

CHAPTER 24

INTRA-PERIOD CONTRACT RENEGOTIATION

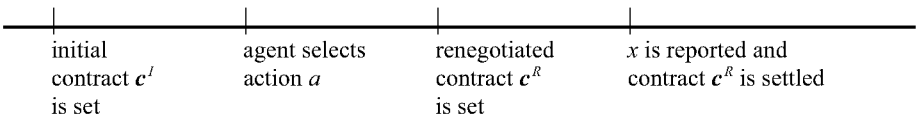
The basic principal-agent model assumes that the two parties establish a contract at the start of the period and there can be no changes to the contract subsequent to that date. *The two parties make a binding commitment that cannot be broken even if both parties would prefer to change the terms of the contract at some subsequent date prior to the “end of the period.”* Is this assumption plausible and, in particular, is it enforceable? That is, would the courts prohibit the change in a contract if both parties agreed to that change?

The Incentive to Renegotiate

Why would a principal and an agent want to renegotiate a contract? If the initial contract is optimal, does that not mean that any change in the contract that would make one party better off would make the other worse off?

The answer depends on the timing of the potential renegotiation. The contract is optimal *ex ante*. Therefore, no Pareto-improvement is possible prior to changes in the information available to the two parties. However, once their information changes, it may be possible to make an *ex post* “improvement” in the contract.

To illustrate, consider the simple one-period principal-agent model in which the two parties have agreed to an efficient compensation contract $c^I: X \rightarrow C$, where a verified report of outcome x will be generated at the end of the period. Now consider a date between when the agent implemented his action a and when the two parties receive information about the outcome x .



At the renegotiation date, the agent's belief about x is $\varphi(x|\hat{a})$ where \hat{a} is the action he *has selected*. The principal's belief about x , on the other hand, is

$$\varphi(x|\Psi) = \int_A \varphi(x|a) d\Psi(a),$$

where $\mathcal{P}(a)$ is the principal's belief about the action that was selected by the agent.

If the principal believes with certainty that the agent took \hat{a} , then the two parties have homogeneous beliefs. With homogeneous beliefs and no further actions to be taken, the two parties face a classic risk sharing problem. The principal will receive $x - c^I(x)$ and the agent will receive $c^I(x)$ – both random amounts. Efficient risk sharing implies that they agree to a renegotiated contract c^R that satisfies the following conditions (where $u^p(x - c)$ and $u^a(c, a) = u(c) - v(a)$ are the principal's and agent's utility functions, respectively):

efficiency:

$$\frac{u^{p'}(x - c^R(x))}{u'(c^R(x))} = \lambda, \quad \forall x \in X,$$

principal's acceptance:

$$\int_X u^p(x - c^R(x)) d\Phi(x|\hat{a}) \geq \int_X u^p(x - c^I(x)) d\Phi(x|\hat{a}),$$

agent's acceptance:

$$\int_X u(c^R(x)) d\Phi(x|\hat{a}) \geq \int_X u(c^I(x)) d\Phi(x|\hat{a}).$$

The first condition indicates that the contract will be renegotiated, unless no incentive constraints were binding at the time the initial contract was established.

For example, if the principal is risk neutral, the two parties will agree to a contract in which all risk is shifted to the principal, i.e., $c^R(x) = w$, where w is a fixed amount satisfying the second two inequalities. There will almost certainly be a range of w values that satisfy the above conditions. The amount selected will depend on the *relative bargaining power* of the two parties at the time of the renegotiation.

Observe that if the principal believes that the agent did not anticipate any renegotiation when he selected his action, the principal will hold belief $\varphi(x|\hat{a})$ where \hat{a} is the action induced by the initial contract. However, if the agent anticipates the renegotiation, he will select action a^o , where a^o minimizes $v(a)$. Then, if the principal “knows” that the agent has selected a^o , there will be homogeneous beliefs $\varphi(x|a^o)$. Furthermore, if the principal “knows” that the agent *will anticipate* renegotiation when he selects his action, the principal can