

Do International Rulings Have Spillover Effects?

The View from Financial Markets

Additional Results

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Note: Full replication files can be found at the following address:

<http://www.wtodisputedata.com/#!research/vb4on>

This appendix reports supplemental information from several of the robustness checks mentioned in the main manuscript.

To begin, Table A1 lists the companies used in this study, including 8 Canadian, 6 US, and 11 Indian firms. Table A1 also reports the index on which each firm is traded. All estimations reported in the paper use the price of the indices listed in this table. Robustness checks use alternative indices, as described below.

Tables A2 - A7 report results from using different estimation and event windows. Event study approaches allow the researcher to designate a relevant ‘window’ of time around the event of interest. The models reported in the paper utilize 50-day estimation windows (the period of time prior to the panel/appeal decision) and 10-day event windows (the period of time subsequent to the panel/appeal report). In order to make sure that these decisions are not affecting the results — or our inferences — we reestimate the baseline specifications with different combinations of estimation & event windows.

For each country’s firm, we run models using 50- and 80-day estimation windows, 10- and 1-day event windows, and each combination of those four periods. Looking across the columns, the results are highly consistent, leading us to conclude that the selection of our estimation/event windows are not driving the results. (Note that the first columns of Tables A2 - A7 repeat the baseline results offered in main manuscript.)

Tables A2 - A5 also include models utilizing industry-specific indices, rather than the aggregate index on which a firm is listed. An individual firm’s price ought to map more closely onto the price of its industry competitors than it would onto the overall NASDAQ price, for example. Comparing any one firm’s price to its industry partners is therefore a more conservative test in many respects.¹ Industry-specific indices are available for Canadian and US firms. We are not aware of an alternative energy index for the BSE. For Canadian firms we use the TSX Renewables (TXCT) index and for the US firms we use NASDAQ Clean Edge (CELS) index. Those results are reported in columns 5-8 and 13-16 of Tables A2 - A5. Note that the results hold when using these narrower indices.

Finally, Table A8 presents the results of the alternative Newey estimation approach comparable to the one used in Jensen (2007). Jensen runs OLS models with Newey-West standard error corrections on a time

¹There is a lower likelihood that a firm will behave abnormally relative to its industry counterparts than relative to the entire market.

series of firms' share prices. His variables are constructed as the day-to-day difference in logged prices, or:

$$\Delta Price_{i,t} = \log(p_{i,t}) - \log(p_{i,t-1})$$

The daily index prices are differenced in the same manner and the exchange rate is measured as a simple day-to-day change. The resulting model specification is:

$$\Delta Price_{i,t} = \beta_0 + \beta_1 * \Delta Index_t + \beta_2 * \Delta Exchange Rate_t + \beta_3 Panel Date_t + Appeal Date_t + \mu_{i,t}$$

where the two “dates” refer to dichotomous indicators of the panel and appeal dates, and where $\mu_{i,t}$ is the error term. As mentioned above, the virtue of this approach is building corrections for heteroskedasticity and autocorrelation into the model—traits common to economic series. Newey estimators require that users specify a lag and, in keeping with Jensen (2007), we use a lag of 10.²

Here, the coefficients on $Panel_t$ and $Appeal_t$ tell us the effect that the WTO's decision had on prices. The results are even stronger here than found in the models utilizing the event study approach. Canadian firms experience significant price drops after not just the panel, but also the appeal. US firms, a potential Canadian competitor, benefit from both decision announcements. And, Indian firms results are split, but still exhibiting a strong, negative response to the final appeal decision.

Across these robustness checks, we find highly consistent results, giving us confidence that the inferences we draw in the paper are not an artifact of (i) estimation/event windows; (ii) the index used as a reference point; or (iii) the estimation strategy employed.

²The results are highly robust to different lags and we found no evidence that using 10 affected the estimates in any significant way.

Table A1: Companies Included in Sample

Company Name	Index
Canadian Firms	
Aecon Group	Toronto (TSX)
Alterra	Toronto (TSX)
Boralex	Toronto (TSX)
Capstone	Toronto (TSX)
Carmanah	Toronto (TSX)
Hammond Power	Toronto (TSX)
Innergex	Toronto (TSX)
Northland Power	Toronto (TSX)
US Firms	
Ascent Solar	New York (NASDAQ)
First Solar	New York (NASDAQ)
Green Plains	New York (NASDAQ)
Real Goods Solar	New York (NASDAQ)
Sun Edison	New York (NYSE)
SunPower	New York (NASDAQ)
Indian Firms	
Bharat Heavy Electricals	Bombay (BSE)
HBL Power	Bombay (BSE)
Indian Oil Company	Bombay (BSE)
Indosolar	Bombay (BSE)
Jain Irrigation	Bombay (BSE)
Lanco Infratech	Bombay (BSE)
Maharashtra Seamless	Bombay (BSE)
Punji Lloyd	Bombay (BSE)
Solar Industries India	Bombay (BSE)
Sujana Towers	Bombay (BSE)
Tata Power	Bombay (BSE)

Table A2: Returns for Canadian Firms Across Different Windows (Panel Date)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Est. Window / Event. Window Index	50 / 10 Toronto	80 / 10 Toronto	50 / 1 Toronto	80 / 1 Toronto	50 / 10 Industry	80 / 10 Industry	50 / 1 Industry	80 / 1 Industry
Aecon Group	-3.588 (-2.675)	-1.635 (-1.181)	-0.852 (-2.682)	-0.575 (-1.633)	-5.009 (-3.026)	-12.427 (-11.783)	-0.898 (-3.466)	-2.091 (-33.543)
Alterra	-0.155 (-2.604)	-0.293 (-4.567)	-0.026 (-1.383)	-0.050 (-2.556)	-0.187 (-2.910)	-0.701 (-16.180)	-0.026 (-1.540)	-0.107 (-12.687)
Boralex	-8.530 (-19.437)	-7.119 (-13.623)	-1.405 (-14.138)	-1.166 (-10.544)	-8.409 (-18.547)	-5.826 (-10.495)	-1.383 (-13.406)	-0.988 (-11.127)
Capstone	-0.345 (-1.709)	-0.359 (-1.827)	-0.238 (-5.922)	-0.243 (-7.902)	-0.559 (-3.188)	-1.837 (-10.228)	-0.241 (-8.031)	-0.450 (-37.524)
Carmanah	-0.422 (-10.260)	0.031 (0.523)	-0.108 (-40.757)	-0.039 (-3.088)	-0.446 (-11.150)	-0.185 (-3.153)	-0.111 (-42.364)	-0.068 (-6.396)
Hammond Power	-1.594 (-7.180)	-1.212 (-6.260)	-0.289 (-25.617)	-0.238 (-5.892)	-1.308 (-4.731)	-1.680 (-10.126)	-0.254 (-25.460)	-0.304 (-10.985)
Innergex	-2.594 (-6.909)	-2.870 (-8.022)	-0.399 (-4.126)	-0.445 (-5.151)	-2.750 (-7.631)	-4.124 (-13.721)	-0.402 (-4.504)	-0.621 (-11.781)
Northland Power	-2.976 (-5.619)	-0.231 (-0.401)	-0.417 (-8.197)	0.023 (0.599)	-3.076 (-6.609)	-1.464 (-2.265)	-0.394 (-5.768)	-0.153 (-1.927)
Test of significance	-2.244** (0.903)	-1.521* (0.768)	-0.414** (0.151)	-0.303** (0.128)	-2.416** (0.932)	-3.138** (1.321)	-0.412** (0.151)	-0.531** (0.221)

APP-5

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * $p < 0.100$ and ** $p < 0.050$.

Table A3: Returns for Canadian Firms Across Different Windows (Appeal Date)

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Est. Window / Event. Window Index	50 / 10 Toronto	80 / 10 Toronto	50 / 1 Toronto	80 / 1 Toronto	50 / 10 Industry	80 / 10 Industry	50 / 1 Industry	80 / 1 Industry
Aecon Group	-14.149 (-11.707)	-4.804 (-4.823)	-1.288 (-10.144)	0.161 (1.391)	-14.334 (-11.604)	-6.259 (-6.469)	-1.284 (-10.012)	-0.146 (-1.279)
Alterra	0.368 (13.100)	-0.278 (-12.163)	0.052 (138.008)	-0.044 (-79.331)	0.418 (11.740)	-0.071 (-1.903)	0.059 (142.903)	-0.007 (-12.799)
Boralex	1.870 (1.717)	8.634 (7.733)	0.219 (16.882)	1.236 (55.591)	1.568 (1.359)	6.900 (5.402)	0.132 (9.125)	0.860 (34.387)
Capstone	-2.542 (-7.595)	-2.117 (-6.461)	-0.386 (-7.694)	-0.307 (-6.112)	-2.462 (-7.504)	-1.812 (-5.653)	-0.376 (-7.501)	-0.273 (-5.532)
Carmanah	0.218 (6.285)	0.188 (5.536)	0.014 (52.778)	0.010 (30.784)	0.247 (7.201)	0.266 (7.560)	0.017 (81.290)	0.019 (127.034)
Hammond Power	-20.005 (-27.684)	-8.881 (-18.765)	-3.055 (-47.012)	-1.381 (-17.265)	-20.053 (-27.272)	-10.933 (-22.151)	-3.037 (-47.445)	-1.790 (-21.856)
Innergex	3.861 (8.027)	1.835 (4.680)	0.537 (16.368)	0.246 (6.790)	4.178 (8.214)	2.783 (6.232)	0.577 (17.794)	0.395 (11.109)
Northland Power	8.418 (13.611)	7.558 (11.647)	1.817 (258.903)	1.727 (179.857)	8.362 (12.981)	8.105 (11.819)	1.864 (203.764)	1.876 (160.988)
Test of significance	-2.440 (2.988)	0.273 (1.829)	-0.232 (0.445)	0.183 (0.183)	-2.453 (3.003)	-0.113 (1.982)	-0.227 (0.447)	0.103 (0.325)

APP-6

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * p<0.100 and ** p<0.050.

Table A4: Returns for US Firms Across Different Windows (Panel Date)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Est. Window / Event. Window Index	50 / 10 New York	80 / 10 New York	50 / 1 New York	80 / 1 New York	50 / 10 Industry	80 / 10 Industry	50 / 1 Industry	80 / 1 Industry
Ascent Solar	-2.805 (-12.062)	-5.442 (-11.394)	-0.434 (-21.917)	-0.949 (-35.781)	-5.577 (-18.305)	-11.695 (-14.393)	-0.900 (-63.626)	-1.997 (-141.190)
First Solar	90.057 (13.417)	92.963 (14.242)	18.658 (36.805)	19.159 (37.420)	85.139 (17.379)	100.090 (16.887)	17.538 (31.799)	20.224 (36.668)
Green Plains	14.980 (9.505)	20.582 (11.970)	3.338 (46.409)	4.376 (57.811)	19.096 (19.612)	34.657 (15.866)	3.916 (92.296)	6.707 (158.091)
Real Goods Solar	2.375 (8.381)	1.347 (5.324)	0.434 (156.980)	0.241 (63.471)	0.760 (3.220)	-1.125 (-6.409)	0.160	-0.179
Sun Edison	6.636 (14.479)	5.476 (10.476)	1.247 (156.922)	1.039 (64.688)	1.606 (9.143)	3.007 (15.166)	0.364 (10.305)	0.615 (17.400)
SunPower	18.634 (4.316)	18.476 (4.299)	1.768 (31.524)	1.735 (31.382)	12.730 (3.191)	15.596 (3.717)	0.752 (11.814)	1.266 (19.888)
Test of significance	18.553 (12.276)	19.057 (12.841)	3.572 (2.558)	3.657 (2.662)	16.250 (11.913)	20.075 (14.465)	3.118 (2.470)	3.805 (2.922)

APP-7

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * $p < 0.100$ and ** $p < 0.050$.

Table A5: Returns for US Firms Across Different Windows (Appeal Date)

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Est. Window / Event. Window Index	50 / 10 New York	80 / 10 New York	50 / 1 New York	80 / 1 New York	50 / 10 Industry	80 / 10 Industry	50 / 1 Industry	80 / 1 Industry
Ascent Solar	2.414 (10.045)	1.216 (5.848)	0.368 (31.343)	0.197 (15.196)	0.847 (3.992)	0.987 (4.478)	0.125 (6.472)	0.138 (6.714)
First Solar	223.635 (20.432)	212.611 (20.343)	33.280 (11.129)	31.747 (10.573)	58.232 (9.342)	190.922 (20.398)	13.531 (6.714)	28.779 (9.763)
Green Plains	-5.776 (-3.396)	-3.925 (-2.296)	-0.347 (-4.103)	0.048 (0.576)	2.223 (1.090)	-13.778 (-4.264)	1.676 (4.693)	-0.012 (-0.024)
Real Goods Solar	12.366 (2.622)	-2.654 (-0.635)	0.833 (14.362)	-1.238 (-16.425)	5.183 (1.168)	-10.058 (-2.674)	-0.146 (-2.814)	-1.853 (-30.939)
Sun Edison	15.846 (7.925)	3.573 (2.466)	2.000 (38.634)	0.270 (1.664)	-1.321 (-1.375)	-7.958 (-8.892)	-0.084 (-4.446)	-0.840 (-12.722)
SunPower	75.969 (9.346)	29.243 (5.184)	8.304 (26.384)	1.855 (5.031)	37.103 (8.008)	2.019 (1.123)	3.889 (213.275)	-0.025 (-0.105)
Test of significance	46.350 (31.315)	34.295 (30.025)	6.348 (4.627)	4.697 (4.521)	14.610 (8.874)	23.152 (28.054)	2.713 (1.887)	3.741 (4.181)

APP-8

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * p<0.100 and ** p<0.050.

Table A6: Returns for Indian Firms Across Different Windows (Panel Date)

	(1)	(2)	(3)	(4)
Est. Window / Event. Window Index	50 / 10 Bombay	80 / 10 Bombay	50 / 1 Bombay	80 / 1 Bombay
Bharat Electricals	-200.177 (-27.353)	-200.423 (-29.330)	-33.608 (-52.181)	-33.700 (-55.748)
HBL Power	10.499 (7.758)	7.005 (5.206)	1.120 (1.958)	0.466 (0.794)
Indian Oil Company	9.320 (0.598)	3.842 (0.252)	-5.603 (-4.759)	-6.635 (-5.784)
Indosolar	-3.336 (-9.337)	-2.991 (-8.577)	-0.405 (-16.413)	-0.341 (-13.028)
Jain Irrigation	41.345 (9.516)	88.427 (26.170)	9.327 (30.871)	18.105 (153.449)
Lanco Infratech	-13.064 (-7.319)	-12.258 (-6.795)	-4.001 (-76.392)	-3.852 (-76.664)
Maharashtra Seamless	-507.713 (-58.707)	-530.580 (-60.635)	-94.000 (-93.146)	-98.238 (-91.199)
Punji Lloyd	32.168 (10.864)	42.203 (12.371)	5.441 (6.454)	7.315 (9.128)
Solar Industries India	-297.225 (-9.145)	-151.234 (-4.537)	-34.135 (-12.298)	-6.872 (-2.032)
Sujana Towers	-11.593 (-0.616)	-87.286 (-4.017)	14.598 (21.182)	0.457 (1.237)
Tata Power	-8.980 (-2.125)	17.840 (3.906)	-4.887 (-6.534)	0.103 (0.159)
Test of significance	-86.250 (52.889)	-75.041 (52.256)	-13.287 (9.337)	-11.199 (9.484)

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * $p < 0.100$ and ** $p < 0.050$.

Table A7: Returns for Indian Firms Across Different Windows (Appeal Date)

	(5)	(6)	(7)	(8)
Est. Window / Event. Window Index	50 / 10 Bombay	80 / 10 Bombay	50 / 1 Bombay	80 / 1 Bombay
Bharat Electricals	-276.647 (-16.255)	-417.213 (-17.890)	-38.572 (-20.307)	-60.176 (-17.623)
HBL Power	-53.370 (-21.429)	-79.132 (-20.716)	-8.176 (-15.773)	-12.138 (-15.275)
Indian Oil Company	-303.764 (-17.534)	-105.215 (-5.821)	-59.424 (-12.099)	-28.340 (-9.482)
Indosolar	-18.623 (-24.020)	-18.753 (-25.272)	-3.014 (-72.296)	-3.056 (-88.418)
Jain Irrigation	-18.150 (-3.094)	-111.395 (-11.066)	2.295 (136.198)	-11.864 (-10.906)
Lanco Infratech	-18.702 (-16.516)	-31.197 (-17.997)	-2.303 (-25.257)	-4.214 (-18.299)
Maharashtra Seamless	-74.384 (-10.736)	-345.289 (-23.832)	-16.282 (-4.364)	-58.064 (-8.803)
Punji Lloyd	85.967 (24.619)	3.702 (0.835)	14.793 (9.963)	2.234 (3.953)
Solar Industries India	-683.926 (-4.310)	-547.485 (-3.521)	-36.164 (-32.499)	-14.309 (-6.374)
Sujana Towers	-335.754 (27.187)	-456.044 (24.985)	-56.605 (27.907)	-75.238 (23.013)
Tata Power	-60.193 (25.425)	-137.954 (21.559)	-9.399 (34.389)	-21.234 (18.365)
Test of significance	-159.776** (66.667)	-204.189** (59.736)	-19.350** (7.429)	-26.036** (7.963)

Test statistics in parenthesis. Absolute values greater than 1.96 represent a significant difference from zero at the 5% level. The last row reports the coefficient and standard error from a regression testing whether the abnormal performance of the firms taken as a group is significantly different from zero. Here, * $p < 0.100$ and ** $p < 0.050$.

Table A8: Newey Estimates

	(1) Canada	(2) US	(3) India
$\Delta Index_t$	0.373*** (0.048)	1.787*** (0.138)	0.544*** (0.046)
$\Delta Exchange Rate_t$	-8.517 (5.690)	44.778* (26.006)	-0.115 (0.102)
$Panel_t$	-0.179*** (0.037)	2.966*** (0.168)	0.311*** (0.049)
$Appeal_t$	-0.142*** (0.031)	2.785*** (0.177)	-0.414*** (0.049)
Constant	0.022 (0.027)	-0.070 (0.155)	-0.059 (0.038)
N	479	479	479

Newey-West standard errors in parentheses * $p < 0.100$, ** $p < 0.050$, *** $p < 0.001$