

TREMBLING INTO MYOPIA: HONESTY IN THE DYNAMIC HOLD-UP PROBLEM

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1 Motivation

In the classical *hold-up problem* (cf. Klein *et al.*, 1978), a firm's *relationship-specific investments* – i.e., investments which are most useful in a specific relationship – leave it vulnerable to *ex post* opportunistic behavior by its contracting partner (whether its supplier or its customer). Two conditions are necessary for hold-ups to emerge: (i) relationship-specific investments, and (ii) contract incompleteness (due to non-contractible outcomes). The canonical example of General Motors (GM) Vs. Fisher Body illustrates how these two factors can interweave to drive hold-ups¹. The following account of GM-Fisher Body dealings is based on Klein *et al.*, 1978.

In the year 1919, car-design began shifting to closed metal bodies from open wooden ones. In an effort to guarantee an adequate supply of closed-metal-bodies, GM asked its key supplier, Fisher Body, to make significant GM-specific investments in dies and stamping machines. Fisher Body balked for fear of being held up by GM once these GM-specific investments were made. To alleviate these fears, GM signed a 10 year exclusive cost-plus contract with Fisher Body, which stipulated that Fisher Body would be the exclusive supplier for all the closed-metal-bodies required by GM. To prevent a *reverse* hold-up, i.e., to prevent Fisher Body from exploiting the exclusivity to overcharge

¹The case of GM and Fisher Body is perhaps the most celebrated example of hold-up, made famous by Klein *et al.*, 1978. For several other fascinating examples of the hold-up problem in vertical relationships, see Sako, 1992.

GM, a complex set of constraints was placed on the price. It was hoped that the exclusive contract with its in-built checks-and-balances would prevent either firm from holding up the other. This worked for a few years. Around 1922, two events colluded to significantly increase GM's demand for closed-metal-bodies: (i) there was a sudden surge in demand for GM products, especially the Chevrolets; and (ii) the industry adopted closed-metal-bodies in a big way. (According to GM's annual report of December 1924, more than 65% of the cars produced in the previous year had closed-metal-bodies). This spike in demand was not anticipated by either GM or Fisher Body, and hence commensurate actions were not discussed in the original 1919 contract (i.e., the contract was incomplete despite its sophistication). GM therefore sought to renegotiate the original contract; specifically, it wanted Fisher Body to collocate its manufacturing plants with GM's assembly plants to economize on the costs of transporting closed-metal-bodies from Fisher Body's plants to GM's assembly plants. Fisher Body, however, once again balked for fear of being held-up. (Collocating the plants would have been another relationship-specific investment.) Because GM was locked into an exclusive contract with Fisher Body, it could not seek alternate source of supply, thereby incurring extremely high transportation costs. The impasse was finally resolved in 1926 when GM vertically integrated with Fisher Body. [Klein *et al.*, 1978]

In the GM-Fisher Body example above, there are two instances of relationship-specific investments. The first was the investment made by Fisher Body in GM-specific dies and stamping machines. The second was the prospect of collocating Fisher Body's plants with GM's. There are also two instances of non-contracted outcomes: (i) There was an unanticipated spike both in the overall demand for cars and in the demand for closed-metal-bodies. (ii) Collocation was not anticipated and hence not covered in the original 1919 contract. Thus, both relationship-specific investments and non-contracted outcomes interweaved to create the possibility of hold-up.

In general, the fear of hold-up stifles relationship-specific investments leading to inefficient outcomes. (In the example above, GM was forced to incur unnecessarily high transportation costs due to Fisher Body's reluctance to collocate plants.) The remedies proposed in the academic literature to mitigate the hold-up problem are complex (e.g., sophisticated vertical contracts), and often extreme (such as vertical integration).

1.1 Research questions

Several questions arise that we address in this research. Given the propensity to hold-ups, why is vertical integration not more widespread, and why do so many bilateral relationships thrive (as also noted by Coase, 2006)? Furthermore, why do so many of these firms employ simple vertical contracts instead of the more sophisticated contracts proposed in the literature? How is the threat of holdup mitigated in practice (as the evidence indicates it must be)?

A possible unifying explanation for all the above questions is that firms do honor their contractual obligations, even when presented with opportunities to hold-up. As Macaulay (1963) argues: "... a key

virtue of relational contracting is that parties can count on each other to abide by the spirit of the contract.” The question that then arises is: Would firms *choose* to be irrationally *honest* (defined in this context as not holding up their contracting partners)?

1.2 Key model features

Through a stylized dynamic economic model, we study the evolving relationship between a manufacturer and its supplier wherein the manufacturer has the opportunity to hold-up the supplier. Our model has three essential features: (i) A dynamic (two-period) setting to capture repeated interactions between the manufacturer and its supplier; (ii) The manufacturer who is, with some probability, *rational* (i.e., expected utility maximizer), or *honest* (i.e., committed to honor its ex ante contractual obligations); and (iii) A tendency for *both* types of manufacturer to *tremble into myopic behavior* – the manufacturer may play its optimal myopic (single-period) strategy, even when this differs from its optimal dynamic strategy, for reasons ranging from bounded rationality to intra-firm incentive conflicts².

Thus, our model departs from rationality in two ways: (i) Firms may be honest; and (ii) Both rational and honest firms can *tremble into myopic behavior*.

2 Summary of Results

In a single period, the rational-type manufacturer outperforms the honest-type – after all, the rational-type can always mimic the honest-type’s strategy (but not vice-versa). However, even in a *minimal* repeated relationship (e.g., over just two periods), *the honest-type manufacturer may outperform the rational-type, even though, as before, the rational-type’s strategy could be to mimic the honest-type*.

Some implications of our research are: (i) Honesty is rewarded in a repeated relationship – it emerges *endogenously* as the optimal policy under very reasonable conditions. (ii) The hold-up problem is mitigated in two ways without resorting to complex and extreme measures: First, honest-type manufacturers are honest throughout (and honesty emerges endogenously as noted above). Second, rational-type manufacturers play honest (i.e., they do not hold-up the supplier) for the first k periods in the general n -period relationship, with k possibly as large as $n - 1$.

Our results thus reinforce Aumann (1997)’s argument on ‘economic evolution’: “*Ordinary people do not behave in a consciously rational way...Rather, they evolve ‘rules-of-thumbs’ [such as always honoring contractual relationships]...if they [rules-of-thumb] work well, they are fruitful and multiply; if they work poorly, they become rare and eventually extinct.*” [Aumann (1997), page 7-8; emphasis added].

²Beginning with Selten (1975)’s seminal paper, trembles – where players select *unintended* strategies – have been regarded as inevitable by game theorists. Much attention has been focused on incorporating trembles to refine equilibria (*cf.* Selten, 1975). A few researchers have used trembles to explain economic phenomenon (*cf.* Carlsson, 1991). Our modeling of trembles falls in the latter category.

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