**TECHNICAL APPENDIX TO ACCOMPANY**

**"The Evolution of Judicial Standards: Evidence from Litigated Merger Trials,"**

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This Appendix characterizes the outcomes that arise when $M$'s expected private benefit from proceeding to court ($B(\cdot)$) declines as the social harm from the merger ($h$) increases, i.e., when Assumption 1 holds.

**Assumption 1.** $\frac{\partial B(h,\hat{s}_c)}{\partial h} < 0$ **for all** $h \in [\underline{h}, \overline{h}]$.

Assumption 1 can hold when: (i) the court signal is quite informative about $h$ (so $\left|\frac{\partial F(\hat{s}_c|h)}{\partial h}\right|$ is relatively large); and (ii) $\pi(h)$ increases relatively slowly as $h$ increases.

Recall from the text that $M$'s expected private benefit from proceeding to court is:

$$B(h, \hat{s}_c) = F(\hat{s}_c|h)\,\pi(h) - K_M\,. \tag{1}$$

Further recall that $\tilde{h}$ is the value of $h$ at which $M$ is indifferent between proceeding to court and accepting the proposed remedy. Formally, $\tilde{h}$ is defined by:

$$B\left(\tilde{h}, \hat{s}_c\right) = \pi(0)\,. \tag{2}$$

Finding A1 reports that when Assumption 1 holds, $\tilde{h}$ declines as the court standard becomes more stringent (i.e., as $\hat{s}_c$ declines).

**Finding A1**. $\frac{d\tilde{h}}{d\hat{s}_c} > 0$ *when Assumption 1 holds*.

Proof. Differentiating (2) provides:

$$\frac{\partial B(\tilde{h},\hat{s}_c)}{\partial \tilde{h}}\,d\tilde{h} + \frac{\partial B(\tilde{h},\hat{s}_c)}{\partial \hat{s}_c}\,d\hat{s}_c = 0 \quad \Rightarrow \quad \frac{d\tilde{h}}{d\hat{s}_c} = -\frac{\partial B(\tilde{h},\hat{s}_c)/\partial \hat{s}_c}{\partial B(\tilde{h},\hat{s}_c)/\partial \tilde{h}}\,. \tag{3}$$

Because $M$ only pursues mergers for which $\pi(\cdot) > 0$, (1) implies:

$$\frac{\partial B(\tilde{h},\hat{s}_c)}{\partial \hat{s}_c} = f\left(\hat{s}_c|\tilde{h}\right)\pi\left(\tilde{h}\right) > 0\,; \text{ and} \tag{4}$$

$$\frac{\partial B(\tilde{h},\hat{s}_c)}{\partial \tilde{h}} = \frac{\partial F\left(\hat{s}_c|\tilde{h}\right)}{\partial \tilde{h}}\,\pi\left(\tilde{h}\right) + F\left(\hat{s}_c|\tilde{h}\right)\pi'\left(\tilde{h}\right)\,. \tag{5}$$

(3) and (4) imply:

$$sign\left(\frac{d\tilde{h}}{d\hat{s}_c}\right) = -\,sign\left(\frac{\partial B(\tilde{h},\hat{s}_c)}{\partial \tilde{h}}\right). \tag{6}$$

(6) implies that $\frac{d\tilde{h}}{d\hat{s}_c} > 0$ when Assumption 1 holds. ■

When Assumption 1 holds, if $M$ proceeds to court, it will do so for the smallest $h$ realizations, i.e., for $h \in [\underline{h}, \tilde{h})$. Finding A1 states that in this case, $M$ becomes less likely to proceed to court (i.e.,

$\tilde{h}$ declines) as the court standard becomes more stringent (i.e., as $\hat{s}_c$ declines). A more stringent standard reduces the likelihood that $M$ prevails in court, holding $h$ constant. Therefore, $M$ will only proceed to court if the lower court signals become more likely, i.e., if the true social harm from the merger declines.

Finding A1 implies that a more stringent court standard has two effects when Assumption 1 holds. First, if any proposed mergers proceed to court, fewer will do so (because $M$ proceeds to court only if $h \in [\underline{h}, \tilde{h})$ and $\tilde{h}$ declines as $\hat{s}_c$ declines). Second, the expected social harm from potential mergers that proceed to court declines (i.e., $E\{\, h \mid h \in [\underline{h}, \tilde{h}) \,\}$ declines as $\hat{s}_c$ declines).

Figure A1 illustrates Finding A1 for the case where some potential mergers proceed to court. Because $B(h, \hat{s}_c)$ declines as $h$ increases when Assumption 1 holds, the $B(h, \hat{s}_c)$ curves slope downward in Figure A1. Also recall from (4) that $B(h, \hat{s}_c)$ declines as the court standard becomes more stringent, holding $h$ constant. Therefore, the $B(h, \hat{s}_c)$ curve shifts downward as $\hat{s}_c$ declines in Figure A1. Consequently, as $\hat{s}_c$ declines from $\hat{s}_{c0}$ to $\hat{s}_{c1}$, the critical value of $h$ at which $M$ is indifferent between proceeding to court and abandoning the merger declines from $\tilde{h}_0$ to $\tilde{h}_1$ in Figure A1.

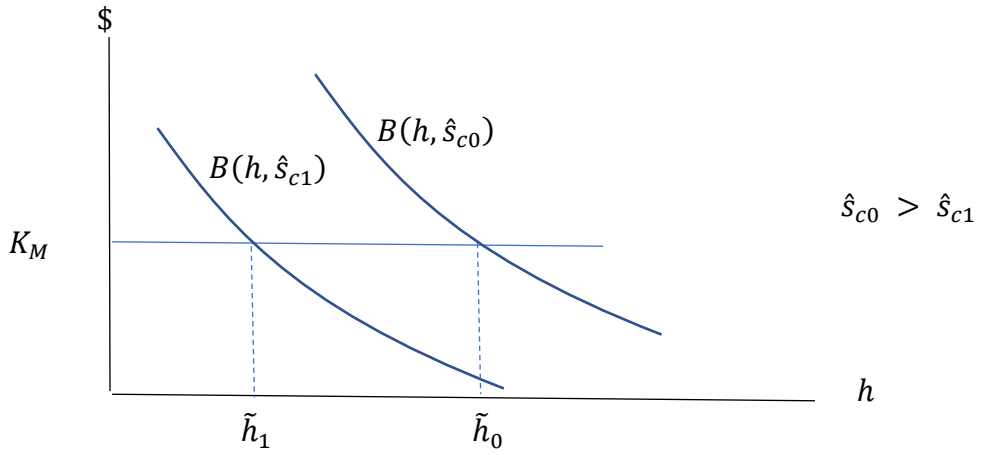


**Figure A1. The Impact of a More Stringent Court Standard when Assumption 1 Holds.**

These considerations underlie Finding A2.

**Finding A2**. *$M$ never proceeds to court if Assumption 1 holds.*

Proof. First suppose $h \leq 0$. $A$ approves the proposed merger in this case. Therefore, $M$'s payoff is $\pi(h)$ if it does not proceed to court. $M$'s payoff is at most $\pi(h) - K_M < \pi(h)$ if it proceeds to court. Consequently, $M$ will not proceed to court when $h \leq 0$.

Now suppose $h > 0$. If $M$ proceeds to court, it must anticipate a higher expected payoff from doing so than from accepting the proposed remedy. If this is the case, then:

$$F(\hat{s}_c|h)\,\pi(h) - K_M > \pi(0). \tag{7}$$

Recall that $M$ only pursues a merger if $\pi(h) > 0$. When Assumption 1 holds, *M*'s expected private benefit from proceeding to court declines as $h$ increases. Therefore, for $h > 0$:

$$F(\hat{s}_c|h)\,\pi(h) \;<\; F(\hat{s}_c|0)\,\pi(0)$$

$$\Rightarrow\; F(\hat{s}_c|h)\,\pi(h) - K_M \;<\; F(\hat{s}_c|0)\,\pi(0) \;\leq\; \pi(0). \qquad (8)$$

(8) implies that (7) cannot hold when Assumption 1 holds. Consequently, $M$ will not proceed to court in this case when $h > 0$. ■

To understand Finding A2, recall that $M$ receives $\pi(0)$ whenever it accepts the proposed remedy. Positive court costs ($K_M > 0$) ensure that $M$'s expected private benefit from proceeding to court when $h = 0$ is less than $\pi(0)$. Furthermore, $M$'s expected private benefit from proceeding to court declines as $h$ increases when Assumption 1 holds. Therefore, $M$'s expected private benefit from proceeding to court is always less than $\pi(0)$, its payoff from accepting the proposed remedy.

Findings A1 and A2 underlie the following conclusions.

**Conclusion A1.** *As the court standard becomes more stringent, the probability that M accepts a proposed remedy does not change when Assumption 1 holds.*

Proof. $A$ proposes a remedy for all $h \in (0, \overline{h}]$. In Case 1, $M$ always accepts the proposed remedy. (Recall Finding A2.) Therefore, the fraction of proposed remedies that $M$ accepts is always 1 for all $\hat{s}_c$ when Assumption 1 holds. ■

**Conclusion A2.** *As the court standard becomes more stringent, the ex ante probability that M prevails in court does not change if Assumption 1 holds.*

Proof. Finding A2 implies that $M$ never proceeds to court when Assumption 1 holds. Therefore, the probability that $M$ prevails in court is always 0, and so does not vary as $\hat{s}_c$ changes. ■