

## ADDENDUM

### Attack of the Shorting Bass: Does the *Inter Partes* Review Process Enable Petitioners to Earn Abnormal Returns?

*Last Revised February 8, 2016*

By J. Gregory Sidak\* & Jeremy O. Skog†

This addendum supplements a more in-depth analysis originally published in the *UCLA Law Review Discourse* in October 2015, available at

<https://www.criterioneconomics.com/kyle-bass-inter-partes-reviews-of-patent-validity.html>.<sup>1</sup>

In this addendum, we update the empirical findings reported in the published article to reflect new information. We will continue to update the results from the event study in this addendum as Kyle Bass files more petitions for *inter partes* review and the PTAB issues decisions on those petitions.

The new data presented in this addendum corroborate our initial conclusions. For convenience, we reprint the published abstract here.

#### **Abstract**

The Patent Trial and Appeal Board launched a patent review process called *inter partes* review that provides for a faster review of patent validity than previous methods. The *inter partes* review also has less restrictive rules about which entities can file a petition challenging a patent. Investment firms have taken advantage of these changes. We test whether the patent challenges made by one investment manager, Kyle Bass, the head of Hayman Capital Management LP, negatively affected the stock prices of the challenged companies. Through an event study, we show that the initial challenges created significant negative abnormal returns. Since then, market reactions have become muted and no longer consistently produce returns that are either negative or statistically significant.

---

\* Chairman, Criterion Economics, LLC, Washington, D.C. Email: [jgsidak@criterioneconomics.com](mailto:jgsidak@criterioneconomics.com).

† Vice President, Criterion Economics, LLC, Washington, D.C. Copyright 2016 by J. Gregory Sidak & Jeremy O. Skog. All rights reserved.

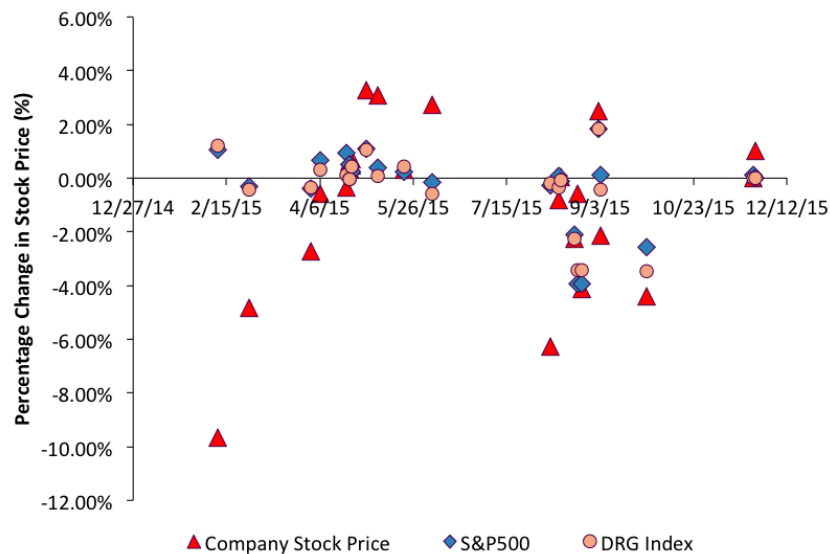
<sup>1</sup> J. Gregory Sidak & Jeremy O. Skog, *Attack of the Shorting Bass: Does the Inter Partes Review Process Enable Petitioners to Earn Abnormal Returns?*, 63 UCLA L. REV. DISCOURSE 120 (2015), <https://www.criterioneconomics.com/docs/kyle-bass-inter-partes-reviews-of-patent-validity.pdf>.

**TABLE 1: THE PERCENTAGE CHANGE IN STOCK PRICE AND DESCRIPTIVE STATISTICS OF COMPANIES WITH CHALLENGED PATENTS ON THE REPORTING DATE OF BASS'S IPR CHALLENGES**

<i>Company Name</i>	<i>Stock Exchange</i>	<i>Most Recently Reported Shares Outstanding (Millions)</i>	<i>Date of IPR Filing</i>	<i>% Change in Price on Date of IPR Filing</i>	<i>Losses Upon IPR Filing (Millions)</i>
<i>Acorda Therapeutics</i>	NASDAQ	41.2	Feb. 10, 2015	-9.65%	-\$158.4
<i>Acorda Therapeutics</i>	NASDAQ	41.2	Feb. 27, 2015	-4.84%	-\$70.8
<i>Shire Inc.</i>	NASDAQ	586.7	Apr. 1, 2015	-2.71%	-\$3,799.7
<i>Jazz Pharma.</i>	NASDAQ	60.7	Apr. 6, 2015	-0.59%	-\$60.1
<i>Pharmacyclics, Inc</i>	NASDAQ	76.0	Apr. 20, 2015	-0.34%	-\$66.9
<i>Biogen IDEC Int'l</i>	NASDAQ	235.0	Apr. 22, 2015	0.35%	\$343.1
<i>Celgene Corp.</i>	NASDAQ	798.9	Apr. 22, 2015	0.63%	\$575.2
<i>Celgene Corp.</i>	NASDAQ	798.9	Apr. 23, 2015	0.48%	\$439.4
<i>Shire Inc.</i>	NASDAQ	586.7	Apr. 23, 2015	0.71%	\$1,049.5
<i>Biogen IDEC Int'l</i>	NASDAQ	235.0	May 1, 2015	3.29%	\$2,888.2
<i>Celgene Corp.</i>	NASDAQ	798.9	May 7, 2015	3.09%	\$2,684.3
<i>Pozen Inc.</i>	NASDAQ	32.4	May 21, 2015	0.30%	\$0.65
<i>Pozen Inc.</i>	NASDAQ	32.4	June 5, 2015	2.72%	\$6.5
<i>Pozen Inc.</i>	NASDAQ	32.7	Aug. 7, 2015	-6.26%	-\$22.9
<i>Horizon Pharma</i>	NASDAQ	150.8	Aug. 12, 2015	-0.82%	-\$40.7
<i>Bristol-Myers Squibb</i>	NASDAQ	1,667	Aug. 13, 2015	0.05%	\$50.0
<i>Anacor</i>	NASDAQ	39.3	Aug. 20, 2015	-2.25%	-\$116.2
<i>Hoffman-La Roche</i>	OTC	850.0	Aug. 22, 2015	-0.59%	-\$170.0
<i>Insys Pharma.</i>	NASDAQ	71.5	Aug. 24, 2015	-4.12%	-\$95.8
<i>Acorda Therapeutics</i>	NASDAQ	42.1	Sept. 2, 2015	2.49%	\$33.2
<i>Acorda Therapeutics</i>	NASDAQ	42.1	Sept. 3, 2015	-2.15%	-\$29.5
<i>Biogen MA Inc.</i>	NASDAQ	235.3	Sept. 28, 2015	-4.39%	-\$2,943.6
<i>Citius Pharma Inc.</i>	NASDAQ	34.7	Nov. 24, 2015	0.00%	\$0.0
<i>Fresenius Medical Care</i>	NASDAQ	305.2	Nov. 25, 2015	1.03%	\$128.2

Notes: \* indicates that the date on which the press reported on the IPR challenge was one to three days within the date on which Bass filed the IPR challenge. Shire, Inc. acquired NPS Pharmaceuticals on February 21, 2015, less than two months before the filing of Bass's IPR petition against NPS Pharmaceuticals' patent. The challenge on April 23, 2015 was filed against both Shire, Inc. and NPS Pharmaceuticals. We exclude the multiple petitions that Bass filed against Celgene's same patent on April 23, 2015 and the multiple petitions that Bass filed against Anacor's same patent on August 20, 2015. Bass also challenged two patents owned by the Trustees of the University of Pennsylvania. Because the University of Pennsylvania is not a publicly traded company and has no stock price information, we exclude challenges against its patents from our event study. On November 24, 2015, Bass filed a petition against Alpex Pharma's patent, which Citius licensed. We thus use the stock price of Citius to assess the impact of Bass's IPR challenge. This table corresponds to Table 1 in the published version of this article. Sidak & Skog, *supra* note 1, at 131-32 tbl.1.

**FIGURE 1: THE PERCENTAGE PRICE CHANGE IN THE S&P 500, THE DRG INDEX, AND THE CHALLENGED COMPANY'S STOCK ON THE REPORTING DATES OF THE PATENT CHALLENGES**



Note: This figure corresponds to Figure 1 in the published version of this article. Sidak & Skog, *supra* note 1, at 134 fig.1.

### ***The Abnormal Returns on the Date of the IPR Challenges of Companies Holding Patents That Bass Challenged***

For each company with a challenged patent, we calculate and present

- its stock's cumulative abnormal returns (CAR), which are the sum of the differences between the actual returns and the predicted returns<sup>2</sup> over a one-day or three-day window around the event,
- the standard deviation of the abnormal returns, which defines the expected distribution of the abnormal returns,
- the standard error of CAR during the event window, and
- the t-statistic to test the cumulative abnormal returns for statistical significance.

<sup>2</sup> We calculate the stock's predicted returns by regressing its daily returns on the market indices' daily returns for the 100 trading days before the event window, thereby determining the stock's price trend and expected response to market changes.

**TABLE 2: CUMULATIVE ABNORMAL RETURNS (CAR) OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 INDEX**

Event #	Company	Event Date	1-Day CAR (%)	Std. Dev. of Residuals	T-Statistic	SQ Test	3-Day CAR (%)	Std. Dev. of Residuals	T-Statistic	SQ Test
1	Acorda Therapeutics	Feb. 10, 2015	-11.9%	3.22%	-3.71	99	-10.8%	5.58%	-1.93	97
2	Acorda Therapeutics	Feb. 27, 2015	-4.6%	2.41%	-1.92	97	-3.0%	4.17%	-0.72	57
3	Shire Inc.	Apr. 1, 2015	-2.6%	1.56%	-1.66	91	-6.2%	2.70%	-2.29	96
4	Jazz Pharma.	Apr. 6, 2015	-1.4%	1.53%	-0.92	63	-2.4%	2.68%	-0.90	63
5	Pharmacyclics, Inc	Apr. 20, 2015	-1.5%	3.00%	-0.49	70	-1.7%	5.20%	-0.33	37
6	Biogen	Apr. 22, 2015	-0.5%	2.18%	-0.21	21	0.2%	3.77%	0.05	3
7	Celgene Corp.	Apr. 22, 2015	0.0%	1.65%	0.03	5	0.4%	2.88%	0.13	12
8	Celgene Corp.	Apr. 23, 2015	0.2%	1.65%	0.12	17	2.2%	2.85%	0.77	62
9	Shire Inc.	Apr. 23, 2015	0.3%	1.71%	0.20	17	0.8%	2.96%	0.28	33
10	Biogen	May 1, 2015	2.1%	2.25%	0.96	81	0.1%	3.89%	0.01	1
11	Celgene Corp.	May 7, 2015	2.7%	1.66%	1.61	88	3.9%	2.87%	1.36	84
12	Pozen Inc.	May 21, 2015	0.4%	2.65%	0.13	22	1.5%	4.59%	0.32	49
13	Pozen Inc.	June 5, 2015	2.9%	2.82%	1.02	85	17.5%	4.85%	3.61	99
14	Pozen Inc.	Aug. 7, 2015	-6.6%	3.72%	-1.77	94	-15.0%	6.42%	-2.33	94
15	Horizon Pharma	Aug. 12, 2015	-1.3%	2.98%	-0.44	44	-3.0%	5.16%	-0.59	53
16	Bristol-Myers Squibb	Aug. 13, 2015	0.2%	1.15%	0.21	20	0.5%	2.01%	0.26	18
17	Anacor	Aug. 20, 2015	1.1%	4.96%	0.23	37	7.9%	8.60%	0.92	89
18	Hoffman-La Roche	Aug. 22, 2015	3.0%	0.99%	3.00	98	4.7%	1.73%	2.73	98
19	Insys Pharma.	Aug. 24, 2015	1.7%	2.93%	0.56	49	13.7%	5.04%	2.72	98
20	Acorda Therapeutics	Sept. 2, 2015	1.4%	2.13%	0.66	57	0.4%	3.70%	0.11	8
21	Acorda Therapeutics	Sept. 3, 2015	-2.2%	2.13%	-1.04	76	-0.3%	3.70%	-0.09	5
22	Biogen	Sept. 28, 15	-0.7%	2.86%	-0.26	46	-1.3%	4.94%	-0.26	41
23	Citius Pharma Inc.	Nov. 24, 2015	0.4%	3.14%	0.11	53	1.0%	5.43%	0.18	42
24	Fresenius Medical Care	Nov. 25, 2015	1.0%	1.30%	0.80	66	-0.4%	2.20%	-0.20	20

Notes: Shire, Inc. acquired NPS Pharmaceuticals on February 21, 2015, less than two months before the filing of Bass's IPR petition against NPS Pharmaceuticals' patent. The challenge on April 23, 2015 was filed against both Shire, Inc. and NPS Pharmaceuticals. We exclude the multiple petitions that Bass filed against Celgene's same patent on April 23, 2015. Bass also challenged two patents owned by the Trustees of the University of Pennsylvania. Because the University of Pennsylvania is not a publicly traded company and has no stock price information, we exclude challenges against its patents from our event study. We also exclude the multiple petitions that Bass filed against Anacor's same patent on August 20, 2015. In addition, Bass's challenge against Hoffmann-La Roche's patent was filed on Saturday, August 24, 2015. As U.S. stocks do not trade on Saturdays, we use the following Monday's CAR. This table corresponds to Table 2 in the published version of this article. Sidak & Skog, *supra* note 1, at 136–38 tbl.2.

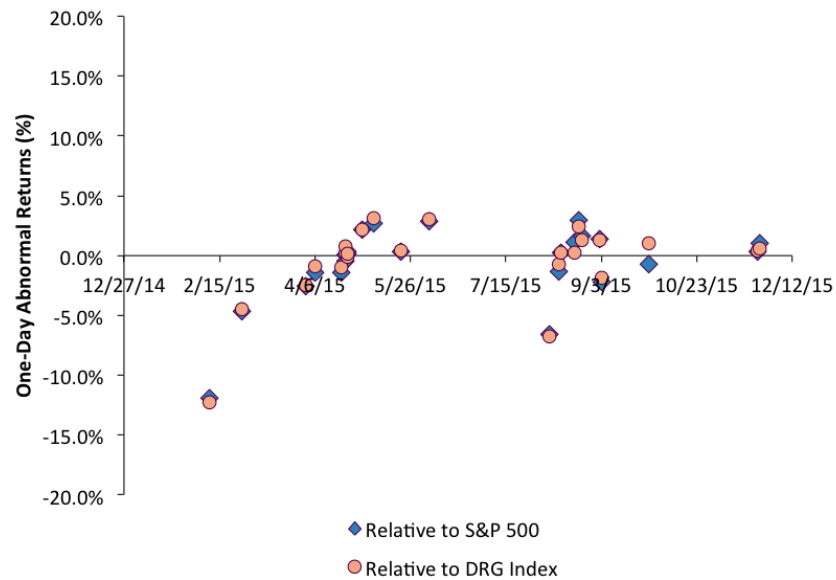
**TABLE 3:** CUMULATIVE ABNORMAL RETURNS (CAR) OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE DRG INDEX

Event Number	Company	Event Date	1-Day CAR (%)	Std. Dev. of Residuals	T-Statistic	SQ Test	3-Day CAR (%)	Std. Dev. of Residuals	T-Statistic	SQ Test
1	Acorda Therapeutics	Feb. 10, 2015	-12.3%	3.16%	-3.89	99	10.97%	5.48%	2.00	97
2	Acorda Therapeutics	Feb. 27, 2015	-4.5%	2.40%	-1.88	98	-2.95%	4.15%	-0.71	62
3	Shire Inc.	Apr. 1, 2015	-2.5%	1.44%	-1.73	92	-4.97%	2.50%	-1.99	94
4	Jazz Pharma.	Apr. 6, 2015	-0.9%	1.53%	-0.58	49	-2.53%	2.69%	-0.94	71
5	Pharmacyclics, Inc	Apr. 20, 2015	-1.0%	2.93%	-0.34	45	-2.35%	5.08%	-0.46	42
6	Biogen	Apr. 22, 2015	0.1%	2.18%	0.06	6	-0.31%	3.77%	-0.08	8
7	Celgene Corp.	Apr. 22, 2015	0.8%	1.41%	0.53	41	-0.57%	2.49%	-0.23	21
8	Celgene Corp.	Apr. 23, 2015	-0.1%	1.42%	-0.05	9	3.05%	2.45%	1.24	85
9	Shire Inc.	Apr. 23, 2015	0.1%	1.57%	0.09	7	1.44%	2.71%	0.53	48
10	Biogen	May 1, 2015	2.1%	2.21%	0.97	81	-0.02%	3.83%	-0.01	0
11	Celgene Corp.	May 7, 2015	3.1%	1.43%	2.16	99	3.98%	2.46%	1.62	91
12	Pozen Inc.	May 21, 2015	0.4%	2.67%	0.14	21	1.47%	4.63%	0.32	50
13	Pozen Inc.	June 5, 2015	3.0%	2.86%	1.06	86	17.00%	4.91%	3.46	98
14	Pozen Inc.	Aug. 7, 2015	-6.7%	3.73%	-1.80	94	-14.11%	6.45%	-2.19	92
15	Horizon Pharma	Aug. 12, 2015	-0.7%	3.01%	-0.24	23	-2.90%	5.21%	-0.56	53
16	Bristol-Myers Squibb	Aug. 13, 2015	0.2%	1.06%	0.21	28	1.18%	1.85%	0.63	57
17	Anacor	Aug. 20, 2015	0.2%	5.01%	0.04	4	3.85%	8.68%	0.44	62
18	Hoffman-La Roche	Aug. 22, 2015	2.4%	0.95%	2.54	97	3.47%	1.68%	2.07	96
19	Insys Pharma.	Aug. 24, 2015	1.3%	2.83%	0.46	40	12.27%	4.90%	2.50	97
20	Acorda Therapeutics	Sept. 2, 2015	1.3%	2.11%	0.62	54	0.53%	3.66%	0.14	15
21	Acorda Therapeutics	Sept. 3, 2015	-1.9%	2.11%	-0.88	71	-0.04%	3.66%	-0.01	0
22	Biogen	Sept. 28, 2015	1.0%	2.74%	0.36	59	3.40%	4.76%	0.72	79
23	Citius Pharma Inc.	Nov. 24, 2015	0.4%	3.13%	0.12	47	0.92%	5.41%	0.17	40
24	Fresenius Medical Care	Nov. 25, 2015	0.6%	1.30%	0.45	37	-1.01%	2.22%	-0.45	37

Note: This table corresponds to Table 3 in the published version of this article. Sidak & Skog, *supra* note 1, at 140–41 tbl.3.

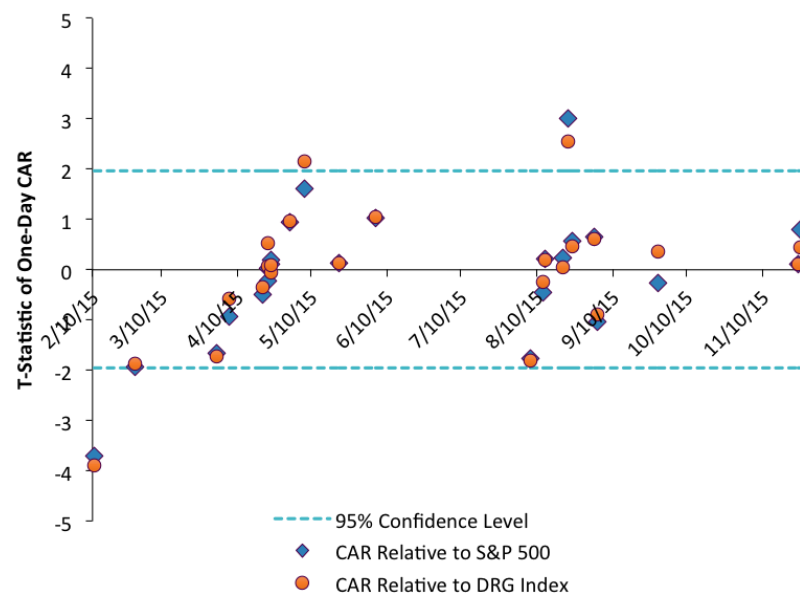
### One-Day Abnormal Returns Following IPR Petition Filings

**FIGURE 2:** ONE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX



Note: This figure corresponds to Figure 2 in the published version of this article. Sidak & Skog, *supra* note 1, at 143 fig.2.

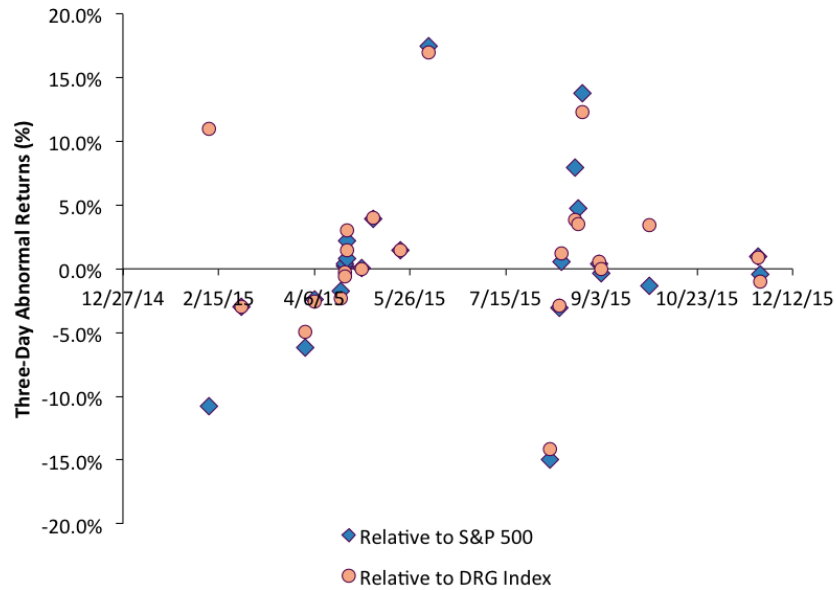
**FIGURE 3:** STATISTICAL SIGNIFICANCE OF ONE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX



Note: This figure corresponds to Figure 3 in the published version of this article. Sidak & Skog, *supra* note 1, at 144 fig.3.

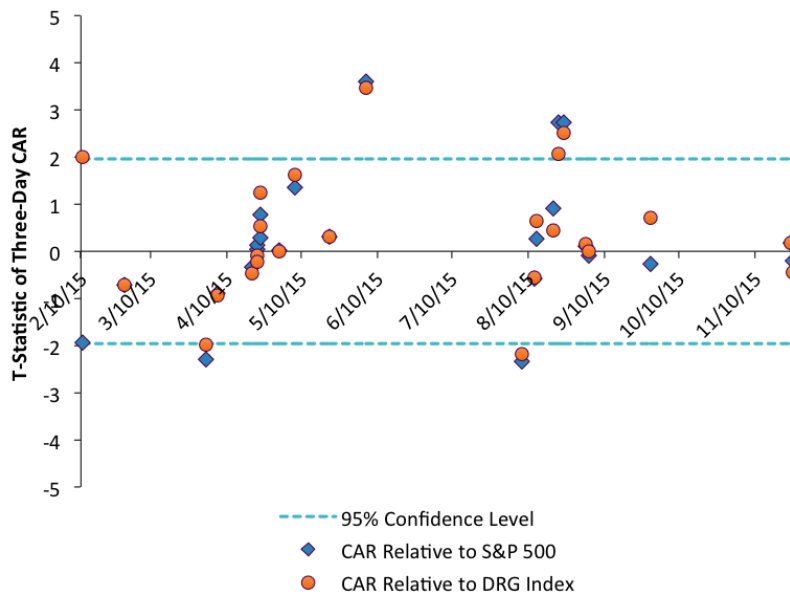
### Three-Day Abnormal Returns Following IPR Petition Filings

**FIGURE 4:** THREE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX



Note: This figure corresponds to Figure 4 in the published version of this article. Sidak & Skog, *supra* note 1, at 145 fig.4.

**FIGURE 5:** STATISTICAL SIGNIFICANCE OF THREE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX



Note: This figure corresponds to Figure 5 in the published version of this article. Sidak & Skog, *supra* note 1, at 146 fig.5.

**TABLE 4:** STATISTICALLY SIGNIFICANT ABNORMAL RETURNS FOLLOWING IPR PETITION FILINGS

<i>Following IPR Petition Filing Events</i>	<i>1-Day Window</i>	<i>3-Day Window</i>
<i>Relative to S&amp;P500</i>		
<i>Number of Events with Positive Abnormal Returns</i>	1	3
<i>Number of Events with Negative Abnormal Returns</i>	1	2
<i>Number of Events with Statistically Significant Abnormal Returns</i>	2 (8.3% of Total)	5 (20.8% of Total)
<i>Relative to DRG Index</i>		
<i>IPR Filing Events with Positive Abnormal Returns</i>	2	4
<i>IPR Filing Events Negative Abnormal Returns</i>	1	2
<i>Number of Events with Statistically Significant Abnormal Returns</i>	3 (12.5% of Total)	6 (25.0% of Total)

*Note:* The percentage in parentheses indicates the number of events with statistically significant abnormal returns as a percentage of the total number of IPR filing events that we analyzed—that is 24 IPR filing events.



***The Abnormal Returns on the Date of the PTAB Decision of the Stocks of Companies Holding Patents That Bass Challenged***

**TABLE 5:** ABNORMAL RETURNS OF CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 FOLLOWING THE PTAB DECISION ON THE INSTITUTION OF AN *INTER PARTES* REVIEW

<i>Decision on IPR Petition</i>	<i>Company</i>	<i>Date of PTAB Decision</i>	<i>1-Day CAR (%)</i>	<i>Std. Dev. of Residuals</i>	<i>T-Statistic</i>	<i>SQ Test</i>	<i>3-Day CAR (%)</i>	<i>Std. Dev. of Residuals</i>	<i>T-Statistic</i>	<i>SQ Test</i>
Denied	Acorda Therapeutics	Aug. 24, 2015	0.37%	1.90%	0.19	9	18.2%	3.1%	5.81	100
Denied	Biogen MA Inc.	Sept. 2, 2015	1.55%	2.88%	0.54	75	3.9%	5.0%	0.79	81
Instituted	Cosmo Tech. Ltd.	Oct. 7, 2015	-2.26%	1.42%	-1.60	89	-1.9%	2.5%	-0.77	57
Denied	Jazz Pharma.	Oct. 15, 2015	1.37%	1.70%	0.80	68	5.9%	2.9%	2.05	98
Denied	Pharmacyclics, Inc.	Oct. 19, 2015	-0.58%	1.14%	-0.50	53	-2.4%	2.0%	-1.23	80
Instituted	Shire Inc.	Oct. 23, 2015	3.50%	1.47%	2.39	97	0.0%	2.5%	0.02	1
Denied	Biogen IDEC Int'l	Oct. 27, 2015	6.33%	3.01%	2.11	99	5.8%	5.2%	1.12	90
Denied	Celgene Corp.	Oct. 27, 2015	1.95%	1.60%	1.22	85	4.4%	2.7%	1.62	91
Instituted	Celgene Corp.	Oct. 27, 2015	1.95%	1.60%	1.22	85	4.4%	2.7%	1.62	91
Instituted	Celgene Corp.	Oct. 28, 2015	-0.71%	1.61%	-0.44	54	-0.6%	2.8%	-0.20	23
Denied	Celgene Corp.	Nov. 16, 2015	0.40%	1.73%	0.23	29	1.7%	3.0%	0.58	54
Denied	Horizon Pharma	Dec. 8, 2015	8.10%	6.35%	1.28	88	4.8%	11.0%	0.43	56
Denied	Horizon Pharma	Dec. 17, 2015	4.19%	6.44%	0.65	71	5.4%	11.2%	0.49	60

*Notes:* We report the abnormal returns of Shire following the PTAB's decision on October 23, 2015 regarding the petition against NPS Pharmaceutical's patent, because Shire acquired NPS Pharmaceuticals on February 21, 2015. We report the abnormal returns of Biogen when the PTAB denied Biogen's request for a rehearing on October 27, 2015. On December 17, 2015, the PTAB refused to institute an *inter partes* review of Pozen's patent on the arthritis medication Vimovo, for which Horizon Pharma acquired the rights in 2013. We hence report the abnormal returns of Horizon Pharma, instead of Pozen, over the one-day and three-day windows around the PTAB decisions on December 8, 2015 and December 17, 2015.<sup>3</sup> This table corresponds to Table 4 in the published version of this article. Sidak & Skog, *supra* note 1, at 147 tbl.4.

<sup>3</sup> See Ryan Davis, *Bass AIA Challenge to Celgene Cancer Drug Patent Rejected*, LAW360, Nov. 18 2015, <http://www.law360.com/articles/728628/bass-aia-challenge-to-celgene-cancer-drug-patent-rejected>; *Pozen Announces U.S. Rights for VIMOVO to be Acquired by Horizon Pharma USA, Inc.*, BUSINESSWIRE (Nov. 19, 2013), <http://www.businesswire.com/news/home/20131119005390/en/POZEN-Announces-U.S.-Rights-VIMOVO%C2%AE-Acquired-Horizon>.

**TABLE 6: CUMULATIVE ABNORMAL RETURNS OF CHALLENGED COMPANIES' STOCKS RELATIVE TO THE DRG INDEX FOLLOWING THE PTAB DECISIONS ON THE INSTITUTION OF AN *INTER PARTES* REVIEW**

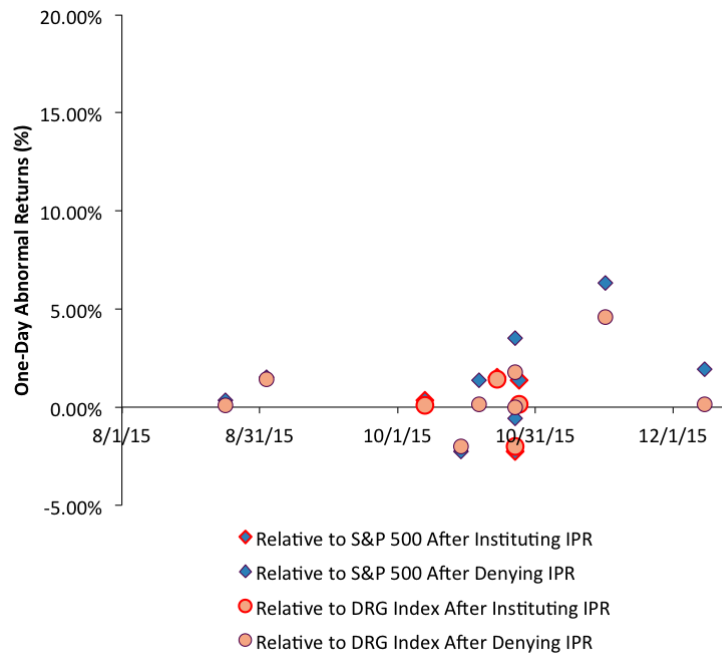
Decision on IPR Petition	Company	Date of PTAB Decision	1-Day CAR (%)	Std. Dev. Of Residuals	T-Statistic	SQ Test	3-Day CAR (%)	Std. Dev. Of Residuals	T-Statistic	SQ Test
Denied	Acorda Therapeutics	Aug. 24, 2015	0.1%	1.9%	0.04	3	16.6%	3.1%	5.39	100
Denied	Biogen MA Inc.	Sept. 2, 2015	1.4%	2.8%	0.50	70	4.1%	4.9%	0.84	85
Instituted	Cosmo Tech. Ltd.	Oct. 7, 2015	-2.0%	1.4%	-1.42	88	-0.9%	2.5%	-0.38	27
Denied	Jazz Pharma.	Oct. 15, 2015	0.1%	1.4%	0.10	14	1.7%	2.4%	0.71	64
Denied	Pharmacyclics, Inc.	Oct. 19, 2015	-0.01%	-0.9%	0.01	3	-0.6%	1.6%	-0.38	33
Instituted	Shire Inc.	Oct. 23, 2015	1.8%	1.2%	1.49	88	0.0%	2.1%	0.00	0
Denied	Biogen IDEC Int'l	Oct. 27, 2015	4.6%	2.9%	1.59	97	2.9%	5.0%	0.57	63
Denied	Celgene Corp.	Oct. 27, 2015	0.2%	1.4%	0.11	13	1.4%	2.4%	0.60	47
Instituted	Celgene Corp.	Oct. 27, 2015	0.2%	1.4%	0.11	13	1.4%	2.4%	0.60	47
Instituted	Celgene Corp.	Oct. 28, 2015	-1.6%	1.4%	-1.13	82	-2.5%	2.4%	-1.02	76
Denied	Celgene Corp.	Nov. 16, 2015	1.0%	1.5%	0.68	61	0.0%	2.6%	-0.02	1
Denied	Horizon Pharma	Dec. 8, 2015	8.1%	5.8%	1.41	90	4.6%	10.0%	0.46	49
Denied	Horizon Pharma	Dec. 17, 2015	4.9%	5.8%	0.84	69	4.0%	10.1%	0.40	42

Notes: We report the abnormal returns of both Shire and Cosmo Technologies following the PTAB's decision on October 7, 2015, because, whereas the initial IPR challenge on April 1, 2015 listed Shire as the patent owner, the PTAB decision listed Cosmo as the patent owner who licensed U.S. Patent No. 6,773,720 B1 to Shire.<sup>4</sup> We report the abnormal returns of Shire following the PTAB's decision on October 23, 2015 regarding the petition against NPS Pharmaceutical's patent, because Shire acquired NPS Pharmaceuticals on February 21, 2015. This table corresponds to Table 5 in the published version of this article. Sidak & Skog, *supra* note 1, at 148 tbl.5.

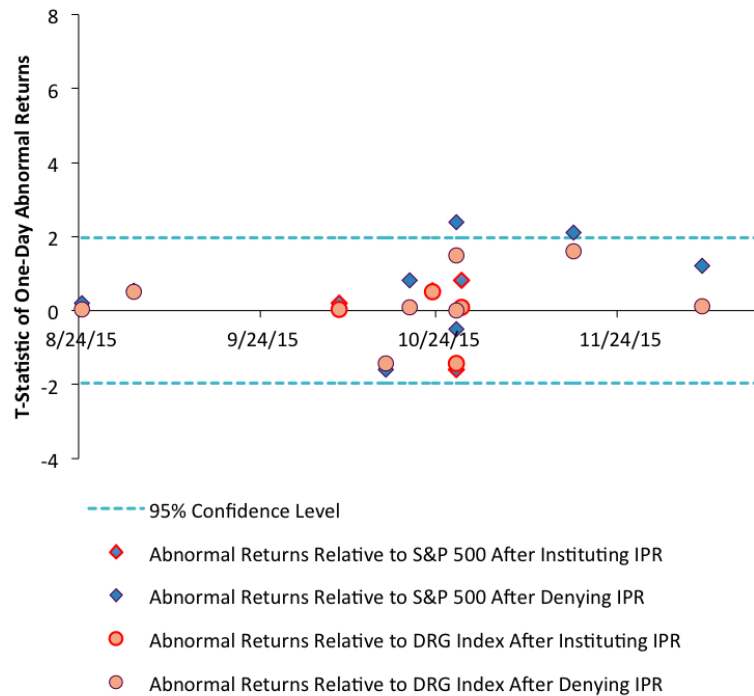
<sup>4</sup> See Decision Institution of *Inter Partes* Review of U.S. Patent No. 6,773,720 B1 at 2, Coal. for Affordable Drugs II LLC v. Cosmo Tech. Ltd., IPR No. 2015-00988 (P.T.A.B. Oct. 7, 2015); Kelly Bit, Susan Decker & Cynthia Koons, *Hayman's Bass Targets Shire in New Drug Patent Challenges*, BLOOMBERGBUSINESS, Apr. 2, 2015, <http://www.bloomberg.com/news/articles/2015-04-02/hayman-s-kyle-bass-targets-shire-in-new-drug-patent-challenges>.

### One-Day Abnormal Returns Following PTAB Decisions on the Institution of IPR

**FIGURE 6:** ONE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX FOLLOWING THE PTAB DECISIONS ON THE INSTITUTION OF *INTER PARTES* REVIEW

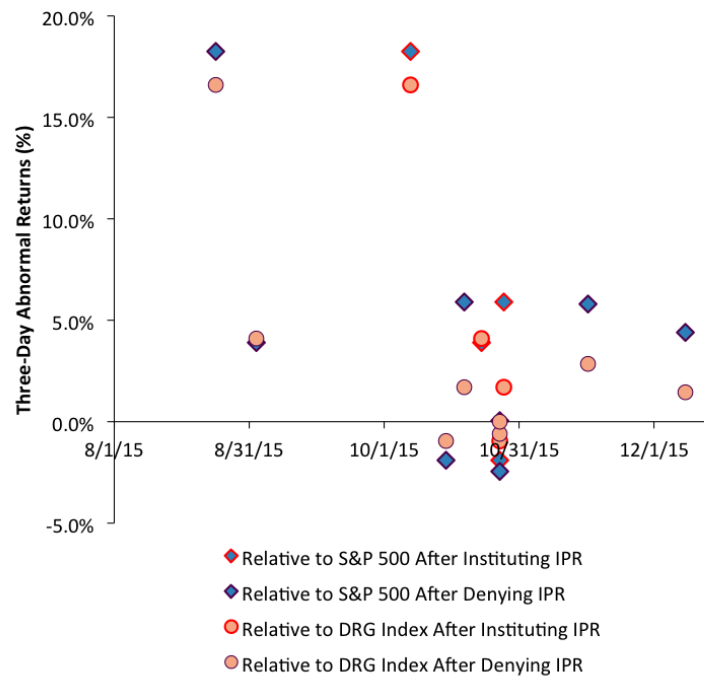


**FIGURE 7:** STATISTICAL SIGNIFICANCE OF ONE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX FOLLOWING THE PTAB DECISIONS ON THE INSTITUTION OF *INTER PARTES* REVIEW

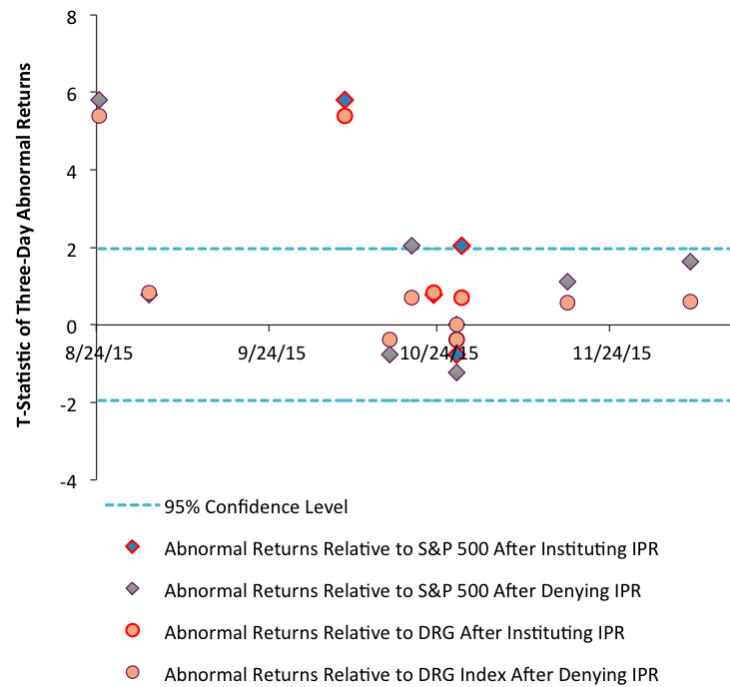


### Three-Day Abnormal Returns Following PTAB Decisions on the Institution of IPR

**FIGURE 8:** THREE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX FOLLOWING THE PTAB DECISIONS ON THE INSTITUTION OF AN *INTER PARTES* REVIEW



**FIGURE 9:** STATISTICAL SIGNIFICANCE OF THREE-DAY ABNORMAL RETURNS OF THE CHALLENGED COMPANIES' STOCKS RELATIVE TO THE S&P 500 AND THE DRG INDEX



**TABLE 7:** STATISTICALLY SIGNIFICANT ABNORMAL RETURNS FOLLOWING PTAB DECISION EVENTS

Following PTAB Decision Events	1-Day Window	3-Day Window
<i>Relative to S&amp;P500</i>		
<i>Number of Events with Positive Abnormal Returns</i>	2	2
<i>Number of Events with Negative Abnormal Returns</i>	0	0
<i>Number of Events with Statistically Significant Abnormal Returns</i>	2 (15.4% of Total)	2 (15.4% of Total)
<i>Relative to DRG Index</i>		
<i>IPR Filing Events with Positive Abnormal Returns</i>	0	1
<i>IPR Filing Events Negative Abnormal Returns</i>	0	0
<i>Number of Events with Statistically Significant Abnormal Returns</i>	0 (0.0% of Total)	1 (7.7% of Total)

*Note:* The percentage in parentheses indicates the number of events with statistically significant abnormal returns as a percentage of the total number of IPR decision events that we analyzed—that is 13 PTAB decision events.

## Relevant *Inter Partes* Review Petitions and P.T.A.B Decisions

### ***Kyle Bass's Inter Partes* Review Petition Filings (in Chronological Order)**

Petition for *Inter Partes* Review of U.S. No. 8,663,685, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-00720 (P.T.A.B. Feb. 10, 2015).

Petition for *Inter Partes* Review of U.S. No. 8,007,826, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-00817 (P.T.A.B. Feb. 27, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 7,056,886, Coal. for Affordable Drugs II LLC v. NPS Pharmas., Inc., IPR No. 2015-00990 (P.T.A.B. Apr. 1, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 6,773,720, Coal. for Affordable Drugs II LLC v. Shire. Inc., IPR No. 2015-00988 (P.T.A.B. Apr. 1, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 7,895,059, Coal. for Affordable Drugs III LLC v. Jazz Pharmas., Inc., IPR No. 2015-01018 (P.T.A.B. Apr. 6, 2015).

Petition for *Inter Partes* Review of U.S. No. 8,754,090, Coal. for Affordable Drugs IV LLC v. Pharmacyclics, Inc., IPR No. 2015-01076 (P.T.A.B. Apr. 20, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,759,393, Coal. for Affordable Drugs V LLC v. Biogen IDEC Int'l GmbH, IPR No. 2015-01086 (P.T.A.B. Apr. 22, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 6,315,720, Coal. for Affordable Drugs VI LLC v. Celgene Corp., IPR No. 2015-01103 (P.T.A.B. Apr. 23, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,399,514, Coal. for Affordable Drugs V LLC v. Biogen MA Inc., IPR No. 2015-01136 (P.T.A.B. May 1, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 5,635,517, Coal. for Affordable Drugs VI LLC v. Celgene Corp., IPR No. 2015-01169 (P.T.A.B. May 7, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 6,926,907, Coal. for Affordable Drugs VII LLC v. Pozen Inc., IPR No. 2015-01241 (P.T.A.B. May 21, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,858,996, Coal. for Affordable Drugs VII LLC v. Pozen Inc., IPR No. 2014-01344 (P.T.A.B. June 5, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,852,636, Coal. for Affordable Drugs VII LLC v. Pozen Inc., IPR No. 2015-01680 (P.T.A.B. Aug. 7, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,945,621, Coal. for Affordable Drugs VII LLC v. Horizon Pharma USA, Inc., IPR No. 2015-01718 (P.T.A.B. Aug. 12, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 6,967,208, Coal. for Affordable Drugs IX LLC v. Bristol-Myers Squibb Pharma Co., IPR No. 2015-01723 (P.T.A.B. Aug. 13, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 7,767,657, Coal. for Affordable Drugs X LLC v. Anacor Pharma. Inc., IPR No. 2015-01780 (P.T.A.B. Aug. 20, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 7,582,621, Coal. for Affordable Drugs X LLC v. Anacor Pharma., Inc., IPR No. 2015-01785 (P.T.A.B. Aug. 20, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,163,522, Coal. for Affordable Drugs V LLC v. Hoffman-LaRoche Inc., IPR No. 2015-01792 (P.T.A.B. Aug. 22, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,835,460, Coal. for Affordable Drugs XI LLC v. Insys Pharma, Inc., IPR No. 2015-01797 (P.T.A.B. Aug. 24, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,835,459, Coal. for Affordable Drugs XI LLC v. Insys Pharma, Inc., IPR No. 2015-01799 (P.T.A.B. Aug. 24, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,486,972, Coal. for Affordable Drugs XI LLC v. Insys Pharma, Inc., IPR No. 2015-01800 (P.T.A.B. Aug. 24, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,007,826, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-01853 (P.T.A.B. Sept. 2, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,440,703, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-01850 (P.T.A.B. Sept. 2, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,354,437, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-01858 (P.T.A.B. Sept. 3, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,663,685, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-01857 (P.T.A.B. Sept. 3, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,399,514, Coal. for Affordable Drugs V LLC v. Biogen MA Inc., IPR No. 2015-01993 (P.T.A.B. Sept. 28, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,440,170, Mr. J Kyle Bass and Mr. Erich Spangenberg v. Alpex Pharma, IPR No. 2016-00245 (P.T.A.B. Nov. 24, 2015).

Petition for *Inter Partes* Review of U.S. Patent No. 8,476,010 B2, J Kyle Bass and Erich Spangenberg v. Fresenius Kabi USA, LLC, IPR No. IPR2016-00254 (P.T.A.B. Nov. 25, 2015).

### **P.T.A.B. Rulings on Kyle Bass's *Inter Partes* Review Petitions (in Chronological Order)**

Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 8,007,826, B2, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-00817 (P.T.A.B. Aug. 24, 2015).

Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 8,663,685 B2, Coal. for Affordable Drugs (ADROCA) LLC v. Acorda Therapeutics, Inc., IPR No. 2015-00720 (P.T.A.B. Aug. 24, 2015).

Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 8,399,514 B2, Coal. for Affordable Drugs V LLC v. Biogen MA Inc., IPR No. 2015-01136 (P.T.A.B. Sept. 2, 2015).

Decision Institution of *Inter Partes* Review of U.S. Patent No. 6,773,720 B1, Coal. for Affordable Drugs II LLC v. Cosmo Tech. Ltd, IPR No. 2015-00988 (P.T.A.B. Oct. 7, 2015).

Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 7,895,059 B2, Coal. for Affordable Drugs III LLC v. Jazz Pharma., Inc., IPR No. 2015-01018 (P.T.A.B. Oct. 15, 2015).

Decision Institution of *Inter Partes* Review of U.S. Patent No. 7,056,886, B2, Coal. for Affordable Drugs II LLC v. NPS Pharma., IPR No. 2015-00990 (P.T.A.B. Oct. 23, 2015).

Decision Denying Institution of *Inter Partes* Review; Dismissing Motion for Additional Discovery of U.S. Patent No. 8,759,393 B2, Coal. for Affordable Drugs V LLC v. Biogen Int'l GmbH, IPR No. 2015-01086 (P.T.A.B. Oct. 27, 2015).

Decision Denying Institution of *Inter Partes* Review of U.S. Patent No. 5,635,517, Coal. for Affordable Drugs VI LLC, v. Celgene Corp., IPR No. 2015-01169 (P.T.A.B. Nov. 16, 2015).