Contract Design

60500 characters in 9455 words on 1565 lines

Florian Moser

October 23, 2020

1 Introduction

1.1 lecturers

alexander stremitzer (prof law at bonn)
nate atkinson (postdoc law & economics)

1.2 target

how to structure deals strategically
(off-topic is the legal language to implement this)

strategically read contracts
when cost-plus → expect cost control clauses
when fixed price → expect quality control clauses

strategically write contracts
choose appropriate overall structure
align incentives to reduce transactions cost

1.3 why state enforces contracts

well functioning system increases societal health
as voluntary transactions enhance welfare
bc seller sells only if price ≥ valuation
bc buyer only buys if price ≤ worth
worth - valuation = welfare increase

other arguments
companies do not have to prepare for other scenarios

limitations
duress, misrepresentation, fraud, uninformed decisions
state must not enforce in these cases
like parties benefiting by hurting others (hitman)
like anticompetitive contracts (preisabsprache)
like externalized cost (selling drug)
like unknown interests (children, incapacitated)

enables economic growth
specialization generates value, but needs division of labour
the cheaper trade, the more fragmented division possible
hence the richer society gets

transaction cost
might make deal more expensive than what its worth
by this, may also prevent some deals to happen
need to optimize transaction cost by optimal clauses
contract writers as "transaction cost engineers"

2 contractible effort

2.1 contract motivation

coordination
agreement about technicalities without conflict of interest
"cheap talk" is enough (no sanctions needed to enforce)
like on which street side to drive on generally
like at which time to deliver so buyer/seller meet

spot transaction
immediate exchange of goods
like buying an apple & paying for it at the store

sequential transactions
goods/services exchanged, potential conflict in the future
like sale (need guarantees product meets expectations)

2.2 conflict of interest

ex-ante (before) and ex-post (after) incentives might be different
rational choice could be to defect later on
as other party knows, might prevent contract

2.2.1 solution options

use ex-ante interests to commit to value
to settle potentially conflicting ex-post incentives

repeated transactions
smaller contracts / reputation systems
works if payoff defect < future transactions benefit

prevent problem
agree on technical solution that prevent problem
like pulling teeth of viper, smart contracts, ...

compensation
compensate for damages
prevents problem if compensation cost higher than defection payoff

criminal sanctions
penalize injurer
prevent problem if penalty cost higher than defection payoff

2.3 value to commitment

commit tools
governance systems and institutions
contracts (use formal language to clearly commit)
promises (willingness to not break a promise, being honest)
moral institutions (willingness to be fair to others)
technical solution (like smart contracts)
enforce by law, continued relationships, reputation, social sanctions

smaller commits
result in smaller temptations to break it
work with milestones (smaller units of work & payment)
transforms one-shot to repeated transaction

2.4 contract structure

define payoff resulting from different clause of action
depends on social model, contracts, institutions, ...

general approach
outcomes result from human interaction, constrained by institutions
model behaviour to find out likely outputs
motivates institutions to be constructed

model human behaviour
assumptions need to be realistic
like "more money better", "less work better"

institution viewpoints
evolutionary hypothesis (existing structures exist bc they work)
social engineering ("triumph of reason")
piecemeal social engineering (look at existing contracts)
utopian social engineering (mechanism design, game theory)

analyse existing contracts
be humble (may contain concealed wisdom)
hence might not be best to simply rewrite contracts
but game theory / mechanism design helps to improve

2.5 contract types

care about risk, quality and cost
choose appropriate type so interests align

cost-plus
seller invoices direct cost + some profit margin
fit if quality important / monitoring difficult, small companies
need to control cost, to avoid expected cost overruns
with cost ceiling, approval for bought products, ...

fixed price
seller invoices full cost in advance
fit for large / diverse operator

need to control quality, to avoid expected quality underruns
with warranties, define product quality, certification

2.6 contract value

work done
seller is able to produce goods at some cost
which is lower than benefit of those to buyer

risk-shifting
shift risk from risk-averse to risk-neutral party
like large operator can diversify / take risk better
shift risk to party controlling it
like seller might has superior information about the product
price rises due to the risk shifting, but worth to other party
like insurance contracts

3 contractible effort examples

3.1 before/after incentives

"the farmer and the viper" (fable by aesop)

setup
viper is in a ditch, and cold / about to die
farmer wants to buy the viper, but does not want to get bitten
viper promises to not bite
farmer takes viper home and warms it up
viper bites farmer, farmer dies

trust game model
farmer/viper payoff
(1) 0/-20 not saving viper; viper dies
or (2) saving viper, then
(a) 5/5 viper does not bite farmer
(b) -20/10 viper bites farmer
hence rational choice of viper to bite
hence rational choice of farmer not to save

save the viper
need to change the game so viper does not bite any more
prevent bite by taking tooth out or mouth muzzle

interpretation
at (1) interests align (viper live, farmer save)
but at (a or b), conflict of interests
hence need to agree at (1) to solution
at (2), an agreement is impossible

3.2 conflict of interests

inventor vs VC
inventor / VS payoff
(1) 1/1 not revealing idea
or (2) revealing, then
(a) 6/6 VC cooperates
(b) -20/20 VS steals idea
hence VC will steal the idea

buyer vs producer
if payment first, buyer risks low-quality product
if product first, producer risks missing payment
more drastic if tailored product

insurance vs customer
if house burns down, insurance does not want to pay

asymmetric information sale
when selling something other has not full information about
need assurances, else transaction likely fails

conclusion
client mistrusts if no warranty given as seller has information superiority
seller needs to grant warranty or else sale will no happen
hence used common interest ex-ante
to agree on terms which resolve different interests afterwards

3.3 value to commitment

warranty clause
seller sells only high quality goods, valuation at 60
buyer values low/high quality at 20/80, but unable to detect quality
as buyer values product at 50, no sale happens
by including warranty clause (pay 60 if low quality)
sale happens, and surplus 20 is created (at buyer or seller)

4 moral hazard

when agents actions are unobservable
need to compensate on something different than effort
creates incentive issues

4.1 terminology

incentive constraint
if incentive exists to act as expected
for example contingency clause motivating high effort

participation constraint
if deal has expected positive payoff for party
for example payoff higher than cost of production / risk

first-best
exchange reached if everyone acts in the common interest
unreachable in practice (ignores private interests of actors)
first-best risk allocation when company takes all the risk
is only possible if agent is honest
contracts needed bc in reality agents use freedom for self advantage

second-best
as close as possible to first-best but including private incentives
hence the realistic contract actually feasible in practice
lose some contractual pie to transaction cost, distortion

zero sum game
if no value created (only allocated)
game-theory approach, but not always true in contracts
bc mutually beneficial clauses increase contractual pie

mutually beneficial term
introduce clauses where costs of $p_1 <$ benefit for p_2
because the contractual pie increases
hence can compensate other party for loss

4.2 contingency contract

payoff depending on result of project

legal remarks
by law, some contingency may apply automatically
"auftragnehmer muss sorgfältig tätig sein"
$\Rightarrow$ by law required to deliver up to some quality
needs not to be spelled out in legal document
legal doctrine applies automatically

4.3 non-contractable effort

if effort not directly measurable contingency clause impossible

4.3.1 when missing

describability (high-effort not known in context)
like travelling sales person; boss is not present
observability (monitoring might not be possible)
like software engineer; boss does not understand work
verifiability (effort not provable in court)
link employee performance; low effort might not be documented

4.3.2 alternatives

contract on signal
contingency clause on signal of effort
like commission, bonus, stock options, hours worked

invest in monitoring
expand contractable contingencies to be observable
invest in monitoring, specialized courts / dispute boards
like cameras on construction sites, ...

self-enforcing mechanism
reputation mechanism for repeated observable interaction
helps to reduce reliance on verifiability
needs observability to be useful
like not extending contract if performance bad

4.4 contract on signal

4.4.1 signal types
"perfect signal"
if output deterministically on effort
simply use contingency contract on signal

"stochastic signal"

if output influenced by other factors than effort
signal is noisy, has some error term
like general market health, colleagues in the office, ...
if output reasonable influenced by effort then still useful

4.4.2 strategies

step function
payoff as soon as some signal strength reached
if noise is known, can compensate all high effort equally
like shifting support scheme
but if noise not exactly known / error terms
then may lead to changed incentives throughout the project
if goal become unreachable or is already reached $\Rightarrow$ low effort

linear
payoff scales with signal strength
but if noisy, may gives different payoff to same real value

4.5 risk sharing

create value by shifting risk from risk averse to risk neutral party

4.5.1 principle

"who controls the risk should bear risk"
like producer controls quality
like regional firms controls regional law changes

4.5.2 risk types

risk neutral pays expected value
risk averse pays less than expected value
risk seeking pays less than expected value

4.5.3 assumptions

risk averse individuals assumption
decreasing marginal utility of money
if low income rather than millionaire
lifestyle changes more radically with same amount

prospect theory
expected payoff usually not used by individuals
prefer lower but secure payoff than larger but insecure (risk-averse)
prefer higher but insecure cost than lower but secure (risk-seeking)
value own property higher than economic value

special case lottery participant
actively risk-seeking
bc probably only way to earn that much money

4.5.4 risk diversification

helps to reduce risk
can take higher risks, but still be risk neutral

example
if owner of buildings & construction company at the same time
risk of earthquake close to neutralized

law of large numbers
probability that car crashes unclear, risky
but overall number of crashed cars in some area similar

4.5.5 risk taking party

less risk-averse party should take all risks

viewpoint conflicts
from risk-sharing point of view "first-best risk sharing"
party which can take higher risks should bear it
from incentive point of view "first-best incentives provision"
party which controls risks should bear it
will lose welfare through transaction cost
for example manager more risk averse than employer, but controls risk

4.6 uncertain output

optimal incentive scheme not necessarily increasing in output
like fast delivery is good, but do not want recklessness

uncertain signals
could be complex / non-linear
use probability density functions for good/bad measurements
use likelihood ratio of these curves to determine signal

mathematical foundation
derivation exists on how optimal contract c depends on input/output

if effort contractible, c independent on output
if effort not contractible, c dependent on output
if likelihood ratio high, then agent should be rewarded
if likelihood ratio low, then signal must be higher for same reward

4.7 effort measurement

if effort contractable, then contract directly on it
if effort non-contractable, then optimal contract depends on output

principle
relationship between optimal contract & output
works through information content of the outcome

valuable information
information must be a signal rather than noise
(like slow delivery time could just mean full streets)
signal correlated to other contains no value

comparisons to other agents
do relative performance evaluation to neutralize noise
like two investors in same market filter out noise

4.8 distortion

measured goals are targeted by actors if known
but potential problem if real target is not measured (only proxy)
"if measurement becomes a target, it ceases to be a measurement"
could try to be intransparent concerning what is actually measured

output factors
relatively undistorted (like measure sales)
but very much noise (why is it high / low?)

input factors
very distorted (how to measure effort?)
but not much noise (can observe single person)

4.9 shifting support schemes

assume curve known for low/high efforts
if supports (=ends) of distributions do not overlap
then can punish where only low effort was a possible input
no risks for compliant agents
like claw back clause (some money not payed out at some signal)

robustness to error
harsh punishments can start as soon as no overlaps anymore
but if error in expected curves then could punish good agents
like incorrectly estimated market risk
linear contracts perform better with errors

4.10 path dependence

effort is chosen not only once
information & incentives might change over time
like if goal unreachable then step function motives low effort

4.11 monitoring

output monitoring
more prone to error; increasingly when more "downstream"
external factors can affect output ("noisy signal")
but easy & inexpensive
like measuring worked hours, ...

input monitoring
some signals very accurate
like "hours worked"
but might be expensive/hard to observe (supervisors, monitoring technologies)
like "working hard" is again hard to observe

distortion
monitoring might not be able to catch all it needs to
agent will focus only on tested outputs
possibly better to not create incentives at all
like measure testing ability but not actual skill

reduce monitoring cost (becker)
make audits probabilistic & increase punishments
archive same deterrence with same expected cost
but limited wealth (simply cannot pay punishment)
but proportionality to crime lost (morally wrong)
but chilling effect (simply will not do task anymore)

but behavioural (small probabilities difficult to comprehend)

rules vs standards
fixed rules define how agents have to perform
easy to enforce but distortion likely, inflexible
standards define general ways how to behave
by standards committees & other knowledge authorities
undistorted & flexible, but vague & difficult to enforce

incentive rent-extraction tradeoff
low commission for distributor results in high profit per sale
but likely results in only low effort of distributor
vice-versa with high commission

4.12 probabilistic monitoring

monitor probabilistic while increasing punishment
keeps same deterrence with lower monitoring cost

conflict of view
breaks with traditional view of punishment proportional to crime
in favour of making it more efficient (mechanism design)

assumptions (which are likely wrong)
humans are rational with small probabilities
no wealth constraints
no monitoring mistakes
no "honest" mistakes (need to be able to observe intent)

conclusion
simplifying assumptions make process look rational
but recommendation not that great when relaxing them
wrong assumptions introduce chilling effect
which prevents trade as risk of wrong punishment too great

4.13 limited wealth changes risk behaviour

limited liability / bankruptcy (can only pay what is available)
the less wealth, the lower potential downside
hence higher willingness to gamble upside
bc do not have to pay cost of downside
asymmetry in risks and rewards distorts behaviour

willingness to game
if utility does not decrease
like take money of company rather than personal reserves

prevent
input monitoring for low-wealth individuals
safety monitoring
capital requirements for banks
mandatory insurance

5 moral hazard examples

5.1 moral hazard

firm (principal) introduces CRM to increase sales
consultant (agent) is payed to help introducing it

model
consultant can choose high/low effort
for high effort, cost is 100, company benefit 200
for low effort, cost is 10, company benefit 20
high effort joint gain 100, low effort gain 10

fixed fee contract proposals
(1) for fixed fee contract for 150 & low effort chosen
then principal loses 130, hence no deal
"participation constraint" violated
(2) for fixed fee contract for 15 & low effort chosen
then principal/agent both earn 5, hence contract entered

(3) contingent contract
payment as function of condition
"if high effort, then 150 payed"
principal/agent both earn 50, hence deal valid
agent agrees to constraint bc else no contract

mutually beneficial term
from (2) to (3) cost of agent increased by 100-10 = 90
but benefit for principal increased by 200-20 = 180
hence contractual pie increased by 180-90
use surplus money to pay agent

5.2 non-contractable effort

performance of manager depends on effort & market condition

setup
manager spends low/high effort (10 / 100 cost)
company benefit for high effort 50% for 400 (success), else 0
company benefit for low effort 5% for 400 (success), else 0
best case output is hence 0.5*400 + 0.5*0 - 100 = 100

fixed salary
company bears all the risks
manager has no incentive any more for high effort

step function
300 bonus in case of success else 0
then manager chooses high effort
hence manager expected payoff 0.5*300 + 0.5*0 - 100 = 50
hence company expected payoff 50
best-case reached (as 100 is best-case joint surplus)
(depending on bargaining power, company or manager earns more)
like bonus depending on reached goals

sell shop
manager buys company for 50
then manager chooses high effort
both again get expected payoff of 50
like management buyout

risk sharing
for step function; both bear risk
for sell shop; agent bears all risk

risk averse manager
step function compensation valued at 30 (-20)
sell shop compensation valued at 20 (-30)
step function preferred by manager
but joint surplus only at 80 (-20)

5.3 risk sharing

cell phone insurance by apple
able to diversify risks & enough money
but user controls risks if cell phone is destroyed
⇒ insuring increases risk of damage ("moral hazard")

landlord / tenant agreements
risk neutral rich landlord
values risk of loosing 100k close to expected cost
risk averse low income tenant
values it much higher bc of resulting lifestyle impact

insurance
risk neutral insurance
deductible (some low amount beared by the insured)
limits (max amount payed out)
co-insurance (some percentage beared by the insured)
exclusions (exclude some damages, reductions for recklessness)

mortgage crisis
combine mortgage claims in packets (risk diversification)
distribute to many agents (low price → risk neutral agents)
mortgage granted if background check passed for applicants
and if vehicle score > 620, then selling mortgage in the bonds possible
observed more defaults > 620, bc banks skipped background checks
as risk sold out, no incentive to evaluate risk (moral hazard)
resolve by "skin in the game" → banks need to keep some part
many institutions bought these bonds bc AAA ratings & high interests

5.4 production / distribution risk sharing

distributor D earns 11% + expenses, rest for producer P

D high effort
through payment structure, D only incentive to cover own cost
introduce monitoring through P (meaningful consulting, ...)
include non-discriminatory clauses to movies produced by D
(expected to be non-distorted, bc interests align)

P high efforts
P has requirements to involve key persons, minimum budget
P also has exclusivity clause (no different distributions)

no-cross-collateralisation
(movies are accounted separately)
prevents D taking unnecessary risks after successful movie
prevents P to stop investing into films after - bad movie

no sell-the-shop
pricing unclear, effort unobservable

5.5 uncertain output

truck driver delivery speed
fast & intact delivery suggests good job
but too fast delivery suggests reckless driving

probability density function
deliver speed curve c_{good} of good driver more to right
deliver speed curve c_{bad} of bad driver more to left
calculate likelihood ratio c_{good} / c_{bad}
as probability density gets higher, more likely good driver

include reckless driving
curve of bad driver increases for very fast speeds again
hence likelihood ratio decreases again at the end

5.6 path dependency

bridge construction
bridge designed for 5 year construction
in the final phase cable & damper technology installed
base payment & big bonus if some quality reached
but potentially during the project goal reached or unreachable
hence low/high effort incentive change

5.7 monitoring

sales company
unclear if contingency should be placed in sales or on monitoring results
sales could be too noisy or monitoring too expensive

southwest airlines
employees with large profit sharing for employees
efforts of single employee has no real effect (signal is noisy)

wristband amazon
allows to calculate how effective employees perform

teacher bonus
paying teachers based on PISA test results
teachers will shift priorities to actually tested skills
might leaves out social skills, critical thinking, ...
might motivate to cheat

football
get bonus with each goal
players argue over who shoots, rather than the best does

sears
commission based on repairs
unnecessary repairs / disgruntled customers

salefites
commission for each windshield installed
but if its broken, then had to fix for free
worked well

manager pay based on accounting
managers might reduce R&D for short term benefit
use stock options, claw clauses, long-term payout to combat

agency marketing
could contract to spend fixed amount on marketing specific product
but distortion possible, potentially nonsense amount
likely better to agree on "best effort" standard of industry

distributor
with commission-based sales difficult to balance commission
with directly sold goods, distributor needs enough money to do so
could add reputation / repetition system

5.8 probabilistic monitoring

rent car
forgot to pay for the gas at gas station
able to pay later + potentially a fine
with probabilistic monitoring, high fine / jail time required

5.9 limited wealth problem

manager bonus
manager gets bonus of 10% of companies benefit
investment 1 has 50% that payoff 100, else 0

company expected = 50, manager expected = 5
investment 2 has 50% that payoff 100, else -200
company expected = -50, manager expected = 5

6 legal regimes

how background rules affect contract design
courts may not enforce contract as written

6.1 tasks of contract designer

economic problem (mechanism to minimize transaction cost)
legal problem (get court to enforce mechanism as intended)

6.2 consideration

to form contract consent is enough in civil law
else need "consideration" (own behaviour somehow restricted)
contracts without exchange potentially not enforceable
could ask for small monetary amount or "good faith"
but courts could also imply good faith without it being stated

6.3 contract enforcement

formation
no contract exists
requirement as specified in contract unmet (like physical signature)
like amount > 500, duration > 1y need written contract (USA)
like sale of land without notary (CH)
like only promise exists (bc promise != contract)

defenses
contract not enforceable
like misrepresentation, unconscionability
like public policy

interpretation
contract means something else
most legal problems happen in this area
like price unreasonable for informed parties

excuses
non-performance is excused
impracticability / frustration of purpose
like rented concert avenue burning down & owner not responsible
then can not sue him for lost money

remedies
desired remedy (payoff) not available
under-compensatory damages (for example for immaterial damages)
like immaterial harm (band misses performance, privacy violations)

6.4 remedies

punitive
additional to compensation get punishment
like additional money or material payout
less common in civil law

compensatory
specific (breaching party forced to perform)
substitutional (other remedy payed out)

substitutional remedy amount
expectation (as much as performance would have resulted in)
calculate like promised value - received value
reliance (restore pre-contract state)
calculate like value before - value now + damages incurred
restitution (reverse all exchanges; damages are not reimbursed)
litigated damages (contract predetermined amount payed)
default is expectation damages

litigated damage clauses
only enforced if not considered excessive, else "penalty clause"
but what may seems excessive ex post might be reasonable ex ante
convince court and/or declare explicitly in contract

6.5 courts

may not always enforce contracts such as it is written
will try to interpret contract to intended meaning

invalid clauses
when unconscionable or against public policy
if appearing unfair (but might only be the case ex post!)

constructive conditions
when conditions obviously depend on each other
does not always has to be specified explicitly
like when customer does not pay in sell contract
then do not have to deliver good

in court
understanding the deal structure (ex-ante incentives)
helps to make arguments & counterarguments in litigation

7 legal regimes examples

7.1 substitutional remedy

serious injury on hand results in work defects
doctor persuades patient for experimental hand surgery
doctor promises 100% restoration of hand function
but surgery went terribly wrong

model
values always pre-op, post-op and promised
value of hand 5000/2500/10000
cost of operation 0/1000/1000
pain from surgery 0/1500/1500
assuming doctors experience benefit worth 2000

substitutional remedy amounts
expectation damages 10000 - 2500 = 7500
reliance damages 5000 - 2500 + 1000 + 1500 = 5000
restitution damages 1000 + 2000

7.2 hard to enforce

NDA
source of information is hard to determine
hard to enforce liquidated damages ex-post
hard to show actually incurred damages

7.3 ex-ante remedies to enable contract

inventor wants to work with VC for more success
but risky bc VC could disclose idea

model
if inventor does not disclose idea to VC (1/1)
else inventor discloses to VC
(1) if VC performs, then (6/6)
(2) or VC does not perform (-20/20)
not performing two possible outcomes
(2a) if VC simply does not perform (50% chance) (0/20)
(2b) else VC additionally discloses idea (50% chance) (-40/20)
no deal bc VC will choose not to perform

contract + expectation damages
if VC simply does not perform (50% chance) (6/14)
else VC additionally discloses idea (50% chance) (6/-26)
hence VC does not perform payoff (6/-6)
deal bc VC will choose to perform

assume (2a) and (2b) not distinguishable / (2b) not quantifiable
if VC simply does not perform (50% chance) (6/14)
else VC additionally discloses idea (50% chance) (-34/14)
hence VC does not perform payoff (-14/14)
no deal bc VC will choose not to perform

assume liquidated damages of 16 or higher
court only needs to observe breach (not quantify damage)
if VC simply does not perform (50% chance) (16/-4)
else VC additionally discloses idea (50% chance) (-24/4)
hence VC does not perform payoff (-4/4)
deal bc VC will choose to perform

assume liquidated damages considered excessive
then in case (2a) only remedy of 6, hence only (6, 12)
hence VC does not perform payoff (-9/9)
no deal bc VC will choose not to perform

7.4 plain language vs intended meaning

beanstalk (marketing) vs AM general (hummer cars)

deal
beanstalk markets brand
gets 35% of all deals including hummer

conflict
AM general sells brand to GM motors
but does not want to pay 35%

question
what was the mutual intent of parties at time of written contract
plain language (as it was written) or would that be absurd?

argument
plain language needs to be interpreted
as how reasonable parties would have agreed to deal
beanstalk is in the trademark business
and hence gets commission for sales, merch, ...
but not entitled to commission for sale of whole company
as hardly intended in clause, as not contributed to it

counter arguments
parties did not want to clear up all cases
to prevent conflicts & sign fast
but possibly were aware of this potential outcome

8 asymmetric information

in contrast to complete information yielding efficient outcome
with asymmetric information only second-best possible
happens when one party knows something the other does not

8.1 phenomena

(low value) seller gets information rent or
high value goods are not traded
in continuous quality case, both happen at same time

buyer tradeoff
allocative efficiency (good goes to party valuing it highest)
extracting information rent (overpaying for good)

choosing a price
if low price, then information rent
but no allocative efficiency (high quality units not sold)
if high price, then allocative efficiency
but information rent (low quality sold for price of high)
if intermediate price both at the same time

8.2 unravelling of the market

model
seller can observe quality, buyer can not
continuous value range
buyer value = seller value + 10

first-best
with complete information, all goods are sold
as each good is worth more to buyer than to seller

offer 50
average value to seller is 50, hence average value to buyer is 60
any seller value lower than 50 will sell
50% chance of trade, average buyer value is 25 + 10 → payoff = -7.5
allocative inefficiency (because only 50% trade)
information rent payed for (many goods value lower than 50 sold)

offer 25
same problem as offer 50
25% chance of trade, average buyer value is 12.5 + 10 → payoff = -0.625

offer 5 (chosen by buyer)
5% chance of trade, average buyer value is 2.5 + 10 → payoff = 0.375

8.3 eliminating information asymmetry

costly, sometimes impossible

why
payoff when selling low value goods (information rent)
but high quality trades will not be possible anymore

third party verification
have expert / rating systems examine good
but costly & risk of collusion

require disclosure
presumes information is verifiable at some point
background legal rules which enable credible communication
(misrepresentation / fraud laws)

8.4 screening

when uninformed party creates contract
customers will all behave the same ("pooling utility")
but want to charge different prices ("differential utility")

pooling equilibrium
customers all take same contract
but contractual pie smaller than it has to be
due to allocative inefficiency (not all goods bought)
or information rent payed (too high a price)

separating equilibrium
customers take different contracts
use differently appealing aspects to sell customer types
based on differential utility, design multiple types of contracts
maximizes joint surplus (both low / high quality goods sold)
like support service to frequent users
like excessive working hours for high quality employees

8.5 signalling

when informed party creates contract
good types might accept inefficient terms to signal high type
like to sell warranty as a premium product seller

offer generous warranty
expensive, but even more for low quality
distortion at the top (as behaviour of top producers changes)
no distortion at the bottom (low quality producers will never offer warranty)
but creates moral hazard

invest in brand
costly commit to high quality (marketing, actually produce high quality)
generate high brand value at customers
then very costly to defect, as brand value is lost instantly
for unknown brand less a problem (as not much to lose anyway)

education & signalling
education more costly for low-types, hence signal for high-type
hence invest in education independently if employee benefits
same reasoning for low-salary internship which high-type accepts
as reasonable probability afterwards for job offer
in contrast to low-type which will be detected

8.6 distortion

behaviour changes suboptimally based on contract setup

with asymmetric information
can no longer fully trade in all cases (first-best unreachable)
design distortion to include private incentives
to make the contractual pie as large as possible
might be necessary to reach optimal second-best contract

bottom vs top
top distortion when high quality goods do not trade
like excessive education only to signal value
bottom distortion when low quality goods do not trade
like chip producer corrupting cheap chips

8.7 contract negotiation

good contractual solutions might exist
but difficult to negotiate

inefficient terms
inefficiency is accepted
because else negative signal might be sent
like prenuptial agreement, tenant contract

default terms
when contractual incompleteness likely
create default terms to replace negotiations

9 asymmetric information examples

9.1 asymmetric information

9.1.1 overlapping prices for high/low quality car

low /high quality undetectable for buyer
buyer simply assumes with 50% probability if high/low quality

setup

high quality car_1 (buyer value 100, seller value 50)
low quality car_2 (buyer value 50, seller value 20)

first-best
sell car_1 for $50 <$ price < 100
sell car_2 for $20 <$ price < 50
bargaining power determines exact price
all cars are sold

price 20
payoff buyer 15, payoff seller 0
only low quality cars traded; 50% no trade happens

price 50
payoff buyer 25, payoff seller 30
seller of low quality car archives "information rent" of 30

9.1.2 non-overlapping prices for high/low quality car

low /high quality undetectable for buyer
buyer simply assumes with 50% probability if high/low quality

setup
high quality car_1 (buyer value 100, seller value 70)
low quality car_2 (buyer value 50, seller value 20)

price 20
payoff buyer 15, payoff seller 0
only low Q cars traded; 50% no trade happens

price 70
payoff buyer 5, payoff seller 25
seller of low quality car archives "information rent" of 50

9.2 unravelling markets

insurance
for high risk people (conditions, dangerous lifestyle) very valuable
if single price set, unattractive to low risk people
but then prices for remaining high risk people go up
moral hazard problem (cost of dangerous activities sink)
adverse selection problem (high risk behaves differently as low risk)
$\Rightarrow$ mandate insurance

borrower rates
good borrowers will reject bad rates
banks left only with bad borrowers

9.3 screening

selling software
frequent users to which program is essential
infrequent users to which program is nonessential
frequent will disguise as infrequent
if high price, then infrequent will leave
if low price, then frequent will gain information rent

after sales service
service more valuable to frequent users than to infrequent
offer high price & after sell service $\rightarrow$ frequent have to choose this
offer low price & no after sell service $\rightarrow$ infrequent will choose this
but distortion that infrequent users do not get service anymore
even though it might still be efficient to provide

hire for indifferent employees
want to hire employees but can not differentiate ability
if high wage, then low quality get too much information rent
if low + high wage, then low quality will pretend to be high
assume high types work more efficiently than low type
offer high wage + excessive hours, low wage + normal hours
low types pick normal hours (as rest is not doable)
high types pick excessive hours (to get good wage)

other screening examples
phone company tries to sell expensive abo
airline makes first class nicer, second class worse
chip producer sabotages chip to sell functioning version for higher price

9.4 signalling

excessive education
as low-types much harder to finish
invest in education even if non-beneficial to employer
as it signals high-type person

waiving access to bankruptcy
costly for anyone, but much more to low-type company

hence good signal; without it loans might not be granted
but in many cases law prevents waiving access

9.5   distortion

prenuptial agreement
both spouses have considerable assets
in case of divorce, lawyers could be costly
hence create contract to avoid dispute
but suggesting the contract raises doubts

tenant contracts
include clauses that are invalid
but if spoken about, then contract will not happen

9.6   "cover all your bases"

the more the contract covers the easier to handle in court
includes already enforced legal doctrines / implicit claims
like copyright, implicit trust assumptions

representation
assert something to be true in the moment
to enforce, have to show it was untrue in the moment
useful if sometimes fact unknown; allocates risk to claimer

warranties
give concrete warranty to outcome or effort
easier enforceable in front of court

indemnify (=reimburse)
"should anything I say be untrue, I will indemnify"
spell out misrepresentation law
claimer will pay for damages caused by misrepresentation

10   elicitation mechanisms

how to get private values ("elicit") of other party

10.1   asset specific investment

asset which is more valuable in specific relationship than else
hence not protected by the market, lower resell value
like non-adaptability to other purposes / customers
with high specificity, need long-term commitment for other party

10.2   buy-sell agreements

work well with equal partner (similar ownerships / financial capabilities)
protect parties in case can no longer do business together

put-call provision (texas shootout)
one party proposes price p
other must buy all shares or sell its own for price p
in general works to buy/sell at reasonable price
if A offers p, then B payoff is abs(v_b - p)
if A knows private value v_b, can choose unfair offering price p

unequal partners
some value might be relationship specific
more valuable party can threaten to leave

10.3   auctions

take advantage of buyer's private value
flat price either too high or too low

auction process
sealed bid when placing without other knowing value
public auction when others learn value

revenue equivalence theorem
if bidders are risk-neutral & values independently drawn
then all auctions lead to same expected revenue for seller
& are efficient (person with highest value gets item)
assumes "independent" value (own valuation does not depend on other's)

model
item worth some value to me
others have independent, uniform distributed value 0-100

first price auction
highest bidding buys for price of highest bid
bid value - value/n
might lose bid, or might make profit = value/n

second price auction
highest bidding buys for price of second bid
bid honestly
not higher (bc maximum price want to pay)
not lower (bc do want item)

split the difference scheme
highest bidding buys for price between highest/second bid
bid value - value/2n

all-pay auction
all bidders pay, highest bidding gets item
bid $value^N$ - $value^N$/N

common values
if value of items depends on what others value is
then winners curse (winnner more optimistic than all others)
like IPO (bc want to sell stock later like others)
like collection items (bc want to resell)
like diamond sights (box full of diamonds, very short time)

defend against winners curse
take into account what others bid
reevaluate / self-reflect in case own bid highest
choose different mechanism (like second price auction)

collusion
likely if few participants in auction (2-4)
prevent designing contract only few parties can actually take

10.4   impossibility theorem (myerson-sattlerwhaite)

if one party owns good, the other wants to buy
but uncertainty about gains from trade
there is not efficient way to trade

human element
in models, would never reveal true values
but in real work, human element outperforms game theory
parties engage in cheap talk
parties reveal their values, coordinate on price
face-to-face communication improves behaviour (compared to written)

11   elicitation mechanisms examples

11.1   goethe

wanted to know own value
unclear bc no copyright, sales unknown, ...

game
sends minimal price p_1 to attorney
attorney receives price of publisher p_2
if $p_1 < p_2$ then no trade
else trade for price p_1 and learn about p_2

publisher view
will bid private valuation as no information about goethes p_1
might understate if interested in long-term relationship

goethes view
wants to learn own market value
hence better than take-it-or-leave-it offer
but goethe might renegotiate with learned value

what happened
attorney told publisher what minimal price was
goethe could sell, but did not learn own price
resulted in big profits for publisher

later auction
received much more of the share
as not all publishers colluded

12   relationship specific investments

12.1   existing vs redesigning mechanisms

redesign with rationality (auguste conte)
create better society by redesigning it ("social engineering)
rationally improve over naturally evolved society
approach of "mechanism design"
assumptions about human rationality / behaviour
lead to mathematically reasoned mechanism
to archive first-best / second-best

accept state of the art (edmund burke)
old institution performed reasonably well in the past
hence constructing everything from scratch is dangerous
underlying assumption that evolution evolves into something efficient
(which is not necessarily true)

hidden wisdom (friedrich august von hayek)
presumption of hidden wisdom of institutions
"fatal conceit" (einbildung) one could redesign all

piecemeal social engineering (karl popper)
iterative process; gradually improving upon state of the art
small, evidence based changes
archive progress without redesigning all

12.2   contract completeness

complete
condition on every possible state (if contractable)
only moral hazard / adverse selection risk remains

incomplete
might not include all contractable possible states
might renegotiate later if enforcement inefficient
bc bounded rationality (cannot predict all possible states)
bc transactional costs (creating contract too expensive)
bc non-verifiability (non-verifiable input/output)
bc institutional comparison (use existing as a guideline)

12.3   hold up

if non-contractable relationship-specific investment has to be made
but proceeds of this have to be shared with other party
like renegotiation due to changed circumstances after investment sunk
introduces underinvestment (trying to reduce relationship specificness)

12.3.1   reasons
trade after production
parties (re)negotiate trade after production
at point in time where investment already sunk

relationship-specific investment
investment worth more inside relationship than outside
like investment specific / customized to customer
like specific skills, machines, software, processes

12.3.2   prevent holdup
less sequential contracts
combine exchange / production; for example with milestone contracts
like in construction contracts

write contract before "fundamental transformation"
before relationship-specific investment happens
leads to first-best if investment is indeed contractable

avoid renegotiation (sign complete contract)
avoid having to negotiate after some investment sunk
but very hard / impossible to write complete contract

long-term contract
enter long-term contract with other party
allow investing party to prolong contract by itself

12.3.3   prevent holdup examples
improve BATNA of investing party
or reduce BATNA for not investing party

fixed price + specific performance
investing party is guaranteed performance
but ex-post inefficient (goods produced even if inefficient)
but overinvestment (as can always sell goods)

fixed price + expectation damages
investing party will be payed out expectation performance
only produce iff price - cost > expectation damage
for expectation damage = value - price
hence contract breached if value < cost (which is good!)
hence ex-post efficient (goods produced only if production worth)
but overinvestment (goods with price - cost < expectation damages)

12.3.4   improve contract
design threat point
for investing (hence weaker) party as a BATNA / outside option
like acquiring ownership of underperforming party's tool

like deciding whether to continue contract
like option to increase/decrease default quantity sold
like exclusivity (preventing to trade with others)

reduce sequential structure
introduce milestones with deliverables on both sides
reduces one-shot character

assign bargaining power
to investing party (hence weaker) party
then efficient investment (socially optimal) will occur
unclear if realistic (bc of incomplete contracts/renegotiation)
like take-it-or-leave-it offer, smart contracts

12.4   renegotiation

solves ex-post inefficient trade
bargaining occurs with thread point in mind

coarse theorem
besides renegotiation cost, efficient allocation occurs
unless personal conflicts, time pressure, strategic games

for continuous trade decisions
balance threats of max sales vs no sales
by contracting in between
then renegotiating with more infos

12.5   vertical integration

as way to redesign outside option / BATNA

coarse
if market good, why do firms exist
⇒ market needs transaction cost to trade
if firms good, why not all done by same firm
⇒ too big firms inefficient

williamson
avoid holdup with vertical integration
firms should produce specialized goods internally
firms should buy standard products on the market

grossman & hart
vertical integration allows to redesign threat points
(hence can easily walk away from bad negotiations)
but does not solve unobservability problems

12.6   legal solutions

complete contracts avoid having to renegotiate
but renegotiation offers flexibility to avoid inefficiencies

economic duress doctrine
limits that parties can exploit each other through renegotiation
if nothing changed since agreeing to first contract
then modifications after renegotiation can be reversed
else likely that one party used unfair leverage to over-compensate
damages for breaking contract might not be enough
bc other party unable to pay, damages non-materialistic, ...

12.7   technical solution

must be robust to error

doomsday machine
prevent attack by threatening massive retaliation
not ex-post efficient (hence not negotiation proof)
for threat to be credible need to build doomsday machine
which excludes human intervention (and enemy knows about it)

smart-contract
might allow to exclude renegotiation
might allow to assign bargaining power
anonymity critical otherwise legal system could revert effects

13   relationship specific investments examples

13.1   example incomplete contract

fisher body (FB) supplies general motors (GM)
FB build new factory next to GM has joint surplus 100

pro vs con
pro bc lower cost, integrate better with GM
cont bc GM may capture part of surplus

no contract
with equal bargaining power, payoff 50
with cost 40, will build it (and should!)
with cost 80, will not build it (but should!)
hence underinvestment could occur

fisher negotiation power after plant built
threaten to withhold does not work
bc investment already sunk
threaten to sell does not work
bc investment worth more inside relationship than outside

contract
predetermine price or exclusive rights
but depending on market, price/quantities need to change

13.2   relationship-specific investment

fishing company
fishing company hires worker for short fishing season
then processes the fish in plant with large investment
shortly before fishing season, workers could renegotiate
company has no choice but to increase salary, else loses investment

13.3   ex-post inefficient trade

wood table production
agree on wood table production with specific wood
but wood not deliverable anymore
cost for wood higher than benefit to buyer
with renegotiation, both parties can benefit

13.4   assigned bargaining power

model
buyer could investment to increase value to seller
seller cost is unknown until buyer made investment
buyer investment can be 0/2/5.5, resulting in gains of 4/10/14
seller cost is 50% 1 else 12
for investment 0, benefit for low cost 3 else -8
for investment 2, benefit for low cost 9 else -2
for investment 5.5, benefit for low cost 13 else 2
socially optimal is investment 2 with expected benefit 2.5
but trade (ex-post) only occurs if cost lower than price

no contract (ex-post efficiency)
assume buyer has 30% bargaining power
then buyers optimal investment is 0 (underinvestment)
as $0.5 * 0.3 * 3$ (archived price) - 0 (investment) = 0.45
assume buyer has 100% bargaining power
then buyers optimal investment is 2 (socially optimal)
as $0.5 * (10 - 1)$ (gain - cost) - 2 (investment) = 2.5

fixed price + specific performance
assume price must be 2 (seller only produces for low cost)
then buyers optimal investment is 5.5 (overinvestment)
as (14-5.5) (gain - investment) - 2 (price) = 6.5

fixed price + expectation damages
assume buyer must be put in as good position as if contract performed
then buyers optimal investment is 5.5 (overinvestment)
as (14-5.5) (gain - investment) - p (price) = 8.5 - p

actual resolution
exclusivity & cost-plus contract
but FB overstaffed to increase costs
GM bought FB in the end

14   relational contracting

when able to rely on relationship & reputation
in absence of formal contract

14.1   repeated cooperation

preconditions
gains from future cooperations sufficiently high
people care about the future (discount rate sufficiently high)
no definite end to cooperation

discount rate
rate < 1 which future events are less worth
bc uncertain about future, today preferred to tomorrow
payoff = $payoff_{today}$ + rate * payoff_tomorrow + $rate^2 *$

payoff_after_tomorrow ...
payoff = 1/(1-rate)
for rate 0, only today relevant

grim-trigger strategy
cooperate unless other player defects
as soon as other defected, defection forever
cooperation happens for rate ≥ 0.5

tit-for-tat
mirror last action of other player
if other cooperates, then cooperate
if other defects, then defect

predefined end of cooperation
no cooperation in last period
but other player anticipates, hence no cooperation either
unravelling (hence no cooperation at all)
in practice incomplete (fail to foresee, late defection preferred)
reputation & contracts as substitutes
like retirement

probable end of cooperation
some future event with probability p will terminate cooperation
payoff = $payoff_{today}$ + rate * (1 - p) * payoff_tomorrow + ...
payoff = 1/(1-rate)(1-p)

spike of payoffs
some future event payoffs for defection will spike
cooperation unsustainable

increasing payoffs in the future
in future event payoffs will increase gradually
cooperation more sustainable

15   relational contracting examples

15.1   cooperation

price wars amongst gas station in vancouver
after demand shock (likely some player defects)
price goes up/down & is more or less chaotic
then after some months, again cooperation on some high price
collusion can not be contracted, hence had to relay on cooperation

15.2   reputation

diamond exchange in new york by orthodox jews
much trust amongst diamond merchants
defection increases reputation cost

15.3   business relationship

business partner & self
both may choose to cooperate & defect

payoffs
both cooperate (1,1)
both defect (0,0)
one cooperates, one defects (2, -1)

one-shot
same as prisoners dilemma
both will defect, anticipating defect of other party

repeated
if discount rate sufficiently high
then cooperation chosen

15.4   predefined end (centipede game)

parties can choose whether to give other party some amount or not
if money received, get additional reward from bank
game stops if both parties have 100 received
but predefined end, hence unravelling expected

in practice
5% end at the end (both get 100)
5% do not event start (as parties predict defect)
rest ends up in the middle

reasons
players do not foresee 100 steps
players want to delay defection

16 externalities

parties enter contract which sets them better
but may hurt third parties / social welfare
government imposes regulation to prevent inefficient outcome

16.1 exclusivity contract

agree on price p with firm to be dealt with
agree on damages d on deals with other firm

problems
while increasing joint payoff of involved parties
decreases societal welfare as market entered late by competition
only after efficiency gain bigger than damages

benefit
prevent free-riding
like advertisement benefiting whole industry
mitigate hold-up problem
like stronger partner abuses other
align incentives
like partner can focus on other
improve certainty
like knowing supply for next years

17 externalities examples

17.1 exclusive dealing

buyer can buy from incumbent (existing) or entrant firm
buyer accepts exclusive dealing contract with incumbent
contract specifies price p and damages d (if dealing with entrant)

model
cost of incumbent 50 and entrant $c = $ uniform(0,100)
buyers value of good 100

order
buyer accepts contract with incumbent (price, damages)
entrants cost is determined (between 0 - 100)
entrant decides whether or not to enter market
production and trade take place

social welfare
if entrant cost < 50 then entrant produces
else incumbent produces

no contract
if entrant cost lower, then prices lower than incumbent
else entrant stays out of market (bc incumbent undercut)
but then incumbent monopoly, could charge 100
buyer welfare $25 = 0.5 * 50$ (if entrant sells) $+ 0.5 * 0$ (if incumbent sells)
incumbent profit $25 = 0.5 * (100 - 50)$ (sell at price 100, cost 50)
entrant profit $12.5 = 0.5 * (50 - 25)$ (average cost 25)
social welfare $62.25 = 25 + 25 + 12.5$

exclusive dealing for p = 75 and d = 100
buyer welfare $= 25$ (always buys for 75)
incumbent profit $= 25$ (always sells for 75)
but entrant profit $= 0$ (no sale)
social welfare $50 = 25 + 25 + 0$
buyer indifferent bc same payoff than before

exclusive dealing for p = 75 and d = 50
buyer welfare $= 25$ (always buys from 75, either from incumbent/entrant)
incumbent profit $31.25 = 0.75 * (75 - 50) + 0.25 * 50$ (damages)
entrant profit $3.125 = 0.25 * (25 - 12.5)$
social welfare 59.375
buyer / incumbent accept as higher payoff

17.2 tort victims

two victims with claim of 300, lawyer costs 400
together would sue firm and get full 600
but single victim accepts settlement 100.1 ($> (600-400)/2$)
then other victim unable to sue anymore ($400-300 < 0$)

17.3 selling your business

worth of 50, two buyers with 90 / 100 valuation
bargaining power is equal

order
negotiate first with $buyer_1$

then with $buyer_2$

no contract
agree with $buyer_1$ to price of 70 (90-50 / 2)
then agree with $buyer_2$ to price of 85 (100-70 / 2)
payoff seller 35, $buyer_1$ 0, $buyer_2$ 15

breakup fee
agree with $buyer_1$ to price of 85, breakup fee 10
then agree with $buyer_2$ to price of 97.5 (100-95 / 2)
payoff seller 37.5, $buyer_1$ 10, $buyer_2$ 2.5

18 observable but not verifiable

informational environment where performance observable
but not verifiable (hence proofable in court)

18.1 discretion clauses

assigns strong power to one of the party
like to terminate contract whenever see fit
but invites opportunism of such party

reputation
abusing clause will prevent further exchanges
works if reputation of accessible & important of stronger party
like mc-donalds reputation under franchises
but franchise reputation irrelevant (can just switch provider)

18.2 up and out

company policy that after some time promoted or let go
to fulfil commitment to promote hard working employees
removes any temptation not to promote

18.3 giving bonus to winner of tournament

verifiable for all that some winner have been chosen
removes temptation not giving bonus
will give bonus to best employees as no other incentive

18.4 shoot the liar

transform what is observable to verifiable
ask observers separately to report on what has happened
reward if reports match, punish otherwise
hence if no no way to coordinate beforehand
then will report the truth as highest probability reports match

19 observable but not verifiable examples

19.1 not verifiable

employee performance
group member performance

19.2 franchise business

charge fee for concept & get marketing, design, procedures
owner of restaurant has to invest into building
includes clause to terminate freely without cause (discretion)

reasons for clause
free-riding (save money but reputation cost payed by brand)

advantage
can use discretion to terminate underperforming franchise
might be hard to prove underperformance in front of court

disadvantage
could abuse discretion to terminate well-performing franchise
to take over restaurant and operate it self
for franchise discretion clause like having no contract
hence franchise will underinvest

20 behavioural

contract are way to give commitment
to reach first-best need to align incentives
but might need additional behaviours

20.1 shading

perfunctory performance (follows contract to the letter)
has to be delivered, enforced by court in any case
consummate performance (follows contract to the spirit)
followed by parties if their interest ("sharding")
avoid shading by including more specific conditions in contract
but too fix contract may deliver inefficient outcome

20.2 promises

use promises to get commitment
where central enforcement costly / impossible

relying vs expectation
"expectation" when only set internally
"relying" when basing decisions / investments off it

why promises are kept
third party enforcement
like begin forced to perform or having to pay damages
reputational concerns
like value of future relationship is lost
moral force
like value system motivates to keep promises

observed moral effects
expectation per-se effect
want to deliver expectation (irrespective of promise)
promising per-se effect
want to keep promise (irrespective of expectation)
interaction effect
if promise given even higher effort to fulfil expectation

overreliance
to guilt-trip others into performance
introducing legal enforcement makes investments more stable
less underinvestment (as enforcement exists)
less overinvestment (as guilt-trip can disappear)

punishment by third party
if third-party observes interactions
will likely punish promisor
increasingly so if promise given, expectation high

irrationality
need to be able to understand / predict other party
but rationality assumption might not be suited
might results in additional negotiation power
like vietnam/kissenger, fighting witches

20.3 implications for contract design

include difficult to enforce clauses (unverifiable, ...)
encourage explicit promise making (oaths, ...)
explicitly invite expectations (advertisement, ...)
make expectations visible (link expectations / promises)

undesirable effects
even efficient breach is avoided
might circumvents public policy/unconscionability defenses
parties feel compelled to fulfil invalid clauses

20.4 realistic goals

might be desirable to set realistic goals
lower performance observable with too high / low threshold
spillover from aspirational goals to realistic goals observable
low variance from low threshold
it matters if people are in win / loss frame
impacts constitutional design, international agreements

20.5 legal theory

expectations / reliance relevant for legal enforcement
legal enforcement solves over and underinvestments

20.6 questions

50% do not follow moral objectives when unpunished
⇒ how to generalize

21 behavioural examples

21.1 trust / guilt

kindergarden example
parents had to pay fine being late
but now can pay-out of moral obligation
parents came even more often late

50% suspectible to guilt
in study could choose to keep / break promise
no reciprocity / reputation effects
50% broke promise for monetary benefits
25% traded off money against morality
25% did keep integrity not matter cost
might be dependent on social circles / cultural effects

21.2 irrationality

scorpion and the turtle
scorpion asks turtle to transfer over shore
but scorpion stings turtle in the middle of the river
turtle asks "why", scorpion responds "bc its in my nature"

kissenger
pretended in negotiations US president is crazy
and would drop nuclear bomb on vietnam
if unable to return with concessions

bar fight
would be likely to get caught after violent dispute
but if actor irrational might not risk an encounter
puts actor in better state

goya's fighting witches
witches are fighting over who is the bigger witch
can get witches together if shared interest
but will never have trust / friendship (because evil)

21.3 source of commitment

third-party observation
third party observes interaction between promisor/promisee
higher/lower reliance investments, choose keep/break promise
third party can then decide to pay to punish promisor
punishment higher when promise was given
and when reliance investments were higher

delegation with low-powered incentives
like manager of company with flat salary
then might feel obligated by own ethics to keep promise
hence contracts with such delegates could be much simpler
as you would not expect this party to defect
observed in civil service, family owned enterprises
but then need to solve moral hazard problem differently

21.4 trust game (charness)

like farmer (trustor) vs viper (trustee)
truster puts itself at mercy of other

model
trustor can opt out (3/3) else can trust
if trust honoured (10/10), else (14, 0)
⇒ nash solution would be expected

observation
25% cooperation in simple case
50% cooperation with enabling communication

interpretation
communication enabled cooperation
even if only cheap talk (non-enforceable)
reputation impact zero as one-shot game

21.5 promises study

keep word to not disappoint promisees expectation

set expectation game
seller/buyer learn deliver has to be over device
promise made that deliver will be made
then both learn if delivery with high/low probability possible
then seller can decide whether to deliver the goods

observations

reliable device motived higher performance

21.6   loss frame

bridge
goal of suspension was unreachable
needed to pay damages depending on goal miss

factory workers
some workers got payment + deductions
others got base payment + bonus
loss frame vs win frame
workers of loss frame performed better

contract variants
vanilla (payed by element)
threshold with bonus / malus (target given)
best performing if threshold realistic
worse than vanilla if threshold aspirational (unrealistic)
low variance with low threshold (nice for safety / coordination)

realistic vs aspirational goals
if some goals unreachable
then spillover effect to other goals observable
like UNO climate commits to 2 °, while 1.5 °would be great
like sustainable development goals too ambitious