

ADVANCED MICROECONOMICS: LECTURE NOTE 9

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- 1 We have considered models (adverse selection and moral hazard) in which the agents face **no constraints on the form of contracts** they can agree upon: the only limit is observability.

在逆向选择和道德风险模型中，合约的形式没有限制；或者说，唯一的限制是“类型/行为是否可被观察”。

- 2 The contracts we considered can include prescriptions for every possible instance (or “state of the world”). These contracts are called **complete**.

之前讨论的合约对“每种可能的情况”均做了约定。这样的合约被称为完全合约。

[*] There is controversy on whether second-best contracts under adverse selection and moral hazard (the so-called comprehensive contracts in some literature) are complete or not.

- Since the second-best contracts are not based on agent's type θ or action a (state of the world), they are not complete.
- The principal could suggest an action for each type. Although the principal cannot observe types (types are not contractible), he can deduce them. Thus, the second-best contracts are complete from this point of view.

- 3 Most contracts in the real world are incomplete. In most situations, it is virtually **impossible, ex ante, to consider explicitly all the possible future events**, either because the agents ignore even the possibility of certain events or because there are too many possible instances and there is no contract that can take them all into account.

真实世界中，大多数合约都是不完全合约。事前无法穷尽所有未来的可能，也无法在合约中进行相应的明确约定。

- 出现了新冠疫情，工作受到影响，要不要延期？这个也没法提前写，因为设计合约的时候没法想到疫情。只能当这个事情出现了，再临时协商。
- 解释权归 XXX。

- 4 Hart (1995): “An incomplete contract has gaps, missing provisions, and ambiguities and has to **be completed** (by renegotiation or by the courts) with strictly positive probability in some states of the world.”

不完全合约存在漏洞、缺少条款、含糊不清，并且当真实状态实现之后，需要被完全（通过重新谈判或法院）。

According to this definition, most real world contracts are incomplete:

- they are not contingent on all relevant, publicly available information; 不完全合约无法依赖于所有相关信息
- they are short-term; 不完全合约有时效性

- they are renegotiated frequently; 不完全合约需要频繁地事后协商
- they are interpreted and completed by the courts. 不完全合约需要被法院解释和完全化

When contracts are incomplete, **institutional arrangements** such as ownership titles, decision-making rules and authority matter.

当合约是不完全时，一些制度性的安排（所有权、决策规则、权威）将异常重要

5 Tirole (1999) provides a good example.

- Patents exist to reward innovation. 专利的存在是为了奖励创新
- In a world of complete contracts, innovation could be rewarded with a prize proportional to the social value of the innovation. 在完全合约的世界中，创新可以按照其创造的社会价值进行一定比例的奖励
- It is difficult to estimate this value when the innovation is introduced (and also after), and it would be hard to establish a reliable institution providing this prize. 这个社会价值很难被估量，因而难以提出一种可靠的机制来进行奖励
- Patents are a less-than-socially-efficient way to reward innovation. Patents give monopoly power, but information is a public good and therefore efficiency would require to distribute it freely. 专利就是针对不完全合约的一种次优奖励方式，是一种特殊的制度性安排

6 The key difference between complete contract and incomplete contract is whether there are “**nondiscrifiable states**”.

完全合约和不完全合约的核心差异在于：是否存在无法描述（也无法写入合约）的状态

7 Reasons for contractual incompleteness:

- Bounded rationality: Parties cannot write long-term state-contingent contracts. They cannot foresee all possible future states. 有限理性：参与者不可能预知未来的所有可能状态，因此不可能针对所有状态来缔约
- Transaction cost: Conditioning long-term contract on all possible future states prohibitively costly. 交易成本：穷尽所有可能状态的成本太高
- Nonverifiability: Some information observable but not verifiable vis-a-vis court and mechanism cannot be used 不可验证性：一些信息可以被观察、但无法被第三方验证

8 The theory of incomplete contracts is closely related to the theory of firm:

- If complete contingent contracts could be written, we would not need firms. All transactions that are carried out within firms could be carried out between independent contractors. 如果企业内部各部门之间可以签订“完全合约”，那么企业疑似没有存在的必要性
- **The firm is an attempt to deal with the problems that arise when contracts are incomplete.** 企业（一种特殊的制度性安排）是现实中解决不完全合约的一个尝试

Questions:

- What exactly is the difference between a transaction carried out within a firm and between two separate firms? “企业内部部门间的交易”与“两个企业间的交易”有何差异
- Which input goods should be produced in-house and which should be contracted out to independent suppliers? 哪些投入品应该在企业内部生产，哪些应该外包给独立供应商
- What determines the degree of vertical and horizontal integration? 什么决定了企业纵向和横向一体化的程度

1 Neoclassical theory and principal-agent theory on the firm

9 Neoclassical theory of the firm:

- A firm is a production function (black box) that transforms inputs into outputs. 企业是个黑箱子，将投入转为产出
- Manager of the firm maximizes profits. 追求利润最大
- No incentive problems within the firm. 没有内部的激励问题
- U-shaped average cost function (because some factors of production cannot be redoubled) \Rightarrow boundaries of the firm are determined by the minimum of the average cost curve. 存在最优产量组合

10 Problems:

- Theory explains the size of a production plant but not the size of the firm. 仅仅解释产量，未能解释企业的规模/大小
- Coase: If the market is an efficient method of resource allocation, then why do so many transactions take place within firms? 如果市场是一种有效配置资源的方式，那么为什么企业内部还存在交易呢
- “Selective intervention” and “Williamson Puzzle”:
 - Large firm employs CEO who controls subdivisions. 大公司雇用 CEO 来控制子部门
 - Let subdivisions produce independently. Then welfare remains the same as if subdivisions were independent firms. 子部门独立运作，其收益与成为独立公司时没有差别
 - But it is possible to selectively intervene and coordinate production if a Pareto improvement exists. 如果存在帕累托改进，则 CEO 可以选择性地干预和协调生产
 - Hence, large firm will be never worse off but sometimes better off than independent firms. 大公司永远不会比独立公司更糟，但有时会比独立公司更好
 - Why isn't it always optimal to merge two firms? 为什么合并两家公司并不总是最优的
- The “firm” itself is not well defined.
 - What is the difference between a contract of the owner of the firm with his workers and a contract of the owner with his suppliers? “公司所有者与其工人的合同”与“所有者与其供应商的合同”有什么区别
 - Why do the workers belong to the firm, while the suppliers are outside of the firm? 为什么工人属于公司，而供应商在公司之外
 - What determines the boundary of the firm? 什么决定了企业的边界
- Samuelson: In a neoclassical world it does not make a difference whether the capitalists hire workers or whether the workers hire capitalists. 在新古典主义世界中，资本家雇用工人或工人雇用资本家都没有区别。

11 Principal-agent theory deals with conflicts of interest and asymmetric information:

- Incentives problems are taken seriously and modeled explicitly. 主要研究激励问题
- Theory characterizes the optimal structure of a “comprehensive” contract.

12 Problems:

- There is no difference between an incentive contract within a firm and an incentive contract between two separate firms. 公司内部的激励合同与两个独立公司之间的激励合同没有区别。

- No solution to the “Williamson Puzzle”.

Conclusion: If comprehensive contracts are being written, the organizational structure does not play a role. Any allocation that can be implemented through a given organizational structure could be implemented within any other organizational structure through the appropriate choice of a comprehensive contract. 如果可以签订完全合约，则组织结构/制度性安排不会发挥作用

2 Transaction cost approach

13 Coase (1937): When does a transaction take place within a firm and when is it carried out on a market? 交易何时在公司内部进行，何时在市场上进行

- Markets: Allocation through the price mechanism 价格
- Firms: Allocation by authority, commands, etc. 权威、命令

14 Coase noted a number of **transaction costs** involved in **using the market**; 交易成本

- The cost of obtaining a good or service via the market actually exceeds the price of the good. 通过市场获得商品或服务的成本
- Other costs, including search and information costs, bargaining costs, keeping trade secrets, and policing and enforcement costs, can all potentially add to the cost of procuring something from another party. 包括搜索和信息成本、谈判成本、保守商业秘密以及监管和执法成本

Different allocation mechanisms give rise to different transaction costs.

- In small groups fiat is the more efficient allocation mechanism. 在小团体中，命令是更有效的分配机制
- But: the larger the group (the “firm”), the higher are “bureaucracy costs” and the more efficient is the price mechanism. 企业越大，“官僚成本”（组织成本）越高，价格机制就越有效

Firms will arise which can internalize the production of goods and services required to deliver a product, thus avoiding these costs. 企业的出现，可以将某种产品所需的生产和服务内部化，避免相关的交易成本

* Coase theorem: If trade in an externality is possible and there are sufficiently low transaction costs, bargaining will lead to a Pareto efficient outcome **regardless of the initial allocation of property**.

科斯定理：在外部性存在的情形下，只要交易成本足够低（近乎零），产权的初始配置并不影响最终的配置效率，议价都将导致帕累托有效的结果。

In practice, obstacles to bargaining or poorly defined property rights can prevent Coasean bargaining. It thus highlights the importance of the property right.

在实践中，议价的障碍或界定不清的产权可能会阻碍“科斯式议价”的成功。因此，它突出了产权（或产权初始配置）的重要性

15 Alchian and Demsetz (1972):

- No difference between prices and fiat.
- Theory of property rights based on monitoring. Who monitors the monitor? The owner.

16 Klein, Crawford and Alchian (1978), Williamson (1975, 1985):

Transaction costs in writing a contract induce parties to write incomplete contracts: 交易成本导致不完全合约

- Costs to think through all possible states of the world. 考虑所有可能的状态
- Costs to write down all possible contingencies (using legal code). 撰写状态依赖的完全合约
- Difficulty to describe a contingency unambiguously so that it can be verified by the courts even if the contingency is obvious to the contracting parties. 难以清楚地描述或有事项，以便法院可以核实

Hence, parties write incomplete contracts ex ante that have to be completed and renegotiated as they go along.

因此，各方在事前签订了不完全合约，这些合约必须在他们进行的过程中完全化、重新谈判。

However, this will yield **inefficiencies** for several reasons:

- Haggling in renegotiation yields delay and inefficient decisions. 重新谈判中的讨价还价会导致延迟和低效的决策
- Asymmetric information may arise during the relationship which prevents the implementation of an ex post efficient allocation. 在关系中可能会出现不对称信息，从而阻止事后有效分配的实施
- These costs would not matter very much, if the parties could easily switch to alternative contracting parties. However, in many situations the **parties are locked in with each other** and a break up would be very inefficient. In these situations, the **hold-up problem** (套牢问题) arises. 如果各方可以轻松地找到替代缔约方，这些成本就不会很重要。然而，在许多情况下，双方相互锁定，解约将是非常低效的

17 Consider a buyer-seller relationship. Seller can produce good at zero cost.

- At date 1, buyer can make relationship-specific investment of \$0 or \$60. Investment is nonverifiable (e.g. investment in human capital). 买家进行人力资源的投资，0 或 60
- If buyer invests \$0, then utility from transaction with seller is 0.
If buyer invests \$60, then the utility is 100.
- Investment is efficient ($100 - 60 = 40 > 0$) and should be carried out. 投资优于不投资
- Buyer and seller cannot write long-term contract regarding price of investment. 合约无法针对是否投资进行详细约定
- Question: Will buyer invest?
- Suppose buyer invests. At date 2, investment is sunk and buyer's utility from transaction is 100. Parties will bargain over price. Nash bargaining yields 50:50 division of surplus: Buyer makes loss of $50 - 60 = -10$. Therefore, buyer will not invest. 买家一旦投资，就被套牢；买家可以预见到套牢，故而选择不投资

18 Ingredients of hold-up problem: 套牢问题的核心要素

- Nonverifiable investment: If investment was verifiable, seller could pay buyer 20 conditional upon investment. Buyer would get $50 - 60 + 20 = 10$ and invest. 不可验证的投资
- Relationship-specific 关系专用性 (or asset-specific 资产专用性) investment: If investment was not specific, buyer could threaten to trade with other seller unless he sells for 20. Buyer would get $100 - 20 - 60 = 20$ and invest. 投资具体关系专用性或资产专用性
- Sunk investment: If investment was not sunk, buyer could threaten to undo investment unless seller sells for 20. 投资是沉没的
- Impossibility to write long-term contract: If long-term contract was possible, parties could set price at 20. 无法签订长期合约

19 The hold-up problem can be described as follows:

- The parties must make “relationship specific investments” ex ante that increase the potential surplus that can be generated in their relationship. 双方必须事先进行“关系专用性的投资”，以增加在他们的关系中可能产生的潜在收益。
- These investments are (at least partially) sunk and lose their value when the relationship breaks up. 当关系破裂时，这些投资（至少部分）沉没并失去价值
- It is not possible to contract ex ante on the investments nor on how to share the surplus ex post. 不可能事前就投资签订合同，也不可能合同中约定事后如何分享收益
- When the parties negotiate on how to share the surplus ex post, the ex ante investments are already sunk and do not affect the bargaining outcome. Hence, the parties get wrong investment incentives. 当各方事后就如何分享收益进行谈判时，事前投资已经沉没，不影响谈判结果。因此，各方可能存在错误的投资激励

20 Examples for asset-specific investments:

- a worker acquires specific skills that are valuable only in one particular firm; 工人获得了仅在特定公司中有价值的特定技能
- a worker builds his house close to the firm he works for; 一个工人在他工作的公司附近建造他的房子
- a company invests in capacity that can only be used for one particular customer; 一家公司投资于只能用于一个特定客户的产能
- a company develops a product that is specific to the needs of one particular customer. 一家公司开发一种特定于特定客户需求的产品

21 A solution to hold-up problem: Buyer and seller merge (vertical integration 垂直一体化或纵向一体化).

- At date 1, buyer buys seller's firm for 20.
- At date 2, transaction takes place (at price of 0) and buyer gets $100 - 60 - 20 = 20$.
- Therefore, buyer invests.

22 Does transaction cost theory solve the Williamson puzzle? Not really:

- Does not explain why buyer's bargaining power increases after vertical integration (above assumed that seller delivers at price of 0, i.e. buyer has full bargaining power). 没有解释为什么纵向一体化后，买方的议价能力增加
 - Seller could threaten to quit \Rightarrow parties bargain (within firm) \Rightarrow same problem as under non-integration.
 - Mechanism that determines bargaining power as consequence of integration must be spelled out more clearly.
- Does not explain disadvantages of integration. So why isn't there just one fully integrated firm? (Williamson names bureaucracy cost as cost of integration. But argued earlier that this doesn't solve puzzle). 没有解释一体化的缺点

23 These problems are solved by the property rights approach of Grossman, Hart and Moore.

3 Property rights approach

- 24 The early “Property Rights” literature emphasized the importance of clearly defined property rights (Coase, 1960). But, this theory cannot explain [to whom the property rights of an asset should be allocated](#).

- 25 Ownership rights (Hart, 1995): An **owner** (资产所有者) of an asset has the **residual control rights** (剩余控制权) over that asset: the right to decide all usages of the asset in any way not inconsistent with a prior contract, custom, or law.

3.1 Example of power plant and coal mine

- 26 Consider a power plant that locates next to a coal mine with the purpose of burning coal to make electricity. 发电厂选址位于煤矿旁边，其目的是燃烧煤炭来发电

One way to regulate the transaction is for the power plant to sign an arms-length long-term contract with the coal mine. Such a contract would specify the quantity, quality, and price of coal for many years to come. 规范交易的一种方法是发电厂与煤矿签署一份公平的长期合同。这样的合同将规定未来许多年煤炭的数量、质量和价格

But any such contract will be incomplete. Events will occur that the parties could not foresee when they started out. 但是任何这样的合约都是不完全的。双方在开始时无法预见将会发生的所有事件

- 27 (合约的不完全性) Suppose that the power plant needs the coal to be pure but that it is hard to specify in advance what purity means, given that there are many potential impurities. 假设发电厂需要煤炭是纯净的，但由于存在许多潜在的杂质，因此很难提前说明纯度的含义

Imagine that ten years into the relationship, ash content is the relevant impurity and that high-ash-content coal is more expensive for the power plant to burn than low-ash-content coal but cheaper for the coal mine to produce. 十年后的关系，灰是相关的杂质，电厂燃烧高灰的煤比低灰的煤更贵，但煤矿的生产成本更低

Given that the contract is incomplete, the coal mine may be within its rights under the contract to supply high-ash-content coal. 鉴于合约不完全，煤矿可能在合约允许的范围内供应高灰煤炭

- 28 (套牢) The power plant and coal mine can, of course, renegotiate the contract. 发电厂和煤矿可以重新谈判合同。 However, the coal mine is in a strong bargaining position. It can demand a high price for switching to low-ash-content coal. 煤矿处于有利的讨价还价地位。改用低灰煤炭可能需要付出高昂的代价

The reason is that the power plant does not have a good alternative: it may be very expensive for the power plant to transport coal from a different coal mine given that it is located next to this one. 发电厂没有一个好的替代方案：发电厂从另一个煤矿运输煤炭可能非常昂贵

The coal mine can hold up the power plant because the power plant, by locating next to the coal mine, has become dependent on it. 煤矿可以套牢发电厂，因为发电厂位于煤矿旁边，已经变得依赖它

- 29 (如果预见到套牢，可能会偏离社会最优的投资程度) Although it may be impossible to write a contract that is complete enough to avoid hold-up, this does not mean that the parties will be unable to anticipate hold-up. 尽管不太可能签订一份足够完全的合约来避免套牢，但这并不意味着双方无法预见套牢

It is assumed that the power plant does anticipate that it will be at the mercy of the coal mine, and that a substantial share of its future profit may be expropriated by the coal mine. 假设发电厂预计它将受到煤矿的支配，并且其未来利润的很大一部分可能会被煤矿没收

Fearing such expropriation, the power plant may choose not to become so dependent on the coal mine in the first place. For example, it may locate at an equal distance between several coal mines rather than right next to this one, even though this may increase the cost of transporting coal. 由于担心这种压榨，发电厂可能首先选择不那么依赖煤矿。例如，它可能位于几个煤矿之间的相等距离处，而不是紧邻这个煤矿，尽管这可能会增加运输煤炭的成本

- 30 (套牢能力源于所有权/剩余控制权) It is worth pinpointing the source of the coal mine's hold-up power. It arises because the owner of the coal mine has residual rights of control over the mine. In this case the key residual right of control is the decision about what kind of coal to mine: high-ash-content or low-ash-content.

煤矿的套牢能力的来源：因为煤矿所有者对煤矿拥有剩余控制权。在这种情况下，剩余控制权决定开采哪种煤：高灰还是低灰

- 31 (兼并的好处) One thing it can do is to buy the coal mine in advance.

That way the power plant as owner of the coal mine will have the key residual control right. 电厂成为煤矿的所有者，将拥有关键的剩余控制权

The coal mine can no longer extract a high price by threatening to produce high-ash-content coal: the power plant can order the coal mine manager to mine low-ash-content coal. 煤矿不能再通过威胁生产高灰煤来获取高价：电厂可以命令煤矿经理开采低灰煤

Then the power plant may now be willing to become dependent on the mine. Given that it does not fear hold-up, it may locate next to it. 发电厂现在可能愿意依赖于矿山。鉴于它不怕被套牢，它可能选址位于它旁边

Thus the theory identifies a benefit of integration, where integration in this case means the purchase of the coal mine by the power plant. The value of integration is that the power plant may undertake efficiency-enhancing relationship-specific investments—in this case locating next to the coal mine—that it would not carry out if it was protected only by an incomplete contract. 一体化意味着发电厂购买了煤矿。一体化的价值在于，发电厂可以进行关系专用性投资（在这种情况下选址位于煤矿旁边）以提升效率；如果它仅受到不完全合约的保护，它就不会进行投资

- 32 (兼并的弊端) But just as the transfer of residual control rights from the coal mine to the power plant empowers the owner of the power plant, it disempowers the owner of the coal mine, and this is likely to have costs in terms of her incentive to make relationship-specific investments. 将剩余控制权从煤矿转让给电厂，赋予了电厂所有者权力，也剥夺了煤矿所有者的权力，而这很可能会影响她进行关系专用性投资的动机

Assume that the coal mine was previously an owner-managed firm. After the acquisition by the power plant the coal mine manager stays on but is now an employee of the power plant. 假设煤矿以前是一个所有者管理的公司。被电厂收购后，煤矿经理留任，但现在是电厂的雇员

Suppose that the coal mine manager has an idea about how to run the mine more efficiently. 假设煤矿经理对如何更有效地经营煤矿有一个想法

When the coal mine was separate, the manager had the authority (residual control rights) to implement, and benefit from, this idea. 当煤矿独立时，经理有权力（剩余控制权）来实施这个想法并从中受益

Now that the manager is an employee she has to get permission to implement the idea from her boss: the owner of the power plant has veto power. The owner of the power plant can use his veto right to extract some of the gains from the idea for himself. 现在经理变成了员工，她必须得到老板的许可才能实施这个想法：发电厂的所有者拥有否决权。发电厂的所有者可以使用他的否决权为自己从这个想法中获取一些收益

Knowing that she faces the risk of expropriation, the coal mine manager's incentive to innovate is reduced. 知道她面临被压榨的风险，煤矿经理的创新动力降低了

- 33 (如何取舍) Whether it makes sense for the power plant to purchase the coal mine will depend on whether the **distortion in the power plant's investment** is more important than the **distortion in the coal mine manager's investment**. 电厂收购煤矿是否有意义，将取决于电厂投资的扭曲是否比煤矿管理者投资的扭曲更重要

It is also worth noting that a further possibility is for the coal mine to purchase the power plant. 还有一种可能是煤矿收购电厂

Either integration or non-integration may be optimal, depending on which ownership form has the most beneficial effect on investments. 一体化或非一体化都可能是最优的，这取决于哪种所有权形式对投资最有利。

3.2 General results

34 Grossman-Hart-1986, Hart-Moore-1990:

In the real world, contracts are incomplete and hence it is impossible to contractually specify what decisions will have to be taken in any conceivable state of the world. 在现实世界中，合约是不完全的，因此不可能通过合同规定在世界任何可能的状态下必须做出哪些决定

There will be renegotiations in the future, so parties have insufficient investment incentives (since they will only get a fraction of the investment's return in future negotiations); i.e., there is a hold-up problem. 未来会有重新谈判，所以各方投资激励不足（因为他们在未来的谈判中只能获得投资回报的一小部分）；即存在套牢问题

Hence, property rights matter, because they determine who has control over future decisions if no agreement will be reached. In other words, property rights determine the parties' future bargaining positions (while their bargaining powers, i.e. their fractions of the renegotiation surplus, are independent of the property rights allocation). 因此，产权很重要，因为如果无法达成协议，产权决定了谁可以控制未来的决定。换言之，产权决定了各方未来的谈判地位

The property rights approach to the theory of the firm can thus explain pros and cons of integration in the context of private firms. 因此，企业理论的产权方法可以解释私营企业一体化的利弊

35 A critical question that arises with an incomplete contract is, who has the right to decide about the missing things? This right is called the **residual control or decision right**. The question is, who has it?

不完全合约引发的一个关键问题是，谁有权决定未能缔约的东西？这种权利称为剩余控制权或决策权

36 “Residual control rights” remain with the **owner**. The owner of an asset has the right to decide on how the asset is used to the extent that its use is not contractually specified.

剩余控制权属于（资产的）拥有者。当资产用途未在合约中规定，其所有者有权决定如何使用该资产

37 Definition of “firm”: A **firm** consists of the **physical assets** that it owns.

In other words, a **firm** is a collection of assets over which the owner has residual control rights.

企业是它所拥有或控制的有形资产的集合

38 This naturally leads to the difference between contracts and firms.

If firm A and firm B sign an arms-length (incomplete) contract, then the owner of firm A has residual control rights over the A assets and the owner of firm B has residual control rights over the B assets. 如果企业 A 和企业 B 签署公平（不完全）合约，则企业 A 的所有者对 A 资产拥有剩余控制权，企业 B 的所有者对 B 资产拥有剩余控制权。

In contrast if, say, firm A buys firm B, then the owner of firm A has residual control rights over the A and B assets. 如果企业 A 收购企业 B，那么企业 A 的所有者对 A 和 B 的资产都拥有剩余控制权。

39 Distinction between “physical capital” and “human capital”: Property rights approach emphasizes control over physical (more generally non-human) assets. Ownership on physical assets can be traded but not ownership on

human assets. “有形资本”和“人力资本”的区别：产权方法强调对有形（非人力）资产的控制。实物资产的所有权可以交易，但人力资产的所有权不能交易。

- When the power plant purchases the coal mine it acquires residual control rights over the mine. 当发电厂购买煤矿时，它获得了对该煤矿的剩余控制权。
- Purchasing the mine would not be worth much if the coal mine manager is indispensable. In that case the manager would retain her hold- up power even as an employee. 如果煤矿经理是必不可少的，那么购买该矿将不值钱。在这种情况下，即使作为雇员，经理也会保留她的控制权。
- If the power plant wants a shift from high-ash-content coal to low-ash-content coal, the coal mine manager could demand a huge increase in salary for doing this. 如果电厂想要从高灰煤转向低灰煤，煤矿经理可能会为此要求大幅提高工资。

40 Why should it matter who has residual control rights?

Residual control rights are like any other good: there is an **optimal allocation** of them. Sometimes it is more efficient for one owner to hold all the residual control rights, and sometimes it is more efficient for these control rights to be split between several owners. Which is the case will determine whether firms A and B should merge or stay as separate entities.

剩余控制权与任何其他商品一样：它们存在最优分配。有时由一个所有者持有所有剩余控制权更有效，有时将这些控制权分配给几个所有者更有效。企业 A 和企业 B 是应该合并还是作为单独的实体保留，将视情况而定。

41 Who should own the assets?

- Synergistic assets should be owned together and that assets should be owned by indispensable human capital. 协同资产应该共同拥有，资产应该由不可或缺的人力资本拥有。

3.3 The yacht example

42 At an island,

- One asset: luxury yacht (豪华游艇).
- Three agents: skipper (水手), chef (厨师), tycoon (富翁).

3.3.1 The yacht example A

43 Assumptions:

- Service is to provide gourmet dinner for tycoon during sea cruise at date 2. 在第二天，富翁可以在海上巡航期间享受晚餐。
- At date 1, chef can invest in preparing a special dish. 在第一天，厨师可以投资准备一道特色菜。
Cost of investment is 100, value to tycoon is 240 \Rightarrow investment is efficient.
- Substitutes for skipper and chef are easy to find at date 2 \Rightarrow skipper and chef are dispensable. 在第二天，很容易找到水手和厨师的替代者。
Both the skipper and the chef can be replaced on the market (but the replacements have not invested).
- There is only one tycoon on the island who can afford this dinner \Rightarrow tycoon is indispensable. 吃得起这顿饭的全岛只有一位富翁。

- The investment costs 100 to the chef and is not transferable to other yachts (or there is only one yacht at this island) \Rightarrow chef's investment is asset-specific. 厨师的投资不可转移到其他游艇。

Question: Who should own yacht? 谁应该拥有游艇?

44 Case A1: The skipper owns the yacht.

			T	C	S
T	C	S	0	0	240
T	S	C	0	240	0
S	T	C	0	240	0
S	C	T	240	0	0
C	T	S	0	0	240
C	S	T	240	0	0
			80	80	80

- (a) In each row, entries depict marginal contributions of agents to coalition represented by permutation in same row. Agents can only enter coalitions from the right.
- (b) Take first row and start at left cell.
- Tycoon can enter coalition \emptyset (no agent to the left of tycoon). Whether he enters or not, value of coalition is 0. Hence, tycoon's marginal contribution is 0.
 - Next, chef can leave tycoon alone or form coalition. In either case, value of coalition (and hence chef's marginal contribution) is 0 because yacht is needed to generate the 240.
 - Finally, skipper can join coalition by tycoon and chef or stay out. If he joins, value of coalition is 240; if he stays out, value is 0. Thus, skipper's marginal contribution is 240.
- (c) In this example, all three agents are needed to create positive surplus. Therefore, only agent who enters last (third column) has positive marginal contribution.
- (d) Each permutation occurs with probability $\frac{1}{6}$. Multiplying each cell in agent i 's column with $\frac{1}{6}$ yields agent i 's expected marginal contribution or Shapley value. Here, Shapley value is 80 for each agent. One can also derive Shapley value with the standard formula.
- (e) Intuition: All three agents are needed to generate surplus: 需要三个人一起才能产生收益
- Tycoon because he consumes gourmet meal.
 - Skipper because he owns yacht.
 - Chef because he made investment.

Consequence: Agents split surplus by three, and each agent gets 80.

The chef will not invest, because the expected payoff of 80 does not cover investment cost of 100. 厨师不会投资

45 Case A2: The tycoon owns the yacht.

			T	C	S
T	C	S	0	240	0
T	S	C	0	240	0
S	T	C	0	240	0
S	C	T	240	0	0
C	T	S	240	0	0
C	S	T	240	0	0
			120	120	0

(a) Since skipper is dispensable, only tycoon and chef are needed to generate surplus. 由于水手可有可无，只需要富翁和厨师就可以产生收益

(b) Thus, skipper has no bargaining power, tycoon and chef divide surplus by two.

The chef will invest, because the expected payoff of 120 covers investment cost of 100. 厨师会投资

46 Case A3: The chef owns the yacht.

Same as case A2. Again, only tycoon and chef are needed to generate surplus.

Investment decision is different whether tycoon or skipper owns yacht.

- If tycoon is owner, chef must only bargain with tycoon—surplus split by two.
- If skipper is owner, chef must bargain with both tycoon and skipper—surplus split by three and chef doesn't get enough to cover investment cost.

47 Tycoon and chef are always needed to generate surplus: Tycoon because he is indispensable, and chef because he makes investment.

The chef is more likely to invest in a skill that is tycoon-specific if the asset is owned by the chef or by the tycoon.

48 General result:

- If only one agent invests, then he should own all assets. 如果只有一个人可以投资，那么他应该拥有所有资产。
- If an agent is indispensable to asset a , then he should own a . 如果某人对资产 a 是不可或缺的，那么他应该拥有 a 。

3.3.2 The yacht example B

49 Assumptions:

- In addition to chef, skipper can also make investment at date 1 (can learn history of local islands to entertain tycoon with anecdotes). 除了厨师，水手也可以在第一天进行投资（可以学习当地岛屿的历史、轶事来取悦富翁）
- Cost of skipper's investment is 100, value to tycoon is another 240.
Hence, if both skipper and chef invest, value to tycoon is 480.
- Both the skipper and the chef can be replaced on the market (but the replacements have not invested). 水手和厨师都可以在市场上找到代替者

50 Case B1: The skipper owns the yacht.

			T	C	S
T	C	S	0	0	480
T	S	C	0	240	240
S	T	C	240	240	0
S	C	T	480	0	0
C	T	S	0	0	480
C	S	T	480	0	0
			200	80	200

Take first row and start at left cell.

- Tycoon can enter coalition \emptyset . Whether he enters or not, value of coalition is 0. Hence, tycoon's marginal contribution is 0.
- Next, chef can leave tycoon alone or form coalition. In either case, value of coalition (and hence chef's marginal contribution) is 0 because yacht is needed to generate the surplus.
- Finally, skipper can join coalition by tycoon and chef or stay out. If he joins, value of coalition is 480; if he stays out, value is 0. Thus, skipper's marginal contribution is 480.

Skipper invests but chef doesn't.

51 Case B2: The chef owns the yacht.

			T	C	S
T	C	S	0	240	240
T	S	C	0	480	0
S	T	C	0	480	0
S	C	T	480	0	0
C	T	S	240	0	240
C	S	T	480	0	0
			200	200	80

Chef invests but skipper doesn't.

52 Case B3: The tycoon owns the yacht.

			T	C	S
T	C	S	0	240	240
T	S	C	0	240	240
S	T	C	240	240	0
S	C	T	480	0	0
C	T	S	240	0	240
C	S	T	480	0	0
			240	120	120

Skipper and chef both receive $120 - 100 > 0$ as opposed to 0 if they hadn't invested \Rightarrow both invest.

53 If tycoon is indispensable, he should own yacht even though he makes no investment. It shows that investment is not necessary condition for ownership. 如果富翁是必不可少的，即使他不投资，他也应该拥有游艇。这表明投资不是所有权的必要条件。

In general, if an agent is indispensable, it is efficient to assign to the property right to her, regardless of whether she has the option to take an investment ex-ante.

3.3.3 The yacht example C

54 Assumptions:

- Yacht consists of two parts, the galley and the hull, which are complementary. 游艇由厨房和船体两部分组成，它们是互补的。
- Assume that all three agents can be replaced in period 2 (all are dispensable). 所有人都是可替代的
- Each agent can take an investment that increases the value by 240, and costs c_T , c_C and c_S respectively.

55 Compare two ownership structures:

- Non-integration: chef owns the gallery, skipper owns the hull.
- Integration: chef owns gallery and hull.

Which ownership structure is more efficient?

	tycoon invests iff	chef invests iff	skipper invests iff
Non-integration	$c_T \leq 80$	$c_C \leq 120$	$c_S \leq 120$
Integration	$c_T \leq 120$	$c_C \leq 240$	$c_S \leq 120$

56 Non-integration: The tycoon requires the chef and the skipper to generate his surplus of 240, so he gets only 80. The skipper and the chef only require each other to generate their surpluses of 240, so they get 120.

57 Integration: The tycoon only requires the chef to generate his surplus of 240, so he gets 120. The same holds for the skipper. The chef can generate his surplus alone, so he gets 240.

58 If two or more assets are complementary, they should be owned together. 如果两个或两个以上的资产是互补的，拥有权应该属于同样的人。

Joint ownership is dominated because it precludes outside opportunities and therefore offers neither party further protection from expropriation.

4 Applications

4.1 Financial contracts

59 One important application has been in financial contracts. Suppose, in the example of the manager, that true performance is difficult to use in a contract because the manager is able to divert the firm's profits.

60 The best solution may be for the manager to become an entrepreneur and own the firm herself—an entrepreneur can freely decide how to run the firm, and make the appropriate trade-off between actions that raise profits and actions that increase her private benefits. 最好的解决方案可能是经理成为企业家并自己拥有公司——企业家可以自由决定如何经营公司，并在提高利润的行动和增加私人利益的行动之间做出适当的权衡。

The limitation of this solution is that the manager sometimes cannot afford to buy the firm, so that outside investors have to finance the purchase. 这种解决方案的局限性在于，经理有时买不起公司，因此外部投资者不得不为购买提供资金。

61 But if profits cannot be contracted on, how can investors be sure they will get their money back?

- 承诺提供部分未来收益，不行。因为经理可能有投机主义行为，类似于套牢问题。

- 将所有权给投资人。这同样也有问题，这会降低经理好好经营的动机。
- 因此需要在两者之间平衡。

62 Hart and Moore (1998): One solution is to promise them a **fixed future payment (regardless of profits) with collateral** (债务合约): if the payment is not made, ownership is transferred to the investors, who can liquidate the firm's assets. 如果不偿付债务，所有权将转移给投资者，他们可以清算公司资产。

This is actually how most bank loans work—and the theory explains why.

- With a debt contract the manager promises to make a fixed stream of payments to the investor. As long as these payments are made the manager remains in charge, that is, she retains (residual rights of) control. If a payment is not made control shifts to the investor, who can decide whether to liquidate the mine. At this stage renegotiation is possible. 通过债务合同，经理承诺向投资者支付固定的款项。只要支付了这些款项，经理就会继续负责，也就是说，她保留剩余控制权。如果不付款，则控制权转移给投资者，投资者可以决定是否清算矿山。在这个阶段重新谈判是可能的。
- The motivation for the manager to make a debt payment is very simple: she wants to retain control of the assets. Why is control valuable? Because the manager can use the assets to produce future monetary returns that she can then pocket. 经理偿还债务的动机很简单：她想保留对资产的控制权。为什么控制很有价值？因为经理可以使用这些资产来产生未来的货币回报，然后她可以将其收入囊中。

63 There are two reasons why the manager may **default on a debt payment**. 经理拖欠债务的可能原因有两个

One is if she cannot make the payment: revenue is too small as a result of an adverse shock, say. This corresponds to an **involuntary default**. 无法付款：例如，由于不利冲击，收入太少

The other reason is that the manager does not want to make the payment. In turn there can be two explanations for this.

- The first is that future revenues, which the manager can pocket, are worth less than what she is being asked to pay. 未来收入比债务要少
 - suppose that the assets will last for one more period and will generate \$100, but the current debt payment is \$120. (Ignore discounting.)
 - It is not worth it for the manager to pay \$120 to be able to earn \$100 in the future; it is better to default and pocket the \$120 now.
- The second explanation is that, even though the debt payment is less than the future revenues (say the debt payment is \$80), the manager may be able to default and renegotiate the payment down to close to the liquidation value of the assets (which might be \$60). 即使债务支付低于未来收入，经理也可能违约并重新协商支付以接近资产的清算价值

These last cases, where the manager can pay but won't pay, correspond to a **voluntary or strategic default**.

64 It shows **how important collateral is**.

- An investor will be less concerned about strategic default if the liquidation value of the assets is high, since the manager cannot renegotiate the debt below this level. Thus the manager will be able to borrow more in this case and more good projects can go forward. 如果资产的清算价值很高，投资者将不太担心策略性违约，因为经理无法重新协商使得债务低于清算价值。因此，在这种情况下，经理将能够借更多的钱，并且可以进行更多的好项目

- Similarly, if the assets are durable—their liquidation value remains high over time—the maturity of the debt can be longer: the investor will not be vulnerable to strategic debt renegotiation late in the project's life. 同样, 如果资产是耐用的——随着时间的推移, 它们的清算价值仍然很高——债务的期限可以更长: 投资者在项目生命周期的后期将不会受到策略性债务重新谈判的影响

65 Notice that **inefficient liquidation** can occur. 非有效的清算依然会发生

- The assets generate \$100 next period, the current debt payment is \$80, and the liquidation value is \$60. Suppose that current revenue is \$40.
- Clearly the manager will default since her \$40 does not cover the debt payment. The investor can liquidate for \$60 but the assets are worth more than this—\$100—if they are left in place.
- In an ideal world, a Coasian renegotiation would ensure that the assets are indeed left in place. In such a renegotiation the manager would compensate the investor for the \$60 liquidation value that he gives up by promising part of next period's \$100.
- However, the parties are not operating in an ideal world. The promise to pay part of the \$100 next period is not credible. Since this is the end of the project, and the assets will have no further value, the investor knows that he will have no leverage then: the manager can pocket all the \$100 with impunity. Thus the only way for the investor to be paid is to liquidate now.

66 In Hart and Moore (1994), the assumption that the manager can pocket the monetary returns is replaced by the assumption that the **manager can withdraw her human capital**.

- Suppose that a project costs \$100 at date 0 and yields \$120 at date 2. The manager borrows the \$100 and promises to repay this amount at date 2. At date 1 the manager could threaten to withdraw her human capital unless the debt is reduced. If the parties have equal bargaining power, and the project has zero value without the manager, then the debt can be renegotiated down to \$60, and an investor who foresees this will not lend money.
- Collateral can again help here. If the assets have an alternative use at date 1, then the investor is at least partially protected against strategic default.
- The Hart-Moore (1994) model reminds us again of the distinction between human and non-human assets.
 - A project that consists mainly of human capital is difficult to finance because an investor is subject to hold-up by the human capital.
 - Conversely, a project that has significant non-human assets can be financed without the fear of hold-up.

67 More generally, incomplete-contract theory predicts that **entrepreneurs should have the right to make most decisions in their firms as long as performance is good**, but **investors should have more decision rights when performance deteriorates**. 更一般地说, 不完全合约理论预测: 只要业绩好, 企业家应该有权在他们的公司中做出大多数决策, 但当业绩恶化时, 投资者应该有更多的决策权。

This feature is typical of real-world financial contracts, such as the sophisticated contracts signed by entrepreneurs and venture capitalists.

4.2 Privatisation

68 Another application concerns the division between the private and public sectors. 私营部门和公共部门之间的划分

There is a long-standing dispute over whether government payment for a certain activity should imply government ownership of that activity. “政府对某项活动的支出”是否要求“政府拥有该活动的所有权”

Most people agree that there are some things for which government should pay (such as infrastructure). Less clear, however, is why government should own things. 大多数人都同意有些事情是政府应该支出的（例如基础设施）。然而，不太清楚的是为什么政府应该拥有这些东西

For instance, schools could be owned by firms, and government could give students vouchers that pay for the cost of education. Prisons too could be owned by private firms. With some creativity, national defense and police services could be provided by private firms. 学校可以归公司所有，政府可以给学生代金券来支付教育费用。监狱也可以归私人公司所有

On the other hand, Medicare and Medicaid services could also be provided by a network of government-employed doctors. Government ownership is highly prevalent in certain sectors of the economy, and almost absent in others. 另一方面，医疗保险和医疗补助服务也可以由政府雇用的医生网络提供。政府所有权在某些经济部门非常普遍，而在其他部门几乎不存在

- 69 What factors determine the government make-or-buy decision? Should providers of public services, such as schools, hospitals, and prisons, be privately-owned or not? 哪些因素决定了政府制造（拥有）或购买（支出）的决定？学校、医院和监狱等公共服务的提供者是否应该私有化？

Hart, Shleifer, and Vishny (1997): This depends on the nature of non-contractible investments. 这取决于不可缔约的投资的性质。

- 70 Suppose a manager who runs a welfare-service facility can make two types of investment: some improve quality, while others reduce cost at the expense of quality. 假设经营福利服务机构的经理可以进行两种投资：一些提高质量，而另一些以牺牲质量为代价降低成本。

Additionally, suppose that such investments are difficult to specify in a contract. 假设此类投资难以在合约中指定。

- 71 If the government owns the facility and employs a manager to run it, the manager will have little incentive to provide either type of investment, since the government cannot credibly promise to reward these efforts. 如果政府拥有该设施并聘请经理来管理它，那么经理将没有动力提供任何一种投资，因为政府无法可靠地承诺奖励这些努力。

- 72 If a private contractor provides the service, incentives for investing in both quality and cost reduction are stronger. 如果由私人承包商提供服务，则对质量和成本降低的投资激励会更强。

Moreover, the private contractor's incentive to engage in cost reduction is typically too strong. 此外，私人承包商降低成本的动机通常更强。

- 73 The desirability of privatisation therefore depends on the [trade-off between cost reduction and quality](#). 因此，私有化的可取性取决于成本降低和质量之间的权衡

In general, the greater the adverse consequences of (non-contractible) cost-cutting on (non-contractible) quality, the stronger is the case for government ownership. 一般来说，（不可缔约的）成本削减对（不可缔约的）质量的不利影响越大，政府越有必要拥有所有权。

- Private provision could be better in situations where innovation matters and violence is a relatively small problem, e.g., half-way houses or youth correctional facilities. 在创新很重要且暴力问题相对较小的情况下，私人供给可能会更好，例如中途之家或青少年惩戒设施。

- However, in maximum security prisons, where the prevention of violence by prisoners against guards and other prisoners is paramount, Hart et al. (1997) conclude that the case for private provision is weak. 然而，在高度安全的监狱中，防止囚犯对看守和其他囚犯的暴力行为至关重要，私人供给可能就不太够。

74 Hart et al. (1997) use the same logic to argue that private provision makes sense for garbage collection, does not make sense for the army, police or foreign policy, and may or may not make sense for schools and health care. 同样的逻辑：私人供给对垃圾收集有意义，对军队、警察或外交政策没有意义，对学校和医疗保健可能有意义，也可能没有意义。

Competition strengthens the case for privatization since actions that reduce quality will elicit a negative market response. Competition may work fairly well in the case of schools and hospitals, but it is hard to imagine it operating in the case of prisons. 竞争加强了私有化的理由，因为降低质量的行为会引起负面的市场反应。竞争在学校和医院的情况下可能运作良好，但很难想象它在监狱的情况下运作。

75 Federal authorities in the United States are in fact ending the use of private prisons, partly because—according to a recently released U.S. Department of Justice report—conditions in privately-run prisons are worse than those in publicly-run prisons. 美国联邦当局实际上正在停止使用私人监狱，部分原因是——根据最近发布的美国司法部报告——私人监狱的条件比公立监狱的条件差。

4.3 承包制

76 1978 年底，安徽省凤阳县小岗村的十八位农民，冒着巨大的风险，立下了生死状，悄悄签订了农村土地承包责任书。之后，得到正式承认的“农村家庭联产承包责任制”拉开了中国农村改革的序幕，并且改变了无数农村的经济面貌。

77 1984 年，大量国有企业开始模仿农村家庭联产承包责任制的做法，将企业承包给经理人。

通常的承包方式是：

- 一个承包期是三四年，承包人自负盈亏，
- 每年向国家上交一个固定的利润数，
- 剩下的利润一部分奖励承包人，一部分用于企业发展和工资发放。

通俗地说就是“交够国家，留足集体，剩多剩少归自己”。

78 国有企业承包可以简单地视为上级主管部门与经理人之间的一种委托代理关系。他们之间的承包合约是不完全的。

- 经理人上交的利润是多了还是少了？
- 经理人在承包期内如何合理地使用企业资产？
- 承包期结束后如何保证续约？
- 承包导致严重亏损时谁来承担责任？

79 问题：

- 因为时代限制，承包制对经营效果较好的经理人的奖励十分有限，这种有限的奖励也往往难于兑现。
- 对国企主管部门来说，它拥有剩余控制权但只能获取固定的利润，因此也容易产生机会主义行为。如果承包期内国企赚钱很多，它会眼红，于是下一个承包期它会大幅提高利润上缴额度，否则它有权更换承包人。

- 对承包国企的经理人而言，目标是在短暂的承包期内实现最大化利润。因此他有很强的短期机会主义行为。他会涸泽而渔，过度使用企业机器、厂房和其它资产，不会做任何长远的投资和研发，这必然给以后的承包者埋下“地雷”并损害企业的可持续发展能力。
- 80 因此，经理人并不会因为实施了承包制就努力工作，因为他们努力了企业也并不一定会好起来，即使好起来了，他们也很可能得不到什么好处。如果他们不努力工作，则即使企业绩效差他们也可以把原因归结为企业的负担太重、受到的管制太多，甚至外部的宏观环境太差。
- 81 国企的股份制改革就是一个正确的方向。

5 Challenge

- 82 A basic premise of property rights theory is that there is some information that is observable to the contracting parties but not verifiable by a court, so that contracts are necessarily incomplete and property rights matter.

This premise was sharply questioned by Maskin and Tirole (1999a, 1999b), who suggested that observable information can be made [verifiable by the use of cleverly designed revelation mechanisms](#).

- 83 There are two parties, a buyer B and a seller S of a single unit of an indivisible good. If trade occurs, then B's payoff is $V_B = \theta - p$; where θ is the value of the good to the buyer and p is the price. S's payoff is just $V_S = p$. The good can be of either high or low quality. If it is of high quality, then B values it at 14; if it is of low quality, then B values it at 10, thus $\theta \in \{10, 14\}$.

- 84 Suppose that the quality θ representing the true value of the good to the buyer is observable and common knowledge to both parties.

Even though θ is not verifiable by a court, and therefore no initial contract between the two parties can be made credibly contingent upon θ , truthful revelation of θ by the buyer B can still be achieved through the following mechanism:

- B announces θ to be either “high” or “low.” If he announces “high,” then B pays S a price equal to 14 and the game then stops.
- If B announces “low” and S does not “challenge” B's announcement, then B pays a price equal to 10 and the game stops.
- If S challenges B's announcement then:
 - B pays a fine F to T (a third party), and
 - B is offered the good for 6.
 - If B accepts the good, then S receives F from T (and also the 6 from B) and we stop.
 - If B rejects at stage (c-ii), then S pays F to T, and
 - B and S Nash bargain 50 : 50 over the good.

- 85 When the true value of the good is common knowledge between B and S, this mechanism yields truth telling as the unique (subgame perfect) equilibrium.

To see this, let the true valuation be 14; and let $F = 9$.

If B announces “high,” then B pays 14 and we stop.

If, however, B announces “low,” then S will challenge because, at stage (c-i), B pays 9 to T and, this cost being sunk, B will still accept the good for 6 at stage (c-ii) (because it is worth 14 and $14 - 6 = 8$ is greater than $14/2 = 7$, which is

what B gets if it rejects the offer of 6). Anticipating this, S knows that by challenging B, S receives $9 + 6 = 15$, which is greater than the 10 that S would receive if S did not challenge. Moving back to stage (a), if B lies and announces $\theta = 10$ when the true state is $\theta = 14$, B gets $14 - 9 - 6 = -1$, whereas B gets $14 - 14 = 0$ if B tells the truth.

86 These kinds of revelation mechanisms are never observed in practice. Why not? One possible explanation is that these mechanisms are not robust to even small deviations from common knowledge.

87 Hart and Moore (2008) consider a simple situation of a buyer B and a seller S, who meet at date 0. At that time there is a competitive market for buyers and sellers, but after date 0 B and S will pair off and will be isolated from the market.

At date 1 there are gains from trade. S can supply one widget at cost c and B obtains value $v > c$ from it. All returns are measured in money (but these returns are not verifiable).

88 For simplicity, suppose that the reservation utility determined in the date 0 market for buyers and sellers is zero.

One contract that B could offer to S that will give B all the gains from trade is the following: The contract states that at date 1, B will make an offer to S that S can accept or reject; S cannot make any offers to B. As we have seen, under standard rationality assumptions, B will offer S just above c at date 1, S will supply the widget, and B will receive the full surplus $v - c$.

89 They assumed that even ex post perfect contracts cannot be written and so it is possible for both the buyer and seller to provide [less than ideal performance](#) while staying within the terms of the contract: we refer to less than ideal performance as “[shading](#).”

In the buyer-seller example, the seller might shade by supplying a widget of deficient quality, while the buyer might shade by not providing information that would make the seller’s task easier.

A critical assumption is that a party will shade if and only if he does [not feel well treated](#).

90 B will make a take-it-or-leave-it offer to S. Let B offer a price just above c . S will consider this unreasonable given that B could have been more generous. Indeed, the best outcome for S under the contract would be for B to offer v (anything more than v would involve B’s making a loss and so would not be individually rational). How much does S shade given the actual offer c ? Hart and Moore (2008) assume that shading is a fraction of how much S is shortchanged or aggrieved, where the latter is the difference between the payoff S feels entitled to—here $v - c$ —and what she gets—zero. Specifically, S reduces B’s payoff by $\theta(v - c)$, where $0 < \theta < 1$. Shading does not affect the payoff of the party doing the shading.

In sum, under the contract that gives B the right to make a take-it-or-leave-it offer to S, there will be a deadweight loss of $\theta(v - c)$.

Note that there is no way of negotiating around this. Coasian bargaining fails because shading is noncontractible. B could, of course, offer more than c to reduce S’s aggrievement, but it is not in his interest to do this: offering a dollar more increases B’s cost by a dollar but reduces shading by only θ .

91 There is, however, a solution to this problem in this simple example. B and S could fix the price in advance: they could write a contract at date 0 that specifies the date 1 price of the widget to be c .

In this case neither party has any discretion at date 1. B and S both regard the price c as fair since it is negotiated at arms-length in a competitive market at date 0. There will be no shading or deadweight losses at date 1 and the full surplus $v - c$ will be earned. The first-best is achieved.

92 A further assumption is made that S has zero wealth. Suppose that $v = 20$ for sure but $c = 16$ with probability π and 10 with probability $1 - \pi$.

The uncertainty about c will be resolved shortly before date 1 and the realization of c is then observable to both parties. However, c is not verifiable. The probability distribution of c is common knowledge ex ante.

Assume further that ex post trade is voluntary: either party can refuse to trade and not be penalized, perhaps because a third party cannot verify who is responsible for the absence of trade.

B and S are both risk neutral. There are many more buyers than sellers in the date 0 market and so the reservation utility level for S is zero. Finally, ignore renegotiation for the moment.

- 93 What is an optimal contract for B to offer in this setting? There are only two possibilities. Either B wants to ensure trade in both states or only in the low cost state.

In the first case the optimal contract will specify a price range $[10, 16]$ and allow B to pick from this range at date 1. That way B can guarantee trade whether c is high or low, given that trade is voluntary. Moreover, this is the smallest price range that will do the job, which minimizes aggrievement and shading.

With such a contract B will choose $p = 10$ when $c = 10$ and $p = 16$ when $c = 16$.

- In the low cost state S will be aggrieved since B could have been more generous and have chosen the best outcome for S, $p = 16$. S's level of aggrievement is 6. S punishes B by shading by 6θ , and so B's net payoff is $10 - 6\theta$.
- In the high cost state, S is not aggrieved since she receives the highest price permitted by the contract. B's payoff is 4.

The expected payoffs for the two parties are, respectively,

$$U_B = (10 - 6\theta)(1 - \pi) + 4\pi, \quad U_S = 0.$$

Call this flexible contract, contract 1.

- 94 On the other hand, B can choose a contract that permits trade only in the low cost state. The best such contract fixes the price at 10. The expected payoffs of the two parties are, respectively,

$$U_B = 10(1 - \pi), \quad U_S = 0.$$

Call this rigid contract, contract 2.

- 95 Obviously, contract 2 is better than contract 1 if and only if

$$10(1 - \pi) \geq (10 - 6\theta)(1 - \pi) + 4\pi.$$

This will be true if π is small.

- 96 In other words, B will offer S a fixed price contract that precludes trade in the high cost state if that state is unlikely to occur.

The intuition is simple. It is not worth expanding the price range from 10 to $[10, 16]$ just to realize trade in the high cost state if it has low probability, given that this causes a large deadweight loss from shading in the low cost state that has high probability.

- 97 Note also the importance of S's wealth constraint. In the absence of such a constraint, B could offer a contract that specifies $p = 16$, leading to trade in both states. B could charge S upfront $6(1 - \pi)$ for this contract, thus recouping all of S's expected profit.

- 98 It is immune to the Maskin-Tirole critique. Mechanisms or take-it-or-leave-it offers do not achieve the first-best. Indeed, contract 1 contains such a mechanism and leads to shading.
- 99 There can be ex post inefficiency. If π is small, B will deliberately choose a contract that causes trade not to occur with some probability.

Task

- Reading:
 - [Popular Science Background](#) and [Scientific Background](#) on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2016.
 - [Prize Lecture by Hart](#).
 - 第 17、19、27、32、33、35 讲 in [聂].
 - 第 6 章第 4 节 in [陈].
- Understanding:
 - Why do firms exist?
 - What is the firm?
 - What is the boundary of a firm?