# Do Appraisal Challenges Benefit Target Shareholders through Narrowing Arbitrage Spread? A Reply

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**Abstract**

In this reply to Jetley and Huang's note on arbitrage spread outliers, we present data showing that the analysis of target shareholders' abnormal returns in our May 2019 article published in the *Journal of Law and Economics* is not materially impacted by outliers.

The emergence of appraisal arbitrage as an investment strategy has focused attention on the role of judicial appraisal in mergers and acquisitions deals. Our study—Boone, Broughman, and Macias (2019)—contributes to this discussion[1] by exploring the impact of appraisal on the ex ante terms of acquisition. Our main findings are that "target shareholders receive higher abnormal returns as the strength of the appraisal remedy increases" (p. 281) and that threat of appraisal does not appear to limit merger activity. To explore alternative explanations, we also report data on mean postannouncement arbitrage spreads. In particular, figure 4 in Boone, Broughman, and Macias (2019) shows lower postannouncement arbitrage spreads for target firms that received an appraisal challenge as compared with target firms that did not receive an appraisal challenge.

While this graph on arbitrage spreads was not the main result of our study, it is the focus of Jetley and Huang (2020).[2] Jetley and Huang (2020) show that the ob-

[1] Prior empirical scholarship on appraisal arbitrage examines arbitrageurs' choice of which mergers and acquisitions deals to challenge (Jiang et al. 2016), whether the resulting lawsuit appears meritorious (Korsmo and Myers 2015), and the impact on shareholder value (Callahan, Palia, and Talley 2018). In one of the only theory pieces on appraisal, Choi and Talley (2018) develop a model that shows conditions under which a strong appraisal regime—akin to a reservation price in an auction—can be expected to yield higher acquisition premiums.

[2] Arbitrage spreads are relevant for understanding public policy related to judicial appraisal. If arbitrageurs have to pay a premium to obtain their position prior to seeking appraisal, that would effectively transfer value to nondissenting shareholders by giving them the option to sell at a higher price between announcement and closing.

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Table 1

**Regressions on Target Cumulative Abnormal Returns while Controlling for Outliers**

| | After August 2007 | | Positive Events | | Net Positive Events | |
|---|---|---|---|---|---|---|
| Proxy for Risk of Appraisal | (1) | (2) | (3) | (4) | (5) | (6) |
| Winsorized CARs: | | | | | | |
| DE | −.010 | −.023$^{+}$ | −.018 | −.035* | −.004 | −.024* |
| | (.012) | (.012) | (.010) | (.014) | (.008) | (.011) |
| After August 2007 | .086** | .047** | | | | |
| | (.012) | (.014) | | | | |
| DE × After August 2007 | .031 | .015 | | | | |
| | (.020) | (.020) | | | | |
| Positive Events | | | .001 | .003 | | |
| | | | (.030) | (.013) | | |
| DE × Positive Events | | | .016* | .013* | | |
| | | | (.006) | (.005) | | |
| Net Positive Events | | | | | −.004 | .005 |
| | | | | | (.010) | (.007) |
| DE × Net Positive Events | | | | | .016 | .013$^{+}$ |
| | | | | | (.009) | (.007) |
| Industry fixed effects | No | Yes | No | Yes | No | Yes |
| Adjusted $R^2$ | .048 | .112 | .047 | .113 | .045 | .113 |
| Log(CARs): | | | | | | |
| DE | −.009 | −.019$^{+}$ | −.014$^{+}$ | −.027* | −.003 | −.019* |
| | (.008) | (.009) | (.007) | (.010) | (.006) | (.008) |
| After August 2007 | .062** | .034** | | | | |
| | (.009) | (.009) | | | | |
| DE × After August 2007 | .025 | .012 | | | | |
| | (.015) | (.015) | | | | |
| Positive Events | | | .000 | .002 | | |
| | | | (.022) | (.010) | | |
| DE × Positive Events | | | .012* | .010* | | |
| | | | (.005) | (.004) | | |
| Net Positive Events | | | | | −.003 | .004 |
| | | | | | (.007) | (.006) |
| DE × Net Positive Events | | | | | .011 | .009 |
| | | | | | (.007) | (.005) |
| Industry fixed effects | No | Yes | No | Yes | No | Yes |
| Adjusted $R^2$ | .045 | .107 | .044 | .108 | .042 | .108 |
| Quantile regressions: | | | | | | |
| DE | −.024* | −.021* | −.032** | −.031** | −.025* | −.033** |
| | (.012) | (.010) | (.011) | (.010) | (.011) | (.010) |
| After August 2007 | .079 | .064** | | | | |
| | (.050) | (.018) | | | | |
| DE × After August 2007 | .019 | .002 | | | | |
| | (.020) | (.015) | | | | |
| Positive Events | | | .001 | .010 | | |
| | | | (.015) | (.015) | | |
| DE × Positive Events | | | .011* | .008$^{+}$ | | |
| | | | (.006) | (.005) | | |

Table 1 (*Continued*)

| | After August 2007 | | Positive Events | | Net Positive Events | |
|---|---|---|---|---|---|---|
| Proxy for Risk of Appraisal | (1) | (2) | (3) | (4) | (5) | (6) |
| Net Positive Events | | | | | −.005 | −.001 |
| | | | | | (.012) | (.008) |
| DE × Net Positive Events | | | | | .017+ | .016* |
| | | | | | (.009) | (.008) |
| Industry fixed effects | No | Yes | No | Yes | No | Yes |
| Pseudo-$R^2$ | .027 | .066 | .027 | .065 | .027 | .066 |

**Note.** Regression estimates are for the cumulative abnormal return (CAR) of the target over the [−1, 1] window centered on the announcement date of the deal. Ordinary least squares estimates have winsorized CARs (at the 1 percent and 99 percent levels) and log(CARs) as the dependent variables. Quantile regressions are at the 50th percentile. Results are from the full sample of observations, with non-Delaware deals as the control group. Inferences are based on White (1980) standard errors corrected for year dependence. All regressions include year fixed effects and the intercept and controls from Boone, Broughman, and Macias (2019, table 4). $N = 2{,}082$.

+ $p < .1$.

* $p < .05$.

** $p < .01$.

served gap in the arbitrage spreads between firms that receive an appraisal challenge and those that do not declines when reporting median arbitrage spreads rather than means, as we do in Boone, Broughman, and Macias (2019). We acknowledge this point. Outliers—particularly in the set of deals that did not receive an appraisal challenge—appear to account for much of the gap shown in figure 4 of Boone, Broughman, and Macias (2019).

The existence of outliers with respect to arbitrage spreads, however, does not alter the main result in our paper that target shareholders receive higher abnormal returns followings events that increase the strength of the appraisal remedy. To ascertain whether outliers impact our regression analysis, we reestimate the models reported in table 4 of Boone, Broughman, and Macias (2019) using the same set of explanatory variables. To limit the impact of outliers, however, we place various constraints on the dependent variable. In particular, we run a set of models that use winsorized cumulative abnormal returns ([CARs]; 1 percent–99 percent) as the dependent variable, log(CARs) as the dependent variable, and median regressions (50th quantile). These robustness checks are reported in Table 1.

In each model, the coefficient on the difference-in-differences term remains positive, and the coefficient estimate is statistically significant in approximately half the models. Indeed, the difference-in-differences results are strongest in models that use positive events as our proxy for the strength of the appraisal regime and somewhat weaker in models that rely exclusively on the variable After August 2007. This finding, however, is similar to results reported in Boone, Broughman, and Macias (2019), which also shows stronger results on the difference-in-differences term for models that use positive events as compared with models that use After August 2007 (see table 4). Even if outliers affect the analysis of ar-

bitrage spreads, there is no evidence that outliers undermine the main regression results reported in Boone, Broughman, and Macias (2019).

## References

Boone, Audra, Brian Broughman, and Antonio J. Macias. 2019. Merger Negotiations in the Shadow of Judicial Appraisal. *Journal of Law and Economics* 62:281–319.

Callahan, Scott, Darius Palia, and Eric Talley. 2018. Appraisal Arbitrage and Shareholder Value. *Journal of Law, Finance, and Accounting* 3:147–88.

Choi, Albert H., and Eric Talley. 2018. Appraising the "Merger Price" Appraisal Rule. *Journal of Law, Economics, and Organization* 34:543–78.

Jetley, Gaurav, and Yuxiao Huang. 2020. Do Appraisal Challenges Benefit Target Shareholders through Narrowing Arbitrage Spread? *Journal of Law and Economics* 63:813–16.

Jiang, Wei, Tao Li, Danqing Mei, and Randall Thomas. 2016. Appraisal: Shareholder Remedy or Litigation Arbitrage? *Journal of Law and Economics* 59:697–729.

Korsmo, Charles R., and Minor Myers. 2015. Appraisal Arbitrage and the Future of Public Company M&A. *Washington University Law Review* 92:1551–1615.

White, Halbert. 1980. A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica* 48:817–38.