”Investment when New Capital is Hard to Find”

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Overview

Question : What is the macro impact of secondary markets for capital? [Eisfeldt and Rampini, 2007]

Normal times: (mis)allocation of capital

Downturns: ”spare wheel” if shortfall of new productive assets

This paper : Effects of 2021 disruptions in supply of new business equipment

Used equipment market becomes more active

But: mature firms crowd out younger firms

1. Theory
2. Data

Theory (1/2)

[Lanteri and Rampini, 2023]

Firms produce with *U*sed or *N*ew capital

N today $\rightarrow$ U tomorrow

Financing: net worth w_t + debt b_t s.t.

$$b_t \leq \theta \, p^U_{t+1} \, k^N_t$$

First order conditions

$$\begin{aligned} p^N_t - p^U_{t+1} \quad &+ \quad \phi_t(w_t)(p^N_t - \theta p^U_{t+1}) \quad \geq \quad MPK_{t+1} \\ p^U_t \quad &+ \quad \phi_t(w_t) p^U_t \quad \geq \quad MPK_{t+1} \end{aligned}$$

Higher p^U_{t+1} is good for firms who buy N and are constrained (mid-w firms) [Collateral externality]

Higher p^U_t is bad for firms who only buy U (low-w firms) [Distributive externality]

Theory (2/2)

[Lanteri and Rampini, 2023]

This paper: $\uparrow p_t^N$

$$p_t^N - p_{t+1}^U \quad + \quad \phi_t(w_t)(p_t^N - \theta p_{t+1}^U) \quad \geq \quad MPK_{t+1}$$

$\implies$ mid-w firms buy less N, more U $\implies$ $p_t^U \uparrow$ $\implies$

$$p_t^U \quad + \quad \phi_t(w_t)p_t^U \quad \geq \quad MPK_{t+1}$$

$\therefore$ Distributive externality gets worse

What about the collateral externality?

$\uparrow p_t^N$ $\implies$ less N today $\implies$ less U tomorrow $\implies$ $\uparrow p_{t+1}^U$

$$p_t^N - p_{t+1}^U \quad + \quad \phi_t(w_t)(p_t^N - \theta p_{t+1}^U) \quad \geq \quad MPK_{t+1}$$

Not in the paper, but could be interesting. Do collateral values of new capital rise?

Theory to data

$p_{N,t} \uparrow$

$\implies k_t^N \downarrow, k_t^U \uparrow$ for mid-w firms

$\implies p_{U,t} \uparrow$

$\implies k_{U,t} \downarrow$ for low-w firms

The effects of disruptions in the supply of new equipment

$$\text{Transaction characteristic}_{i,t} = \mathbf{1}\{t \geq \text{Nov. 21}\} + \text{Fixed effects} + \epsilon_{i,t}$$

1. After Nov. 21, transactions are more likely to involved Used

   % of transactions involving New: 60% $\rightarrow$ 52%, i.e. $k_t^N/k_t^U \downarrow$

   C Change in levels (k_t^N, k_t^U)? Price effects (p_t^N, p_t^U)?

2. After Nov. 21, there is "more competition" in the market for Used

   Repeat transactions within serial #

   Happen more quickly, across more distant locations or industries

   C Sample size divided by 10; magnitudes hard to interpret

Age-specific responses to the supply shock

1. Graphically, firms age 4-30y buy older capital than usual

   C Transaction characteristic$_{i,t} = \sum_g \mathbf{1}\{t \geq \text{Nov. 21}\} \times \{\text{age}_{i,t} = g\} + \text{Fixed effects} + \epsilon_{i,t}$

   Is there evidence of within-firm substitution of New for Used?

2. In aggregated data (age $\times$ equipment code)

   (a) Investment in used equipment (k_t^U) goes up more for mid-age than for old and young firms

   (b) Total investment responds similarly for mid-age and for old firms

   C Very small economic magnitudes for (a)

   These are effects relative to old firms

   Do mid-age firms purchase more used equipment overall, while young firms purchase less?

   Crucial for distributive externality

An identified negative supply shock

John Deere strike: Oct.-Nov. 21

$\text{Shock}_{e,t} = (\text{John Deere share})_{e,t} \times \mathbf{1}\{t \geq \text{Nov. 21}\}$

Result: $p_{U,t} \uparrow$ more for more exposed equipment

C1 How big of a shock to p_t^N was this? i.e. "first-stage"

John Deere earnings call: 1.5% increase in prices

"All colors were having supply problems. Our customers are exhibiting more patience than ever."

C2 John Deere share proxies for exposure to some other macro shock?

(e.g. oil-intensive sectors use more John Deere equipment)

report more on instrument

Conclusion

What did I learn?

Clear increase in secondary market activity in response to primary market supply shock

Consistent with distributive externality [Lamperi and Rampini, 2023]

What more is there to do?

Only leases or secured loans — does this matter?

How quantitatively important is the amplification coming from the distributive externality?