Toulouse School of Economics

Conglomerate mergers and the dynamics of innovation

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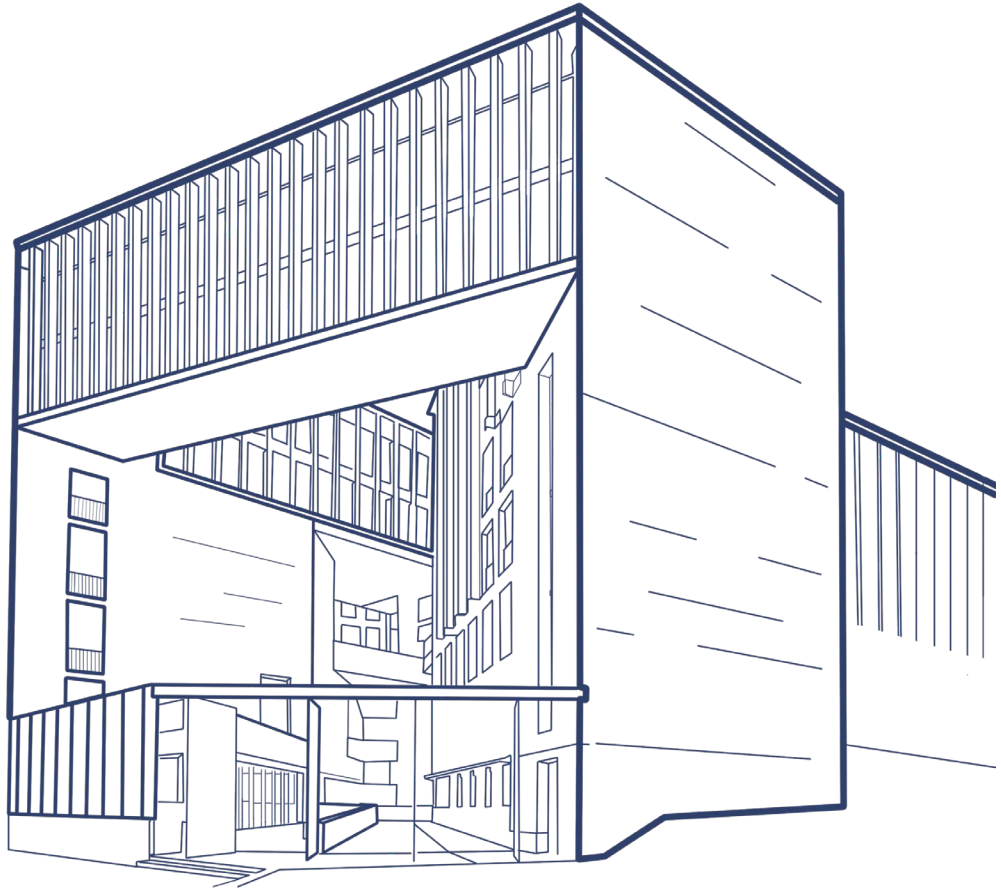


Conglomerate mergers

- Antitrust: neither horizontal nor vertical
  - Separate product markets (non-substitutable products)
  - Same customer (often complementary products)
- EU Non-Horizontal Merger guidelines (2008)

  "Conglomerate mergers are mergers between firms that are in a relationship which is neither horizontal […] nor vertical […]. In practice, the focus is on mergers between companies active in closely related markets (e.g. mergers involving suppliers of complementary products […])."
- [Finance: broader definition – fully unrelated activities]

Policy

- Four decades of US—EU divide
  - US: no antitrust concerns
  - EU: exclusionary concerns & “portfolio effects” (limited success)
- Revived interest
  - Important activity, particularly in digital economy
  - US: Merger guidelines (2023) [“Mergers threatening rivals’ access”]
  - EU: *Booking/ETG* (2023), draft Merger guidelines (April 30, 2026)
- Efficiency benefits
- Theories of harm?

Theories of harm

- Foreclosure through tying (and commitment) [Rey & Tirole *HIO* 2007]
- Portfolio effects through bundling [Nalebuff *QJE* 2004 , Choi *JIE* 2008]
- Ecosystems
  - Scale / scope, data, direct / indirect network effects [Rhodes & Zhou *MS* 2019, de Cornière & Taylor MS 2024, Chen *et al*. *Rand* 2022, Choi *et al*. *AER* 2026]
  - Convenience: consumption synergies, one-stop benefits [Chen and Rey 2026]
- Here: competition and innovation [Aghion-Howitt *Eca* 1992]
  - Innovation benefits requires complementors
  - Involves sharing information: risk of information leakages
  - In the spirit of hold-up problems and vertical integration
    - solution [Williamson 1975, Grossman & Hart *JPE* 1986, Bolton & Whinston *RES* 1993]
    - … but exacerbates problems for rivals [Allain *et al*. *RES* 2016]

Preview of the model

- Endogenous growth setting (Aghion-Howitt)
  - Continuous time, continuum of industries, infinite technology ladder
  - In each industry, platforms and complementors
- At each instant
  - Platforms decide on investment and compatibility (sharing information)
  - Compatible complementors decide whether to leak information to rival platform
- Automatic catch up
  - Technological gap is at most one step (two states: leveled or uneven)
  - Duplicated technologies fall in public domain (full compatibility)
- States evolve via investments and leakages (imitation)

Preview of the findings

A conglomerate merger between a platform and a complementor …

- Exacerbates risk of leaks (independent platform / integrated complementor)
  - Induces *both* platforms to switch from full to selective compatibility
  - Decreases value of innovation for independent rivals (double marginalization)
- Direct impact: reduces innovation incentives
  - For independent platform when leveled
  - For integrated platform when lagging behind
- Overall impact: reduces innovation and growth
  - Formal results for costly innovation, small innovation step, high discount rate
  - Simulations covering entire range of parameters

Setting: industry players and timeframe

- Firms
  - Two platforms P_A, P_B
  - Two complementors C_1, C_2
- Timeframe
  - Infinite horizon and continuous time $t \in [0, +\infty)$
  - Common interest rate $r > 0$
- Conglomerate merger
  - Initially, all firms are independent
  - Consider a merger between P_A and C_1

Setting: technology decisions

- Technology ladder: $k \in \mathbb{N} \rightarrow$ quality γ^k ($\gamma > 1$)
  - R&D for next generation: Poisson arrival rate ρ at cost $C(\rho) = \rho^2/2\lambda$
  - Automatic "catch-up": the previous technology becomes public
    → two technology states: leveled or uneven
- Leveled state
  - Both platforms offer the same quality
  - Their technology is public → full compatibility with both complementors
- Uneven state
  - Quality advantage γ for leader [+ laggard's technology fully compatible]
  - Leader chooses whether to be compatible or not with each complementor
    - compatibility: delivers "full value" but provides information to complementor
    - at arbitrarily small cost, complementor can leak that information to rival platform

    → enables rival platform to imitate at no cost

Setting: product market competition

- Leveled state: both platforms obtain π_0 [Micro-foundation]
- Uneven state: if leader is
  - Integrated or fully compatible
    - full comparative advantage γ
    - leader obtains π_+, laggard obtains π_-
  - Compatible with 0 or 1 independent complementor
    - degraded comparative advantage (double marginalization) $\hat{\gamma} < \gamma$
    - leader obtains $\hat{\pi}_+$, laggard obtains $\hat{\pi}_-$

$$\pi_- < \hat{\pi}_- < \pi_0 < \hat{\pi}_+ < \pi_+$$

- Independent complementors: no profit absent exclusivity

Setting: recap

- At each instant t
  - Flow profits determined by industry state
    - technology (leveled or uneven)
    - compatibility (if uneven)
  - Informed complementors (if uneven) decide whether to leak info
  - Investment and leaks determine evolution of technology state
- Focus on Markov perfect equilibria in pure strategies

Pre-merger

- Full compatibility
  - There exists an equilibrium with full compatibility
    - unique symmetric one
    - investments $\rho_0^S > \rho_-^S > \rho_+^S = 0$, ↘ in r, ↗ in λ and γ
  - All equilibria feature full compatibility if investment sufficiently costly
- Intuition
  - Compatibility yields full value of technologies
  - Competition among complementors
    - no double marginalization
    - no incentive to leak information (small cost and no benefit)

Post-merger

- Selective compatibility: $P_A \to C_1$ and $P_B \to C_2$
  - There always exists an equilibrium with selective compatibility
    investments $\rho^I_{A0}, \rho^I_{A-}, \rho^I_{B0}, \rho^I_{B-} > \rho^I_{A+} = \rho^I_{B+} = 0$
  - All equilibria feature selective compatibility

- Intuition: imitation versus degradation
  - Full compatibility *would* trigger imitation
    - C_1 wants to enable imitation by $P_A \to$ would leak information about P_B
    - C_2 makes a profit (only) when P_B is leader $\to$ would leak information about P_A
  - Avoiding imitation always preferable … even if full degradation
    makes it more difficult for the rival to become a leader (*dynamic* perspective)

Growth

- Setting [Aghion, Harris, Howitt and Vickers *RES* 2001]
  - Continuum of industries
  - Steady proportions of even and uneven states
  - Consumption growth rate (over a cycle, increases by γ)
- Pre-merger

$$g^S \equiv \frac{2\rho_0^S \rho_-^S}{2\rho_0^S + \rho_-^S}, \searrow \text{in } r, \nearrow \text{in } \lambda \text{ and } \gamma$$

- Post-merger

$$g^I \equiv \frac{\rho_{A-}^I \rho_{B-}^I (\rho_{A0}^I + \rho_{B0}^I)}{\rho_{A0}^I \rho_{A-}^I + \rho_{B0}^I \rho_{B-}^I + \rho_{A-}^I \rho_{B-}^I}$$

Impact of merger: direct effects

- Integration has an impact only when independent rival is leader
  - Does not affect investment incentive for
    - integrated platform when leveled
    - independent rival when lagging behind
  - *Reduces* investment incentive for
    - independent rival when leveled → may invest *less than when lagging behind*
    - integrated platform when lagging behind

  → negative impact on growth
- Direct effects prevail when investments are "small"
  - Heavy discounting (r high)
  - R&D is costly or incremental (λ or γ small)

Impact of merger: indirect effects

- Internal best-responses: strategic complements
  - Intuition: direct effect boosts value → incentive to get there
  - Absent additional effects, R&D would be reduced in all states
- External best-responses
  - ρ_{A0} and ρ_{B0} are strategic complements
    rival's investment reduces value of being leveled
  - ρ_{i0} and ρ_{j-} are strategic substitutes (for $i \neq j \in \{A, B\}$)
    rival's investment when leveled reduces incentives to get there
  - No direct interplay between of ρ_{A-} and ρ_{B-}
    no incidence on relevant states

Impact of merger: overall effects

- Less innovation in leveled state: $\rho_{A0}^{I} + \rho_{B0}^{I} < 2\rho_{0}^{S}$
- Formal result for small levels of degradation ($\hat{\gamma} > \underline{\hat{\gamma}}$): $g^{I} < g^{S}$
- Simulations [$1\ 000\ 000$ observations]

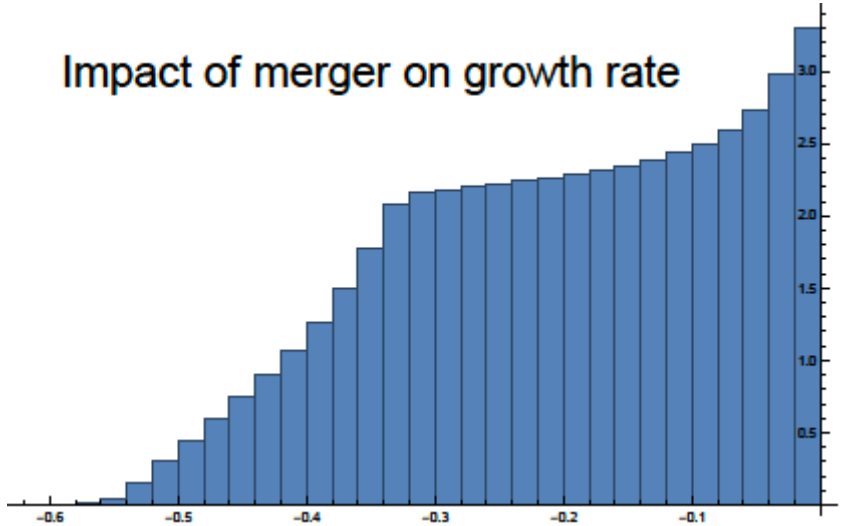
  ρ/r (and, thus, growth rate) depends on

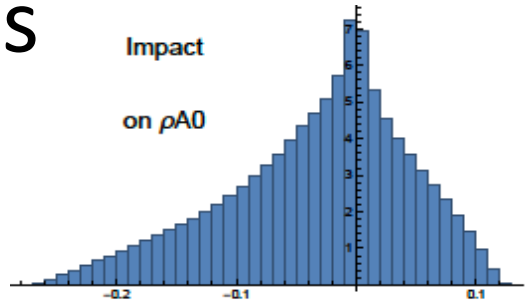
  - r and λ through $\omega \equiv r^2/\lambda$
  - $\gamma(>1)$ through $\beta(\gamma) \equiv (\pi_+(\gamma) - \pi_0)/(\pi_+(\infty) - \pi_0)(\in (0,1))$
  - $\hat{\gamma}(\in (1,\gamma))$ through $\eta(\hat{\gamma},\gamma) \equiv [\beta(\gamma) - \beta(\hat{\gamma})]/\beta(\gamma)\ (\in (0,1))$

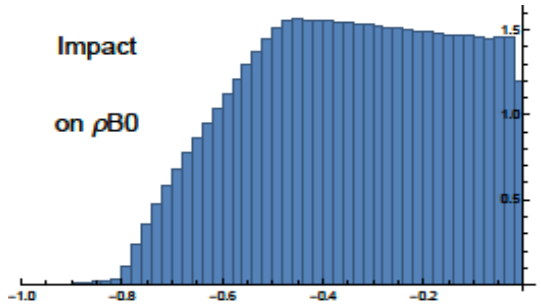
  $\rightarrow$ for each of ω, β, η, 100 equidistant values covering (entire) range

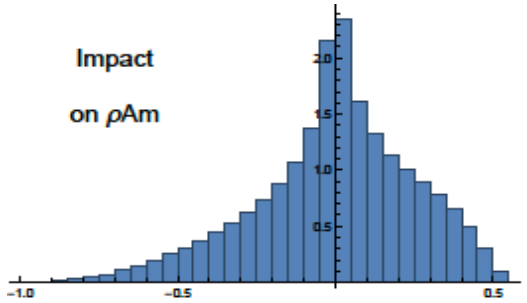
Simulations

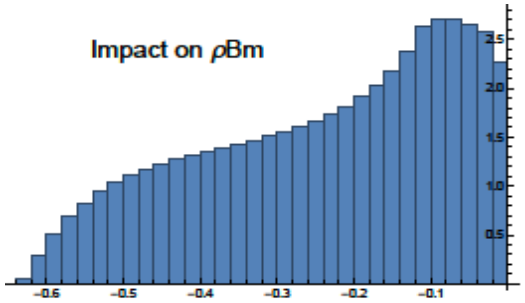
- Impact on growth and investments











  - $\rho^I_{B0} < \rho^S_0, \rho^I_{A0}$
  - $\rho^I_{A0} > \rho^I_{A-}$ but $\rho^I_{B0} < \rho^I_{B-} \sim 11\%$ cases

- $\#A$ leader, $\#B$ leader ↘ ($\#A$ leader $> \#B$ leader in $\sim 88\%$ cases)

Lessons

- A novel theory of horizontal foreclosure

  Does *not* require commitment to tying / bundling / degraded access
  - Independent P_B does not want to deal with integrated C_1
  - Integrated P_A does not want to deal with independent C_2
- Fully dynamic model
  - Independent P_B invests when leveled even if no technology benefit … postpones the moment when integrated P_A is leader
  - Impact on consumption growth in long-run perspective
- Next steps?
  - Probabilistic imitation (short-term competition / long-run growth)
  - Bright side (double marg. / coordination problems / … pre-merger)
  - …

Thank you!

Additional material

Four decades of US—EU divide

- US: no antitrust concerns (and no prohibition in 40 years)
  - Robert Bork (1978): "no threat to competition"
  - Merger Guidelines: concerns disappear in 1982
  - Deputy AAG William Kolasky on GE / Honeywell
    - "After fifteen years of painful experience with these now long-abandoned theories, the U.S. antitrust agencies concluded that antitrust should rarely interfere with any conglomerate merger"
    - "US agencies simply could not identify any conditions under which a conglomerate merger would likely to give the merged firm the ability and incentive to raise price and restrict output"
- EU: exclusionary concerns based on "portfolio effects"
  - *Coca-Cola/Amalgamated Beverages (1997), Coca-Cola/Carlsberg (1997), Guinness/Grand Metropolitan (1997)*
  - *GE/Honeywell* (2001): upheld by CFI on non-conglomerate grounds
  - *Tetra Laval/Sidel* (2001): overturned by CFI/ECJ
  - [No prohibition afterwards for 20 years; NCAs: Eurotunnel / SeaFrance (2013)]

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Merger activity

- Important activity in digital economy
  - 2014: *Google/Motorola*, $12.5 billion; *Facebook/WhatsApp*, $22 billion
  - 2015: *AT&T/DIRECTV*, $48.5 billion; *Dell/*EMC, $67 billion
  - 2016: *Microsoft/LinkedIn*, $26.2 billion
  - 2018: *Qualcomm/NXP*, $47 billion
  - 2019: *Nvidia/Mellanox*, $6.9 billion
  - 2020: *Google/Fitbit*, $2.1 billion; *Facebook/Giphy*, $315 million
  - 2023: *Booking/eTraveli*, $1.7 billion
- Other sectors as well
  - 2016: *ASL/Arianespace*, €150 million
  - 2018: *Luxottica/Essilor*, €46 billion

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Efficiency benefits

- Double marginalization [Cournot 1838]
  Applies to all complements ("vertical" / "horizontal")
  - Reducing price of one component boosts demand for others
  - A merger leads to lower prices
- Can be transposed to investment, R&D and innovation
  - Reducing cost / increasing quality boosts demand for compl.
  - A merger leads to greater investment
- Tying, technical integration
  - Pervasive (cars and smartphones are "bundles")
  - Lower transaction costs, consumption synergies

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Micro-foundation: product market competition (1/3)

- Stage game
  - Technologies (γ_A, γ_B) & compatibility state
  - Consumers' utility $\log(\tilde{\gamma}_A q_A + \tilde{\gamma}_B q_B)$, where $\tilde{\gamma}_i$ is P_i's "net quality"
- Timing
  - Platforms simultaneously choose quantities (q_A, q_B)
  - Complementors simultaneously choose platform-specific prices
  - Auctioneer sets platform prices & allocates cons. to complementor with best value
- Competition among complementors on P_i
  - If both are compatible with P_i, price at cost → P_i's net quality is γ_i
  - [If both are incompatible, price at cost → P_i's net quality is γ_i/m]
  - If single C_j is compatible, captures $\gamma_i - \gamma_i/m$ → P_i's net quality is γ_i/m

Micro-foundation: product market competition (2/3)

- Auctioneer sets platform prices, given the quantities and net qualities

$$p_i = P(q_i, q_j; \tilde{\gamma}_i, \tilde{\gamma}_j) \equiv \frac{\tilde{\gamma}_i}{\tilde{\gamma}_i q_i + \tilde{\gamma}_j q_j} \quad (\tilde{\gamma}_i = \gamma_i \; or \; \gamma_i/m)$$

- In first stage, each P_i seeks to maximize $\left[P\left(q_i, q_j; \tilde{\gamma}_i, \tilde{\gamma}_j\right) - c\right] q_i$
  - Equilibrium quantities

$$q_A = q_B = q(\tilde{\gamma}_A, \tilde{\gamma}_B) \equiv \frac{\tilde{\gamma}_A \tilde{\gamma}_B}{c(\tilde{\gamma}_A + \tilde{\gamma}_B)^2}$$

  - Equilibrium profits

$$\pi_i = \pi\left(\tilde{\gamma}_i, \tilde{\gamma}_j\right) \equiv \frac{\tilde{\gamma}_i^2}{c\left(\tilde{\gamma}_i + \tilde{\gamma}_j\right)^2} = \frac{1}{c(1 + \frac{\tilde{\gamma}_j}{\tilde{\gamma}_i})^2}$$

Micro-foundation: product market competition (3/3)

- Leveled state
  - Platforms obtain $\pi_0 \equiv \frac{1}{4}$ and complementors obtain 0 Back
- Uneven state: if leader is
  - integrated or fully compatible: comparative advantage γ
    - leader obtains $\pi_+(\gamma) \equiv \frac{\gamma^2}{(1+\gamma)^2}$ whereas laggard obtains $\pi_-(\gamma) \equiv \frac{1}{(1+\gamma)^2}$
    - complementors obtain 0
  - compatible with single indep. complementor, comp. adv. $\hat{\gamma} = \gamma/m$
    - leader obtains $\pi_+(\hat{\gamma})$ whereas laggard obtains $\pi_-(\hat{\gamma})$
    - compatible complementor obtains $\hat{\pi} \equiv \log\frac{1+\gamma}{1+\hat{\gamma}} (> 0)$ and other obtains 0