

Intangible Assets and Imperfections in Product and Labor Markets

Measuring retainability and leakability

Eric Bartelsman¹, Sabien Dobbelaere¹ and Alessandro Zona Mattioli²

¹Vrije Universiteit Amsterdam, Tinbergen Institute, LISER

²University of Amsterdam, Tinbergen Institute

ESCoE Conference — London

May 20, 2026

Research Question

Q: Why do product-market markups and labor-market rent sharing co-move?

A: Intangible Assets

Observed objects

- Price-cost markups: $\mu = P/MC$
- Wage markups / rent sharing:
 $\psi = W/MRPL$
- Firm-level intangible intensity

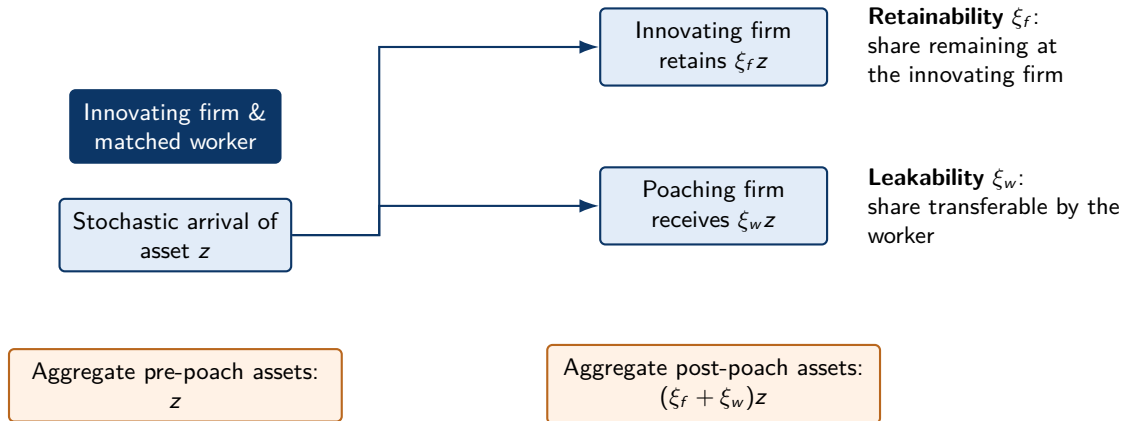
Latent object

- Intangible asset value as (stochastic) manna-from-heaven
 - Non-rival in use and limits to ownership (enforcement)
- Worker mobility as a value transfer channel

Related Literature

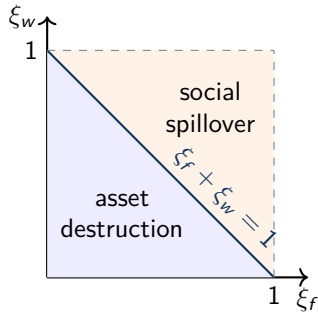
- (Joint) occurrence of product and labor markets imperfections: (Cavalleri et al., 2019; De Loecker et al., 2020; van Heuvelen et al., 2021; Dobbelaere and Mairesse, 2018; Card et al., 2018; Caselli et al., 2021; Manning, 2021; Sokolova and Sorensen, 2021; Yeh et al., 2022; Lamadon et al., 2022)
- Empirical evidence of imperfections (wedges): (Mertens and Mottironi, 2025; Kroft et al., 2025; Damoah, 2021; Dobbelaere and Wiersma, 2025; Berry, 1994; Berry et al., 1995; Nevo, 2001; Berry et al., 2004; De Loecker and Warzynski, 2012; De Loecker et al., 2016; De Loecker and Scott, 2026; Manning, 2011, 2021; Sokolova and Sorensen, 2021; Dobbelaere and Mairesse, 2013; Caselli et al., 2021; Dobbelaere et al., 2024)
- Economics of intangibles: (Eeckhout and Veldkamp, 2022; Kirov and Traina, 2023; Corrado et al., 2013; Döttling and Perotti, 2017; Haskel and Westlake, 2018; Aghion et al., 2020; Crouzet et al., 2022; Hsieh and Rossi-Hansberg, 2023; Bessen, 2019; Acemoglu, 2023; Aghion et al., 2023; De Ridder, 2024)
- Non-compete Agreements:(Starr et al., 2021; Balasubramanian et al., 2022; Lipsitz and Starr, 2022; Young, 2024; Potter et al., 2024; Johnson et al., 2025; Thomä and Bizer, 2013; Sampat and Williams, 2019; Conti, 2014; Johnson et al., 2023; Jeffers, 2024)

The core conceptual setup



The empirical challenge is not only measuring z , but also how z evolves when intangibles are leaked.

Appropriation geometry after worker mobility

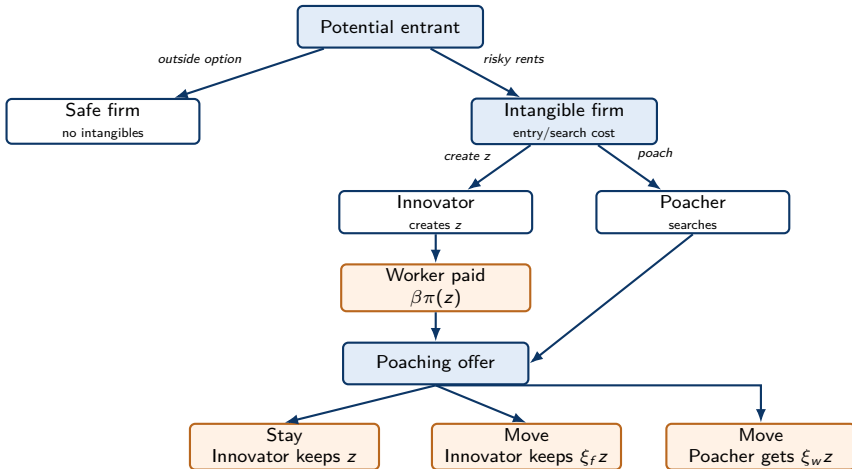


Interpretation

- $\xi_f + \xi_w < 1$: mobility destroys some effective intangible capital.
- $\xi_f + \xi_w = 1$: redistribution across firms.
- $\xi_f + \xi_w > 1$: non-rival use creates spillovers.

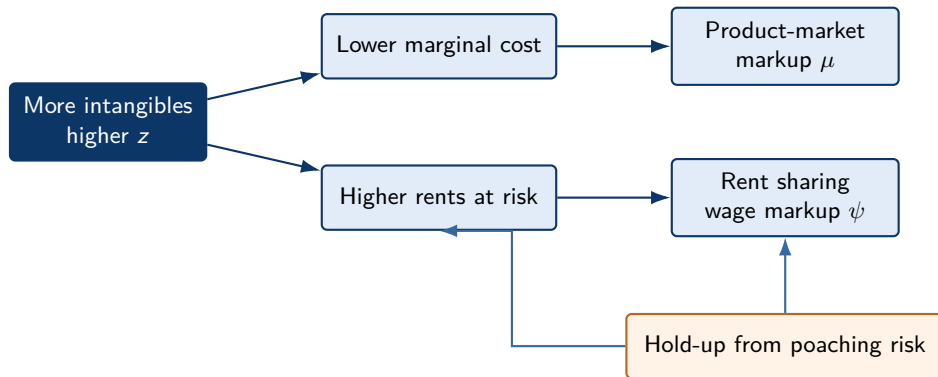
This is where worker mobility becomes a measurement issue for intangible capital.

Model: innovation, poaching, and rent sharing



A higher β protects rents by making poaching less attractive; ξ_f and ξ_w determine how z is split after mobility.

Mechanism: from intangibles to markups and rent sharing



Predictions: more intangibles raise μ and usually ψ ;
higher retainability and non-competes weaken rent sharing.

Data and measurement in the paper

Firm data

- Production Statistics: output, inputs, costs
- ICT survey: technology use
- Community Innovation Survey
- Patents and firm characteristics

Worker data

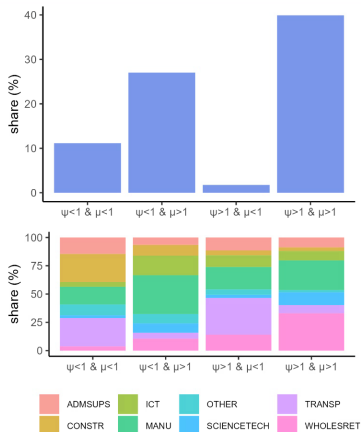
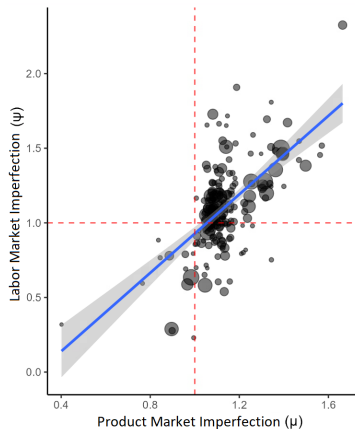
- Matched employer-employee records
- Earnings, hours, transitions
- Education and occupation
- Non-compete agreement survey

Intangible proxy
automation expenditure

μ from production-function approach

ψ as wage / MRPL

Empirical fact 1: co-movement of market imperfections



Pattern

- Many firms price above marginal cost.
- Many firms pay wages above marginal revenue product.
- The two wedges often appear together.

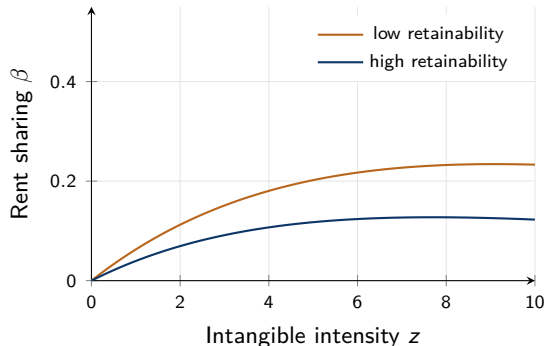
Empirical fact 2: intangibles are linked to both wedges



Paper Evidence

- Firms with higher product-market markups exhibit stronger labor-market rent sharing.
- Both labor- and product-market wedges increase with intangible intensity.
- Non-competitive enforcement weakens rent sharing in intangible-intensive firms.
- Worker mobility diffuses innovative activity across firms.en.

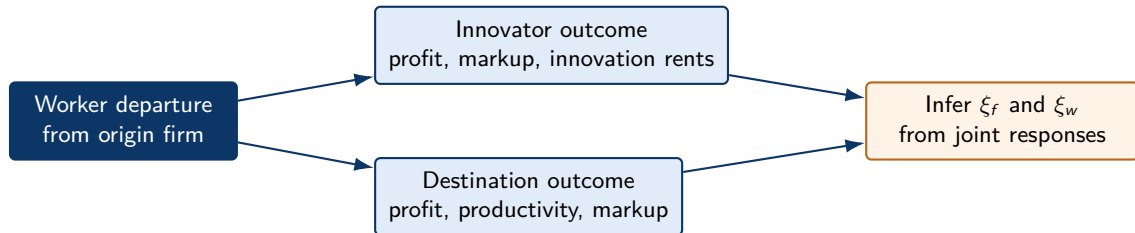
Retainability and non-competes



Paper evidence

- Workers in intangible-intensive firms with non-competes are paid less.
- The positive wage-markup/intangible relationship weakens for high-retainability firms.
- IP protection is interpreted as a proxy for higher retainability.

From proxy evidence to measurement



Measurement idea

Use linked firm-worker transitions to study how firm-specific intangible rents change at both the origin and destination after key-worker moves.

Determinants of leakability and retainability

Asset feature	Interpretation	ξ_f	ξ_w
Firm-embedded tacit knowledge	Teams, routines, organizational capital	↑	↓
Worker-embedded tacit knowledge	Inventor know-how, personal relationships	↓	ambiguous
Codifiability	Software, data, blueprints, patents, manuals (property rights enforceability)	↑	ambiguous
Worker loyalty / incentives	Deferred compensation, culture, non-competes	indirect ↑	↓

Key distinction

Tacitness and codifiability are characteristics of the asset.

Leakability (ξ_w) and retainability (ξ_f) determine how the asset and rents evolves after worker mobility.

Firm-level data on 'Innovatiebox' (NL tax subsidy)

Institutional feature

- Dutch firms with qualifying R&D can use the *Innovatiebox*.
- Effective corporate tax rate of 9 percent on profits attributable to qualifying innovative activities.
- Administration must describe qualifying intangible assets and account for the benefits attributable to them.

Qualifying intangible
asset or innovation



Attributed profits
from tax files



Linked key workers
and mobility

Source: Belastingdienst, Innovatiebox guidance.

Measuring retainability and leakability: Dutch Innovation Box

Measurement idea

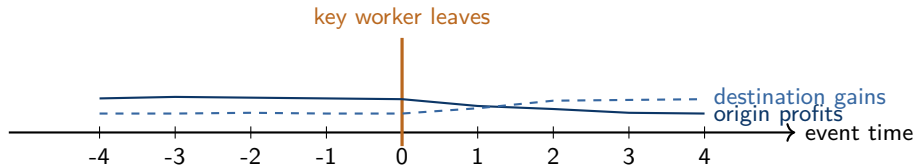
Use descriptions of innovative asset to code characteristics on a 0–1 scale:

- **Leakability:** Is a worker (legally) able to carry rent-generating knowledge to poaching firm?
- **Retainability:** Can the innovator continue using the asset after worker exit?

Calibration / validation

Use linked worker transitions and post-exit innovation profits to discipline the coding of ξ_w and ξ_f .

A possible empirical design



Retainability signal

Small decline in origin-firm innovation-box profits after departure.

Leakability signal

Increase in destination-firm intangible profits or performance after hiring.

Measurement Issues

Inferring key employees: Is linked worker information sufficient, or is extra (survey) data needed.

Takeaways and discussion

- ① Intangibles can jointly generate product-market markups and labor-market rent sharing.
- ② Retainability and leakability describe how the allocation of intangible assets evolve after worker mobility.
- ③ Linked administrative data may allow direct measurement of these latent parameters.

Discussion: how should statistical systems measure mobile, non-rival knowledge?

- Daron Acemoglu. Distorted innovation: Does the market get the direction of technology right? In *AEA Papers and Proceedings*, volume 113, pages 1–28. American Economic Association, 2023.
- Philippe Aghion, Céline Antonin, Simon Bunel, and Xavier Jaravel. What are the labor and product market effects of automation? New evidence from France. Discussion Paper 14443, Centre for Economic Policy Research, 2020.
- Philippe Aghion, Antonin Bergeaud, Timo Boppart, Peter J Klenow, and Huiyu Li. A theory of falling growth and rising rents. *Review of Economic Studies*, 90(6):2675–2702, 2023.
- Natarajan Balasubramanian, Jin Woo Chang, Mariko Sakakibara, Jagadeesh Sivadasan, and Evan Starr. Locked in? The enforceability of covenants not to compete and the careers of high-tech workers. *Journal of Human Resources*, 57(S):S349–S396, 2022.
- Steven Berry. Estimating discrete-choice models of product differentiation. *The RAND Journal of Economics*, 25(2):242–262, 1994.
- Steven Berry, James Levinsohn, and Ariel Pakes. Automobile prices in market equilibrium. *Econometrica*, 63(4):841–890, 1995.
- Steven Berry, James Levinsohn, and Ariel Pakes. Differentiated products demand systems from a combination of micro and macro data: The new car market. *Journal of political Economy*, 112(1):68–105, 2004.
- James Bessen. Automation and jobs: When technology boosts employment. *Economic Policy*, 34(100):589–626, 2019.

- David Card, Ana Rute Cardoso, Joerg Heining, and Patrick Kline. Firms and labor market inequality: Evidence and some theory. *Journal of Labor Economics*, 36(S1):S13–S70, 2018.
- Mauro Caselli, Lionel Nesta, and Stefano Schiavo. Imports and labour market imperfections: Firm-level evidence from France. *European Economic Review*, 131(C):103632, 2021.
- Maria Chiara Cavalleri, Alice Eliet, Peter McAdam, Filippos Petroulakis, Ana Cristina Soares, and Isabel Vansteenkiste. Concentration, market power and dynamism in the Euro area. Discussion Paper 2253, European Central Bank, 2019.
- Raffaele Conti. Do non-competition agreements lead firms to pursue risky R&D projects? *Strategic Management Journal*, 35(8):1230–1248, 2014.
- Carol Corrado, Jonathan Haskel, Cecilia Jona-Lasinio, and Massimiliano Iommi. Innovation and intangible investment in Europe, Japan, and the United States. *Oxford Review of Economic Policy*, 29(2):261–286, 2013.
- Nicolas Crouzet, Janice C Eberly, Andrea L Eisfeldt, and Dimitris Papanikolaou. The economics of intangible capital. *Journal of Economic Perspectives*, 36(3):29–52, 2022.
- Kaku Attah Damoah. Markups, market imperfections, and trade openness: Evidence from Ghana. *World Bank Economic Review*, 35(1):92–116, 2021.
- Jan De Loecker and Paul Scott. Markup estimation using production and demand data. an application to the us brewing industry. *Review of Economic Studies*, 2026. Forthcoming.
- Jan De Loecker and Frederic Warzynski. Markups and firm-level export status. *American Economic Review*, 102(6):2437–2471, 2012.

Jan De Loecker, Pinelopi K Goldberg, Amit K Khandelwal, and Nina Pavcnik. Prices, markups, and trade reform. *Econometrica*, 84(2):445–510, 2016.

Jan De Loecker, Jan Eeckhout, and Gabriel Unger. The rise of market power and the macroeconomic implications. *Quarterly Journal of Economics*, 135(2):561–644, 2020.

Maarten De Ridder. Market power and innovation in the intangible economy. *American Economic Review*, 114(1):199–251, 2024.

Sabien Dobbelaere and Jacques Mairesse. Panel data estimates of the production function and product and labor market imperfections. *Journal of Applied Econometrics*, 28(1):1–46, 2013.

Sabien Dobbelaere and Jacques Mairesse. Comparing micro-evidence on rent sharing from two different econometric models. *Labour Economics*, 52:18–26, 2018.

Sabien Dobbelaere and Quint Wiersma. The impact of trade liberalization on firms' product and labor market power. *Industrial and Corporate Change*, 34(1):210–233, 2025.

Sabien Dobbelaere, Boris Hirsch, Steffen Mueller, and Georg Neuschaeffer. Organized labor, labor market imperfections, and employer wage premia. *Industrial and Labor Relations Review*, 77(3): 396–427, 2024.

Robin Döttling and Enrico C Perotti. Secular trends and technological progress. Discussion Paper 12519, Centre for Economic Policy Research, 2017.

Jan Eeckhout and Laura Veldkamp. Data and market power: A macro-finance perspective. Working Paper 30022, National Bureau of Economic Research, 2022.

Jonathan Haskel and Stian Westlake. *Capitalism without capital: The rise of the intangible economy*. Princeton University Press, 2018.

Chang-Tai Hsieh and Esteban Rossi-Hansberg. The industrial revolution in services. *Journal of Political Economy Macroeconomics*, 1(1):3–42, 2023.

Jessica S Jeffers. The impact of restricting labor mobility on corporate investment and entrepreneurship. *Review of Financial Studies*, 37(1):1–44, 2024.

Matthew S Johnson, Michael Lipsitz, and Alison Pei. Innovation, inventor mobility and the enforceability of noncompete agreements. Working Paper 31487, National Bureau of Economic Research, 2023.

Matthew S Johnson, Kurt Lavetti, and Michael Lipsitz. The labor market effects of legal restrictions on worker mobility. *Journal of Political Economy*, 133(9):2735–2793, 2025.

Ivan Kirov and James Traina. Labor market power and technological change in US manufacturing. Technical report, mimeo, 2023.

Kory Kroft, Yao Luo, Magne Mogstad, and Bradley Setzler. Imperfect competition and rents in labor and product markets: The case of the construction industry. *American Economic Review*, 115(9):2926–2969, 2025.

Thibaut Lamadon, Magne Mogstad, and Bradley Setzler. Imperfect competition, compensating differentials, and rent sharing in the US labor market. *American Economic Review*, 112(1):169–212, 2022.

- Michael Lipsitz and Evan Starr. Low-wage workers and the enforceability of noncompete agreements. *Management Science*, 68(1):143–170, 2022.
- Alan Manning. *Imperfect competition in the labor market*, volume 4B, pages 973–1041. Elsevier, 2011.
- Alan Manning. Monopsony in labor markets: A review. *Industrial and Labor Relations Review*, 74(1):3–26, 2021.
- Matthias Mertens and Bernardo Mottironi. Do larger firms exert more market power? markups and markdowns along the size distribution. *Economics Letters*, page 112500, 2025.
- Aviv Nevo. Measuring market power in the ready-to-eat cereal industry. *Econometrica*, 69(2):307–342, 2001.
- Tristan Potter, Bart Hobijn, and André Kurmann. On the inefficiency of non-competes in low-wage labour markets. *Economica*, 91(362):446–496, 2024.
- Bhaven Sampat and Heidi L Williams. How do patents affect follow-on innovation? evidence from the human genome. *American Economic Review*, 109(1):203–236, 2019.
- Anna Sokolova and Todd Sorensen. Monopsony in labor markets: A meta-analysis. *Industrial and Labor Relations Review*, 74(1):27–55, 2021.
- Evan Starr, James Prescott, and Norman Bishara. Noncompete agreements in the US labor force. *Journal of Law and Economics*, 64(1):53–84, 2021.
- Jörg Thomä and Kilian Bizer. To protect or not to protect? Modes of appropriability in the small enterprise sector. *Research Policy*, 42(1):35–49, 2013.

Gerrit Hugo van Heuvelen, Leon Bettendorf, and Gerdien Meijerink. Markups in a dual labour market: The case of the Netherlands. *International Journal of Industrial Organization*, 77: 102762, 2021.

Chen Yeh, Claudia Macaluso, and Brad Hershbein. Monopsony in the US labor market. *American Economic Review*, 112(7):2099–2138, 2022.

Samuel Young. Noncompete clauses, job mobility, and job quality: Evidence from a low-earning noncompete ban in Austria. Technical report, mimeo, 2024.