

Online Appendix for:

**Price and Liquidity Spillovers
during Fire Sale Episodes**

April 13, 2017

A. Event study results

A.1 For Fire Sales

The main result of our paper is that fire sales spill over to the returns of peer firms. In the paper, we show this in a panel regression setting, which we argue is best suited to isolate the return evolution for a given event in the presence of event clustering (i.e., the fact that sometimes fire sale events follow right after another). Here, we show that our spillover results are robust to using a standard event study approach—only that the evolution of returns is “smoothed out” due to not accounting for event clustering.

As in the paper, our fire sale events comprise all permno-quarter observations in which *mfflow* (the Edmans et al., 2012, measure of mutual funds’ selling pressure) is in the bottom decile. For each event, we obtain the (value-weighted) portfolio of the ten closest peer stocks (in terms of the TNIC similarity score). We calculate abnormal returns using the market-model. Specifically, for each event, we estimate the intercept and β -coefficient from regressing returns of the fire sale stock and the corresponding peer portfolio on the CRSP value-weighted market index over a five-year period ending one year before the event-quarter (e.g., for quarters $t=-24$ to $t=-5$ where $t=0$ marks the event). We work with monthly return data to increase the precision of this estimation:

$$ret_{i\tau} = \alpha_i + \beta_i \times CRSPmktret_{\tau} \quad \text{for } \tau = [-92, -13]$$

where τ indicates the distance in number of months from the event quarter.

In the event period, we then calculate abnormal returns (ARs) as the difference of realized returns minus the expected return based on the market-model:

$$AR_{it} = ret_{it} - (\hat{\alpha}_i + \hat{\beta}_i \times CRSPmktret_t) \quad \text{for } t = [-4, +12]$$

For each event, we then cumulate abnormal returns (CARs) during the event period. Figure A.1 shows the evolution of average CARs in event-time—in Panel A for fire sale firms and in Panel B for the corresponding peer portfolio. 95%-confidence intervals are based on standard errors clustered by event-quarter.

A.2 For S&P 500 Index Additions

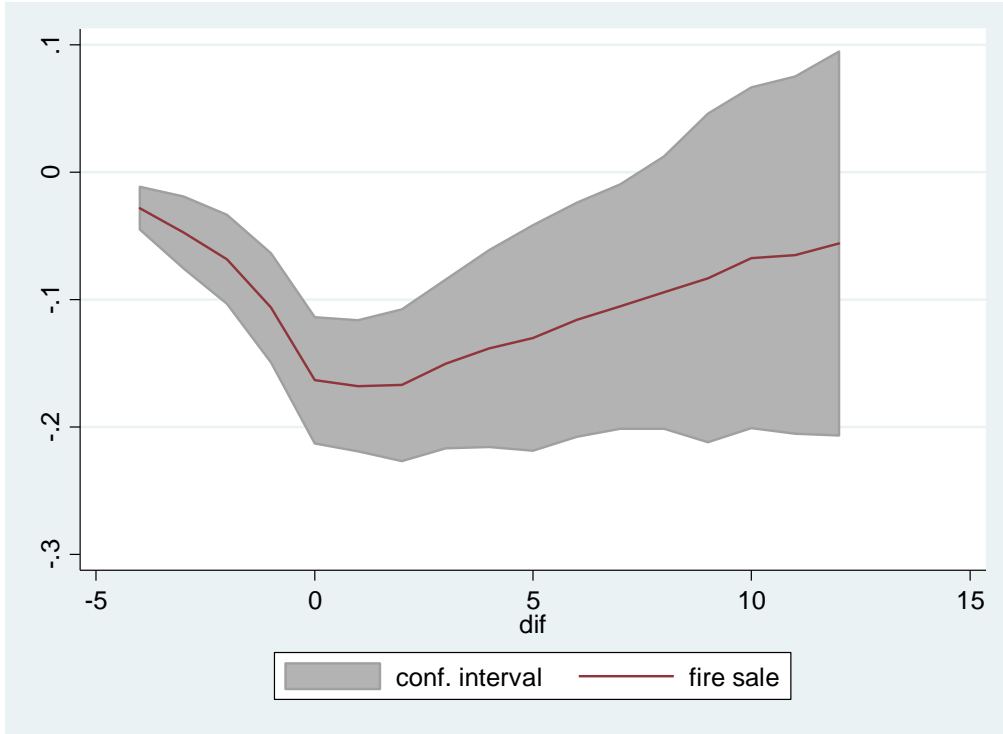
We also show event study results for S&P 500 index additions and their peers. Since this analysis is at the daily frequency, we estimate the market-model using daily return data over the period $[-300, -50]$ relative to the effective date of the index addition. For each addition event, we again focus on the (value-weighted) portfolio of the top ten peers of the added stock.

Figure A.2 depicts the results. While added stocks experience a strong run-up in returns over the days preceding the effective inclusion (Panel A), there is no significant spillover to peer firms (Panel B).

Figure A.1: Event study results for Fire Sale and Peer Firms

This figure shows cumulative abnormal returns based on the market-model for fire sale firms (Panel A) and the (value-weighted) portfolio of the top ten peer firms (Panel B) in event-time (where 0 is the quarter of the fire sale). The grey band around the cumulated returns represents the 95%-confidence interval based on standard errors clustered at the event-quarter level.

Panel A: Fire Sale Firms



Panel B: Peer Firms

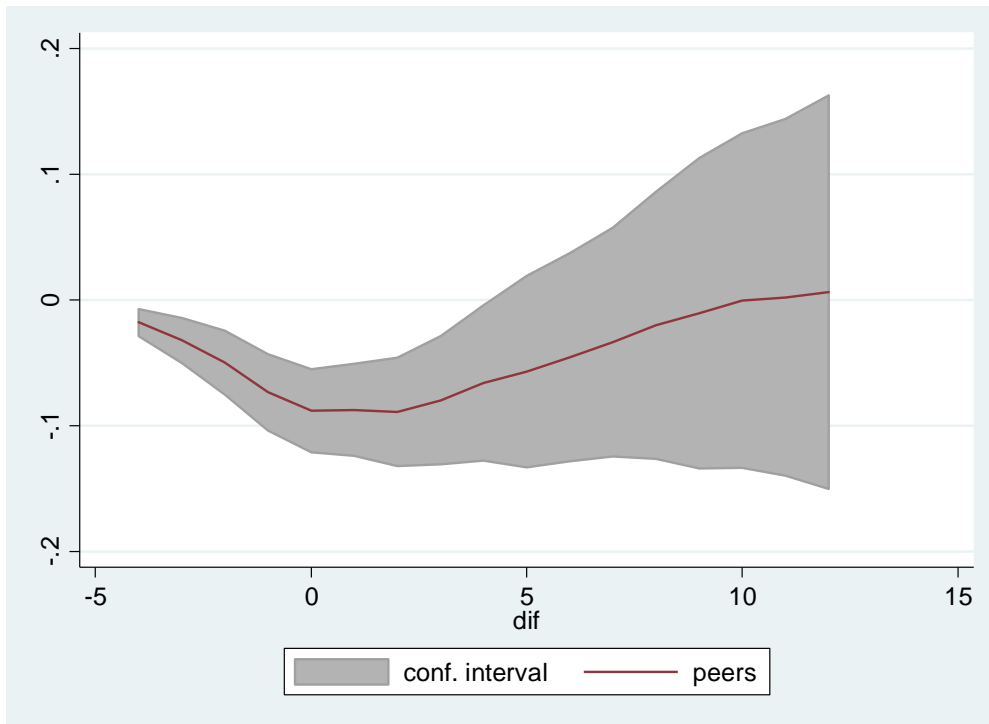
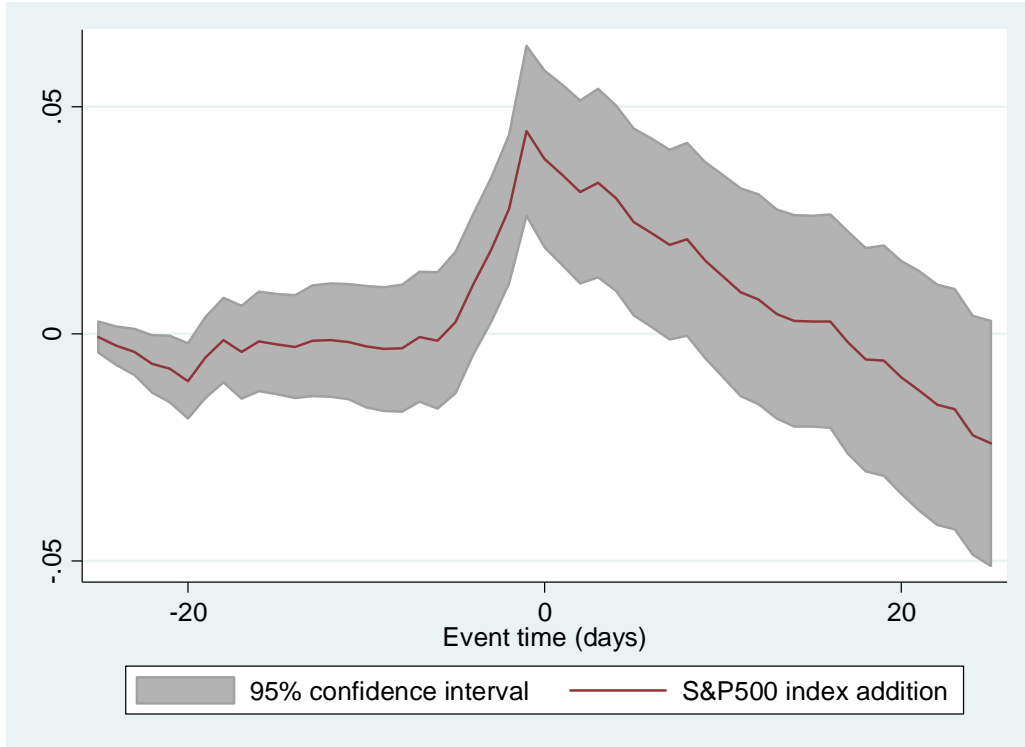


Figure A.2: Event study results for S&P 500 Index Additions and Peer Firms

This figure shows cumulative abnormal returns based on the market-model for firms added to the S&P 500 index (Panel A) and the (value-weighted) portfolio of the top ten peer firms (Panel B) in event-time (where 0 is the day when the addition becomes effective). The grey band around the cumulated returns represents the 95%-confidence interval based on standard errors clustered at the event-quarter level.

Panel A: Added Firms



Panel B: Peer Firms

