panel B: Firms in	industries	with low a	lependence	on extern	al finance		
$Private \times Crisis_{t-1}$	-0.023	-0.016	-0.021	-0.011	-0.004	-0.006	
1 / ///////////////////////////////////	(0.029)	(0.025)	(0.021)	(0.024)	(0.009)	(0,009)	
	(0:020)	(0.020)	(0.001)	(0.021)	(0.000)	(0.000)	
Observations	$43,\!980$	42,938	$43,\!629$	42,592	$28,\!610$	$27,\!642$	
R-squared	0.0162	0.0240	0.0161	0.0238	0.388	0.414	
Controls:							
$Private_i, Crisis_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	
Country-industry FE	Yes	Yes	Yes	Yes	Yes	Yes	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	
Firm-level controls		Yes		Yes		Yes	

Table A3: Baseline results: alternative crisis dummy

Table presents the estimates of Eq. (4). The dependent variable in columns (1)-(2) is the growth rate of R&D investment in year t, in columns (3)-(4) is the growth rate of the ratio of R&D to sales, while in columns (5)-(6) it is the share of R&D to total investment. Panel A includes industries with an above the median dependence on external finance, while Panel B those with below the median dependence.  $Private_i$  is a dummy for private firms.  $Crisis_{t-1}$  is a dummy taking the value one in 2008-2010 and 2012-2013. Different from previous estimations, Germany is excluded as a crisis country during 2012-2013. Standard errors are clustered at the country level. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Dependent variables:	R&D		$\frac{R\&}{Sal}$	<u>D</u>	$\frac{R\&D}{Investment}$		
	High	Low	High	Low	High	Low	
	(1)	(2)	(3)	(4)	(5)	(6)	
Panel A: Robustness of Tab	le 3						
$Private_i \times Crisis_{t-1}$	-0.070**	-0.025	-0.090***	-0.019	-0.026***	-0.004	
	(0.029)	(0.026)	(0.030)	(0.027)	(0.009)	(0.011)	
Observations	$40,\!614$	42,938	40,119	$42,\!592$	28,773	$27,\!642$	
R-squared	0.0330	0.0241	0.0247	0.0239	0.399	0.415	
Panel B: Robustness of Tab	le 4						
$Private_i \times Crisis_{t-1} \times BLS_{c,t}$	-0.193	-0.222**	-0.238*	-0.222**	-0.062**	-0.084***	
	(0.126)	(0.106)	(0.131)	(0.106)	(0.025)	(0.026)	
Observations	$37,\!615$	39,981	$37,\!367$	39,981	25,903	24,823	
R-squared	0.0333	0.0240	0.0252	0.0240	0.333	0.313	
Other Grantesla	Duturt	Quinin	DIC	a			
Other Controls:	$Frivate_i,$ Time FF	$Crisis_{t-1}$	, DL $S_{c,t}$ , (	ountry-ine	iusiry FE,		
Observations R-squared Other Controls:	(0.126) 37,615 0.0333 Private <sub>i</sub> , Time FE.	(0.106) 39,981 0.0240 $Crisis_{t-1}$ Firm-level	(0.131) 37,367 0.0252 , $BLS_{c,t}$ , $0$ l controls	(0.106) 39,981 0.0240 Country-ine	(0.025) 25,903 0.333 dustry FE,	$(0.026) \\ 24,823 \\ 0.313$	

Table A4: Baseline estimations: clustering at the country-industry

The dependent variable in columns (1)-(2) is the growth rate of R&D investment in year t, in columns (3)-(4) is the growth rate of the ratio of R&D to sales, while in columns (5)-(6) it is the share of R&D to total investment. Columns (1), (3) and (5) include industries with an above the median dependence on external finance, while columns (2), (4) and (6) those with a below the median dependence. Small<sub>i</sub> is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by total assets in a given industry and 0 if it is in the 75th percentile. Crisis<sub>t</sub> is a dummy taking the value one in 2008-2010 and 2012-2013. Firm level controls include: the log of total assets, the log of sales, liquidity, leverage and investment to total assets. Standard errors are clustered at the country-industry level. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Dependent variables:		R&D			<u>R&amp;D</u> Sales			<u>R&amp;D</u> Investment	ī
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firms in in	n dustries	with high	dependent	ce on exte	ernal fin	ance			
$Small_i \times Crisis_{t-1}$	-0.123**			-0.132**			-0.009		
$Liquidity_i \times Crisis_{t-1}$	(0.048)	-0.073**		(0.052)	-0.050		(0.011)	0.003	
		(0.032)			(0.035)			(0.010)	
$Leverage_i \times Crisis_{t-1}$			$-0.094^{***}$			-0.068**			0.013
			(0.030)			(0.029)			(0.009)
Observations	12.704	12.851	13.976	12.496	12.653	13.706	8.207	6.698	7.574
R-squared	0.0393	0.0303	0.0289	0.0312	0.0229	0.0200	0.419	0.587	0.549
Panel B: Firms in in	idustries	with low	dependence	e on exter	rnal fina	nce			
$Small_i \times Crisis_{t-1}$	0.021			0.010			0.013		
	(0.075)			(0.072)			(0.012)		
$Liquidity_i \times Crisis_{t-1}$		-0.070**			-0.049			0.012	
		(0.036)			(0.036)			(0.010)	
$Leverage_i \times Crisis_{t-1}$			-0.036			-0.019			0.018*
			(0.035)			(0.034)			(0.010)
Observations	11,703	16,446	17.847	11.549	16,277	17.611	7.921	8,773	9,773
R-squared	0.0222	0.0192	0.0195	0.0230	0.0221	0.0216	0.440	0.571	0.533
Controls:			3.7	3.7	3.7	3.7	37	37	3.7
$Crisis_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sinall <sub>i</sub> Liquidita	res	Vac		res	Vec		res	Vez	
Liquidity $_i$		res	Voc		res	Voc		res	Voc
Leverage <sub><math>i</math></sub>	Voc	Voc	Tes	Voc	Vor	res Voc	Voc	Vor	Tes Vos
Time FE	Ves	Ves	Ves	Ves	Ves	Ves	Ves	Ves	Ves
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A5: Alternative measures of financial constraints: clustering at country-industry level

The dependent variable in columns (1)-(3) is the growth rate of R&D investment in year t, in columns (4)-(6) is the growth rate of the ratio of R&D to sales, while in columns (7)-(9) it is the share of R&D to total investment. Panel A includes industries with an above the median dependence on external finance, while Panel B those with a below the median dependence.  $Crisis_{t-1}$  is a dummy taking the value one in 2008-2010 and 2012-2013.  $Small_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by total assets in a given industry and 0 if it is in the 75th percentile.  $Liquidity_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile of the distribution of firms by liquidity in a given industry in 2007 and 0 if it is in the 75th percentile.  $Leverage_i$  is a dummy that takes the value of 1 if a firm is in the 25th percentile. Firm level controls include: the log of total assets, the log of sales, liquidity, leverage and investment to total assets. Standard errors are clustered at the country-industry level. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Dependent variables:	R&	zD	$\frac{R\&}{Sa}$	$\frac{dzD}{les}$	$\frac{R\&D}{Investment}$		
	(1)	(2)	(3)	(4)	(5)	(6)	
Panel A: Firms in	industries	with $high$	dependence	e on extern	nal financ	e	
$Private_i \times Crisis_{t-1}$	-0.061***	-0.071***	-0.081***	-0.087***	-0.022**	-0.022***	
	(0.022)	(0.026)	(0.027)	(0.031)	(0.009)	(0.008)	
Observations	46,822	45,465	46,167	44,837	33,728	32,518	
R-squared	0.0132	0.0101	0.0108	0.0103	0.134	0.146	
Panel B: Firms in	industries	with low a	lependence	on extern	al finance		
$Private_i \times Crisis_{t-1}$	-0.024	-0.024	-0.015	-0.013	-0.002	-0.004	
	(0.022)	(0.022)	(0.023)	(0.019)	(0.009)	(0.008)	
Observations	47,549	46,388	47,115	45,963	31,281	30,205	
R-squared	0.0176	0.0268	0.0166	0.0245	0.379	0.409	
Other Controls:	Private, ( Firm-level	Credit, Cou controls	intry-industr	ry FE, Tin	ne FE,		

Table A6: Baseline model: different attrition rule

Table presents the estimates of Eq. (4) for a sample of firms that report at least 5 years of R&D data. The dependent variable in columns (1)-(2) is the growth rate of R&D investment in year t, in columns (3)-(4) is the growth rate of the ratio of R&D to sales, while in columns (5)-(6) it is the share of R&D to total investment. Panel A includes industries with an above the median dependence on external finance, while Panel B those with below the median dependence.  $Private_i$  is a dummy for private firms.  $Crisis_t$  is a dummy taking the value one in 2008-2010 and 2012-2013. Standard errors are clustered at the country level. \*/\*\*/\*\*\* represents significance at 10, 5 and 1% level.

Nov.2       00       Manufacture of food products       0.02         11       Manufacture of boverages       -0.04         12       Manufacture of tobacco products       -1.49         13       Manufacture of textiles       0.10         14       Manufacture of wearing apparel       0.17         15       Manufacture of wood and of products of wood and cork, except furniture; man- ufacture of articles of straw and plaiting materials       0.02         18       Printing and reproduction of recorded media       0.19         20       Manufacture of basic pharmaceutical products       0.18         21       Manufacture of basic pharmaceutical products       0.18         23       Manufacture of basic pharmaceutical products       0.19         24       Manufacture of basic metals       0.24         25       Manufacture of basic metals       0.24         26       Manufacture of basic metals       0.24         27       Manufacture of computer, electronic and optical products       0.36         27       Manufacture of onotor vehicles, trailers and semi-trailers       -0.17         28       Manufacture of other transport equipment n.e.c.       -0.14         31       Manufacture of turiniture	NACE	Description	ExtDep
10     Manufacture of lood products     0.02       11     Manufacture of tobecrages     -0.04       12     Manufacture of tobacco products     -1.49       13     Manufacture of textiles     0.10       14     Manufacture of waving apparel     0.17       15     Manufacture of wood and of products of wood and cork, except furniture; manufacture of wood and products of wood and cork, except furniture; manufacture of paper and paper products     0.02       18     Printing and reproduction of recorded media     0.19       20     Manufacture of chemicals and chemical products     0.02       21     Manufacture of other non-metallic mineral products     0.18       22     Manufacture of other non-metallic mineral products     0.024       33     Manufacture of basic metals     0.24       34     Manufacture of indericated metal products, except machinery and equipment     0.11       26     Manufacture of indor vehicles, trailers and semi-trailers     0.021       27     Manufacture of furniture     0.16       28     Manufacture of furniture     0.17       29     Manufacture of furniture     0.17       20     Manufacture of indor vehicles, trailers and semi-trailers     0.161 <th>Rev.2</th> <th></th> <th></th>	Rev.2		
11     Manufacture of beverages     -0.04       12     Manufacture of tobacco products     -1.49       13     Manufacture of textiles     0.10       14     Manufacture of textiles     0.02       15     Manufacture of vood and of products of wood and cork, except furniture; manufacture of paper and paper products     0.02       16     Manufacture of chemicals and chemical products     0.01       17     Manufacture of chemicals and chemical products     0.15       21     Manufacture of chemicals and chemical products     0.15       21     Manufacture of chemicals and chemical products     0.16       23     Manufacture of other non-metallic mineral products     0.06       24     Manufacture of basic pharmaceutical products     0.36       25     Manufacture of computer, electronic and optical products     0.36       26     Manufacture of computer, electronic and panical products     0.36       27     Manufacture of ther inn-metallic mineral products     0.36       28     Manufacture of tonic vehicles, trailers and semi-trailers     -0.11       29     Manufacture of tonic vehicles, trailers and semi-trailers     -0.15       30     Repair and installation of machinery and equipment	10	Manufacture of food products	0.02
12     Manufacture of tobacco products     -1.49       13     Manufacture of textiles     0.10       14     Manufacture of vexing apparel     0.17       15     Manufacture of wood and or products of wood and ocrk, except furniture; manufacture of apper and paper products     0.02       17     Manufacture of paper and paper products     0.02       18     Printing and reproduction of recorded media     0.19       20     Manufacture of chemicals and chemical products and pharmaceutical preparations     4.88       21     Manufacture of other non-metallic mineral products     0.18       22     Manufacture of basic metals     0.24       23     Manufacture of basic metals     0.24       24     Manufacture of basic metals     0.24       25     Manufacture of basic metals     0.24       26     Manufacture of basic metals     0.24       27     Manufacture of computer, electronic and optical products     0.36       28     Manufacture of adminery and equipment n.e.c.     -0.11       29     Manufacture of furniture     -0.26       20     Other manufacturing     1.00       38     Electricity, gas, steam and ar conditioning supply     -0.44	11	Manufacture of beverages	-0.04
13     Manufacture of textiles     0.10       14     Manufacture of woaring apparel     0.17       15     Manufacture of swaring apparel     0.01       15     Manufacture of achter and related products     0.02       16     Manufacture of achter and paper products     0.02       17     Manufacture of chemicals and chemical products     0.02       18     Printing and reproduction of recorded media     0.19       19     Manufacture of chemicals and chemical products and pharmaceutical preparations     4.88       20     Manufacture of chericals products     0.06       21     Manufacture of abricated metal products, except machinery and equipment     0.11       23     Manufacture of computer, electronic and optical products     0.36       24     Manufacture of machinery and equipment n.e.c.     -0.11       25     Manufacture of furniture     -0.26       26     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     0.94       34     Electricity, gas, steam and air conditioning supply     -0.24       36     Water collection, treatment and supply     0.24       36     Wabescollectricity, except of moto	12	Manufacture of tobacco products	-1.49
14   Manufacture of wearing apparel   0.17     15   Manufacture of leather and related products   -0.02     16   Manufacture of straw and plaiting materials   0.01     17   Manufacture of paper and paper products   0.02     18   Printing and reproduction of recorded media   0.19     20   Manufacture of basic pharmaceutical products and pharmaceutical preparations   4.88     21   Manufacture of basic pharmaceutical products and pharmaceutical preparations   0.16     22   Manufacture of basic metamaceutical products   0.02     23   Manufacture of basic metalis mineral products   0.08     24   Manufacture of basic metalis   0.24     25   Manufacture of computer, electronic and optical products   0.36     24   Manufacture of facticated metal products, except machinery and equipment   0.17     25   Manufacture of motor vehicles, trailers and semi-trailers   -0.13     26   Other manufacturing   -0.04     27   Manufacture of furniture   -0.26     28   Manufacture of furniture   -0.26     29   Manufacture of furniture   -0.26     20   Other manufacturing   1.00     31   Manufacture of furniture   -0.26     32   Other manufacturing <td>13</td> <td>Manufacture of textiles</td> <td>0.10</td>	13	Manufacture of textiles	0.10
15   Manufacture of leather and related products   -0.02     16   Manufacture of wood and op products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials   0.01     17   Manufacture of paper and paper products   0.02     18   Printing and reproduction of recorded media   0.19     19   Manufacture of chemicals and chemical products   0.15     21   Manufacture of obsic pharmaceutical products and pharmaceutical preparations   4.88     22   Manufacture of obsic pharmaceutical products   0.06     23   Manufacture of absic entals   0.24     24   Manufacture of computer, electronic and optical products   0.36     27   Manufacture of acabinery and equipment n.e.c.   -0.11     28   Manufacture of machinery and equipment n.e.c.   -0.12     29   Manufacture of furniture   -0.26     20   Other manufacturing   1.00     33   Repair and installation of machinery and equipment   0.94     34   Water collection, treatment and disposal activities; materials recovery   0.61     35   Wholesale trade, except of motor vehicles and motorcycles   0.33     36   Food and beverage service activities   0.35     37   Retail trade, except of motor vehicles and motorcycles   0.34 <t< td=""><td>14</td><td>Manufacture of wearing apparel</td><td>0.17</td></t<>	14	Manufacture of wearing apparel	0.17
16     Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials     0.01       17     Manufacture of paper and paper products     0.02       18     Printing and reproduction of recorded media     0.19       0     Manufacture of chemicals and chemical products and pharmaceutical preparations     4.88       21     Manufacture of obter non-metallic mineral products     0.06       23     Manufacture of obter non-metallic mineral products     0.06       24     Manufacture of computer, electronic and optical products     0.36       25     Manufacture of computer, electronic and optical products     0.36       26     Manufacture of motor vehicles, trailers and semi-trailers     -0.11       27     Manufacture of fubricules, trailers and semi-trailers     -0.15       30     Manufacture of fubricules, trailers and semi-trailers     -0.16       31     Manufacture of fubricules, trailers and semi-trailers     -0.16       32     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     0.94       34     Electricity, gas, steam and air conditioning supply     -0.24       34     Waste collection, treatment and supposl     0.24 <td>15</td> <td>Manufacture of leather and related products</td> <td>-0.02</td>	15	Manufacture of leather and related products	-0.02
ufacture of articles of straw and plating materials     0.02       17     Manufacture of paper and paper products     0.019       18     Printing and reproduction of recorded media     0.15       20     Manufacture of chemicals and chemical products and pharmaceutical preparations     4.88       21     Manufacture of rubber and plastics products     0.16       23     Manufacture of basic pharmaceutical products sevept machinery and equipment     0.17       24     Manufacture of fabricated metal products, except machinery and equipment     0.17       25     Manufacture of computer, electronic and optical products     0.06       26     Manufacture of machinery and equipment n.e.c.     -0.11       27     Manufacture of furniture     -0.12       28     Manufacture of furniture     -0.12       30     Repair and installation of machinery and equipment     -0.14       31     Manufacturing     1.00       32     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     0.94       35     Electricity, gas, steam and air conditioning supply     0.24       36     Wate collection, treatment and supply     0.24       37 <td< td=""><td>16</td><td>Manufacture of wood and of products of wood and cork, except furniture; man-</td><td>0.01</td></td<>	16	Manufacture of wood and of products of wood and cork, except furniture; man-	0.01
17     Manufacture of paper and paper products     0.02       18     Printing and reproduction of recorded media     0.19       19     Manufacture of chemicals and chemical products     0.15       21     Manufacture of basic pharmaccutical products and pharmaccutical preparations     4.88       22     Manufacture of other non-metallic mineral products     0.16       23     Manufacture of other non-metallic mineral products     0.06       24     Manufacture of computer, electronic and optical products     0.36       25     Manufacture of computer, electronic and optical products     0.36       26     Manufacture of other transport equipment n.e.c.     -0.11       27     Manufacture of other transport equipment     -0.14       38     Manufacture of furniture     -0.26       39     Other manufacturing     1.00       30     Repair and installation of machinery and equipment     0.94       36     Electricity, gas, steam and air conditioning supply     -0.44       36     Waste collection, treatment and supply     0.24       37     Waste collection, treatment and disposal activities; materials recovery     0.61       40     Wholesale trade, except of motor vehicles and motorcycles		ufacture of articles of straw and plaiting materials	
18     Printing and reproduction of recorded media     0.19       20     Manufacture of chemicals and chemical products     0.15       21     Manufacture of basic pharmaceutical products and pharmaceutical preparations     4.88       22     Manufacture of basic pharmaceutical products     0.18       23     Manufacture of basic pharmaceutical products     0.06       24     Manufacture of basic pharmaceutical products, except machinery and equipment     0.11       26     Manufacture of computer, electronic and optical products     0.36       27     Manufacture of machinery and equipment n.e.c.     -0.11       28     Manufacture of furniture     -0.15       30     Manufacture of furniture     -0.26       32     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     -0.41       34     Waste collection, treatment and supply     0.24       35     Waste collection, treatment and supply     0.24       36     Wholesale trade, except of motor vehicles and motorcycles     0.43       37     Retail trade, except of motor vehicles and motorcycles     0.35       36     Wholesale trade, except of motor vehicles and motorcycles     0.34 <td>17</td> <td>Manufacture of paper and paper products</td> <td>0.02</td>	17	Manufacture of paper and paper products	0.02
20     Manufacture of chemicals and chemical products     0.15       21     Manufacture of basic pharmaceutical products and pharmaceutical preparations     4.88       22     Manufacture of rubber and plastics products     0.16       23     Manufacture of absic metals     0.06       24     Manufacture of absic metals     0.24       25     Manufacture of absic metals     0.36       26     Manufacture of computer, electronic and optical products     0.36       27     Manufacture of motor vehicles, trailers and semi-trailers     0.11       28     Manufacture of motor vehicles, trailers and semi-trailers     -0.11       29     Manufacture of other transport equipment n.e.c.     -0.14       31     Manufacture of furniture     -0.26       32     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     0.94       34     Electricity, gas, steam and air conditioning supply     0.24       38     Waste collection, treatment and disposal activities; materials recovery     0.61       41     Construction of buildings     0.37       45     Accommodation     0.38       54     Rectail trade, except of motor vehicl	18	Printing and reproduction of recorded media	0.19
Manufacture of basic pharmaceutical products and pharmaceutical preparations     4.88       Manufacture of rubber and plastics products     0.06       Manufacture of other non-metallic mineral products     0.06       Manufacture of basic metals     0.24       Manufacture of basic metals     0.24       Manufacture of absic metals     0.36       Manufacture of activical equipment     0.17       Manufacture of omotion vehicles, trailers and semi-trailers     -0.11       Manufacture of furniture     -0.14       Manufacture of furniture     -0.26       Other manufacturing     1.00       Repair and installation of machinery and equipment     0.94       Electricity, gas, steam and air conditioning supply     -0.44       Waste collection, treatment and supply     0.24       Waste collection, treatment and disposal activities; materials recovery     0.61       Construction of buildings     0.78       Wholesale trade, except of motor vehicles and motorcycles     0.33       Feod and beverage service activities     0.59       Motion picture, video and television programme production, sound recording and music publishing activities     0.56       Computer programming, consultancy and related activities     0.32       Mare coure	20	Manufacture of chemicals and chemical products	0.15
22Manufacture of rubber and plastics products0.1823Manufacture of other non-metallic mineral products0.0624Manufacture of basic metals0.2425Manufacture of fabricated metal products, except machinery and equipment0.1126Manufacture of electrical equipment0.1727Manufacture of machinery and equipment n.e.c0.1128Manufacture of motor vehicles, trailers and semi-trailers-0.1530Manufacture of furniture-0.2631Manufacture of furniture-0.2632Other manufacturing1.0033Repair and installation of machinery and equipment0.9444Electricity, gas, steam and air conditioning supply-0.4436Water collection, treatment and supply0.2437Retail trade, except of motor vehicles and motorcycles0.4346Wholesale trade, except of motor vehicles and motorcycles0.4347Retail trade, except of motor vehicles and motorcycles0.3146Yaccommodation0.3147Retail trade, except of motor vehicles and motorcycles0.5848Publishing activities0.2849Motion picture, video and television programme production, sound recording and music publishing activities0.3240Programming and broadcasting activities0.3241Commutations0.3411542Fieldean diffices; management consultancy activities0.3444Telecommunications0.32 </td <td>21</td> <td>Manufacture of basic pharmaceutical products and pharmaceutical preparations</td> <td>4.88</td>	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	4.88
23Manufacture of other non-metallic mineral products0.0624Manufacture of basic metals0.2425Manufacture of fabricated metal products, except machinery and equipment0.1126Manufacture of computer, electronic and optical products0.3627Manufacture of computer, electronic and optical products0.3627Manufacture of machinery and equipment0.1728Manufacture of motor vehicles, trailers and semi-trailers-0.1130Manufacture of other transport equipment-0.1431Manufacture of furniture-0.2632Other manufacturing1.0033Repair and installation of machinery and equipment0.9434Electricity, gas, steam and air conditioning supply-0.4436Water collection, treatment and supply0.2437Waste collection, treatment and disposal activities; materials recovery0.6141Construction of buildings0.7846Wholesale trade, except of motor vehicles and motorcycles0.3552Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.3657Motion picture, video and television programme production, sound recording and music publishing activities0.3258Publishing activities0.3256Real estate activities0.3257Accommodation0.5668Real estate activities0.327	22	Manufacture of rubber and plastics products	0.18
24Manufacture of basic metals0.2425Manufacture of babricated metal products, except machinery and equipment0.1126Manufacture of computer, electronic and optical products0.3627Manufacture of machinery and equipment0.1728Manufacture of motor vehicles, trailers and semi-trailers-0.1129Manufacture of motor vehicles, trailers and semi-trailers-0.1430Manufacture of furniture-0.2632Other manufacturing1.0033Repair and installation of machinery and equipment0.9434Electricity, gas, steam and air conditioning supply-0.4436Water collection, treatment and supply0.2438Waste collection, treatment and supply0.2438Waste collection, treatment and disposal activities; materials recovery0.6140Construction of buildings0.7841Construction of buildings0.7842Warehousing and support activities for transportation0.1843Food and beverage service activities0.2844Programming and broadcasting activities0.5955Publishing activities0.5666Programming, consultancy and related activities0.3167Activities of head offices; management consultancy activities0.3270Activities of and programme production, sound recording and music publishing activities0.5671Architectural and engineering activities; technical testing and analysis0.10	23	Manufacture of other non-metallic mineral products	0.06
25Manufacture of fabricated metal products, except machinery and equipment0.1126Manufacture of computer, electronic and optical products0.3627Manufacture of electrical equipment n.e.c0.1128Manufacture of motor vehicles, trailers and semi-trailers-0.1530Manufacture of other transport equipment-0.1431Manufacture of other transport equipment-0.2632Other manufacturing1.0033Repair and installation of machinery and equipment0.9435Electricity, gas, steam and air conditioning supply-0.4436Water collection, treatment and supply0.2437Waste collection, treatment and disposal activities; materials recovery0.6141Construction of buildings0.7842Warehousing and support activities for transportation0.1843Food and beverage service activities0.2944Water collecture, video and television programme production, sound recording and music publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.5668Real estate activities0.5668Real estate activities0.5770Architectural and engineering activities; technical testing and analysis0.1071Architectural and engineering activities; technical testing and analysis0.1072Computer programming, consultancy activities0.3273Retate activities0.	24	Manufacture of basic metals	0.24
26     Manufacture of computer, electronic and optical products     0.36       27     Manufacture of electrical equipment     0.17       28     Manufacture of machinery and equipment n.e.c.     -0.11       29     Manufacture of turniture     -0.26       30     Manufacture of turniture     -0.26       31     Manufacture of motor vehicles, trailers and semi-trailers     -0.14       31     Manufacture of furniture     -0.26       32     Other manufacturing     1.00       33     Repair and installation of machinery and equipment     0.94       35     Electricity, gas, steam and air conditioning supply     -0.44       36     Waste collection, treatment and supply     0.24       37     Retail trade, except of motor vehicles and motorcycles     0.43       46     Wholesale trade, except of motor vehicles and motorcycles     0.35       52     Warehousing and support activities for transportation     0.18       55     Accommodation     0.31       56     Food and beverage service activities     0.26       59     Motion picture, video and television programme production, sound recording and music publishing activities     0.32       57     Programm	25	Manufacture of fabricated metal products, except machinery and equipment	0.11
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31Manufacture of furniture-0.2632Other manufacturing1.0033Repair and installation of machinery and equipment0.9435Electricity, gas, steam and air conditioning supply-0.4436Water collection, treatment and supply0.2438Waste collection, treatment and disposal activities; materials recovery0.6141Construction of buildings0.7846Wholesale trade, except of motor vehicles and motorcycles0.4347Retail trade, except of motor vehicles and motorcycles0.3552Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities0.0974	30	Manufacture of other transport equipment	-0.14
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38Waste collection, treatment and disposal activities; materials recovery0.6141Construction of buildings0.7846Wholesale trade, except of motor vehicles and motorcycles0.4347Retail trade, except of motor vehicles and motorcycles0.3552Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.3462Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.2378Travel agency, tour operator, reservation service and related activities0.4279Travel agency, tour operator, reservation service and related activities0.0982Office administrative, office support and other business support activities0.46	36	Water collection, treatment and supply	0.24
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46Wholesale trade, except of motor vehicles and motorcycles0.4347Retail trade, except of motor vehicles and motorcycles0.3552Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2375Rental and leasing activities0.2376Rental and leasing activities0.2377Rental and leasing activities0.2379Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.43	41	Construction of buildings	0.78
47Retail trade, except of motor vehicles and motorcycles0.3552Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.090.9982Office administrative, office support and other business support activities0.46	46	Wholesale trade, except of motor vehicles and motorcycles	0.43
52Warehousing and support activities for transportation0.1855Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	47	Retail trade, except of motor vehicles and motorcycles	0.35
55Accommodation0.3156Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.3270Activities of head offices; management consultancy activities0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	52	Warehousing and support activities for transportation	0.18
56Food and beverage service activities0.2858Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.3270Activities of head offices; management consultancy activities0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	55	Accommodation	0.31
58Publishing activities0.5959Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3270Activities of head offices; management consultancy activities0.3771Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	56	Food and beverage service activities	0.28
59Motion picture, video and television programme production, sound recording and music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.3268Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	58	Publishing activities	0.59
music publishing activities0.3460Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.5668Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	59	Motion picture, video and television programme production, sound recording and	0.34
60Programming and broadcasting activities0.3461Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.5668Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46		music publishing activities	
61Telecommunications0.5662Computer programming, consultancy and related activities1.1563Information service activities0.5668Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	60	Programming and broadcasting activities	0.34
62Computer programming, consultancy and related activities1.1563Information service activities0.5668Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	61	Telecommunications	0.56
63Information service activities0.5663Real estate activities0.3268Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	62	Computer programming, consultancy and related activities	1.15
68Real estate activities0.3270Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	63	Information service activities	0.56
70Activities of head offices; management consultancy activities0.7471Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	68	Real estate activities	0.32
71Architectural and engineering activities; technical testing and analysis0.1073Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	70	Activities of head offices: management consultancy activities	0.74
73Advertising and market research0.0374Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	71	Architectural and engineering activities: technical testing and analysis	0.10
74Other professional, scientific and technical activities0.2377Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	73	Advertising and market research	0.03
77Rental and leasing activities0.4279Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	74	Other professional, scientific and technical activities	0.23
79Travel agency, tour operator, reservation service and related activities1.0180Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	77	Rental and leasing activities	0.42
80Security and investigation activities0.0982Office administrative, office support and other business support activities0.46	79	Travel agency, tour operator, reservation service and related activities	1.01
82 Office administrative, office support and other business support activities 0.46	80	Security and investigation activities	0.09
	82	Office administrative, office support and other business support activities	0.46

Table A7: Industry-leve	l measure of dependence on	external finance
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Table presents the Rajan and Zingales (1998) measure of dependence of external finance recomputed by Peia (2017) for a sample of US Compustat firms for the period 1990-1999.

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