

4.3 — Asset Specificity

ECON 326 • Industrial Organization • Spring 2023

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Outline



Transaction Costs & The Economics of Governance

Asset Specificity

A Game-Theoretic Hold-Up Model

The Double-Marginalization Problem

Vertical Integration

Theory of the Firm & Transaction Costs



Ronald H. Coase

(1910-2013)

Economics Nobel 1991

- Coase's (1937) answer to why there are firms is very general, almost tautological, what about the details?
1. Life cycle of firms
 - Stigler (1951)
 2. Nexus of Contract Theory
 - Alchian and Demsetz (1972); Jensen and Meckling (1976)
 3. **Asset specificity theory**
 - Williamson (1975); Klein, Crawford, and Alchian (1978)
 4. Property Rights View of the Firm
 - Grossman and Hart (1986)



Transaction Costs & The Economics of Governance

Transaction Costs and the Economics of Governance



John R. Commons

1862-1945

“[T]he ultimate unit of activity ... must contain in itself the three principles of conflict, mutuality, and order. This unit is a transaction,” (p.4).

Commons, John R, 1932, "The Problem of Correlating Law, Economics, and Ethics," *Wisconsin Law Review* 8(1):3-26

Transaction Costs and the Economics of Governance



Olivier E Williamson

1932-

Economics Nobel 2009

“As the term suggests, transaction cost economics adopts a microanalytic approach to the study of economic organization. The focus is on transactions and the economizing efforts that attend the organization thereof..With a well-working interface, as with a well-working machine, these transfers occur smoothly. In mechanical systems we look for frictions: Do the gears mesh, are the parts lubricated, is there needless slippage or other loss of energy?” (p.1).

Williamson, Oliver E, 1985, *The Economic Institutions of Capitalism*

Transaction Costs and the Economics of Governance



Olivier E Williamson

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Economics Nobel 2009

“The economic counterpart of friction is transaction cost: Do the parties to the exchange operate harmoniously, or are there frequent misunderstandings and conflicts that lead to delays, breakdowns, and other malfunctions? Transaction cost analysis supplants the usual preoccupation with technology and steady-state production (or distribution) expenses with an examination of the comparative costs of planning, adapting, and monitoring task completion under alternative governance structures.” (pp.1-2).

Williamson, Oliver E, 1985, *The Economic Institutions of Capitalism*

Transaction Costs and the Economics of Governance



Olivier E Williamson

1932-

Economics Nobel 2009

“Rather than characterize the firm as a production function, transaction cost economics maintains that the firm is (for many purposes at least) more usefully regarded as a governance structure.” (p.13)

“Contrary to earlier conceptions—where the economic institutions of capitalism are explained by reference to class interests, technology, and/or monopoly power—the transactions cost approach maintains that these institutions have the main purpose and effect of economizing on transaction costs,” (p.1).

Williamson, Oliver E, 1985, *The Economic Institutions of Capitalism*

Transaction Costs and the Economics of Governance



Olivier E Williamson

1932-

Economics Nobel 2009

“Governance...is the means by which to infuse *order*, thereby to mitigate *conflict* and realize *mutual gain*...Furthermore, the transaction is made the basic unit of analysis,” (p.2).

Williamson, Oliver E, 2009, "Transaction Cost Economics: The Natural Progression," *Nobel Prize Lecture*

The Fundamental Transformation



Olivier E Williamson

1932-

Economics Nobel 2009

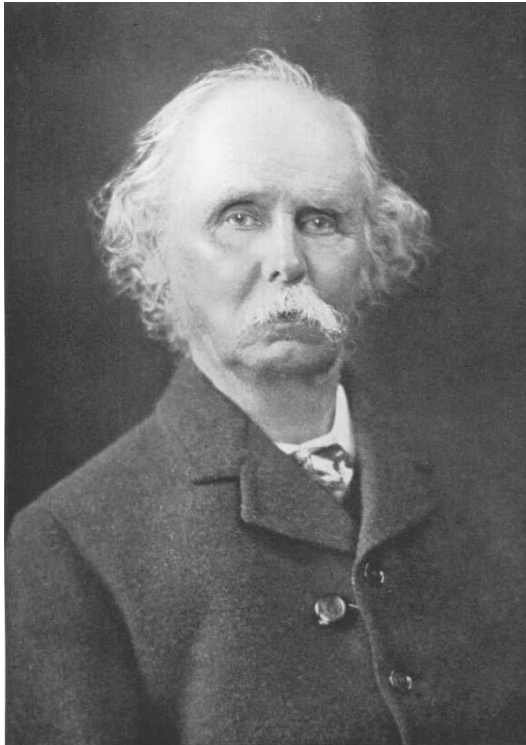
- A contract between two parties constitutes a “**fundamental transformation**” from *ex ante* competitive market to an *ex post* bilateral monopoly
 - Two parties depend on one another’s performance to jointly capture the gains from exchange (“quasi-rents” of cooperation)
 - Committing a factor of production into such a relationship is a **specific investment**, possibly **sunk cost**
- Creates the possibility of **post-contractual opportunism** by the parties

The Fundamental Transformation



- This bilateral dependency creates “**quasi rents**” from cooperation that might be **appropriated** by a party
- Need to contract *ex ante* to protect *ex post* possibility of someone threatening to appropriate the rents
- Inability to prevent this may cause parties to inefficiently avoid making agreements!

Appropriable Quasi-Rents



Alfred Marshall

1842-1924

“Indeed, **in some cases and for some purposes, nearly the whole income of a business may be regarded as a quasi-rent**, that is an income determined for the time by the state of the market for its wares, **with but little reference to the cost of preparing for their work** the various things and persons engaged in it. In other words it is a **composite quasi-rent divisible among the different persons in the business by bargaining**, supplemented by custom and by notions of fairness...Thus the head clerk in a business has an acquaintance with men and things, the use of which he could in some cases sell at a high price to rival firms. But in other cases **it is of a kind to be of no value save to the business in which he already is; and then his departure would perhaps injure it by several times the value of his salary**, while probably he could not get half that salary elsewhere,” (VI.viii.35).

Marshall, Alfred, 1870, *Principles of Economics*

Appropriable Quasi-Rents



Benjamin Klein

1943-

“Coase's fundamental insight [was] that transaction, coordination, and contracting costs must be considered explicitly in explaining the extent of vertical integration...[We] explore one particular cost of using the market system-**the possibility of postcontractual opportunistic behavior,**” (p.297)

“The particular circumstance we emphasize as likely to **produce a serious threat of this type of renegeing on contracts is the presence of appropriable specialized quasi rents. After a specific investment is made and such quasi rents are created, the possibility of opportunistic behavior is very real.** Following Coase's framework, **this problem can be solved in two possible ways: vertical integration or contracts,**” (p.298)

Appropriable Quasi-Rents



Benjamin Klein

1943-

“An appropriable quasi rent is not a monopoly rent in the usual sense, that is, the increased value of an asset protected from market entry over the value it would have in an open market. [It] can occur with no market closure or restrictions placed on rival assets. Once install, an asset may be so expensive to remove or so specialized to a particular user that if the price paid to the owner was somehow reduced the asset's services to that user would not be reduced,” (p.299).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, “Vertical Integration, Appropriable Rents, and the Competitive Contracting Process,” *Journal of Law and Economics* 21(2): 297-326

Appropriable Quasi-Rents



Benjamin Klein

1943-

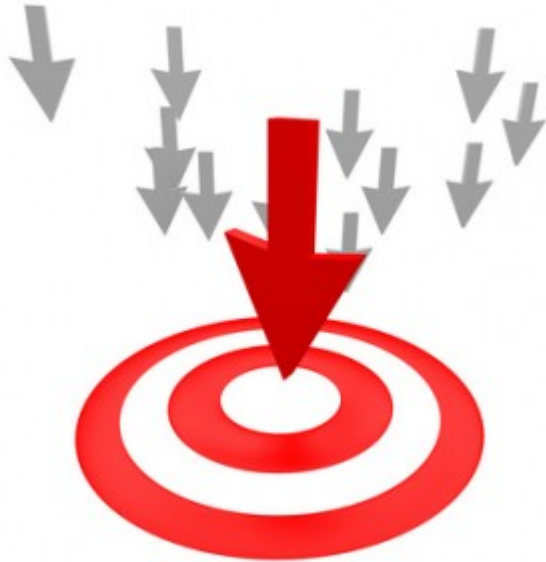
“Because of transaction and mobility costs, ‘market power’ will exist in many situations not commonly called monopolies. There may be many potential suppliers of a particular asset to a particular user but once the investment in the asset is made, the asset may be so specialized to a particular user that monopoly or monopsony power, or both, is created,” (p.299).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326



Asset Specificity

Asset Specificity



- **“Asset specificity”**: degree to which an asset has alternative valuable uses outside a specific use
 - Or degree to which it loses value for other uses
- **General assets** can easily be diverted to other productive uses for most or all of their value
 - Very liquid: easily re-sold on thick markets for most of its value
 - e.g. trucks, shipping containers, hammers, computers

Asset Specificity



- **Specific assets** have few alternative uses outside a specific use
 - Illiquid: would sell for drastically lower than its value
 - e.g. dyes, drill presses, designed to make a very specific output

Asset Specificity



Olivier E Williamson

1932-

Economics Nobel 2009

“Four types of asset specificity are usefully distinguished:

[1.] site specificity - e.g. successive stations that are located in a cheek-by-jowl relation to each other so as to economize on inventory and transportation expenses;

[2.] physical asset specificity - e.g. specialized dies that are required to produce a component;

[3.] human asset specificity that arises in a learning-by-doing fashion; and

[4.] dedicated assets, which represent a discrete investment in generalized...production capacity that would not be made but for the prospect of selling a significant amount of product to a specific consumer,” (p. 95).

Williamson, Oliver E, 1985, *The Economic Institutions of Capitalism*

Asset Specificity



Olivier E Williamson

1932-

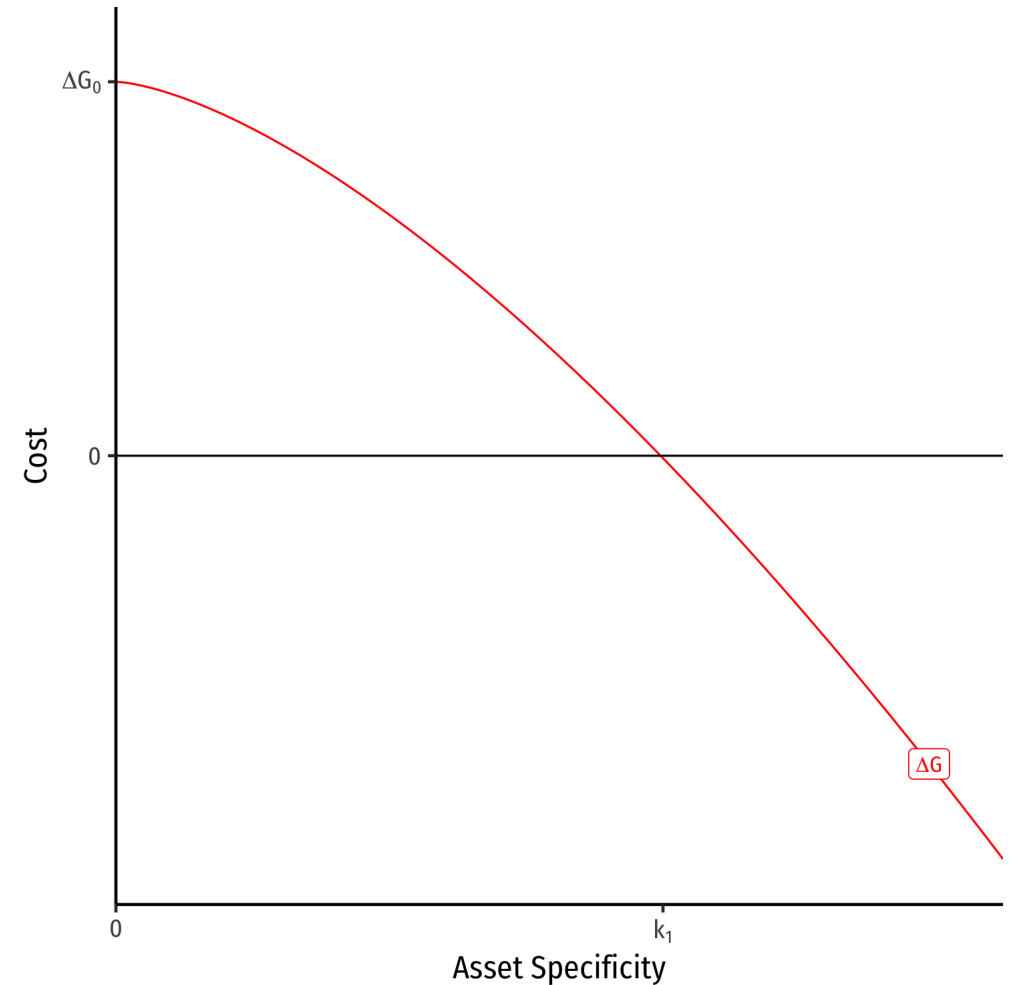
Economics Nobel 2009

“Transaction cost economics maintains that the principal factor that is responsible for transaction cost differences among transactions is variations in asset specificity. Transactions that are supported by non-specific (redeployable) investments are ones for which neoclassical analysis is well-suited to deal. As a condition of asset specificity becomes more important, however, exchange relations take on a progressively stronger bilateral trading character. The reason is that parties to such trades have a stake in preserving the continuity of the relationship,” (p. 367).

Asset Specificity: Simple Heuristic Model



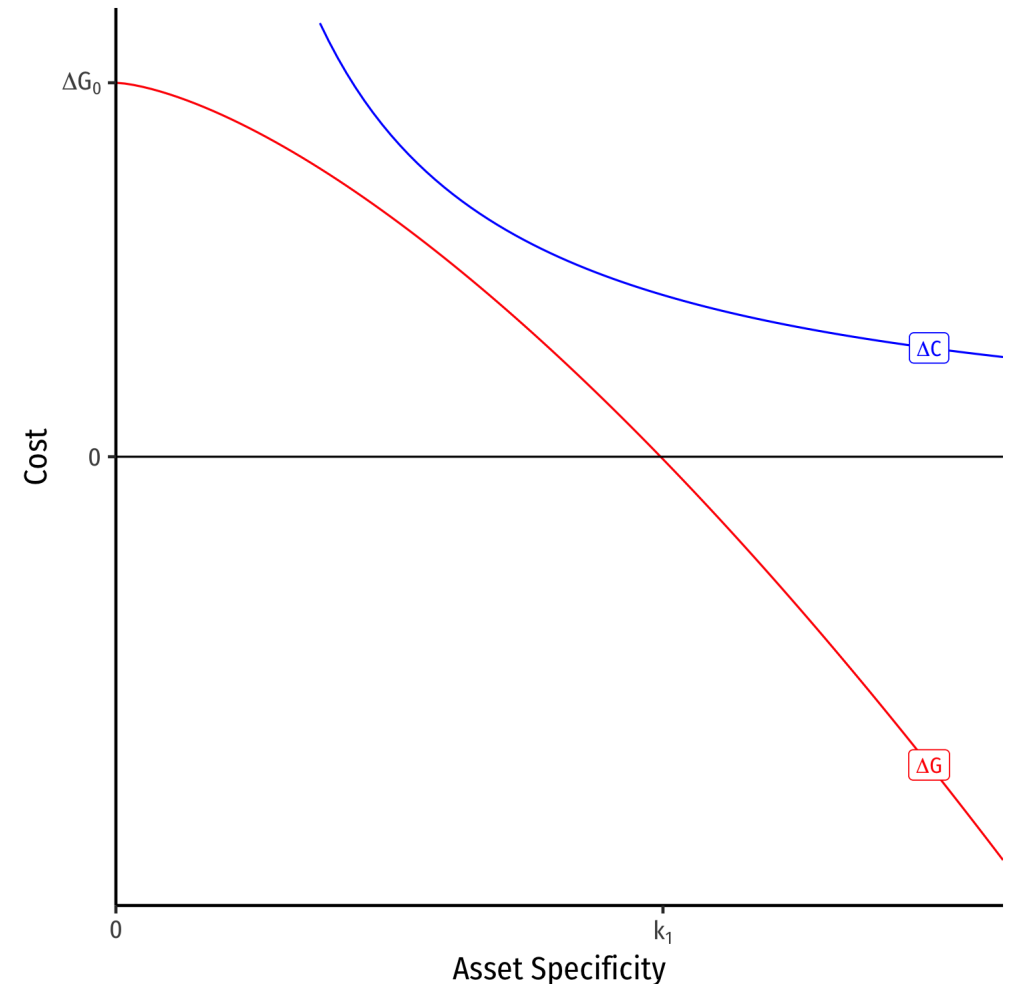
- ΔG : difference in governance cost of organization (firm) vs. market
 - $\Delta G(0)$: advantages of markets $>$ costs of asset specificity
 - declines as assets are more specific (market contracts become disadvantageous beyond k_1)



Asset Specificity: Simple Heuristic Model



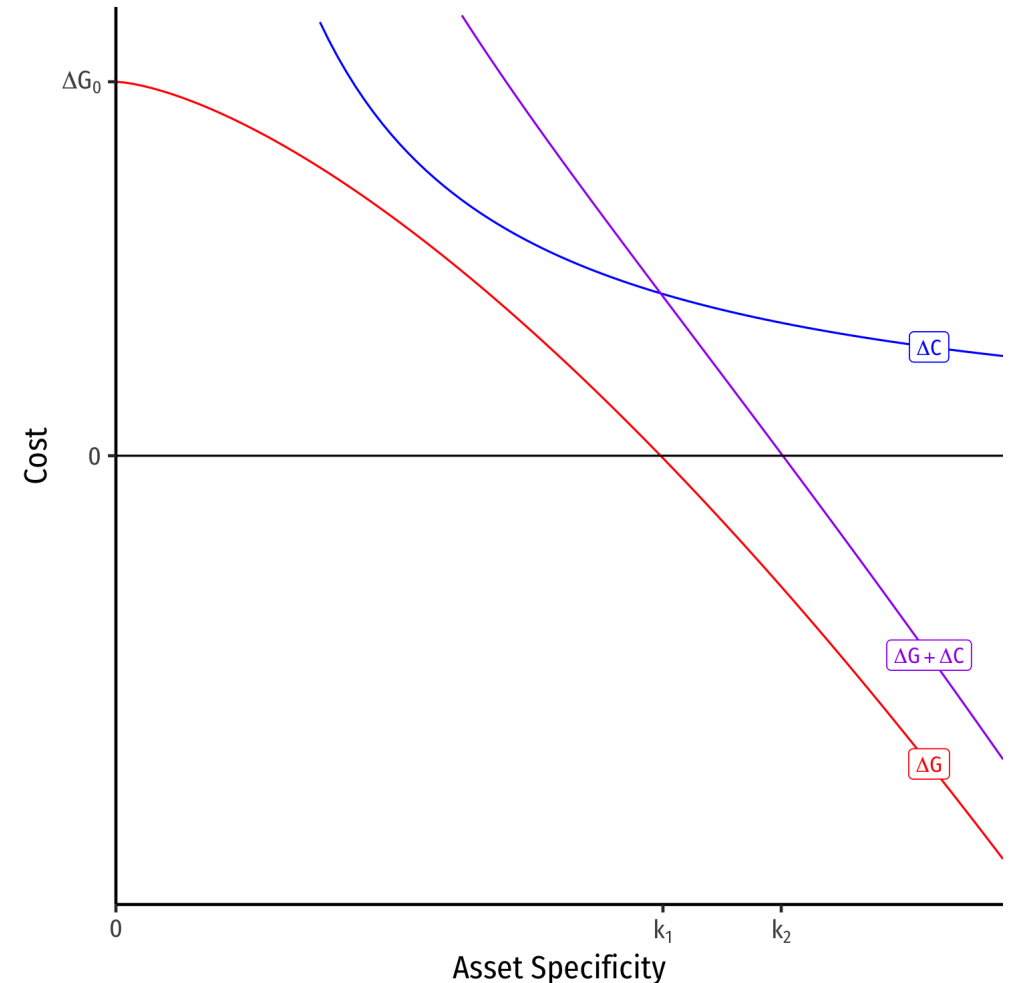
- ΔG : difference in governance cost of organization (firm) vs. market
 - $\Delta G(0)$: advantages of markets $>$ costs of asset specificity
 - declines as assets are more specific (market contracts become disadvantageous beyond k_1)
- ΔC : difference in production costs of organization (firm) vs. market
 - advantages of markets $>$ organization (firm)
 - declines as assets get more specific, but never fully reduced to zero (same as market)
 - since $\Delta C > 0$, firm will never internalize for production cost reasons alone



Asset Specificity: Simple Heuristic Model



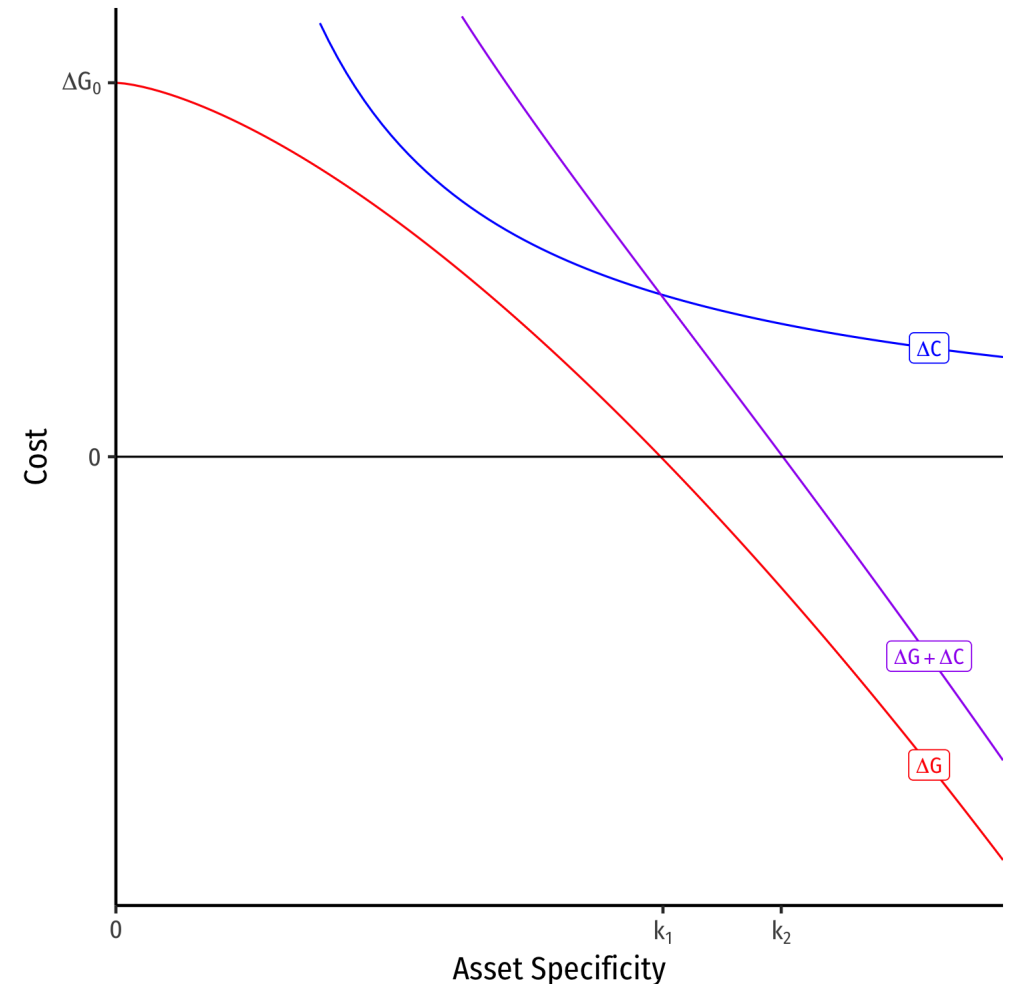
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 - declines as assets get more specific, but never fully reduced to zero (same as market)
 - since $\Delta C > 0$, firm will never internalize for production cost reasons alone
- $\Delta C + \Delta G$: total cost difference between organization and market



Asset Specificity: Simple Heuristic Model



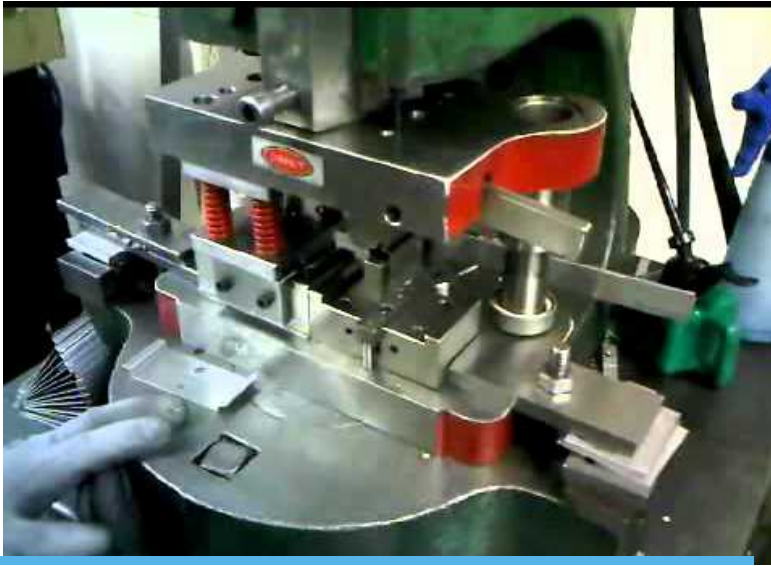
- At low levels of asset specificity ($k < k_2$), market transactions are lower cost than organization
 - contract & buy most things
 - since $\Delta C > 0$, firm will never internalize for production cost reasons alone
- At higher levels of asset specificity ($k > k_2$), organization is lower cost than market
 - produce most things internally
- At modest levels of asset specificity k_2 , no clear superior mode, may be a combination
 - make some things, buy some things



Asset Specificity: Example



- Suppose one party owns a **generic** asset
 - trucks
 - High opportunity cost - easily resold or put to other uses
- Another party owns a **highly specific** asset - highly specialized machines
 - Next best alternative use is a boat anchor

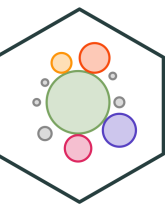


Asset Specificity: Example

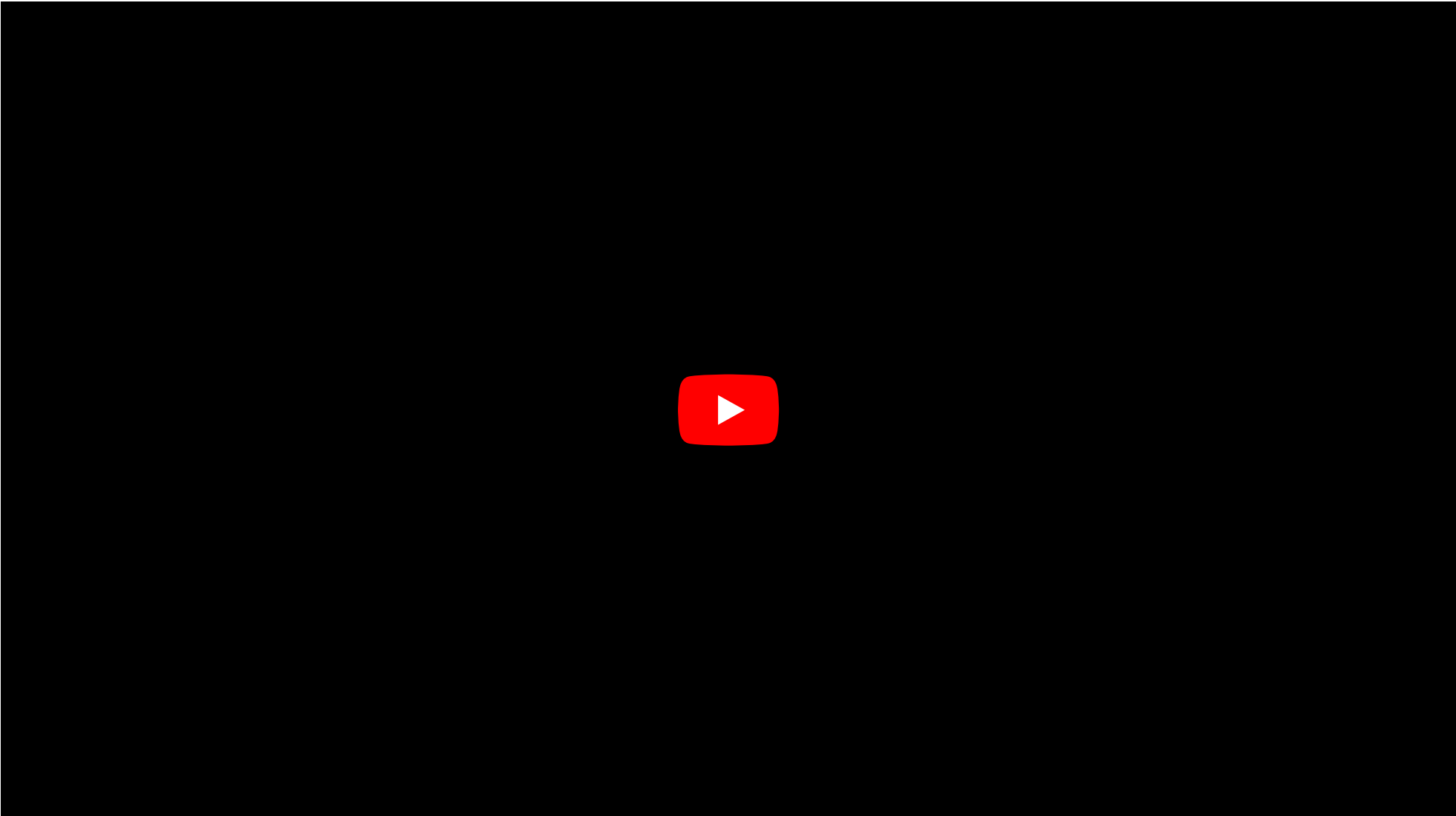
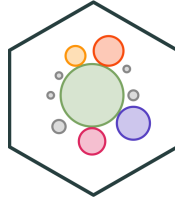


- Suppose a contract between them creates **\$50,000** of joint net value for the owner of the generic asset and the owner of the specific asset
- Can't recontract until next year
- Once the contract is signed, the owner of the generic asset threatens to pull out of the contract
 - **Demands \$49,000** of the "quasirents of cooperation"

They Are Altering The Deal...



...Pray They Don't Alter it Any Futher



Asset Specificity: Example

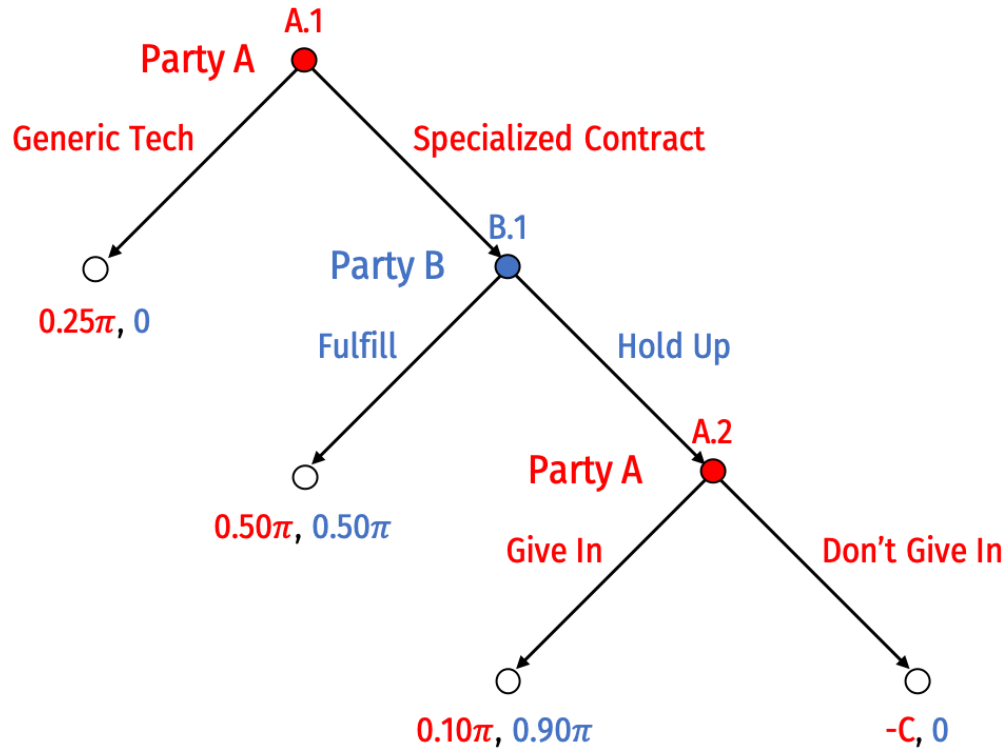


- Foreseeing such contractual hazards parties will be reluctant to cooperate
- Or will choose a less specialized and less efficient technology



A Game-Theoretic Hold-Up Model

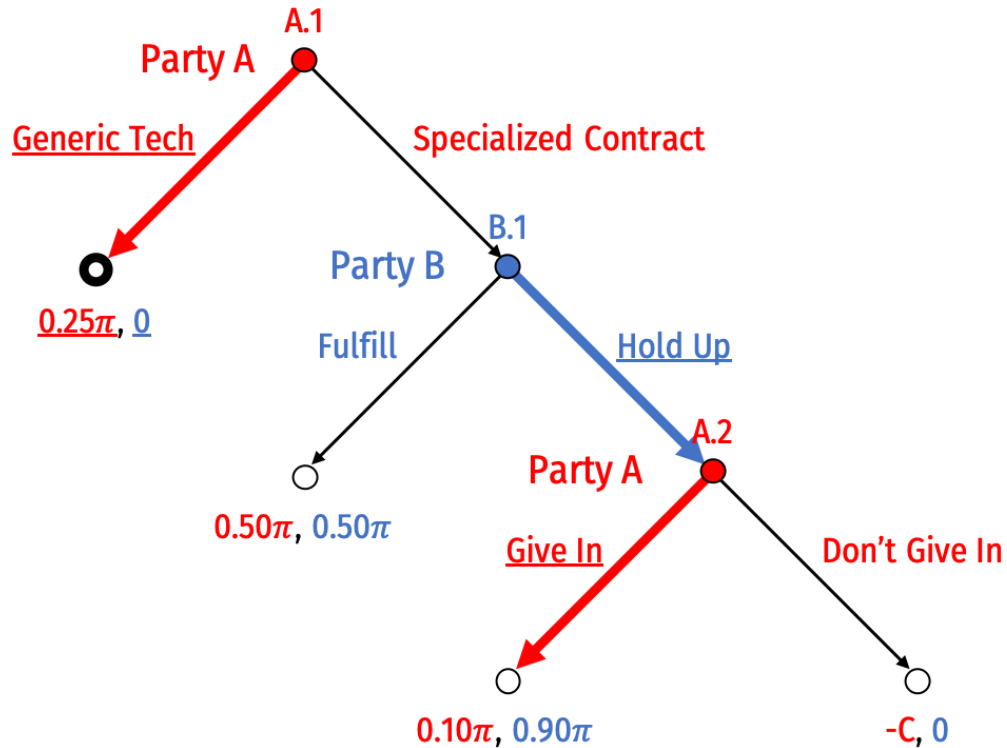
A Game-Theoretic Hold-Up Model



- Two players, **Party A** and **Party B**
- **Party A** incurs a sunk cost $-C$ once contract is signed

$$C > 0.10\pi$$

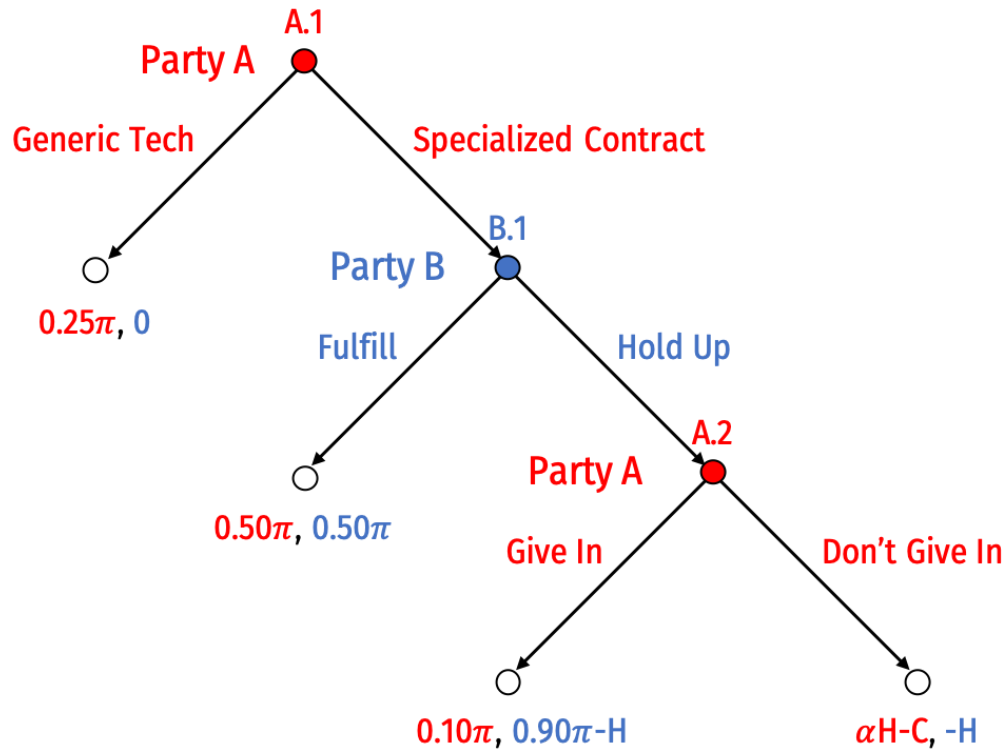
A Game-Theoretic Hold-Up Model



- **Subgame perfect Nash equilibrium:**
 $\{ (\text{Generic Tech, Give In}), (\text{Hold Up}) \}^\dagger$
- **Outcome:** Party A uses less efficient **Generic Tech**

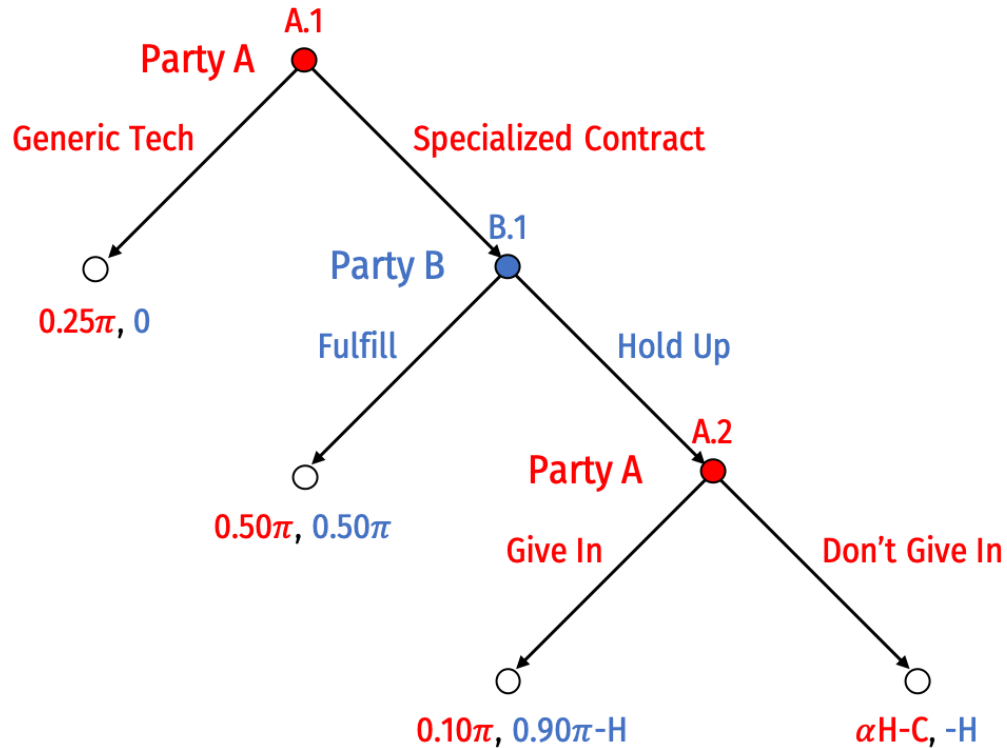
[†] Strategies for Party A chosen at (A.1, A.2) and Party B at (B.1)

A Game-Theoretic Hold-Up Model: Hostages



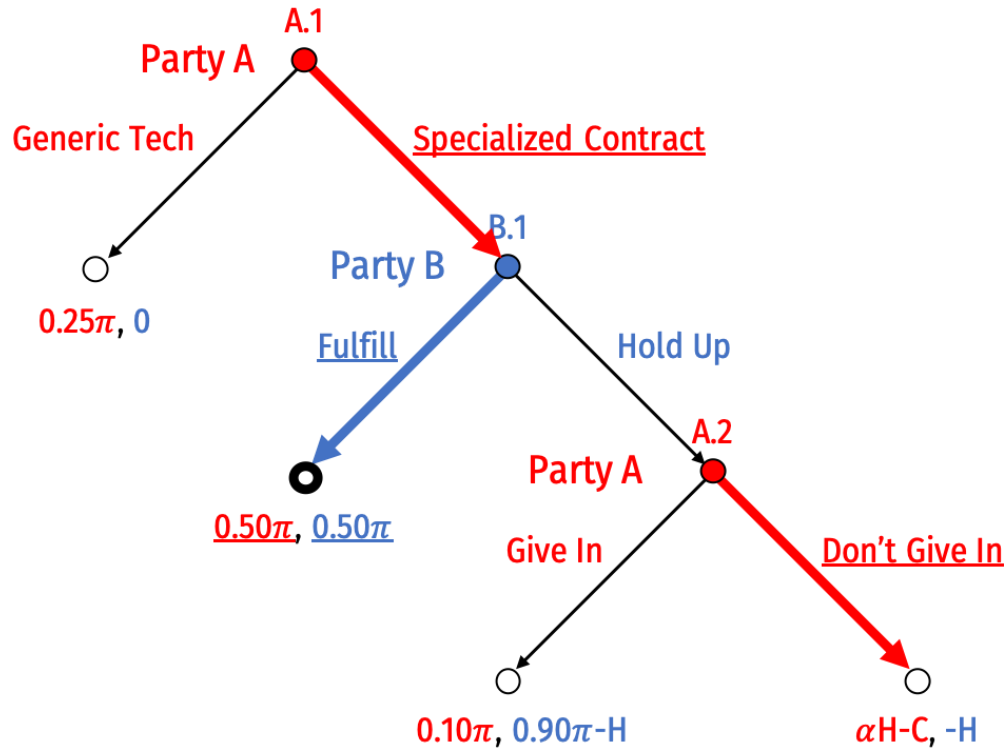
- Suppose before **Party A** makes their initial decision, **Party B** supplies a **bond** or a **hostage** to **Party A**
- Hostage will be forfeited if **Party B** does not **Fulfill** their contract:
 - **Party A** gets $\alpha H - C$
 - **Party B** gets $-H$

A Game-Theoretic Hold-Up Model: Hostages



- H : value of hostage to **Party B**
- α : fraction of H that is valuable to **Party A**
 - $\alpha = 0$: no value to A
 - $\alpha = 1$: cash
- If $\alpha H > 0.10\pi + C$, **Party A** will **Not Give In** to a **Hold Up**, and **Party B** will thus **Fulfill**

A Game-Theoretic Hold-Up Model



- **Subgame perfect Nash equilibrium:**
 $\{ (\text{Specialized Contract, Don't Give In}), (\text{Fulfill}) \}^\dagger$
- **Outcome:** **Party A** uses more efficient **Specialized Contract**, and generates more value for **both Party A** and **Party B**

[†] Strategies for **Party A** chosen at (A.1, A.2) and **Party B** at (B.1)

Using Hostages to Support Exchange

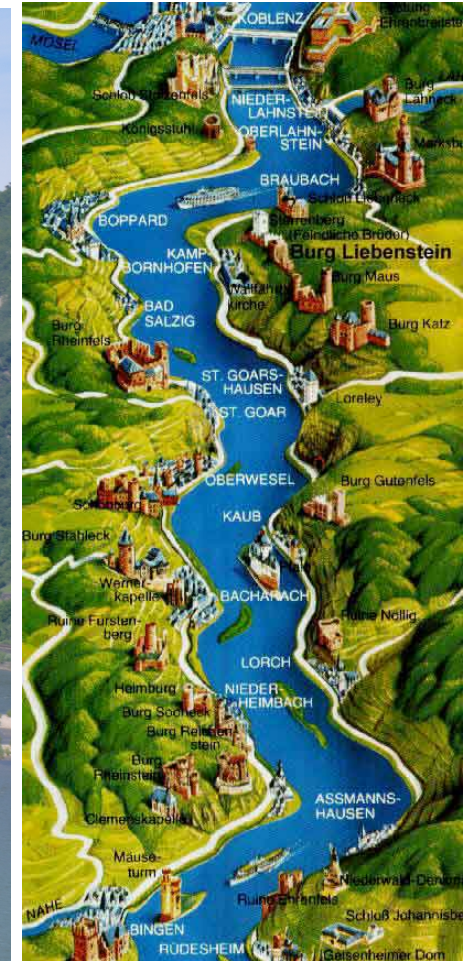


Williamson, Oliver E, 1983, "Credible Commitments: Using Hostages to Support Exchange," *American Economic Review*

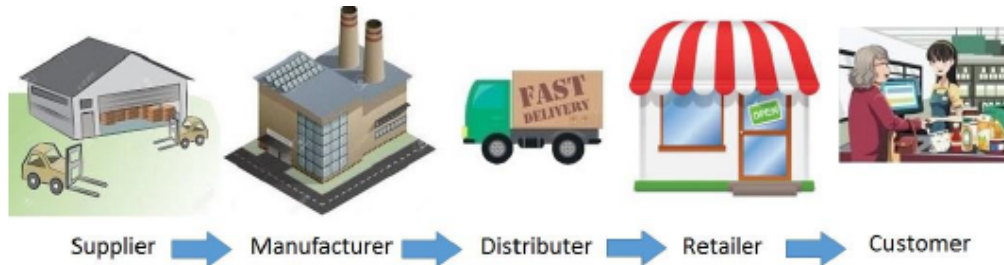


Double Marginalization Problem

Double Marginalization Problem

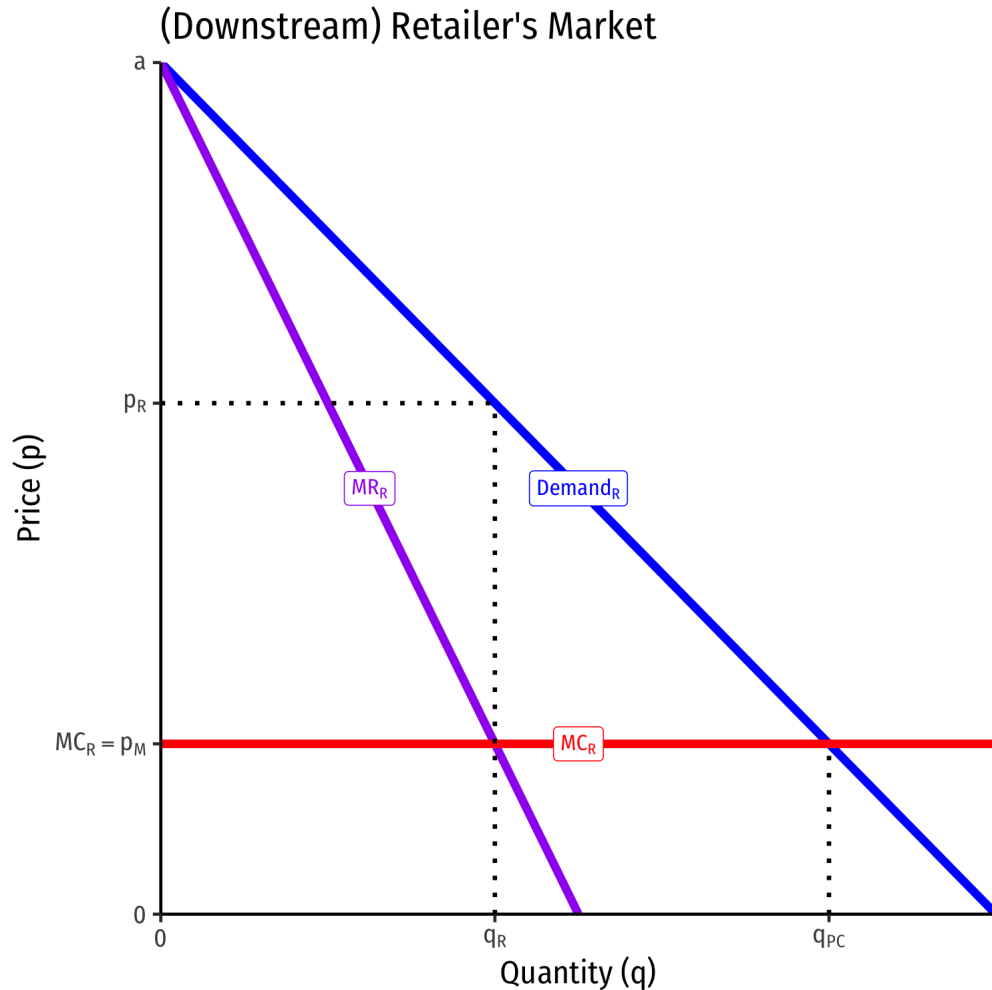


Double Marginalization Problem



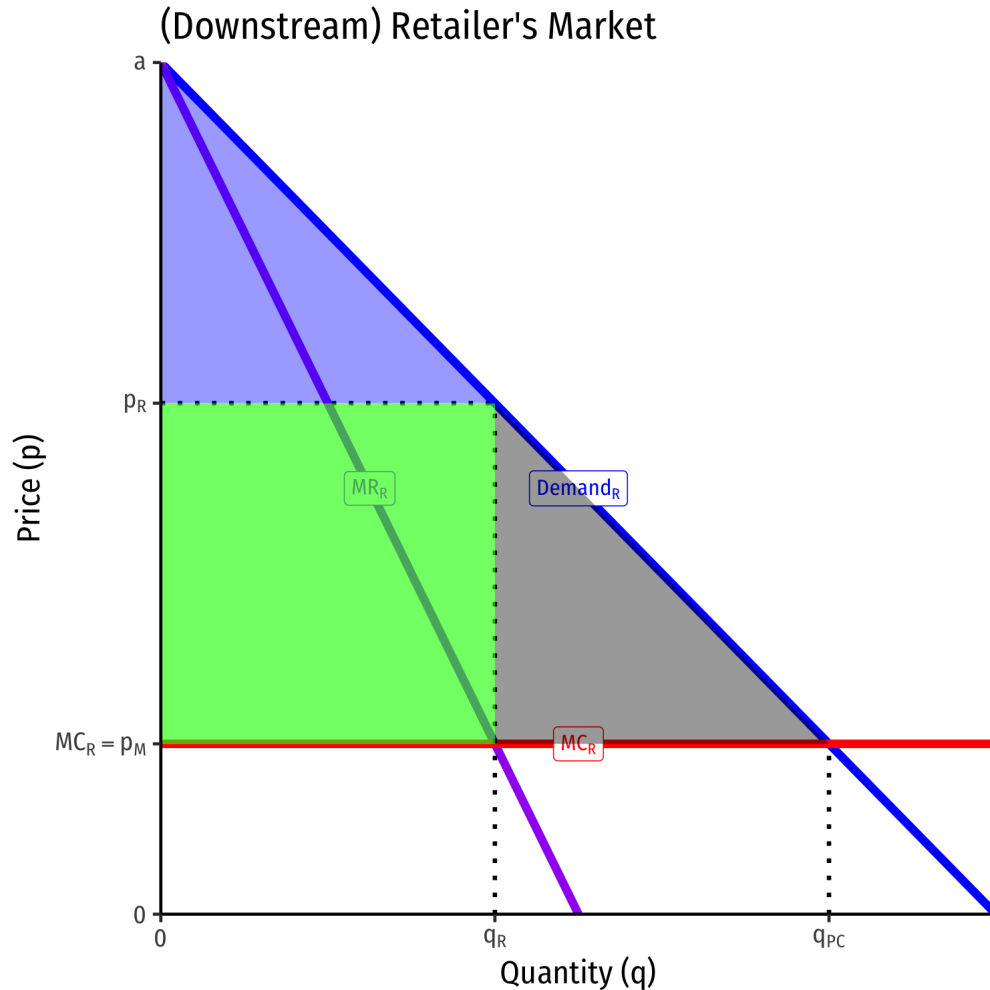
- Consider a simple model of two-stage production:
 1. Manufacturing (“upstream”)
 2. Retailing (“downstream”)
- Assume each unit of final product (sold by retailer to consumers) requires 1 unit of input (sold by manufacturer to retailer)
 - e.g. 1 engine for 1 car
- Each stage is a separate market, which could be competitive or monopolistic

Double Marginalization Problem



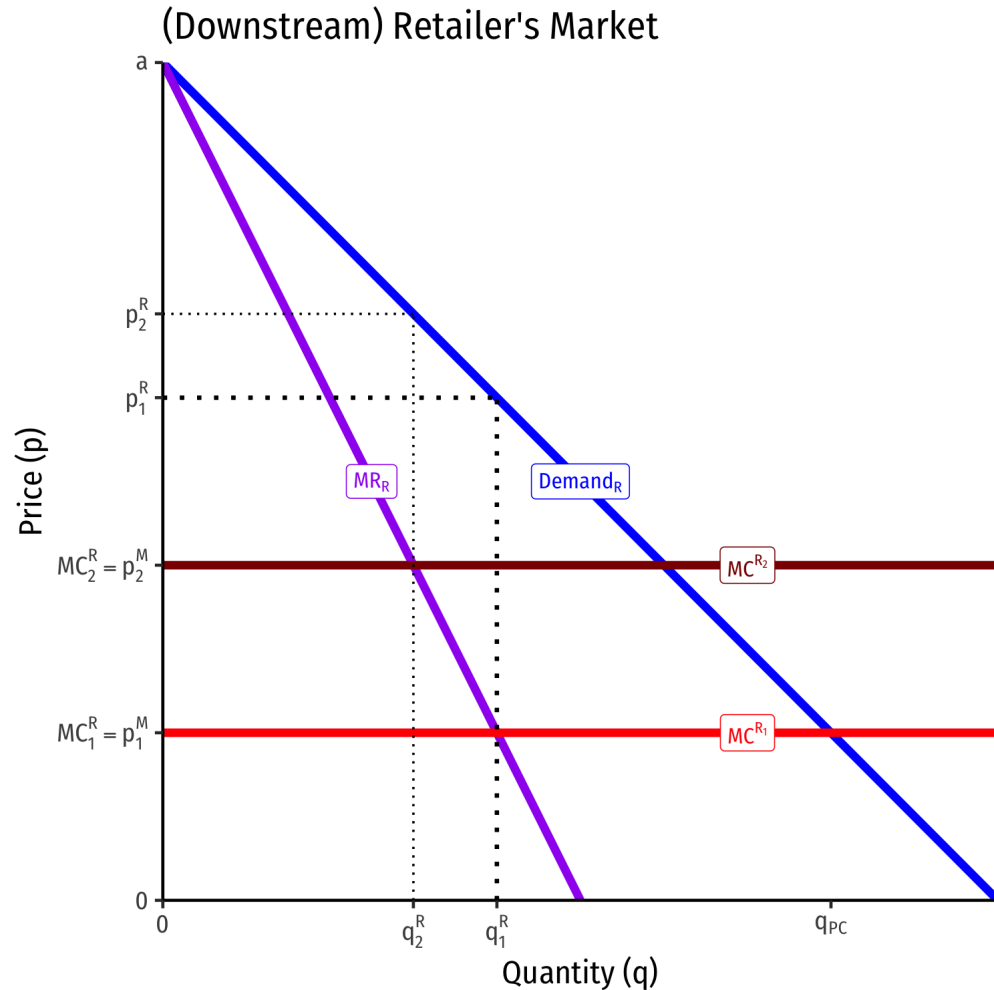
- MC_R for **Retailer** = price for **Manufacturer's** output ($MC_R = p_M$)
- **Retailer** sets $MR = MC$ at q_R and marks up $p_R > MC_R$ to consumers

Double Marginalization Problem



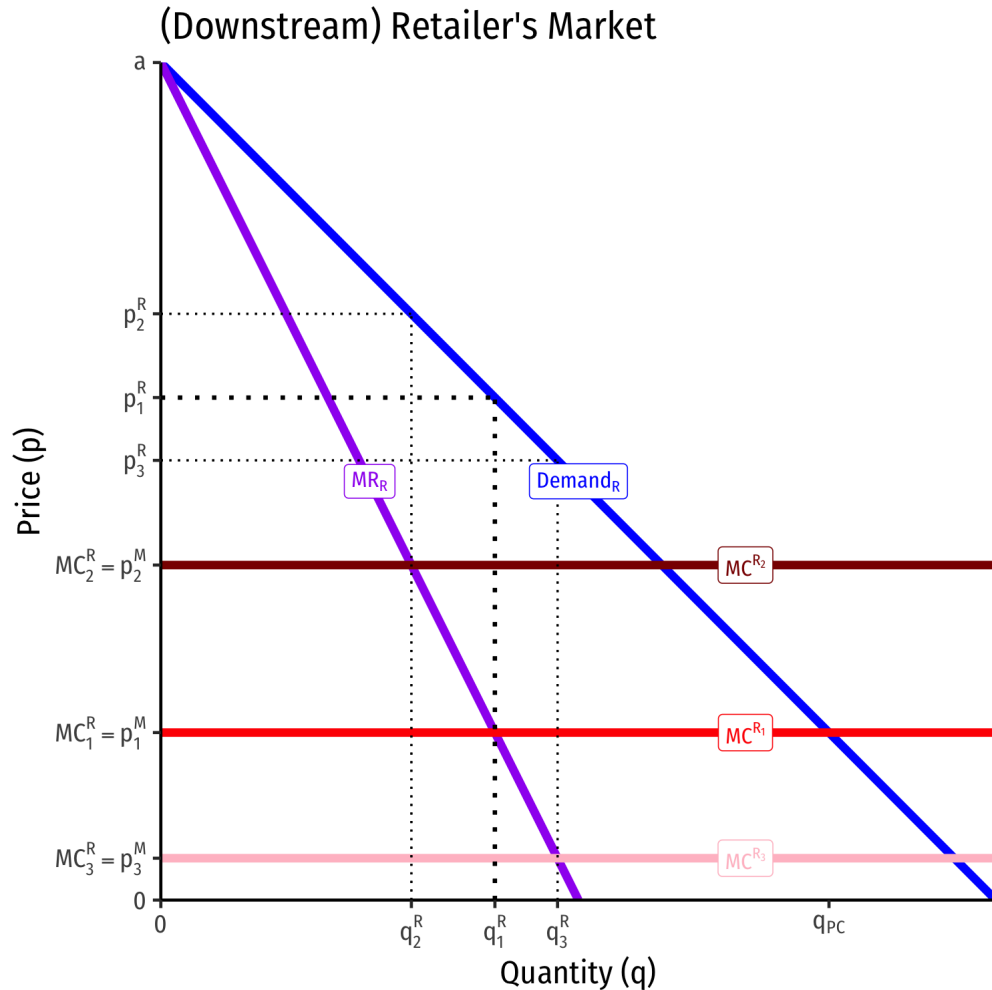
- MC_R for **Retailer** = price for **Manufacturer's** output ($MC_R = p_M$)
- **Retailer** sets $MR = MC$ at q_R and marks up $p_R > MC_R$ to consumers
- **Retailer** earns **Profits**
- Generates **Consumer surplus** and **DWL**

Double Marginalization Problem



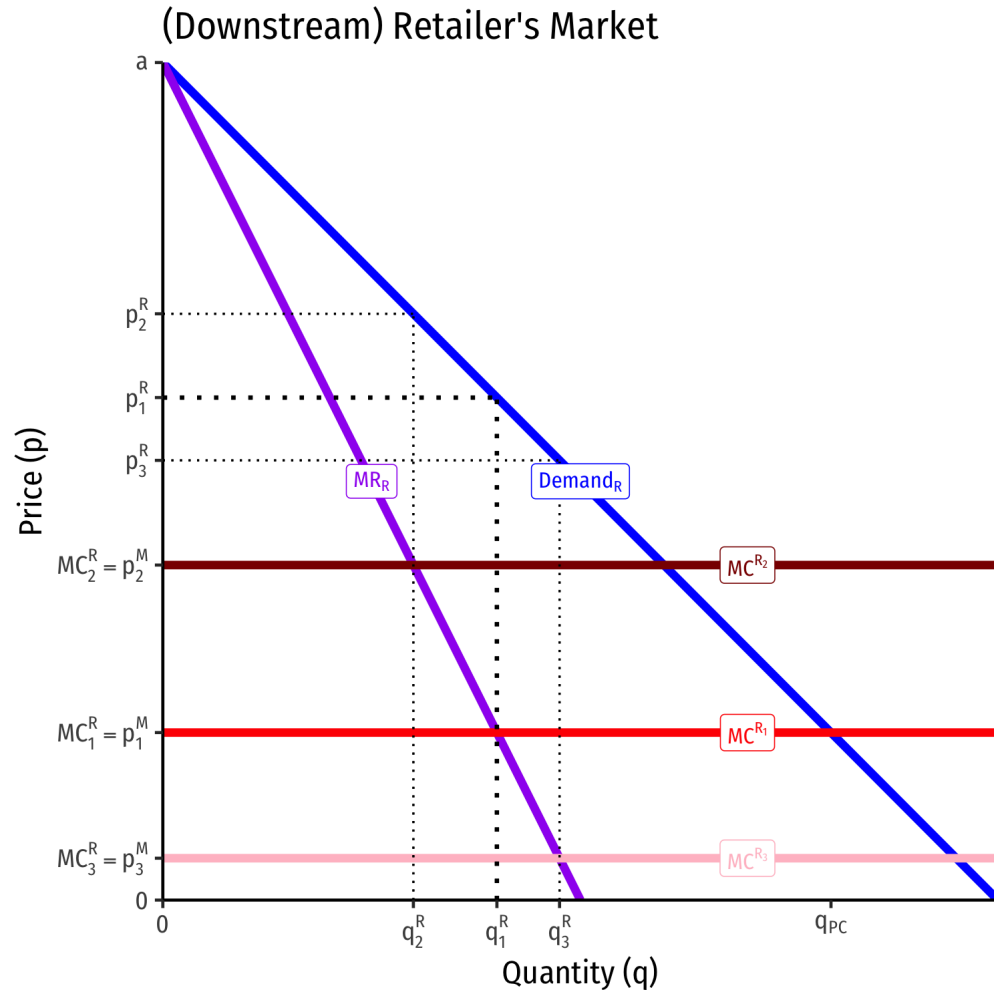
- Note that **Retailer's MR** curve is the demand curve for the **Manufacturer**
- If **Manufacturer** were to raise/lower price, **Retailer** would buy q^R where $MR_R = MC_R$
 - Recall **Retailer's** MC_R is **Manufacturer's** P_M !

Double Marginalization Problem



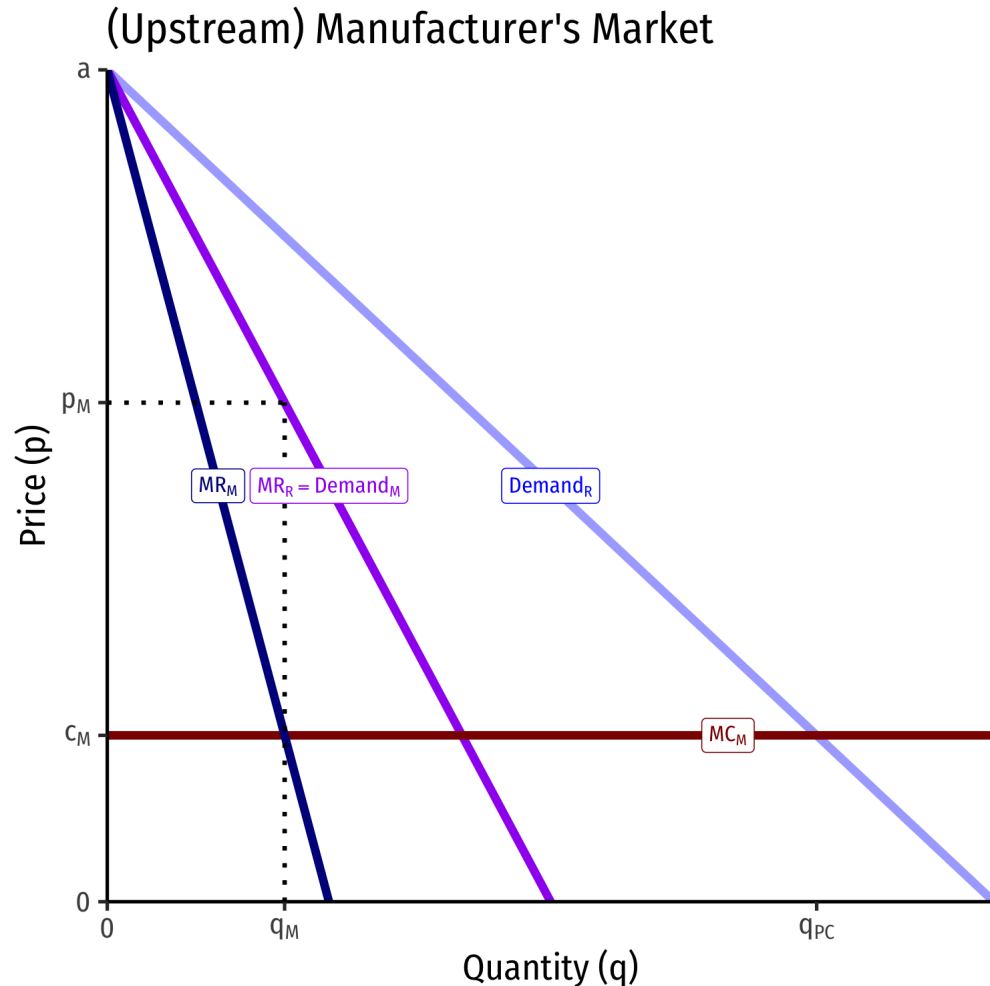
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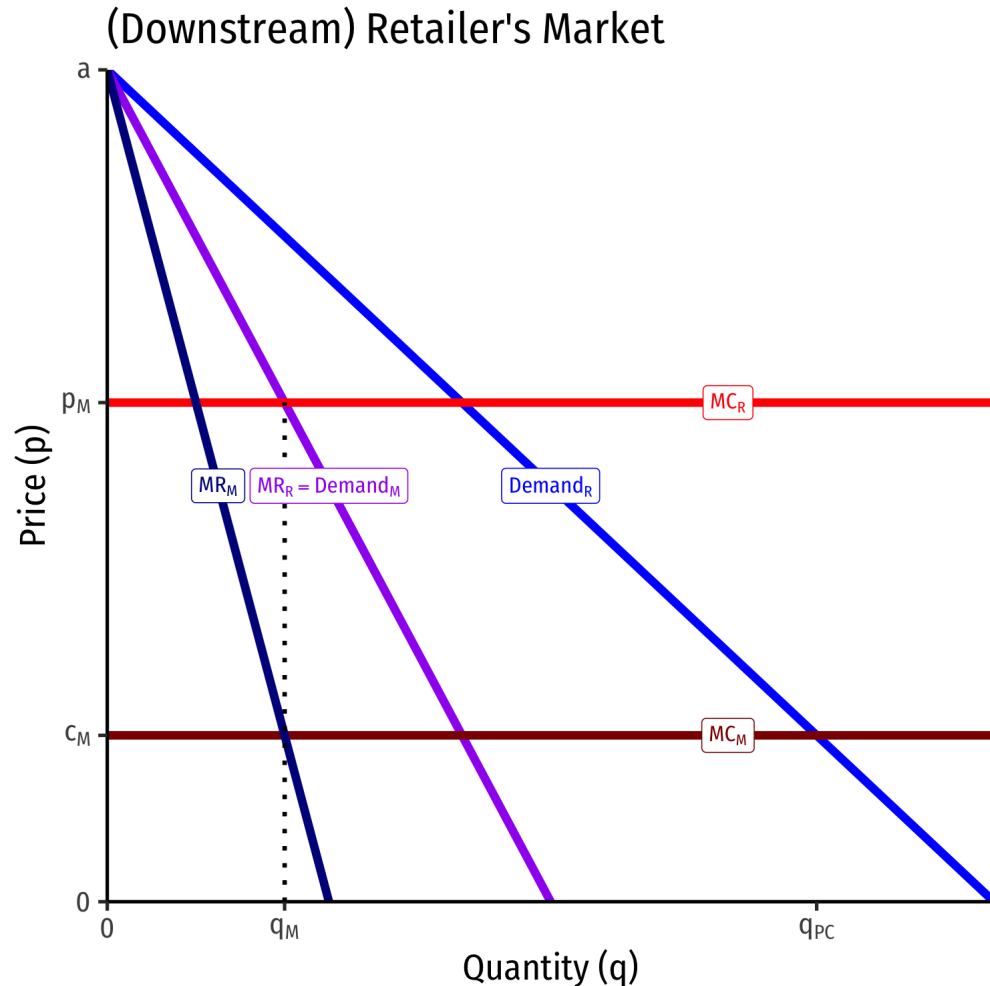
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- If **Manufacturer** were to raise/lower price, **Retailer** would buy q^R where $MR_R = MC_R$
 - Recall **Retailer's** MC_R is **Manufacturer's** P_M !
- Describes q_R for every possible P_M !
- So what price P^M will the **Manufacturer** set??

Double Marginalization Problem



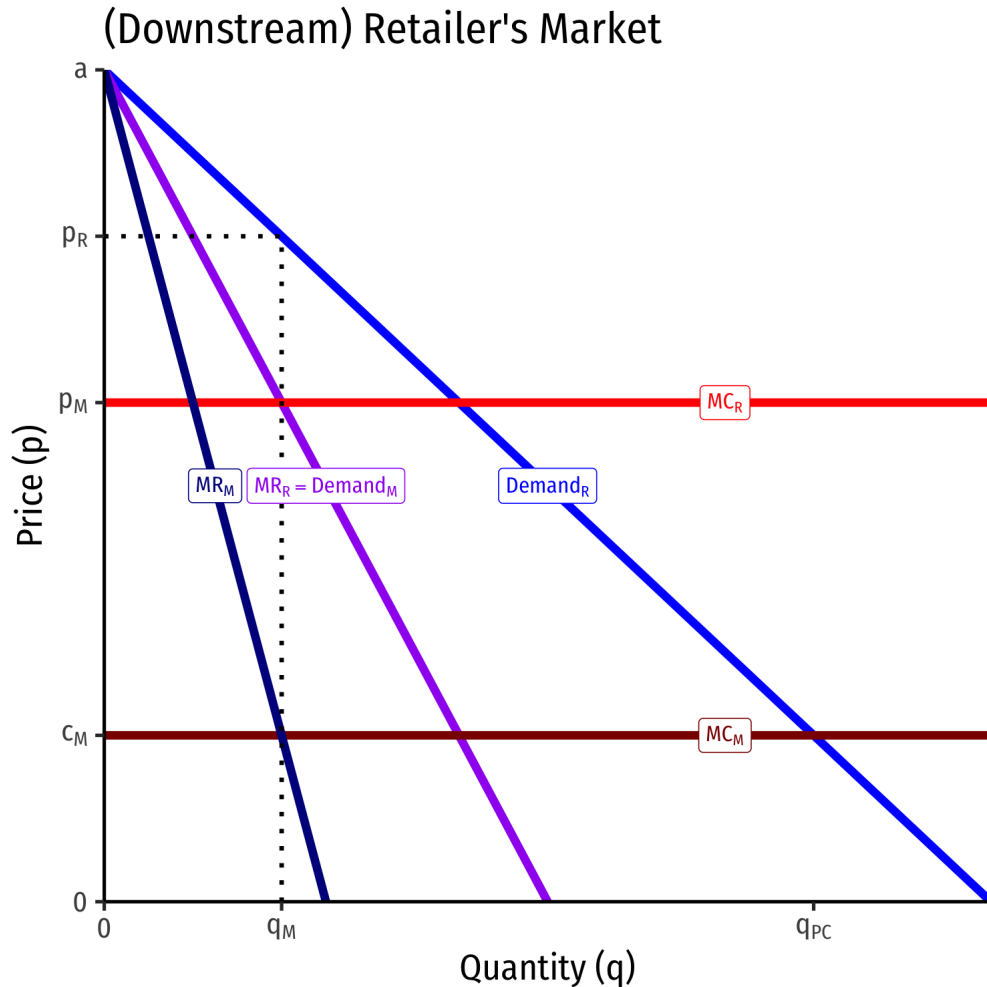
- Since **Manufacturer's** MR_M curve is **Retailer's** Demand curve, consider **Retailer's** MR_R curve
 - Starting at a , with twice the slope of MR_M !
- It will set its own $MC_M = MR_M$
- Then markup the price to p_M (most **Retailer** is willing to pay!)

Double Marginalization Problem



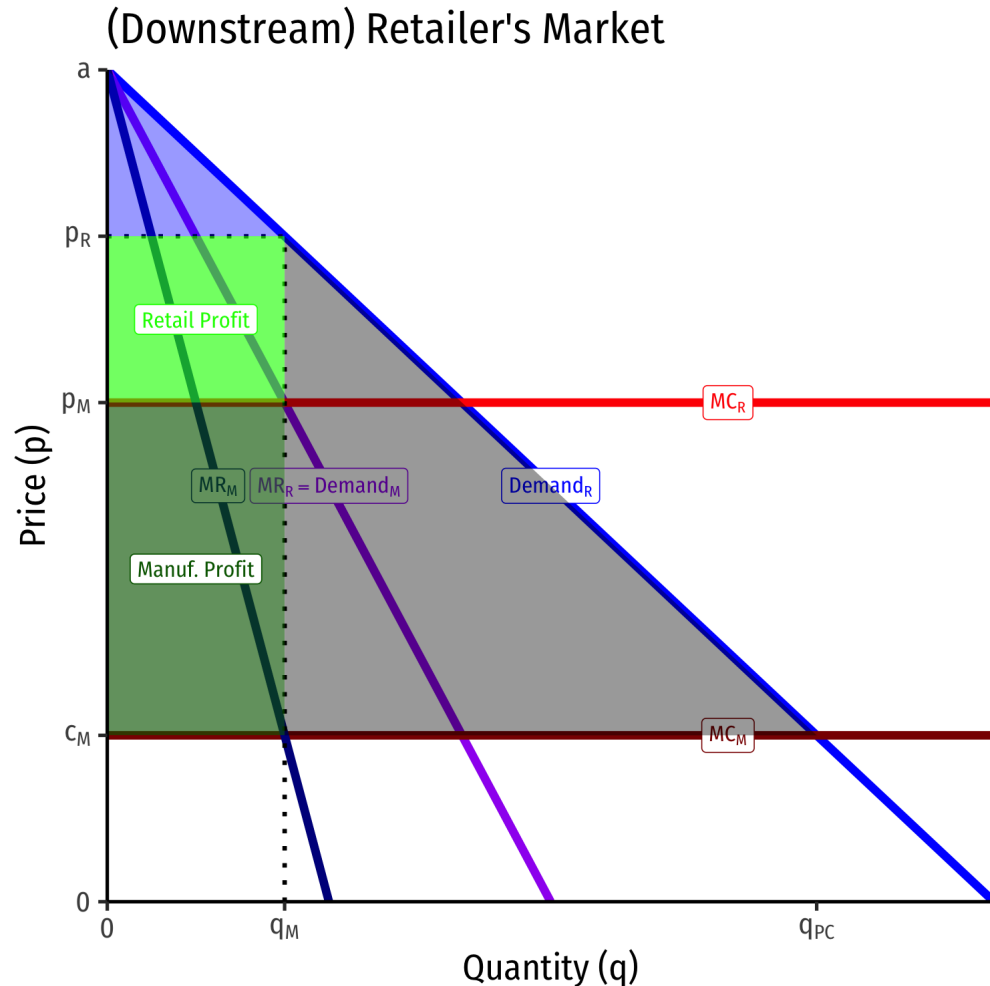
- Since **Manufacturer's** MR_M curve is **Retailer's** Demand curve, consider **Retailer's** MR_R curve
 - Starting at a , with twice the slope of MR_M !
- It will set its own $MC_M = MR_M$
- Then markup the price to p_M (most **Retailer** is willing to pay!)
- p_M becomes the new MC_R for **Retailer**

Double Marginalization Problem



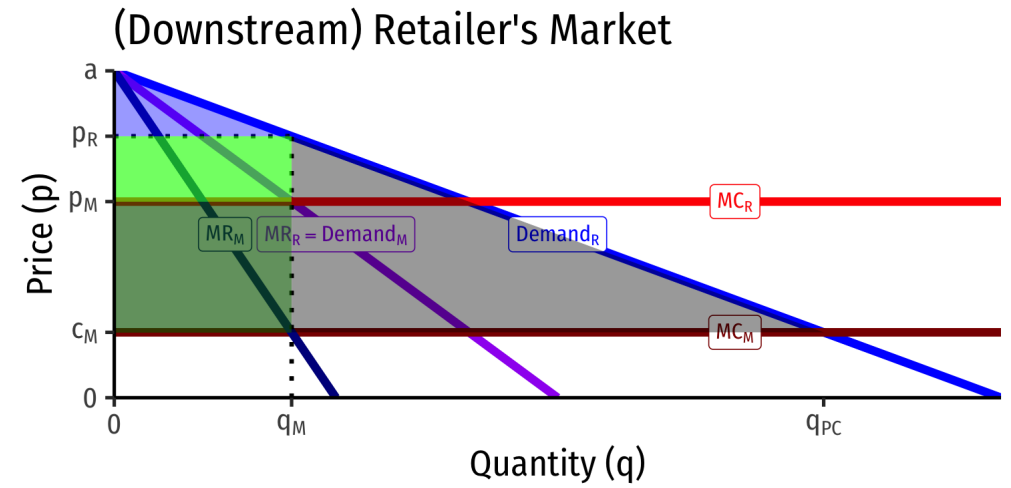
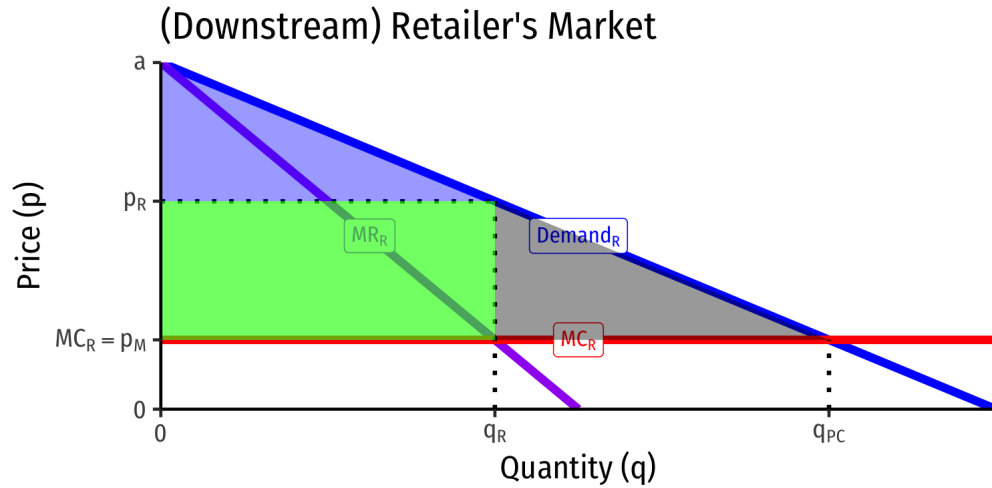
- **Retailer** takes this higher $p_M = MC_R$ and sets it equal to its own MR_R
- Marks up the price to p_R

Double Marginalization Problem



- **Manufacturer** earns some **profit**
- **Retailer** extracts some of this **profit (darker)**
- Less **Consumer Surplus**
- Much greater **DWL** from *double markup*

Double Marginalization Problem



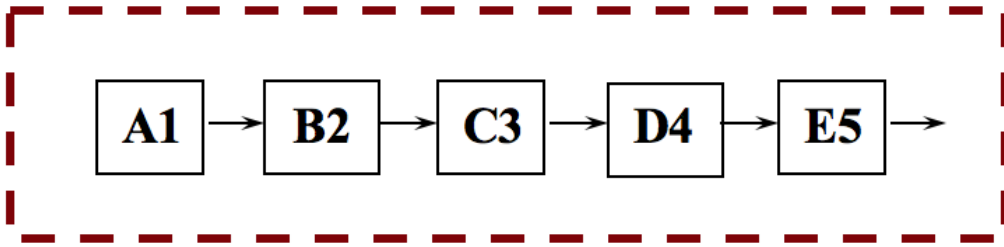
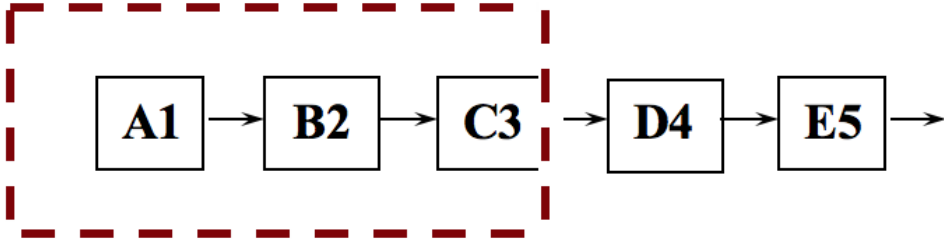
With bilateral monopoly, a **double-markup** causing:

- Much less **consumer surplus**
- Much more **DWL**
- Less total **profit** (and it's split between Manufacturer & Retailer)



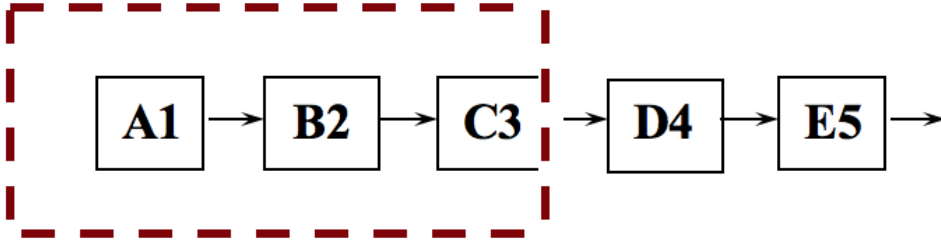
Vertical Integration

Vertical Integration



- One solution to this problem is **vertical integration**: the firm internalizes a stage of production in the supply chain
 - Often by **buying its supplier**
- Avoids hold up problems and post-contractual opportunism

Vertical Integration



- **Antitrust implications:** vertical integration *may* not be done to intentionally create market power, but to economize on transaction costs from asset specificity

Vertical Integration



Benjamin Klein

1943-

“[A]s assets become more specific and more appropriable quasi rents are created (and therefore the gains from opportunistic behavior increases), the costs of contracting will generally increase more than the costs of vertical integration. Hence, *ceterus paribus*, we are more likely to observe vertical integration,” (p.298).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326

Vertical Integration



Benjamin Klein

1943-

“We maintain that if an asset has a substantial portion of quasi rent which is strongly dependent upon some other particular asset, both assets will tend to be owned by one party,” (p.300).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326

Vertical Integration



Benjamin Klein

1943-

“The primary alternative to vertical integration as a solution to the general problem of opportunistic behavior is some form of economically enforceable long-term contract,” (p. 302).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326

Vertical Integration

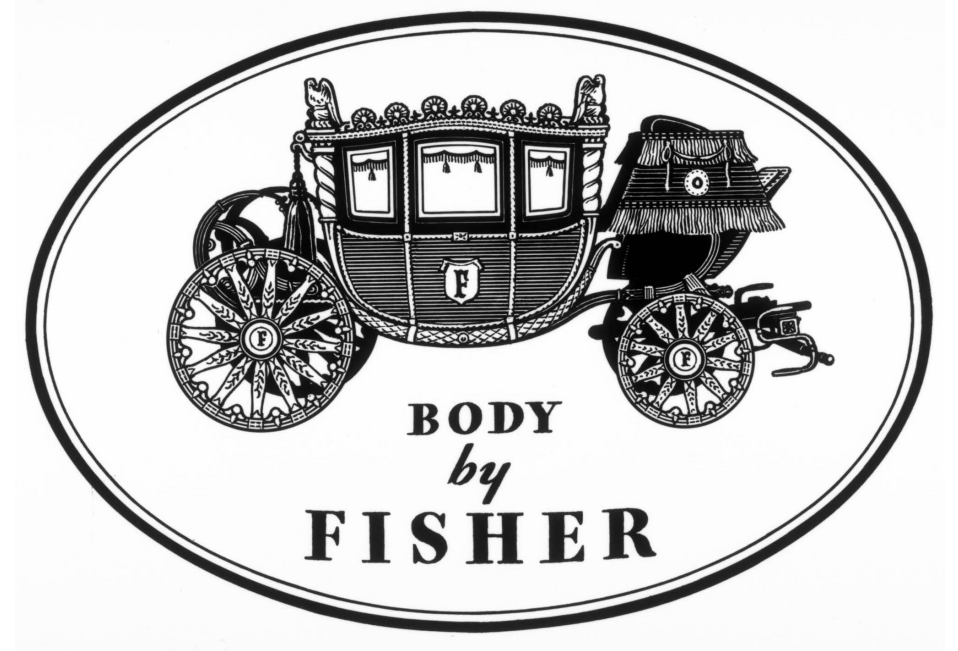


Benjamin Klein

1943-

“Long-term contracts used as alternatives to vertical integration can be assumed to take two forms: (1) an explicitly stated contractual guarantee legally enforced by the government or some other outside institution, or (2) an implicit contractual guarantee enforced by the market mechanism of withdrawing future business if opportunistic behavior occurs...[However, they are] often very costly solutions. They entail costs of specifying possible contingencies and the policing and litigation costs of detecting violations and enforcing the contract in the courts..every contingency cannot be cheaply specified in a contract or even known and because legal redress is expensive...”
(p.303).

GM and Fisher Body Example



GM and Fisher Body Example



Benjamin Klein

1943-

“The manufacture of dies for stamping parts in accordance with the above specifications [for a Mustang or Ford model] gives a value to these dies specialized to Ford, which implies an appropriable quasi rent in those dies...once the large sunk fixed cost of the specific investment in the dies is made, the incentive for Ford to opportunistically renegotiate a lower price at which it will accept body parts from the independent die owner may be large. Similarly, if there is a large cost to Ford from the production delay of obtaining an alternative supplier of the specific body parts, the independent die owner may be able to capture quasi rents by demanding a revised higher price for the parts. Since the opportunity to lose the specialized quasi rent of assets is a debilitating prospect, neither party would invest in such equipment. Joint ownership of designs and dies removes this incentive to attempt appropriation,” (p.308).

GM and Fisher Body Example



Benjamin Klein

1943-

“[I]n 1919 General Motors entered a ten-year contractual agreement with Fisher Body for the supply of closed auto bodies. In order to encourage Fisher Body to make the required specific investment, this contract had an exclusive dealing clause whereby General Motors agreed to buy substantially all its closed bodies from Fisher. This exclusive dealing arrangement significantly reduced the possibility of General Motors acting opportunistically by demanding a lower price for the bodies after Fisher made the specific investment in production capacity,”

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326

GM and Fisher Body Example



Benjamin Klein

1943-

“But large opportunities were created by this exclusive dealing clause for Fisher to take advantage of General Motors, namely to demand a monopoly price for the bodies. Therefore, the contract attempted to fix the price which Fisher could charge for the bodies supplied to General Motors...The price was set on a cost plus 17.6 per cent basis [and had other provisions to protect GM].”

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive

Contracting Process," *Journal of Law and Economics* 21(2): 297-326

GM and Fisher Body Example



Benjamin Klein

1943-

“Unfortunately, however, these complex contractual pricing provisions did not work out in practice. The demand conditions facing General Motors and Fisher Body changed dramatically over the next few years. There was a large increase in the demand for automobiles and a significant shift away from open bodies to the closed body styles supplied by Fisher. Meanwhile, General Motors was very unhappy with the price it was being charged by its now very important supplier, Fisher...By 1924, General Motors had found the Fisher contractual relationship intolerable and began negotiations for purchase of the remaining stock in Fisher Body, culminating in a final merger agreement in 1926,” (pp.309-310).

Klein, Benjamin, Robert G Crawford, and Armen A Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* 21(2): 297-326