

The Supply Chain Spillovers of Private Equity Buyouts

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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 buyouts**

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Supply Chain Strategy Makes or Breaks PE Deals

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:**
 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-backed firms generate **crowding-out effects** for **competitors 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

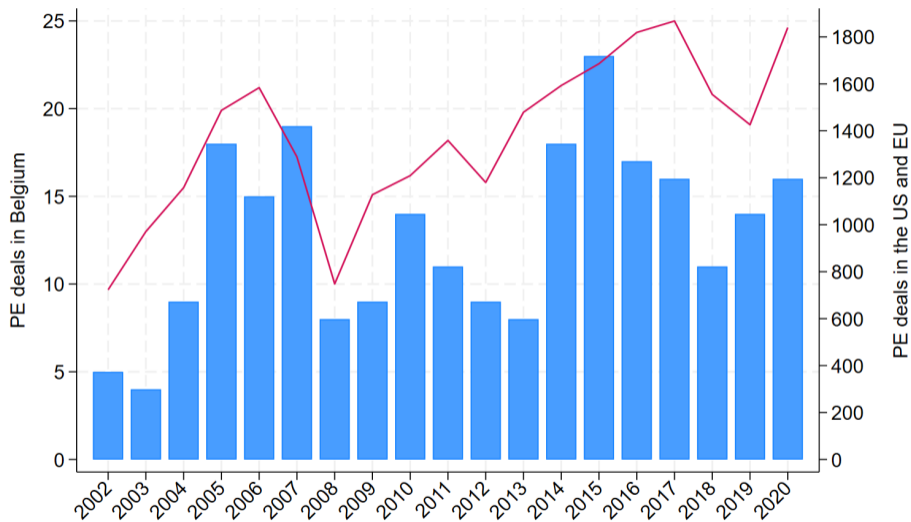
Bolton and Whinston (1993, REStud); Chod et al. (2019, JFE); Freeman et al. (2024, WP); Giannetti et al. (2021, JPE)

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

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

Number of PE deals over time

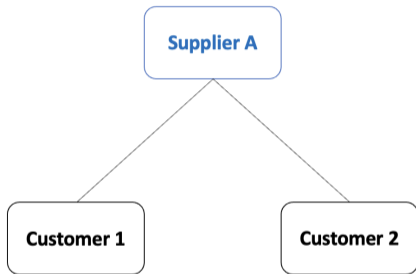


PE deal characteristics

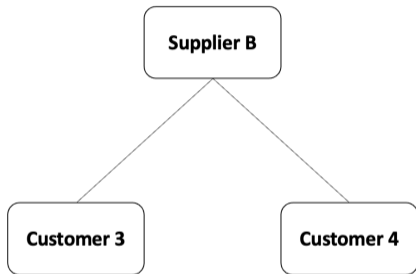
Belgium seems a representative country in terms of PE activity

	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%

Identification strategy



PE investor



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**
- 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

We run a **stacked difference-in-differences** model:

$$y_{i,t,c} = \beta \cdot \text{Post } PE_{i(j),t,c} + \lambda_{i,c} + \lambda_{t,c} + \epsilon_{i,t,c}$$

- $y_{i,t,c}$ represents firm outcomes, such as sales, profitability, employment, and markups (De Loecker and Warzynski, 2012, AER)
- $\text{Post } PE_{i(j),t,c}$ 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

The impact of PE buyouts on targets

- PE funds seem to improve targets' access to debt financing, allowing them to grow
- 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*** (0.06)	0.15** (0.07)	0.12*** (0.04)	0.20*** (0.07)
Post PE × Economic downturn	0.09 (0.08)	0.17* (0.10)	0.12*** (0.04)	0.06** (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

The impact of PE buyouts on suppliers of targets

In general, suppliers of PE-backed firms seem to outperform other suppliers.
In downturns, suppliers of PE-backed firms: little to no outperformance

	(1)	(2)	(3)	(4)
	ln(Sales)	ln(Employees)	ln(EBITDA)	ln(Markup)
Post PE	0.08*** (0.03)	0.05*** (0.01)	0.07** (0.03)	0.01 (0.02)
Post PE × Economic downturn	-0.06* (0.03)	-0.04** (0.02)	-0.04* (0.02)	-0.08* (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

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)

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** and **rewiring supply chains**, particularly if they face **lower switching costs** vis-à-vis suppliers:

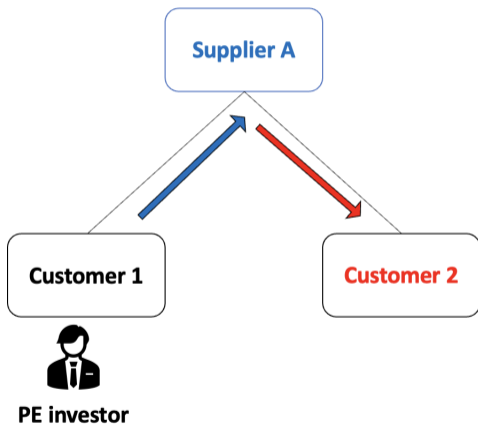
- suppliers that offer standardized (rather than differentiated) inputs
- suppliers operating in highly competitive industries

The effects are also stronger for suppliers of PE-backed firms owned by **more reputable PE firms**:

- suppliers of PE-backed firms owned by larger and older PE investors

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

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 (0.02)	0.00 (0.02)	-0.01 (0.02)
Post PE × Competitor	0.01 (0.02)	0.04** (0.02)	0.06** (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 (0.02)	0.01 (0.02)	0.00 (0.02)
Post PE × Competitor	0.02 (0.03)	0.03 (0.02)	0.04** (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* (0.01)	-0.00 (0.00)	-0.02*** (0.00)	0.00 (0.01)
Post PE × Common supplier exposure	-0.07* (0.04)	-0.07** (0.03)	-0.23*** (0.05)	-0.11*** (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

- 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**