The Supply Chain Spillovers of Private Equity Buyouts

Cédric Huylebroek
KU Leuven

Olivier De Jonghe
ECB, NBB, and Tilburg University

AFA
Philadelphia, 4 Janaury 2026

Motivation

- The private equity (PE) industry has quadrupled in size since 2010, reaching more than $4 trillion in assets under management last year
- Critics often express concerns about the adverse impact of PE buyouts, although research generally finds that buyouts have a positive impact on target firms (Bloom et al., 2015, AER; Davis et al., 2014, AER; Kaplan, 1989, JFE; Lerner et al., 2011, JF)

Motivation

- The private equity (PE) industry has quadrupled in size since 2010, reaching more than $4 trillion in assets under management last year
- Critics often express concerns about the adverse impact of PE buyouts, although research generally finds that buyouts have a positive impact on target firms (Bloom et al., 2015, AER; Davis et al., 2014, AER; Kaplan, 1989, JFE; Lerner et al., 2011, JF)
- Despite the fact that firms are part of complex production networks, **we lack evidence on the supply chain spillovers of PE ownership**

Motivation

MERGERS & ACQUISITIONS | PRIVATE EQUITY

Private Equity Giants Use Size to Lean on Suppliers

Private Equity Ate My Customer

UNDERSTANDING THE PRIVATE EQUITY MINDSET TO BUILD EFFECTIVE PARTNERSHIPS

TompkinsVentures

Supply Chain Strategy Makes or Breaks PE Deals

Motivation

- The private equity (PE) industry has quadrupled in size since 2010, reaching more than $4 trillion in assets under management last year
- Critics often express concerns about the adverse impact of PE buyouts, although research generally finds that buyouts have a positive impact on target firms (Bloom et al., 2015, AER; Davis et al., 2014, AER; Kaplan, 1989, JFE; Lerner et al., 2011, JF)
- Despite the fact that firms are part of complex production networks, **we lack evidence on the supply chain spillovers of PE ownership**

→ **We address this research gap using unique production network data and PE buyouts from Belgium**

Hypotheses

- **Theoretically**, the supply chain spillovers of PE buyouts are **ambiguous**

Hypotheses

- **Theoretically**, the supply chain spillovers of PE buyouts are **ambiguous**

– Assuming that PE buyouts enable targets to pursue new growth opportunities and improve operational efficiency, suppliers may benefit from increased demand or knowledge spillovers (Holmström, 1988)

Hypotheses

- **Theoretically**, the supply chain spillovers of PE buyouts are **ambiguous**

– Assuming that PE buyouts enable targets to pursue new growth opportunities and improve operational efficiency, suppliers may benefit from increased demand or knowledge spillovers (Holmström, 1988)

– Even if PE funds create value for their portfolio companies, they may do so at the expense of suppliers, for instance by renegotiating long-term contracts in order to cut costs (Shleifer and Summers, 1988)

Preview of the main findings

- Using unique **firm-to-firm sales data** combined with **PE buyouts** from Belgium, we run **difference-in-differences models** comparing the economic trajectories of suppliers with versus without PE-backed customers
- 3 key findings:

Preview of the main findings

- Using unique **firm-to-firm sales data** combined with **PE buyouts** from Belgium, we run **difference-in-differences models** comparing the economic trajectories of suppliers with versus without PE-backed customers

- 3 key findings:
  1. On average, PE buyouts **positively impact suppliers** through **increased demand for inputs** (not, e.g., knowledge spillovers)

Preview of the main findings

- Using unique **firm-to-firm sales data** combined with **PE buyouts** from Belgium, we run **difference-in-differences models** comparing the economic trajectories of suppliers with versus without PE-backed customers

- 3 key findings:
  1. On average, PE buyouts **positively impact suppliers** through **increased demand for inputs** (not, e.g., knowledge spillovers)
  2. **In economic downturns**, this effect is muted as **PE investors exert greater pressure on suppliers** to realize short-term cost savings for portfolio companies

Preview of the main findings

- Using unique **firm-to-firm sales data** combined with **PE buyouts** from Belgium, we run **difference-in-differences models** comparing the economic trajectories of suppliers with versus without PE-backed customers

- 3 key findings:
  1. On average, PE buyouts **positively impact suppliers** through **increased demand for inputs** (not, e.g., knowledge spillovers)
  2. **In economic downturns**, this effect is muted as **PE investors exert greater pressure on suppliers** to realize short-term cost savings for portfolio companies
  3. PE buyouts have **crowding-out effects on rivals that rely on common suppliers**

Related literature

1. The real effects of PE buyouts
   Acharya et al. (2013, RFS); Agrawal and Tambe (2016, RFS); Bernstein and Sheen (2016, RFS); Bernstein et al. (2019, RFS); Bloom et al. (2015, AER); Biesinger et al. (2023, WP); Boucly et al. (2011, JFE); Chevalier (1995a, AER); Chevalier (1995b, JF); Cohn et al. (2021, RFS); Davis et al. (2014, AER); Fracassi et al. (2022, JF); Gornall et al. (2024, MS); Kaplan (1989, JFE); Lerner et al. (2011, JF); Lichtenberg and Siegel (1990, JFE);

→ **The role of supply chains in PE investors' ability to create and extract value**

2. The propagation of shocks in production networks
   Acemoglu et al. (2012, ECTA); Alfaro-Urena et al. (2022, QJE); Amiti et al. (2024, JIE); Bhattacharyya and Nain (2011, JFE); Fee et al. (2006, JF); Barrot and Sauvagnat (2016, QJE); Boehm et al. (2019, REStat); Carvalho et al. (2021, QJE); Costello (2020, JPE); Crosignani et al. (2023, JFE); Giroud and Mueller (2019, AER); Jacobson and Von Schedvin (2015, ECTA)

→ **The network effects of PE buyouts**

3. Product market interactions through common suppliers
   Bolton and Whinston (1993, REStud); Chod et al. (2019, JFE); Freeman et al. (2024, WP); Giannetti et al. (2021, JPE)

→ **Crowding-out effects of PE buyouts through common suppliers**

Roadmap

Background

Data and methodology

Results

Mechanism

Conclusion

Background

PE firms

- PE firms raise funds from institutions and wealthy individuals, and then invest that money in buying and selling companies
- A PE buyout = the purchase of a (mature) company using equity from a PE fund + debt, with the aim of increasing the company's value
- As a PE fund matures, its portfolio companies are publicly listed or sold to a strategic or financial buyer (usually after 4–6 years)

$\Leftrightarrow$ VCs do not use lots of debt and typically target earlier-stage firms

PE value-creation strategies

- Broadly, PE firms have 3 value-creation strategies:
  1. Operational improvements (e.g., reducing agency frictions or providing professional expertise)
  2. Relaxation of financing constraints that limit the realization of growth opportunities
  3. Financial engineering (e.g., through interest tax shields)
- For private firm buyouts, 1. and 2. have been shown to be more important (Boucly et al., 2011, JFE; Biesinger et al., 2023, WP; Cohn et al., 2022, RF; Davis et al., 2021, MS)

PE value-creation strategies

- Broadly, PE firms have 3 value-creation strategies:
  1. Operational improvements (e.g., reducing agency frictions or providing professional expertise)
  2. Relaxation of financing constraints that limit the realization of growth opportunities
  3. Financial engineering (e.g., through interest tax shields)
- For private firm buyouts, 1. and 2. have been shown to be more important (Boucly et al., 2011, JFE; Biesinger et al., 2023, WP; Cohn et al., 2022, RF; Davis et al., 2021, MS)

→ **We lack evidence about the role of supply chains in PE investors' ability to create or extract economic value**

Data and methodology

Data

- Firm-to-firm sales data (National Bank of Belgium)
- Firm balance sheet data (National Bank of Belgium)
- PE transactions data (Orbis M&A and Capital IQ) PE selection criteria

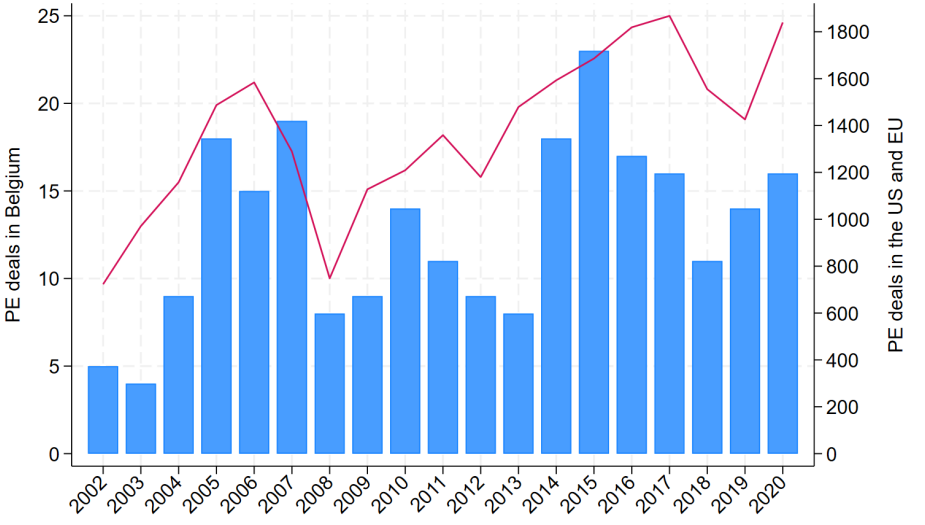
→ Our final data sample includes 230K unique firms (with 204 PE targets) over the period 2002–2022 Summary statistics

→ Most PE deals in our sample, as well as globally, are private firm buyouts

Treatment sample

PE-backed firms	204
Suppliers of PE-backed firms	36,222
Suppliers of PE-backed firms with sales share $> 5\%$	2,457

Number of PE deals over time



PE deal characteristics

Belgium seems a representative country in terms of PE activity

	Belgium	France	UK	US
PE capital/GDP	0.05%	0.05%	0.17%	0.17%
PE deal size (average, million $)	$280m	$395m	$280m	$389m
Proportion of private-to-private PE deals	55%	52%	61%	43%

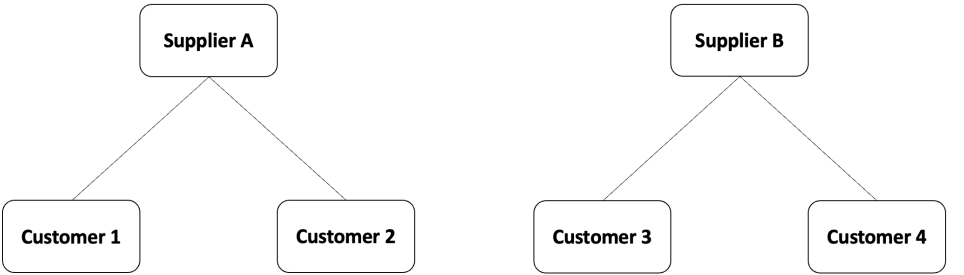
PE acquirer countries

Acquirer country	Number of PE deals	Percentage of total deals (%)
Belgium	96	47.06
Netherlands	33	16.18
United States	20	9.80
United Kingdom	14	6.86
Luxembourg	7	3.43
Germany	6	2.94
France	6	2.94
Other	22	10.79
Total	204	100.00

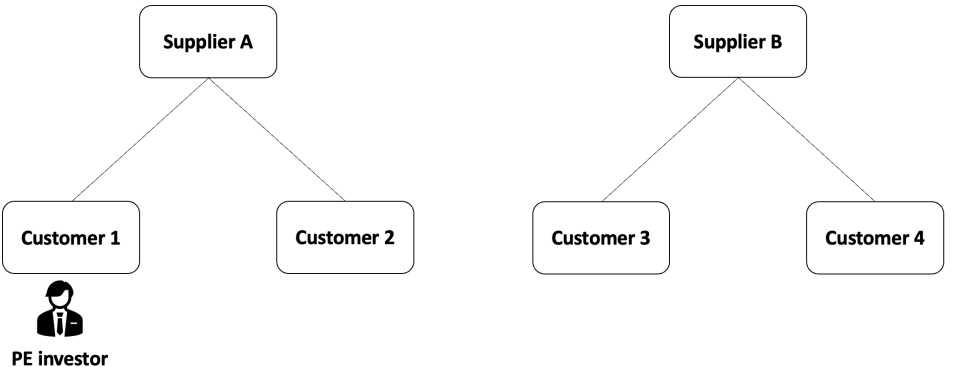
PE deals across sectors

The acquirers include (smaller) Belgian PE firms as well as (larger) global PE firms (such as the Carlyle Group, CVC Capital Patners, and Goldman Sachs)

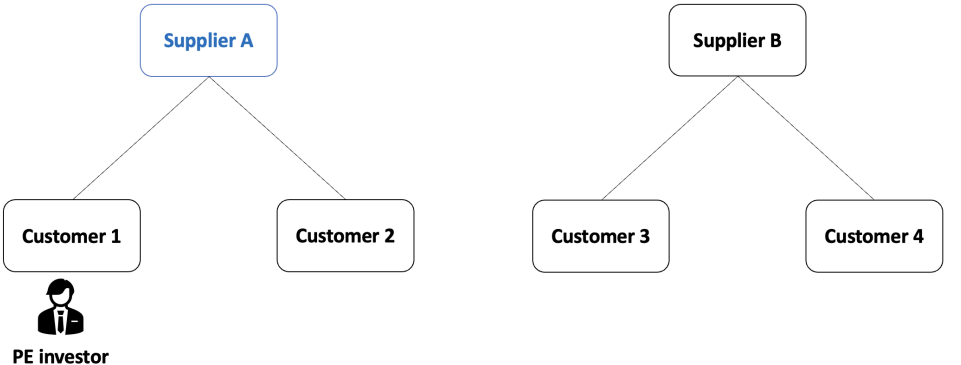
Identification strategy



Identification strategy



Identification strategy



Identification strategy

We compare the economic trajectories of treated versus non-treated suppliers

Identification strategy

- A common identification challenge in this setting is that buyouts are non-random

Identification strategy

- A common identification challenge in this setting is that buyouts are non-random
- Unlike other studies, we do not focus on target firms, but on the *suppliers* of those firms, which already reduces potential endogeneity concerns
  - Moreover, PE investors do not target firms with inherently different suppliers Details
- We attempt to resolve any remaining concerns by using the granularity of our data to construct a control group of comparable firms (Davis et al., 2014, AER; Boucly et al., 2011, JFE)

Identification strategy

1. We match treated firms with control firms using PSM
2. Matching criteria:
   - Size_{t-1}
   - Leverage_{t-1}
   - $\text{Profitability}_{t-1}$
   - 4-digit NACE industry_{t-1}
3. We retain the 5 closest control firms for each suppliers, creating cohorts
   - We restrict our focus to affected suppliers for whom sales to PE-backed firms constitute at least 5% of their total sales

Identification strategy

We run a stacked difference-in-differences model:

$$y_{i,t,c} = \beta \cdot \textit{Post PE}_{i(j),t,c} + \lambda_{i,c} + \lambda_{t,c} + \epsilon_{i,t,c}$$

- $y_{i,t,c}$ represents firm outcomes, such as sales, profitability, employment, and markups (De Loecker and Warzynski, 2012, AER)
- $\textit{Post PE}_{i(j),t,c}$ is equal to 1 after customer j of supplier i was involved in a PE buyout
- $\lambda_{i,c}$ and $\lambda_{t,c}$ are firm-by-cohort and year-by-cohort FE, respectively
- $\epsilon_{i,t,c}$ is clustered at the firm-cohort level

Identification strategy

We run a stacked difference-in-differences model:

$$y_{i,t,c} = \beta \cdot \textit{Post PE}_{i(j),t,c} + \lambda_{i,c} + \lambda_{t,c} + \epsilon_{i,t,c}$$

- $y_{i,t,c}$ represents firm outcomes, such as sales, profitability, employment, and markups (De Loecker and Warzynski, 2012, AER)
- $\textit{Post PE}_{i(j),t,c}$ is equal to 1 after customer j of supplier i was involved in a PE buyout
- $\lambda_{i,c}$ and $\lambda_{t,c}$ are firm-by-cohort and year-by-cohort FE, respectively
- $\epsilon_{i,t,c}$ is clustered at the firm-cohort level

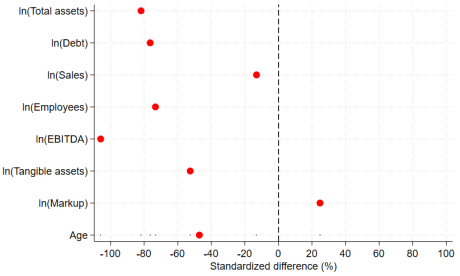
$\Rightarrow$ The main assumption is that firms in the same cohort would follow similar trends in the absence of treatment (as confirmed below)

Summary statistics: Final sample of treated and control suppliers

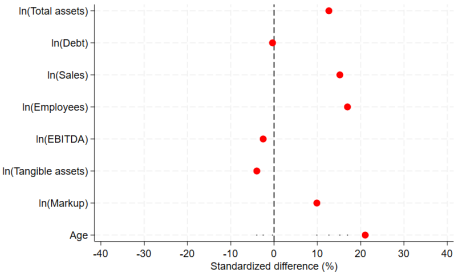
	N	Mean	Median	SD	P10	P90
ln(Total assets)	46,256	14.331	14.049	2.119	11.674	17.369
ln(Employees)	46,256	2.277	1.917	1.692	0.336	4.734
Age	46,256	21.790	19.000	15.018	6.000	41.000
Debt/TA	46,256	0.580	0.550	0.432	0.109	0.957
ln(Debt)	46,254	13.461	13.168	2.268	10.631	16.778
EBITDA/Sales	46,256	0.886	0.907	0.274	0.743	1.107
ln(EBITDA)	46,256	12.335	12.198	2.072	9.715	15.256
Tangible assets/TA	46,256	0.234	0.162	0.225	0.010	0.583
ln(Tangible assets)	46,256	11.941	12.081	2.966	8.987	15.469
ln(R&D expenses)	46,256	0.393	0.000	2.155	0.000	12.906
ln(Sales)	46,256	13.274	13.392	2.373	10.065	16.536
ln(markup)	14,111	0.746	0.571	0.697	0.132	1.524
Number of suppliers	46,256	84.834	55.000	72.350	15.000	216.000
Number of customers	46,256	81.389	26.000	124.707	2.000	266.000

Balance test: Treated and control suppliers

Balance test: Standardized differences



(a) Unmatched



(b) Matched

Target firms

Results

1. The impact of PE buyouts on targets

In general, target firms outperform their peers

Consistent with Boucly et al. (2011, JFE) and Cohn et al. (2022, RF), PE funds seem to improve targets' access to debt financing, allowing them to grow

	(1) ln(Debt)	(2) ln(Sales)	(3) ln(Employees)	(4) ln(EBITDA)
Post PE	0.50***	0.22***	0.16***	0.22***
	(0.06)	(0.06)	(0.03)	(0.06)
Observations	6,662	6,662	6,662	6,662
Adjusted R-squared	0.92	0.86	0.98	0.80
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Pre-trends Heterogeneity

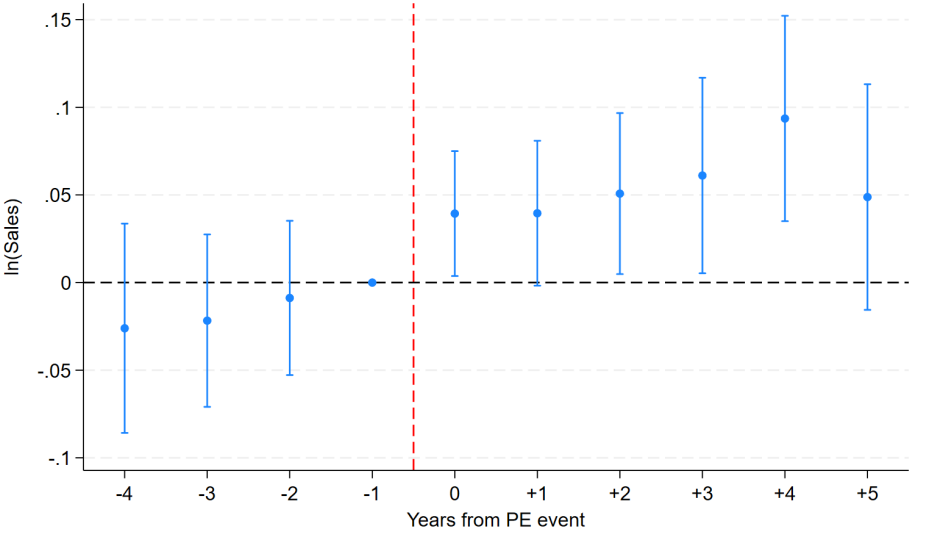
Target firms outperform their peers even more during downturns

Consistent with Bernstein et al. (2019, RFS), target firms outperform their peers even more during economic downturns, when PE investors' managerial expertise may be particularly valuable

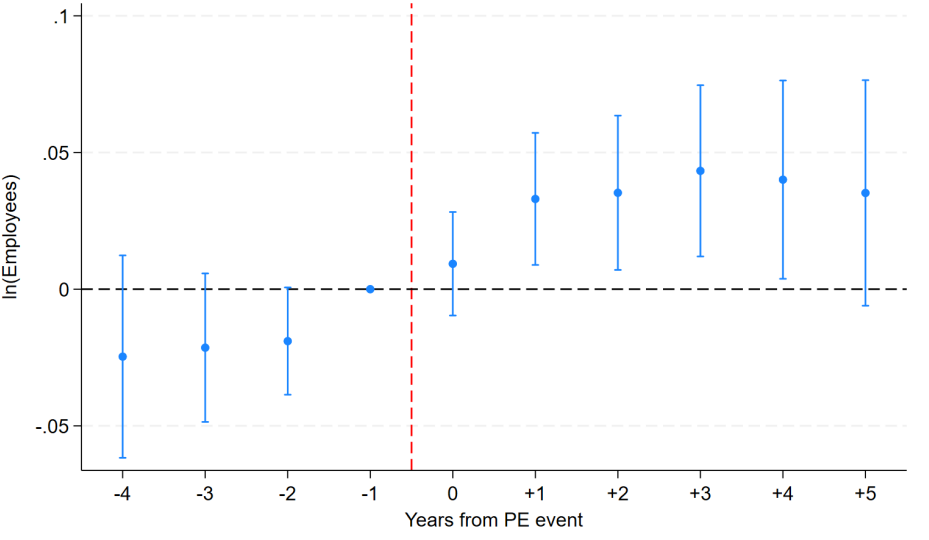
	(1) ln(Debt)	(2) ln(Sales)	(3) ln(Employees)	(4) ln(EBITDA)
Post PE	0.47***	0.15**	0.12***	0.20***
	(0.06)	(0.07)	(0.04)	(0.07)
Post PE × Economic downturn	0.09	0.17*	0.12***	0.06**
	(0.08)	(0.10)	(0.04)	(0.03)
Observations	6,662	6,662	6,662	6,662
Adjusted R-squared	0.92	0.86	0.98	0.80
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

2. The impact of PE buyouts on **suppliers** of targets

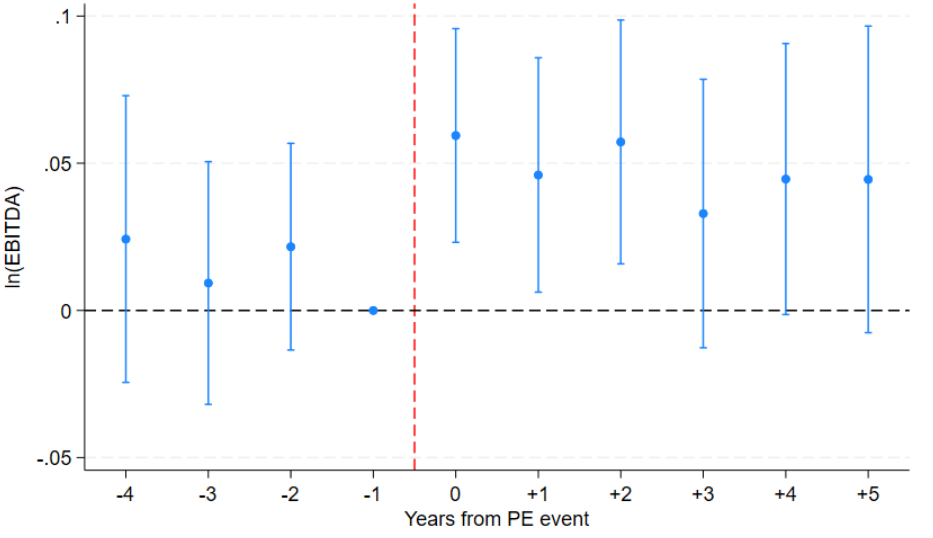
Sales increase



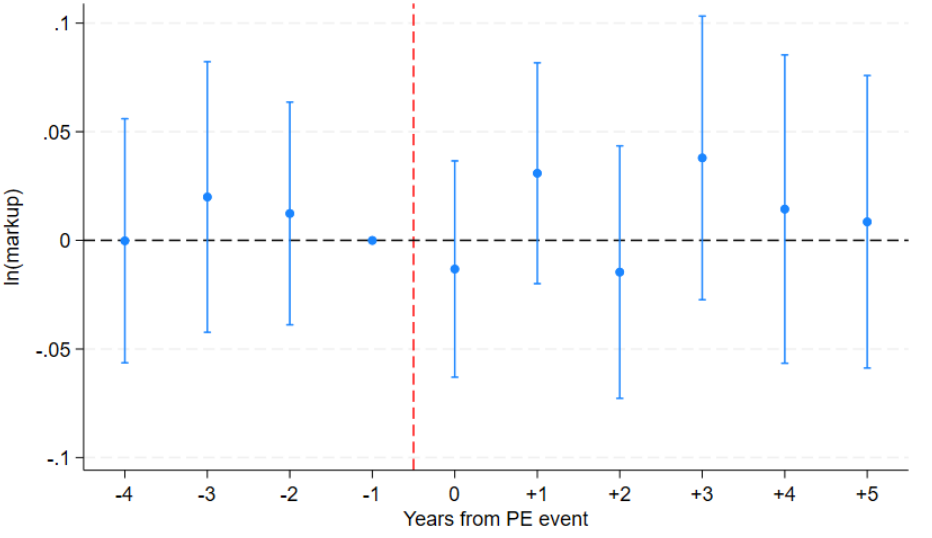
Employment increases



Profitability increases



Markups do not change



In general, suppliers of PE-backed firms seem to outperform other suppliers

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE	0.06***	0.04***	0.06**	-0.00
	(0.02)	(0.01)	(0.02)	(0.02)
Observations	45349	45349	45349	15821
Adjusted R-squared	0.93	0.97	0.90	0.73
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

However, suppliers of PE-backed firms show little signs of outperformance during downturns

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE	0.08***	0.05***	0.07**	0.01
	(0.03)	(0.01)	(0.03)	(0.02)
Post PE × Economic downturn	-0.06*	-0.04**	-0.04*	-0.08*
	(0.03)	(0.02)	(0.02)	(0.05)
Observations	45349	45349	45349	15821
Adjusted R-squared	0.93	0.97	0.90	0.73
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Interestingly, suppliers of PE-backed firms also report an 8% decrease in markups during economic downturns

Mechanism

1. Mechanism: Normal times

The positive impact in normal times can be explained by increased demand

Consistent with an **increased demand channel**, the positive spillovers are:

- larger for suppliers of target firms with greater growth potential
- larger for suppliers on which target firms are highly dependent for inputs
- driven by increased demand from PE-backed customers (rather than other customers)

The positive impact in normal times can be explained by increased demand

Consistent with an **increased demand channel**, the positive spillovers are:

- larger for suppliers of target firms with greater growth potential
- larger for suppliers on which target firms are highly dependent for inputs
- driven by increased demand from PE-backed customers (rather than other customers)

The results are not driven by alternative mechanisms, such as knowledge spillovers (Alfaro-Urena et al., 2022, QJE; Amiti et al., 2024, JIE)

2. Mechanism: Crisis times

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

PE investors help portfolio firms to weather downturns by **exerting greater pressure on suppliers**, particularly if they face lower switching costs vis-à-vis suppliers or have more baraganing power:

- suppliers that offer standardized (rather than differentiated) inputs
- suppliers operating in highly competitive industries

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

PE investors help portfolio firms to weather downturns by **exerting greater pressure on suppliers**, particularly if they face lower switching costs vis-à-vis suppliers or have more baraganing power:

- suppliers that offer standardized (rather than differentiated) inputs
- suppliers operating in highly competitive industries
- suppliers of PE-backed firms owned by more reputable PE funds

These suppliers also see a reduction in markups, suggesting that PE funds "lean on suppliers" to obtain lower prices (The New York Times, 2012)

The role of PE management and leverage

- Leverage plays an important role in explaining the increased input demand and cost-saving pressures documented earlier +
- However, leverage alone does not account for our findings, highlighting a distinctive role played by PE management (Bloom et al., 2015, AER; Kaplan, 1989, JFE)

Robustness

- Parallel trends assumption Details
- Alternative channels Details
- Placebo tests Details
- Matching procedure Details
- The determinants of PE buyouts Details
- Excluding buy-and-build deals Details
- Data sample and measurement Details

Spillovers through common suppliers

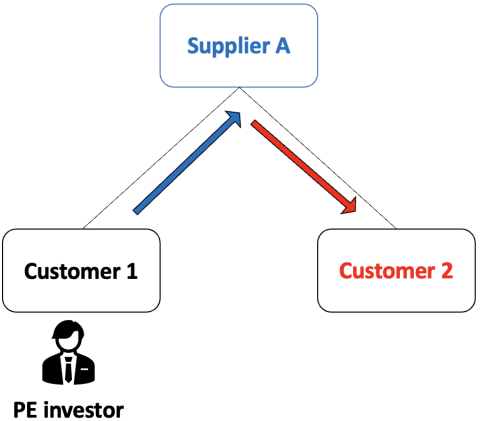
Spillovers through common suppliers

- So far, on average, affected suppliers seem to benefit from increased demand for inputs from their PE-backed customers
- This suggests affected suppliers can effectively fulfill the increased demand

Spillovers through common suppliers

- So far, on average, affected suppliers seem to benefit from increased demand for inputs from their PE-backed customers
- This suggests affected suppliers can effectively fulfill the increased demand
- However, if capacity constraints arise, suppliers may prioritize their (faster-growing) PE-backed customers over other customers

Spillovers through common suppliers



Suppliers terminate relationships with competitors of their PE-backed customers

	(1) Relationship terminated	(2) Relationship terminated	(3) Relationship terminated
Post PE	-0.03	0.00	-0.01
	(0.02)	(0.02)	(0.02)
Post PE × Competitor	0.01	0.04**	0.06**
	(0.02)	(0.02)	(0.03)
Observations	78812	78083	68990
Adjusted R-squared	0.18	0.33	0.45
Supplier FE	Yes	No	No
Customer FE	Yes	Yes	No
Year FE	Yes	No	No
Customer × Year FE	No	Yes	Yes
Supplier × Customer FE	No	No	Yes

where *Competitor* is equal to 1 if the customer operates in the same 4-digit NACE industry as the common supplier's PE-backed customer

Suppliers terminate relationships with competitors of their PE-backed customers

	(1) Relationship terminated	(2) Relationship terminated	(3) Relationship terminated
Post PE	-0.02	0.01	0.00
	(0.02)	(0.02)	(0.02)
Post PE × Competitor	0.02	0.03	0.04**
	(0.03)	(0.02)	(0.02)
Post PE × Competitor × Low ICR supplier	0.06*		
	(0.03)		
Post PE × Competitor × Low EBITDA customer		0.06**	
		(0.03)	
Post PE × Competitor × Low Altman Z-score customer			0.06*
			(0.03)
Observations	68990	68990	68990
Adjusted R-squared	0.46	0.46	0.46
Customer × Year FE	Yes	Yes	Yes
Supplier × Customer FE	Yes	Yes	Yes

PE buyouts create crowding-out effects on rivals that heavily rely on common suppliers

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE	-0.01*	-0.00	-0.02***	0.00
	(0.01)	(0.00)	(0.00)	(0.01)
Post PE × Common supplier exposure	-0.07*	-0.07**	-0.23***	-0.11***
	(0.04)	(0.03)	(0.05)	(0.03)
Observations	273961	273961	273961	83942
Adjusted R-squared	0.92	0.92	0.82	0.67
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

where *Common supplier exposure* is firm f's exposure to suppliers that are also supplying its PE-backed rival

Conclusion

Conclusion

- Despite academic and policy interest in the real effects of PE buyouts, we lack evidence on how PE buyouts impact supply chains

Conclusion

- Despite academic and policy interest in the real effects of PE buyouts, we lack evidence on how PE buyouts impact supply chains
- Our study offers 3 new insights:
  - On average, PE buyouts have **positive spillovers on suppliers** of target firms, primarily through **increased demand**
  - **In economic downturns**, this effect is muted as **PE investors exert greater pressure** on suppliers
  - PE buyouts have **crowding-out effects on rivals that rely on common suppliers**
- Our study offers novel evidence on **the network effects of PE buyouts**, improving our understanding of how **PE investors create and extract value**

Thank you!

References I

Acemoglu, D., Carvalho, V. M., Ozdaglar, A., and Tahbaz-Salehi, A. (2012). The network origins of aggregate fluctuations. *Econometrica*, 80(5):1977–2016.

Acharya, V. V., Gottschalg, O. F., Hahn, M., and Kehoe, C. (2013). Corporate governance and value creation: Evidence from private equity. *The Review of Financial Studies*, 26(2):368–402.

Agrawal, A. and Tambe, P. (2016). Private equity and workers' career paths: The role of technological change. *The Review of Financial Studies*, 29(9):2455–2489.

Alfaro-Urena, A., Manelici, I., and Vasquez, J. P. (2022). The effects of joining multinational supply chains: New evidence from firm-to-firm linkages. *The Quarterly Journal of Economics*, 137(3):1495–1552.

Amiti, M., Duprez, C., Konings, J., and Van Reenen, J. (2024). FDI and superstar spillovers: Evidence from firm-to-firm transactions. *Journal of International Economics*, 152:103972.

References II

Barrot, J.-N. and Sauvagnat, J. (2016). Input specificity and the propagation of idiosyncratic shocks in production networks. *The Quarterly Journal of Economics*, 131(3):1543–1592.

Bernstein, S., Lerner, J., and Mezzanotti, F. (2019). Private equity and financial fragility during the crisis. *The Review of Financial Studies*, 32(4):1309–1373.

Bernstein, S. and Sheen, A. (2016). The operational consequences of private equity buyouts: Evidence from the restaurant industry. *The Review of Financial Studies*, 29(9):2387–2418.

Bhattacharyya, S. and Nain, A. (2011). Horizontal acquisitions and buying power: A product market analysis. *Journal of Financial Economics*, 99(1):97–115.

Biesinger, M., Bircan, Ç., and Ljungqvist, A. (2023). Value creation in private equity. *Working Paper*.

References III

Bloom, N., Sadun, R., and Van Reenen, J. (2015). Do private equity owned firms have better management practices? *American Economic Review*, 105(5):442–446.

Boehm, C. E., Flaaen, A., and Pandalai-Nayar, N. (2019). Input linkages and the transmission of shocks: Firm-level evidence from the 2011 Tōhoku earthquake. *Review of Economics and Statistics*, 101(1):60–75.

Bolton, P. and Whinston, M. D. (1993). Incomplete contracts, vertical integration, and supply assurance. *The Review of Economic Studies*, 60(1):121–148.

Boucly, Q., Sraer, D., and Thesmar, D. (2011). Growth LBOs. *Journal of Financial Economics*, 102(2):432–453.

Carvalho, V. M., Nirei, M., Saito, Y. U., and Tahbaz-Salehi, A. (2021). Supply chain disruptions: Evidence from the great east Japan earthquake. *The Quarterly Journal of Economics*, 136(2):1255–1321.

References IV

Chevalier, J. A. (1995a). Capital structure and product-market competition: Empirical evidence from the supermarket industry. *American Economic Review*, pages 415–435.

Chevalier, J. A. (1995b). Do LBO supermarkets charge more? An empirical analysis of the effects of LBOs on supermarket pricing. *The Journal of Finance*, 50(4):1095–1112.

Chod, J., Lyandres, E., and Yang, S. A. (2019). Trade credit and supplier competition. *Journal of Financial Economics*, 131(2):484–505.

Cohn, J., Hotchkiss, E. S., and Towery, E. M. (2022). Sources of value creation in private equity buyouts of private firms. *Review of Finance*, 26(2):257–285.

Cohn, J., Nestoriak, N., and Wardlaw, M. (2021). Private equity buyouts and workplace safety. *The Review of Financial Studies*, 34(10):4832–4875.

Costello, A. M. (2020). Credit market disruptions and liquidity spillover effects in the supply chain. *Journal of Political Economy*, 128(9):3434–3468.

References V

Crosignani, M., Macchiavelli, M., and Silva, A. F. (2023). Pirates without borders: The propagation of cyberattacks through firms' supply chains. *Journal of Financial Economics*, 147(2):432–448.

Davis, S. J., Haltiwanger, J., Handley, K., Jarmin, R., Lerner, J., and Miranda, J. (2014). Private equity, jobs, and productivity. *American Economic Review*, 104(12):3956–3990.

Davis, S. J., Haltiwanger, J. C., Handley, K., Lipsius, B., Lerner, J., and Miranda, J. (2021). The (heterogenous) economic effects of private equity buyouts. *Management Science (forthcoming)*.

De Loecker, J. and Warzynski, F. (2012). Markups and firm-level export status. *American Economic Review*, 102(6):2437–2471.

Fee, C. E., Hadlock, C. J., and Thomas, S. (2006). Corporate equity ownership and the governance of product market relationships. *The Journal of Finance*, 61(3):1217–1251.

References VI

Fracassi, C., Previtero, A., and Sheen, A. (2022). Barbarians at the store? Private equity, products, and consumers. *The Journal of Finance*, 77(3):1439–1488.

Freeman, K., He, J., Xia, H., and Yang, L. (2024). (Don't) Feed the Mouth that Bites: Trade Credit Strategies among Rival Customers Sharing Suppliers. *Working Paper*.

Giannetti, M., Serrano-Velarde, N., and Tarantino, E. (2021). Cheap trade credit and competition in downstream markets. *Journal of Political Economy*, 129(6):1744–1796.

Giroud, X. and Mueller, H. M. (2019). Firms' internal networks and local economic shocks. *American Economic Review*, 109(10):3617–3649.

Gornall, W., Gredil, O. R., Howell, S. T., Liu, X., and Sockin, J. (2024). Do employees cheer for private equity? The heterogeneous effects of buyouts on job quality. *Management Science*.

References VII

Holmström, B. (1988). Comment: Breach of trust in hostile takeovers. In *Corporate takeovers: Causes and consequences*, pages 33–68. University of Chicago Press.

Jacobson, T. and Von Schedvin, E. (2015). Trade credit and the propagation of corporate failure: An empirical analysis. *Econometrica*, 83(4):1315–1371.

Kaplan, S. (1989). The effects of management buyouts on operating performance and value. *Journal of Financial Economics*, 24(2):217–254.

Lerner, J., Sorensen, M., and Strömberg, P. (2011). Private equity and long-run investment: The case of innovation. *The Journal of Finance*, 66(2):445–477.

Lichtenberg, F. R. and Siegel, D. (1990). The effects of leveraged buyouts on productivity and related aspects of firm behavior. *Journal of Financial Economics*, 27(1):165–194.

Shleifer, A. and Summers, L. H. (1988). Breach of trust in hostile takeovers. In *Corporate takeovers: Causes and consequences*, pages 33–68. University of Chicago Press.

References VIII

The New York Times (2012). Private Equity Giants Use Size to Lean on Suppliers. https://archive.nytimes.com/dealbook.nytimes.com/2012/07/11/16-million-reams-of-paper-please/.

Appendix

Summary statistics: Full sample

	N	Mean	Median	SD	P10	P90
ln(Total assets)	1,638,918	13.579	13.422	1.501	11.817	15.539
ln(Employees)	1,638,918	1.603	1.386	1.245	0.000	3.277
Age	1,638,918	17.716	15.000	13.092	4.000	35.000
Debt/TA	1,638,918	0.663	0.675	0.335	0.253	0.961
ln(Debt)	1,638,918	13.015	12.909	1.555	11.131	15.024
EBITDA/Sales	1,364,769	0.948	0.905	0.181	0.790	1.166
ln(EBITDA)	1,638,918	11.549	11.453	1.542	9.736	13.515
Tangible assets/TA	1,638,918	0.290	0.225	0.249	0.017	0.675
ln(Tangible assets)	1,638,918	11.511	11.823	2.549	9.117	13.999
ln(R&D expenses)	1,638,918	0.125	0.000	1.199	0.000	7.888
ln(Sales)	1,638,918	12.460	12.675	2.246	9.306	15.209
ln(Markup)	336,959	0.932	0.736	0.806	0.230	1.777
Number of suppliers	1,638,918	63.487	47.000	51.805	16.000	139.000
Number of customers	1,638,918	65.810	21.000	104.835	2.000	191.000

↑

Variable definitions

Variable	Description
ln(Total assets)	The natural logarithm of total assets.
ln(Employees)	The natural logarithm of the number of employees.
Age	The number of years since the firm was founded.
Debt/TA	The ratio of debt to total assets.
ln(Debt)	The natural logarithm of the total debt.
EBITDA/Sales	The ratio of earnings before interest, taxes, depreciation, and amortization to sales.
ln(EBITDA)	The natural logarithm of earnings before interest, taxes, depreciation, and amortization (EBITDA).
Tangible assets/TA	The ratio of tangible assets to total assets.
ln(Tangible assets)	The natural logarithm of tangible assets.
ln(R&D expenses)	The natural logarithm of research and development expenses.
ln(Sales)	The natural logarithm of total sales.
ln(Markup)	The natural logarithm of firm-level markups, estimated following the procedure from De Loecker and Warzynski (2012).
ln(Skilled labor)	The natural logarithm of employees with a higher education degree.
Accounts payable	The ratio of accounts payable over total purchases.
Accounts receivable	The ratio of accounts receivable over total sales.
Number of suppliers	The total number of suppliers that the firm has a relationship with.
Number of customers	The total number of customers that the firm has a relationship with.

PE deal selection criteria

- Following prior literature, we restrict our focus to PE transactions with:

– Deal type = "Private equity" or "Institutional buy-out" or "Acquisition"

– Deal financing = "Leveraged buyout" or "Private equity"

– The acquirer = an institutional investor

– Initial stake $< 50\%$ and final stake $> 75\%$

↑

PE deals across sectors

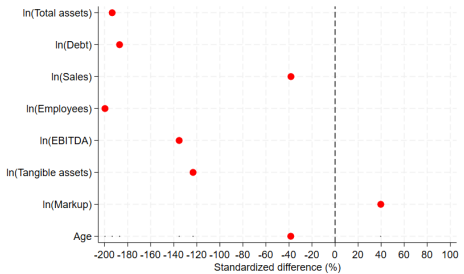
Sector	Number of PE deals	Percentage of total deals (%)
Accommodation and food services	3	1.5
Administrative and support services	12	5.9
Agriculture, forestry, and fishing	1	0.5
Construction	7	3.4
Electricity, gas, steam	1	0.5
Information and communication services	27	13.2
Manufacturing	73	35.8
Mining and Quarrying	1	0.5
Professional, scientific and technical services	25	12.3
Transportation and storage	3	1.5
Water supply	3	1.5
Wholesale and retail trade	48	23.5
Total	204	100.0

The distribution of PE deals across sector is similar as in Davis et al. (2021)

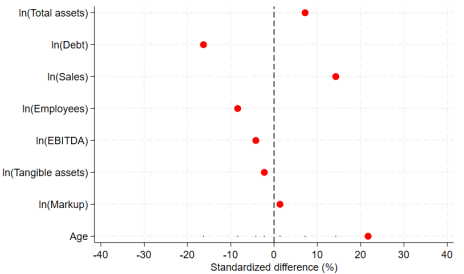
↑

Balance test: Target firms

After matching, the standardized mean differences are between -20% and 20%, indicating that the variables are well-balanced



(a) Unmatched



(b) Matched

↑

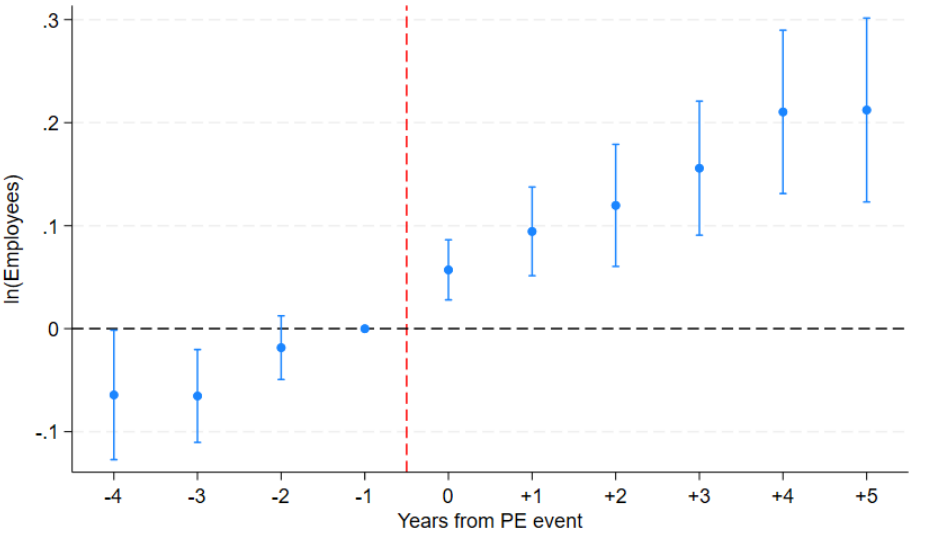
Extension: Heterogeneity in treatment intensity

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE × Sales share ∈ (0%, 5%]	0.04	0.01	0.05*	0.02
	(0.03)	(0.02)	(0.03)	(0.03)
Post PE × Sales share ∈ (5%, 10%]	0.10***	0.06***	0.09***	-0.02
	(0.03)	(0.02)	(0.03)	(0.03)
Post PE× Sales share ∈ (10%, 100%]	0.13***	0.08***	0.09***	-0.01
	(0.01)	(0.00)	(0.01)	(0.01)
Observations	399829	399829	399829	119329
Adjusted R-squared	0.94	0.97	0.91	0.75
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

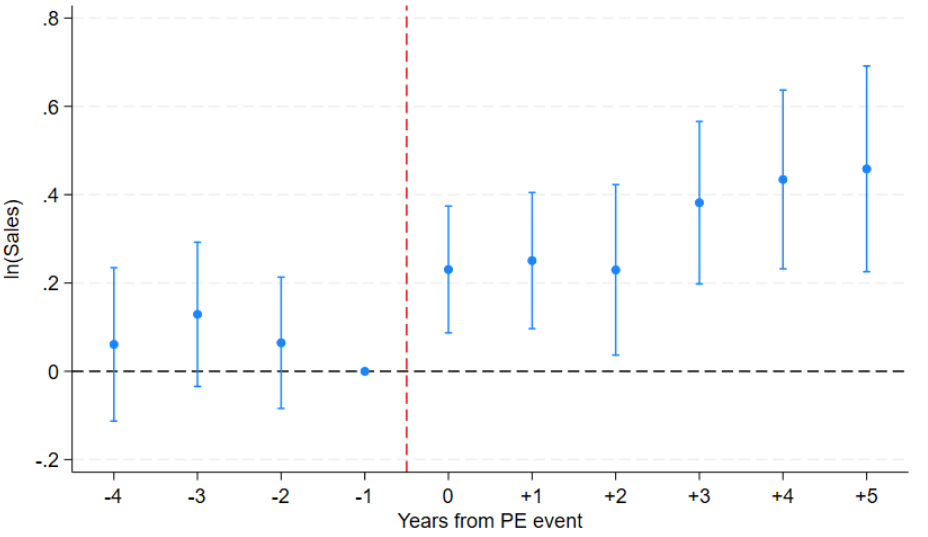
The 5% cutoff used in the main analysis seems reasonable

↑

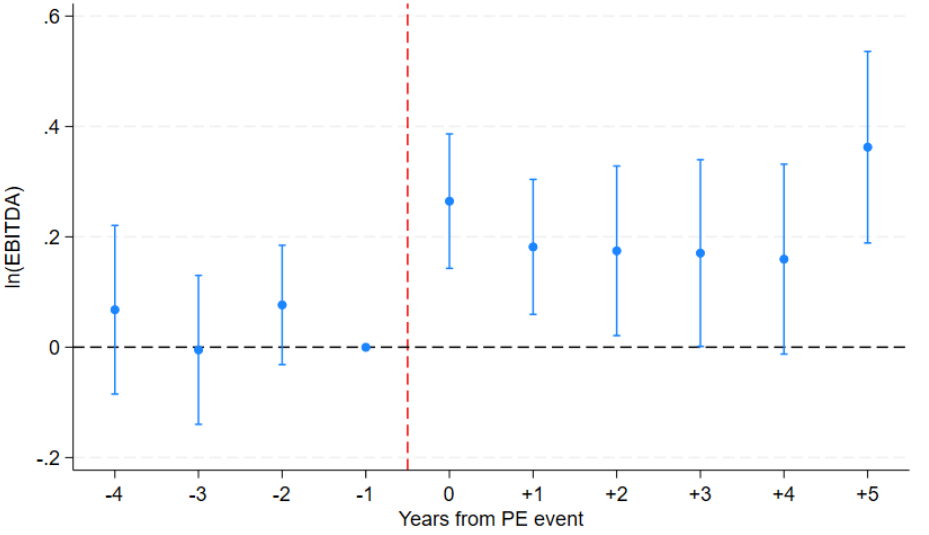
PE targets: Employment increases



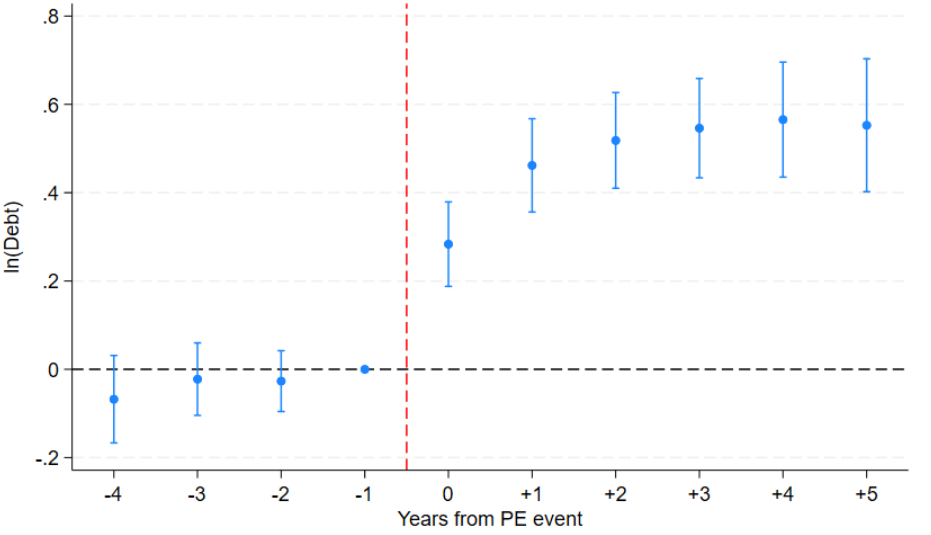
PE targets: Sales increase



PE targets: Profitability increases



PE targets: Debt increases



Extensions: The impact on target firms

The effects of PE buyouts are more pronounced for targets that were more financially constrained pre-buyout

	(1) ln(Debt)	(2) ln(Sales)	(3) ln(Employees)	(4) ln(EBITDA)
Post PE	0.42***	0.17**	0.11***	0.17**
	(0.07)	(0.07)	(0.04)	(0.07)
Post PE × Low leverage$_{pre}$	0.38**	0.21*	0.28***	0.23*
	(0.15)	(0.12)	(0.08)	(0.13)
Observations	6,662	6,662	6,662	6,662
Adjusted R-squared	0.92	0.86	0.98	0.80
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

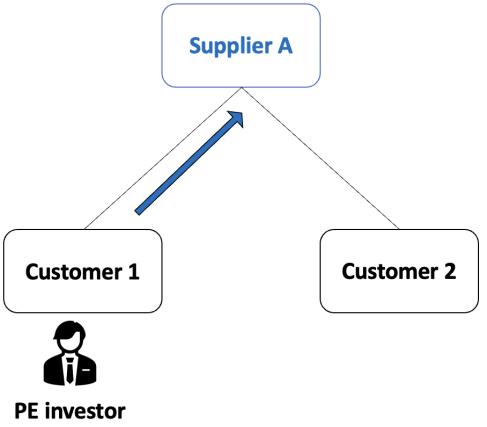
The positive impact in normal times can be explained by increased demand

	ln(Sales)		ln(Employees)	
	(1)	(2)	(3)	(4)
Panel A:	Low leverage	High leverage	Low leverage	High leverage
Post PE	0.07***	0.06	0.04**	0.03
	(0.03)	(0.04)	(0.02)	(0.02)
Observations	28432	16099	28432	16099
Adjusted R-squared	0.94	0.93	0.97	0.97
Panel B:	High input dependence	Low input dependence	High input dependence	Low input dependence
Post PE	0.07**	0.06	0.05***	0.02
	(0.03)	(0.04)	(0.02)	(0.02)
Observations	27309	18040	27309	18040
Adjusted R-squared	0.92	0.93	0.97	0.97
Panel C:	Long relationships	Short relationships	Long relationships	Short relationships
Post PE	0.10***	0.04	0.07***	0.01
	(0.04)	(0.03)	(0.02)	(0.02)
Observations	17845	22827	17845	22827
Adjusted R-squared	0.93	0.93	0.97	0.97
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

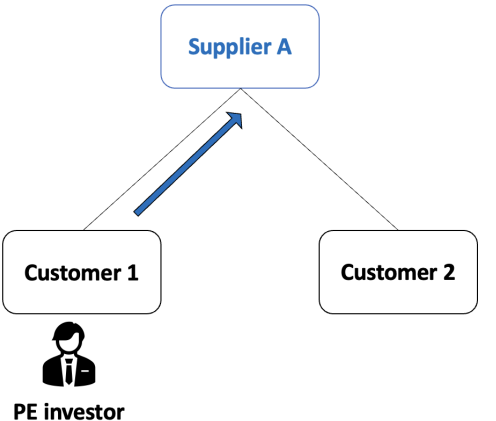
The positive impact in normal times can be explained by increased demand

	ln(EBITDA)		ln(Markup)	
	(5)	(6)	(7)	(8)
Panel A:	Low leverage	High leverage	Low leverage	High leverage
Post PE	0.07**	0.05	0.00	-0.01
	(0.03)	(0.04)	(0.03)	(0.03)
Observations	28432	16099	9940	5632
Adjusted R-squared	0.90	0.89	0.73	0.74
Panel B:	High input dependence	Low input dependence	High input dependence	Low input dependence
Post PE	0.08**	0.02	0.00	-0.01
	(0.03)	(0.03)	(0.02)	(0.04)
Observations	27309	18040	11785	4036
Adjusted R-squared	0.89	0.88	0.75	0.67
Panel C:	Long relationships	Short relationships	Long relationships	Short relationships
Post PE	0.08**	0.04	0.02	-0.01
	(0.04)	(0.03)	(0.03)	(0.03)
Observations	17845	22827	5253	8975
Adjusted R-squared	0.89	0.90	0.70	0.77
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Increased demand for inputs from PE-backed customers versus other customers



Increased demand for inputs from PE-backed customers versus other customers



$$ln(Purchases)_{i,j,t} = \beta \cdot Post\ PE_{j,t} + \lambda_{i,t} + \lambda_j + \lambda_{i,j} + \epsilon_{i,j,t}$$

The positive impact in normal times is driven by increased demand from PE-backed customers

	(1) ln(Purchases)	(2) ln(Purchases)	(3) ln(Purchases)
Post PE	0.15**	0.16**	0.18**
	(0.06)	(0.07)	(0.07)
Observations	9951	9238	9197
Adjusted R-squared	0.78	0.78	0.82
Supplier FE	Yes	No	No
Customer FE	Yes	Yes	No
Year FE	Yes	No	No
Supplier × Year FE	No	Yes	Yes
Supplier × Customer FE	No	No	Yes

$$ln(Purchases)_{i,j,t} = \beta \cdot Post\ PE_{j,t} + \lambda_{i,t} + \lambda_j + \lambda_{i,j} + \epsilon_{i,j,t}$$

↑

In addition, we find that suppliers of PE-backed firms benefit from a certification effect

	ln(Number of customers) (1)	ln(Number of within-network customers) (2)	ln(Number of outside-network customers) (3)	ln(Exports to PE investor country) (4)
Post PE	0.04**	0.05***	-0.01	0.06*
	(0.02)	(0.01)	(0.02)	(0.03)
Observations	45349	45349	45349	30883
Adjusted R-squared	0.95	0.87	0.95	0.87
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Further analyses imply that the certification effect is quantitatively minor compared to the direct demand channel from PE-backed customers More results

↑

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

	ln(Sales)		ln(Employees)	
	(1)	(2)	(3)	(4)
Panel A:	Differentiated inputs	Standardized inputs	Differentiated inputs	Standardized inputs
Post PE	0.11***	0.06*	0.04**	0.04**
	(0.04)	(0.03)	(0.02)	(0.02)
Post PE × Economic downturn	-0.04	-0.09**	-0.03	-0.04*
	(0.05)	(0.04)	(0.03)	(0.02)
Observations	18845	26194	18845	26194
Adjusted R-squared	0.94	0.92	0.97	0.97
Panel B:	Low competition	High competition	Low competition	High competition
Post PE	0.08*	0.08***	0.04*	0.05***
	(0.04)	(0.03)	(0.02)	(0.02)
Post PE × Economic downturn	-0.05	-0.07*	-0.02	-0.04*
	(0.06)	(0.04)	(0.03)	(0.02)
Observations	15929	29420	15929	29420
Adjusted R-squared	0.93	0.93	0.96	0.97
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

	ln(EBITDA)		ln(Markup)	
	(5)	(6)	(7)	(8)
Panel A:	Differentiated inputs	Standardized inputs	Differentiated inputs	Standardized inputs
Post PE	0.04	0.09**	0.07	-0.02
	(0.04)	(0.04)	(0.05)	(0.02)
Post PE × Economic downturn	0.07	-0.09*	-0.09	-0.09*
	(0.06)	(0.05)	(0.08)	(0.05)
Observations	18845	26194	5832	9922
Adjusted R-squared	0.89	0.90	0.73	0.74
Panel B:	Low competition	High competition	Low competition	High competition
Post PE	0.04	0.08**	-0.04	0.02
	(0.04)	(0.03)	(0.07)	(0.02)
Post PE × Economic downturn	0.03	-0.05	-0.02	-0.08*
	(0.06)	(0.05)	(0.14)	(0.05)
Observations	15929	29420	2685	13136
Adjusted R-squared	0.88	0.90	0.62	0.75
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

	ln(Sales)		ln(Employees)	
	(1)	(2)	(3)	(4)
Panel C:	Young PE firm	Old PE firm	Young PE firm	Old PE firm
Post PE	0.08**	0.09***	0.05**	0.06***
	(0.04)	(0.03)	(0.03)	(0.02)
Post PE × Economic downturn	-0.03	-0.09*	0.01	-0.04*
	(0.05)	(0.04)	(0.03)	(0.03)
Observations	18586	24662	18586	24662
Adjusted R-squared	0.92	0.93	0.96	0.96
Panel D:	Small PE firm	Large PE firm	Small PE firm	Large PE firm
Post PE	0.06**	0.13***	0.03*	0.10***
	(0.04)	(0.03)	(0.02)	(0.02)
Post PE × Economic downturn	-0.05	-0.10*	-0.01	-0.05*
	(0.03)	(0.05)	(0.02)	(0.03)
Observations	18263	25571	18263	25571
Adjusted R-squared	0.92	0.94	0.96	0.96
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

The increased demand effect is offset during economic downturns as PE funds exert pressure on suppliers

	ln(Sales)		ln(Employees)	
	(1)	(2)	(3)	(4)
Panel C:	Young PE firm	Old PE firm	Young PE firm	Old PE firm
Post PE	0.07	0.07**	0.04	0.01
	(0.04)	(0.03)	(0.04)	(0.02)
Post PE × Economic downturn	0.06	-0.07	-0.04	-0.09*
	(0.07)	(0.05)	(0.08)	(0.05)
Observations	18586	24662	4588	11233
Adjusted R-squared	0.90	0.90	0.75	0.70
Panel D:	Small PE firm	Large PE firm	Small PE firm	Large PE firm
Post PE	0.05*	0.13***	0.03	0.01
	(0.03)	(0.04)	(0.02)	(0.02)
Post PE × Economic downturn	0.01	-0.10*	-0.04	-0.03
	(0.04)	(0.06)	(0.04)	(0.04)
Observations	18263	25571	6167	9574
Adjusted R-squared	0.90	0.91	0.76	0.78
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

PE-backed firms are more likely to reconfigure their supply chains during economic downturns

- PE firms may not only "lean on suppliers," but also reconfigure their supply chains by terminating relationships with certain suppliers
- To test this, we run the following customer-supplier level regression:

$$Pr(\textit{Relationship terminated})_{i,j,t} = \beta \cdot \textit{Post PE}_{j,t} + \lambda_{i,t} + \lambda_j + \lambda_{i,j} + \epsilon_{i,j,t}$$

↑

PE-backed firms are more likely to reconfigure their supply chains during economic downturns

	Relationship terminated		Relationship terminated	
	Standardized inputs (1)	Differentiated inputs (2)	High competition (3)	Low competition (4)
Post PE	-0.12***	-0.08***	-0.10***	-0.09***
	(0.03)	(0.02)	(0.03)	(0.02)
Post PE × Economic Downturn	0.08**	-0.03	0.07*	-0.03
	(0.04)	(0.03)	(0.04)	(0.03)
Observations	1934	6490	2603	5827
Adjusted R-squared	0.66	0.57	0.63	0.58
Supplier FE	No	No	No	No
Customer FE	No	No	No	No
Year FE	No	No	No	No
Supplier × Year FE	Yes	Yes	Yes	Yes
Supplier × Customer FE	Yes	Yes	Yes	Yes

PE-backed firms are more likely to reconfigure their supply chains during economic downturns

	Relationship terminated		Relationship terminated	
	Young PE firm (1)	Old PE firm (2)	Large PE firm (3)	Small PE firm (4)
Post PE	-0.12***	-0.09***	-0.18***	-0.09***
	(0.03)	(0.02)	(0.03)	(0.02)
Post PE × Economic Downturn	0.07**	-0.02	0.11*	-0.02
	(0.05)	(0.03)	(0.05)	(0.03)
Observations	2090	7107	1597	7522
Adjusted R-squared	0.58	0.59	0.56	0.58
Supplier FE	No	No	No	No
Customer FE	No	No	No	No
Year FE	No	No	No	No
Supplier × Year FE	Yes	Yes	Yes	Yes
Supplier × Customer FE	Yes	Yes	Yes	Yes

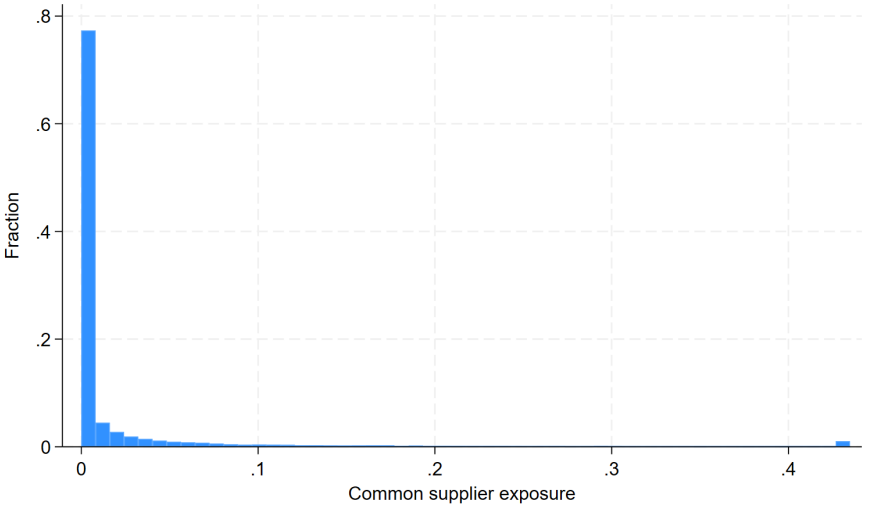
↑

PE-backed firms ultimately diversify their procurement sources and realize cost savings during economic downturns

	ln(Number of suppliers)		Cost of inputs/Sales	
	(1)	(2)	(3)	(4)
Post PE	0.04*	0.02	-0.02**	-0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Post PE × Economic downturn		0.04*		-0.02**
		(0.02)		(0.01)
Observations	6106	6106	6584	6584
Adjusted R-squared	0.95	0.95	0.70	0.70
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

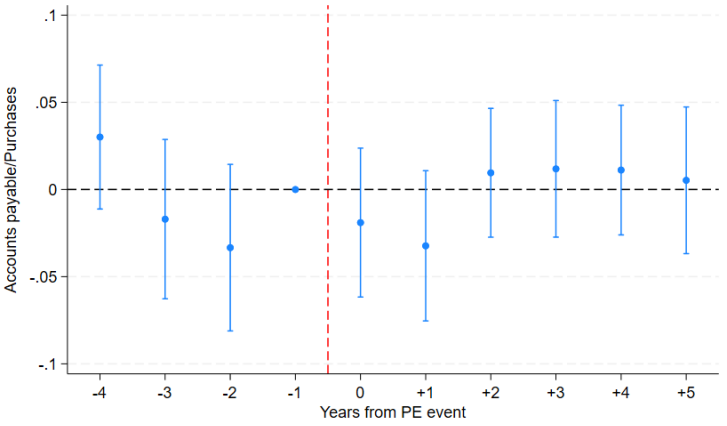
Distribution of firms' reliance on suppliers of PE-backed rivals



↑

Alternative channel: Trade credit

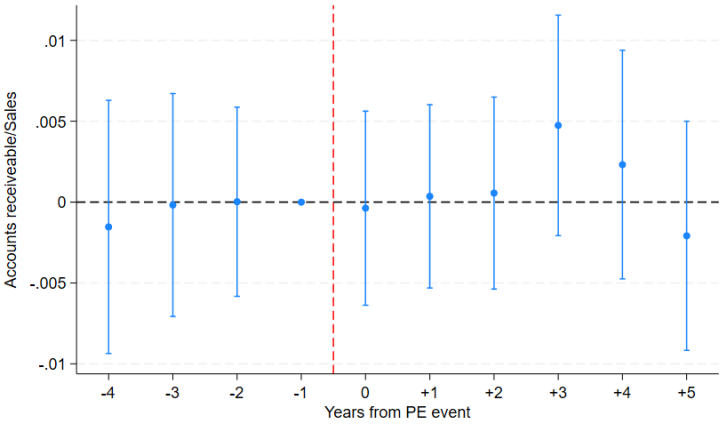
Target firms' do not change their use of accounts payable post-buyout, and ...



↑

Alternative channel: Trade credit

. . . their suppliers also do not report a change in accounts receivables



↑

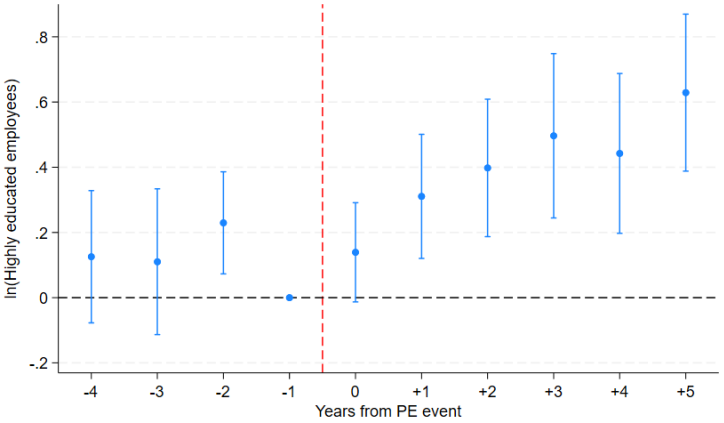
Alternative channel: Trade credit

	Accounts payable (customers)		Accounts receivable (suppliers)	
	(1)	(2)	(3)	(4)
Post PE	0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Post PE × Economic downturn		0.01		-0.00
		(0.01)		(0.00)
Observations	6296	6296	41454	41454
Adjusted R-squared	0.77	0.77	0.67	0.67
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Knowledge spillovers

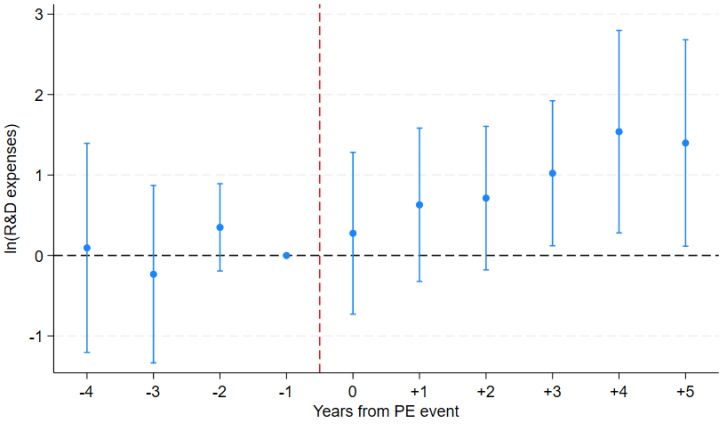
While target firms' increase hiring of highly educated employees and innovation activities post-buyout...



↑

Alternative channel: Knowledge spillovers

While target firms' increase hiring of highly educated employees and innovation activities post-buyout...



↑

Alternative channel: Knowledge spillovers

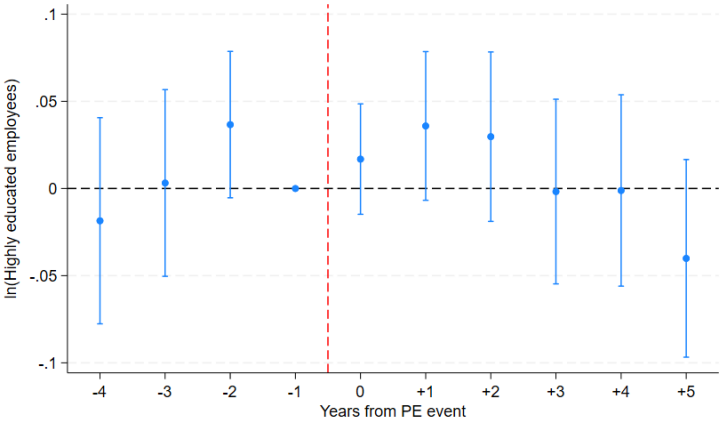
While target firms' increase hiring of highly educated employees and innovation activities post-buyout...

	ln(Skilled labor)		ln(R&D expenses)	
	(1)	(2)	(3)	(4)
Post PE	0.25***	0.23**	0.72**	0.48*
	(0.09)	(0.11)	(0.30)	(0.27)
Post PE × Economic downturn		0.04		0.72
		(0.14)		(0.45)
Observations	5163	5163	6662	6662
Adjusted R-squared	0.83	0.83	0.73	0.73
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Knowledge spillovers

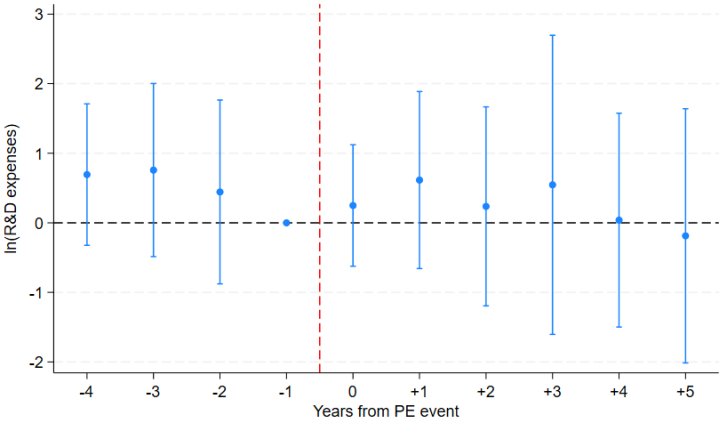
... suppliers of PE-backed firms do not increase hiring of highly educated employees or innovation activities post-buyout



↑

Alternative channel: Knowledge spillovers

... suppliers of PE-backed firms do not increase hiring of highly educated employees or innovation activities post-buyout



↑

Alternative channel: Knowledge spillovers

... suppliers of PE-backed firms do not increase hiring of highly educated employees or innovation activities post-buyout

	ln(Skilled labor)		ln(R&D expenses)	
	(1)	(2)	(3)	(4)
Post PE	-0.01	-0.01	0.04	0.04
	(0.03)	(0.03)	(0.05)	(0.05)
Post PE × Economic downturn		-0.00		0.02
		(0.03)		(0.06)
Observations	30622	30622	45349	45349
Adjusted R-squared	0.87	0.87	0.70	0.70
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Knowledge spillovers

The results do not depend on the innovation-intensity of the sector in which the targets operate

	ln(Skilled labor)		ln(R&D expenses)	
	(1)	(2)	(3)	(4)
Panel A:	Innovative sectors (targets)			
Post PE	-0.04	-0.03	0.02	0.02
	(0.03)	(0.04)	(0.05)	(0.05)
Post PE × Economic downturn		-0.01		0.01
		(0.04)		(0.09)
Observations	19067	19067	30922	30922
Adjusted R-squared	0.87	0.87	0.72	0.72
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Knowledge spillovers

The results do not depend on the innovation-intensity of the sector in which the suppliers operate

	ln(Skilled labor)		ln(R&D expenses)	
	(1)	(2)	(3)	(4)
Panel B:	Innovative sectors (suppliers)			
Post PE	0.02	-0.00	0.03	0.01
	(0.05)	(0.06)	(0.08)	(0.07)
Post PE × Economic downturn		0.05		0.07
		(0.05)		(0.12)
Observations	12552	12552	19145	19145
Adjusted R-squared	0.86	0.86	0.74	0.74
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Knowledge spillovers

The results do not depend on the innovation-intensity of the sector in which the suppliers or the targets operate

	ln(Skilled labor)		ln(R&D expenses)	
	(1)	(2)	(3)	(4)
Panel C:	Innovative sectors (targets & suppliers)			
Post PE	-0.03	-0.04	0.04	0.03
	(0.05)	(0.06)	(0.09)	(0.08)
Post PE × Economic downturn		0.02		0.06
		(0.06)		(0.16)
Observations	8600	8600	14207	14207
Adjusted R-squared	0.86	0.86	0.74	0.74
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Alternative channel: Leverage

High-leverage M&As have no effect on supplier performance or markups, neither during normal times nor during crisis periods, suggesting that leverage alone does not explain our findings

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post High-leverage M&A	0.02	0.02	0.04	0.03
	(0.03)	(0.02)	(0.04)	(0.03)
Observations	18909	18909	18909	6100
Adjusted R-squared	0.93	0.97	0.90	0.77
Panel B:				
Post High-leverage M&A	0.01	0.01	0.02	0.02
	(0.03)	(0.02)	(0.04)	(0.03)
Post High-leverage M&A × Economic Downturn	0.05	0.04	0.06	0.02
	(0.06)	(0.03)	(0.06)	(0.07)
Observations	18909	18909	18909	6100
Adjusted R-squared	0.93	0.97	0.90	0.77
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

The role of leverage in PE investors' cost-savings pressure

PE investors are more likely to exert pressure on suppliers' markups if portfolio firms are highly levered or have low interest coverage ratios

Indebtedness measure	PE-backed firms with high leverage		PE-backed firms with low ICR	
	ln(Markup) (1)	ln(Markup) (2)	ln(Markup) (3)	ln(Markup) (4)
Post PE	-0.00	0.01	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Post PE × Indebtedness	-0.00	0.04	-0.01	0.06
	(0.04)	(0.04)	(0.05)	(0.05)
Post PE × Economic downturn		-0.04		-0.04
		(0.05)		(0.05)
Post PE × Economic downturn × Indebtedness		-0.15*		-0.22**
		(0.08)		(0.11)
Observations	15821	15821	15821	15821
Adjusted R-squared	0.73	0.73	0.73	0.73
Firm×Cohort FE	Yes	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes	Yes

↑

Placebo I: Canceled deals

We do not find that announced but canceled PE deals have an impact on suppliers of the target firms

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post $PE_{canceled}$	0.04	0.00	0.02	-0.02
	(0.04)	(0.03)	(0.04)	(0.05)
Observations	14959	14959	14959	5458
Adjusted R-squared	0.95	0.97	0.91	0.69
Panel B:				
Post $PE_{canceled}$	0.03	0.00	-0.02	-0.01
	(0.05)	(0.03)	(0.05)	(0.06)
Post $PE_{canceled}$ × Economic Downturn	0.03	-0.00	0.09	-0.03
	(0.05)	(0.03)	(0.06)	(0.07)
Observations	14959	14959	14959	5458
Adjusted R-squared	0.95	0.97	0.91	0.69
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Placebo II: Customer-supplier relationships that ended right before the PE event

We do not find that any effects for suppliers whose relationship with the PE target ended one year before the buyout

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post $PE_{placebo}$	-0.01	-0.01	0.21	-0.07
	(0.05)	(0.02)	(0.18)	(0.05)
Observations	19399	19399	19399	3529
Adjusted R-squared	0.90	0.94	0.50	0.64
Panel B:				
Post $PE_{placebo}$	0.02	-0.01	0.09	-0.08
	(0.06)	(0.02)	(0.24)	(0.07)
Post $PE_{placebo}$ × Economic Downturn	-0.07	-0.01	0.31	0.01
	(0.10)	(0.04)	(0.39)	(0.12)
Observations	19399	19399	19399	3529
Adjusted R-squared	0.90	0.94	0.49	0.64
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Robustness: Stricter matching procedure

Our results hold if we match suppliers on supplier-level characteristics as well as the average characteristics of their customer base

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post PE	0.06**	0.03**	0.05*	-0.00
	(0.02)	(0.01)	(0.02)	(0.02)
Observations	43773	43773	43773	14229
Adjusted R-squared	0.93	0.97	0.89	0.72
Panel B:				
Post PE	0.08***	0.04***	0.05*	0.00
	(0.03)	(0.01)	(0.03)	(0.02)
Post PE × Economic downturn	-0.07**	-0.03*	0.01	-0.04*
	(0.03)	(0.02)	(0.04)	(0.02)
Observations	43773	43773	43773	14229
Adjusted R-squared	0.93	0.97	0.89	0.72
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

Extension: The determinants of PE buyouts

We do not find evidence that PE investors actively take into account firms' supply chain structure in their investment decisions.

	(1) PE target	(2) PE target	(3) PE target	(4) PE target
ln(Total assets)	0.0006***	0.0007***	0.0010***	0.0011***
	(0.0001)	(0.0001)	(0.0004)	(0.0004)
ln(Employees)	-0.0000	0.0000	-0.0003*	-0.0002
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Debt/TA	0.0008***	0.0008***	0.0018***	0.0018***
	(0.0002)	(0.0002)	(0.0006)	(0.0007)
Accounts receivable	0.0002	0.0004	-0.0009	-0.0007
	(0.0007)	(0.0007)	(0.0022)	(0.0022)
EBITDA/TA	0.0023***	0.0023***	0.0057***	0.0058***
	(0.0005)	(0.0005)	(0.0016)	(0.0016)
ln(Markup)			-0.0006*	-0.0006**
			(0.0003)	(0.0003)
$\text{Age}_{\text{average supplier}}$		-0.0000		-0.0000
		(0.0000)		(0.0000)
$\ln(\text{Total assets})_{\text{average supplier}}$		0.0003		0.0004
		(0.0003)		(0.0007)

(Continued on next slide)

Extension: The determinants of PE buyouts

(Continued from previous slide)

$\ln(\text{Employees})_{\text{average supplier}}$		-0.0001		0.0001
		(0.0002)		(0.0006)
$\text{Debt/TA}_{\text{average supplier}}$		0.0002		0.0008
		(0.0005)		(0.0018)
$\text{Accounts payable}_{\text{average supplier}}$		0.0022		-0.0104
		(0.0029)		(0.0078)
$\text{EBITDA/TA}_{\text{average supplier}}$		0.0002		0.0039
		(0.0011)		(0.0037)
Number of suppliers		-0.0002		-0.0004
		(0.0001)		(0.0004)
Share of suppliers offering standardized inputs		0.0004		0.0003
		(0.0007)		(0.0015)
Share of suppliers in low competition sectors		-0.0004		0.0000
		(0.0005)		(0.0012)
$\ln(\text{Markup})_{\text{average supplier}}$				0.0002
				(0.0003)
Observations	400106	400106	117946	117404
Adjusted R-squared	0.09	0.09	0.12	0.12
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Extension: Excluding buy-and-build

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post PE	0.06***	0.03**	0.06**	-0.02
	(0.02)	(0.01)	(0.02)	(0.02)
Observations	40150	40150	40150	13816
Adjusted R-squared	0.94	0.97	0.91	0.73
Panel B:				
Post PE	0.08***	0.04***	0.06**	0.01
	(0.02)	(0.01)	(0.03)	(0.02)
Post PE × Economic downturn	-0.06**	-0.05**	-0.04	-0.11**
	(0.03)	(0.02)	(0.04)	(0.05)
Observations	40150	40150	40150	13816
Adjusted R-squared	0.94	0.97	0.91	0.73
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

Extension: Excluding PE deals executed during recessions

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post PE	0.07***	0.04***	0.07***	0.02
	(0.02)	(0.01)	(0.03)	(0.02)
Observations	34495	34495	34495	12236
Adjusted R-squared	0.94	0.97	0.91	0.78
Panel B:				
Post PE	0.09***	0.04***	0.09***	0.02
	(0.03)	(0.01)	(0.03)	(0.02)
Post PE × Economic downturn	-0.08**	-0.02*	-0.08*	-0.00
	(0.04)	(0.01)	(0.05)	(0.04)
Observations	34495	34495	34495	12236
Adjusted R-squared	0.94	0.97	0.91	0.78
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

Extension: Heterogeneity in treatment intensity

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE × Sales share ∈ (0%, 5%]	0.04	0.01	0.05*	0.02
	(0.03)	(0.02)	(0.03)	(0.03)
Post PE × Sales share ∈ (5%, 10%]	0.10***	0.06***	0.09***	-0.02
	(0.03)	(0.02)	(0.03)	(0.03)
Post PE× Sales share ∈ (10%, 100%]	0.13***	0.08***	0.09***	-0.01
	(0.01)	(0.00)	(0.01)	(0.01)
Observations	399829	399829	399829	119329
Adjusted R-squared	0.94	0.97	0.91	0.75
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

The 5% cutoff used in the main analysis seems reasonable

↑

Extension: Real effects for rivals with common suppliers whose relationships were terminated

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Panel A:				
Post PE	0.10	0.05	0.03	0.09
	(0.08)	(0.04)	(0.09)	(0.05)
Observations	3701	3701	3701	1634
Adjusted R-squared	0.94	0.94	0.80	0.69
Panel B:				
Post PE	-0.19*	-0.07	-0.37***	0.11
	(0.11)	(0.09)	(0.13)	(0.09)
Observations	1307	1307	1307	650
Adjusted R-squared	0.96	0.94	0.82	0.65
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

↑

Extension: Disentangling the certification and demand channel

	(1) ln(Sales)	(2) ln(Employees)	(3) ln(EBITDA)	(4) ln(Markup)
Post PE	0.07***	0.04***	0.06**	-0.00
	(0.02)	(0.01)	(0.02)	(0.02)
Post-buyout within-network customers	0.01	0.01	0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	45349	45349	45349	15821
Adjusted R-squared	0.93	0.97	0.90	0.73
Controls	No	No	No	No
Firm × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes

where *Post-buyout within-network customers* captures the number of new customers a treated supplier gains within the PE-backed firms' network post-buyout

↑