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EXECUTION**

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## **ABSTRACT**

### **Renegotiation Before Contract Execution\***

By offering or choosing a contract the informed agent might reveal information to the principal which could be used for immediate renegotiation. This is discussed in an axiomatic approach. We show that if, given the revealed information, there exists a contract which is preferred by everyone, the former contract could not have been renegotiation-proof. For private values and common values of the 'Spence' type, a generalized Coase conjecture holds: the principal cannot raise their profit by offering inefficient contracts to the agent. Only for common values of the 'Rothschild-Stiglitz' type, inefficient, but pooling, contracts are possible.

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## **NON-TECHNICAL SUMMARY**

Negotiations where the involved parties have limited information about relevant characteristics of the other party are very widespread in economics. If this asymmetry in information is one-sided, this is discussed in the literature under the heading of principal agent problem. Consider the following three examples:

1. A monopolist who sells a good with an unknown valuation to customers. Here it has long been noted that by using non-linear prices the monopolist may discriminate the market and thus increase their profit.

2. Spence education as a signal model: here the employer does not know the ability of the worker. It can be shown that the individuals with larger ability will signal this with the level of education they obtained, as for more able workers it is less hard to obtain e.g. a university degree.

3. An insurance situation under adverse selection, where the risk of the insured is not known to the insurer. Following the work by Rothschild and Stiglitz, it can be shown that the insurer tries to screen the market by offering different contracts: one with full insurance and a larger premium rate, which will be bought by the high risks. Another contract with partial insurance and a lower premium rate that the low risks prefer.

In the derivation of these results above, one crucial assumption is made: once one party has made an offer and the other party either accepted or rejected this offer, negotiation will end. This assumption is rather restrictive: why should the parties not renegotiate if, for example, one party rejected the original offer? More delicately, even if the original offer is accepted, by the choice of contract the uninformed party obtains more information about the other party. As in general these original contracts are inefficient, which means

that given this revealed information there is scope for improvement, one would expect renegotiation to take place.

Consider again the insurance market. The result of the principal agent model is that low risks buy underinsurance. However, once they have bought this contract, the insurer knows that the person who bought this contract is a low risk type. So they both have an incentive to improve the terms of the contract, i.e. to renegotiate towards a full insurance contract. However, anticipating this, the high risks might not have bought their more expensive full insurance contract in the first place. Allowing for renegotiation might thus significantly change the result of the analysis.

This renegotiation problem is what the present paper discusses. In particular it is analysed whether allowing renegotiation alters the insight we have gained from the use of principal agent models. Renegotiation itself has long been known to be a crucial factor in the optimal design of contracts. However the literature so far was mainly concerned with renegotiation at later periods and very little attention has been given to immediate renegotiation.

We approach this problem by providing consistency conditions for renegotiation-proof outcomes. These take the following form: first, for any possible negotiation situation there must exist at least one renegotiation-proof outcome which both parties prefer. Second, if an outcome is renegotiation-proof, then any other renegotiation-proof outcome cannot be better for both parties.

With these stability requirements the following results can be shown to hold:

- I. In the situation 1 and 2 discussed above (and any other model where the link between the utilities of the principal and the agent is similar), a generalized Coase conjecture holds: it is not possible to increase the profit/utility of one party by the use of inefficient contracts.

For example, the monopolist can only offer price/quantity contracts which are such that marginal valuation equals marginal costs. This does not exclude non-linear contracts, but it limits the extent to which the monopolist can increase their profit by offering distorting, i.e. inefficient contracts. In the education as a signal model, where the level of education is part of the negotiation, i.e. where education takes place after the contract is signed, this result has the following implication. If education only serves as a signal, i.e. if it has no productive value, no one will use this instrument.

II. In the situation 3 discussed above and generalizations thereof, inefficient contracts are still possible. However, due to the renegotiation problem and in contrast to the standard principal-agent problem, these contracts are not separating, but pooling. That is, these inefficient contracts (e.g. underinsurance contracts) are bought by more than one type in equilibrium.

The Coase conjecture implies that there is less reason to worry about a durable goods monopoly, because the monopolist competes with themselves over time and ends up charging the competitive price. Our result I implies that for these principal agent situations there is less to worry about with respect to efficiency even if one party has all the bargaining power: it is not possible to increase profits by distorting different types once renegotiation is explicitly considered.

Result II indicates that in contrast to the perception in the literature, one should expect many more pooling contracts than separating ones, as renegotiation makes it much harder to discriminate between types.