

# Renegotiation Design by Contract: Appendix

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## APPENDIX. ADR DERIVATION

Suppose that the valuation,  $v$ , to the buyer is either  $v_L$  or  $v_H$  and the seller's cost of production is either  $c_L$  or  $c_H$ . Trade takes place at price  $p$ . The buyer can invest  $j$  at cost  $\phi(j)$ , which makes the probability of the high valuation equal to  $j$ . Similarly, the seller can invest amount  $i$  at cost  $\phi(i)$ , which leads to the probability of the low cost state being  $i$ . The buyer's payoff is thus  $vq - p - \phi(j)$ , and the seller's is  $p - cq - \phi(i)$ . Let the default option be a price quantity pair  $(\tilde{p}, \tilde{q})$ .

Set the default level of trade such that  $\tilde{q}(c_H - c_L) = \phi'(i^{FB})$ , where the superscript FB denotes the first-best level of investment. The default price is set to split the surplus according the respective bargaining weights of the two parties. This, along with the mechanism described in the text, achieves the first-best level of investment by both buyer and seller. Moreover, nothing important hinges on continuous investment and differentiability of the cost functions.

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We are grateful to Philippe Aghion, Douglas Baird, Scott Baker, Omri Ben-Shahar, Rosalind Dixon, Bob Gibbons, Oliver Hart, Todd Henderson, Saul Levmore, Andrei Shleifer, and Alex Stremitzer for helpful discussions and comments.