

IPO Spillover Effects in a New and Uncertain Sector: The Case of a Marijuana REIT

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I examine the IPO spillover effects using the case of Innovative Industrial Properties (IIPR). IIPR, as a new REIT firm that focuses on marijuana real estate facilities, provides a unique opportunity to study both the contagion effects and competition effects within the REIT industry and the marijuana industry. I find that direct competing firms, such as healthcare REITs and marijuana stocks, are affected more by IIPR IPO than indirect competing firms. The results suggest that the negative externalities from IIPR IPO might be due to the high level of uncertainty associated with the marijuana industry.

INTRODUCTION

In United States, as of November 2016, 28 states and Washington DC (see Appendix 1) have legalized marijuana in terms of medical use and/or recreational use. Despite federal prohibition, marijuana industry has become a fast-growing industry with many uncertainties, partially due to the conflict between the ever-growing demand to legalize marijuana (a slim majority of Americans support legalization as suggested by Motel, 2015) and the stance from the federal government prohibition on the same issue. In this research, I focus on the IPO event on NYSE of a marijuana REIT: Innovative Industrial Properties (Ticker: IIPR). I hope that my study can shed some light on the firm valuation in a new but uncertain sector of the REIT industry, and also give us a sneak peak of the market perceptions on the budding marijuana industry in public capital market.

Determining the firm value in a new and uncertain industry is not simple due to the high level of information asymmetry and uncertainty. Investors are afraid to make investments in lemons (Akerlof, 1970). In an uncertain sector, data from financial statements might not be a good indicator for firm valuation (Kim and Ritter, 1999). Titman and Trueman (1986) suggest that outside information can be sometimes more valuable given the unknown circumstances related to certain industries. Thus, when a new firm decides to file for IPO and enter the uncertain industry, the information spillover can be significant.

The spillover effects can be interpreted as twofold: contagion effects and competition effects. The former describes the phenomenon that the competing incumbents benefit (suffer) from the new IPO event when the emerging industry is perceived to be of high (low or uncertain) growth potential (see, Lee, Bach, and Baik, 2011; Liang and Yang, 2012). The latter depicts the phenomenon that the competing incumbents suffer from the new IPO event when the market considers the new player in the game would “steal” market shares from the existing players (see, Hsu, Reed, and Rocholl, 2010; Lee *et al*, 2011; Liang and Yang, 2012).

My research examines the abnormal stock returns, risk-adjusted using Fama-French five-factor model (Fama and French, 2015), of four groups of competitors of IIPR (i.e. NASDAQ/NYSE marijuana stocks¹, OTC marijuana stocks, healthcare REITs, and non-healthcare REITs) surrounding the IPO event (i.e. IPO announcement date, IPO downsize date, and IPO completion date).

I find that the IPO of IIPR significantly impacts marijuana common stocks. Marijuana stocks on OTC markets experience significantly positive cumulative abnormal returns surrounding the initial announcement and the IPO downsize event dates; they show significant negative abnormal returns surrounding the final completion date. Healthcare REITs experience significant positive abnormal returns during the IPO announcement and downsize dates; while they experience significant negative abnormal returns on the final completion date. Marijuana stocks that are traded on the major stock exchanges (NASDAQ or NYSE) show slight or insignificant reactions towards the IPO of IIPR. The IPO of IIPR has lesser impacts on non-healthcare REITs.

The results support that the spillover effects from the IPO of IIPR are significant to its directly competing incumbents. My empirical findings suggest that OTC marijuana stocks and healthcare REITs initially benefit from the announcement of IIPR IPO because the market perceives the marijuana industry to be of low/uncertain growth. The IPO of IIPR on NYSE could potentially reduce the information asymmetry in the industry. However, on the IPO completion date, the disappointing performance of IIPR IPO only adds on to the murky situation and is insufficient to reduce the level of information asymmetry associated with the industry. On the downsize dates, IPO competition effects prevail over contagion effects. The capital market views that some of the incumbents in the marijuana industry celebrated briefly over the smaller of IIPR IPO.

To further my investigation, I conduct cross-sectional analysis on whether or how firm characteristics influence abnormal returns surrounding the series of events in IIPR IPO. I show that firm characteristics, such as size, leverage, and ROA, are factors that have impacts on the abnormal returns surrounding the events. I also find that marijuana firms that focus on marijuana real estate business react more strongly to the IPO events than other firms.

The remaining paper is organized as follows: the next section provides basic information on IIPR IPO, and develops hypotheses; the section following introduces the data and methodology used in the empirical analysis, and discusses the results; the final section concludes.

IIPR INITIAL PUBLIC OFFERING AND HYPOTHESIS DEVELOPMENT

Basic Information on IIPR IPO

According to Innovative Industrial Properties (IIPR) website²: IIPR “targets medical-use cannabis facilities for acquisition, including sale-leaseback transactions, with tenants that are licensed growers under long-term triple-net leases”. The firm is “focused on being a creative capital provider to this industry through the long-term ownership of cultivators’ mission-critical facilities”.

On October 17th, 2016, IIPR filed for IPO for 8.75 million shares at the price of \$20 per share. Subsequently it revised down its IPO size twice in November to 5 million shares on November 25th, and to 4 million shares on November 29th. On December 1st, 2016, IIPR went public on NASDAQ by selling 3.35 million shares at \$20 per share. The REIT stock opened slightly above the IPO price at \$20.25, but closed disappointingly at \$19.15.

IIPR’s first-day performance is not uncommon in REIT industry given the mixed results on REIT IPO performances in previous literature. Wang, Chan, and Gau (1992) show that U.S. REIT IPOs are surprisingly overpriced during the 1970s and 1980s. However, Ling and Ryngaert (1997) find that equity REIT IPOs in the early 1990s were underpriced. Hartzell, Kallberg, and Liu (2005) suggest insignificant intra-day returns for REIT IPOs between 1980-1998, even though Buttner, Hyland, and Sanders (2005) find a significant average annualized return of 2.47% for the period of 1980-2001. Bairagi and Dimovski (2011) document insignificant returns for REIT IPOs during the recent years from 2007-2010. Recent global evidence on REIT IPOs also confirms low intra-day returns for period of 1996-2010 (Chan, Chen, and Wang, 2013).

One of my research motivations is similar to Akhigbe, Johnston, and Madura (2004). When a REIT decides to go public, it may reveal relevant information about the real estate market conditions. The information revelation may lead to re-value the existing real estate firms in the industry. Furthermore, IIPR IPO presents a unique opportunity for my study that traditional REIT IPO studies do not share. IIPR IPO reveals information not only about the underlying real estate market, but also on the growing but uncertain marijuana industry. The unique position that IIPR puts itself in offers us a tremendous opportunity to study the spillover effects to both REIT industry and marijuana industry. The combination of the traditional REIT industry and budding marijuana industry adds another layer of flavor to my study.

Hypothesis Development

In an uncertain industry, the level of information asymmetry is high. A new entry to the public capital marketplace provides additional information about the firm and the industry. Heil and Robertson (1991) and Lee, Bach, and Baik (2011) both argue that the information externalities from IPOs are greater for the directly competing firms than indirectly competitors. Thus, I develop my first hypothesis:

H1: The spillover effects from the IIPR IPO are greater for the direct competitors than the indirect competitors.

An initial public offering by a private firm can inject flows of information to the market, and in turn, receive flows of feedbacks about the specific industry from the market. If an IPO is received positively from the market, the uncertain industry can benefit from the reduced level of information asymmetry. However, if an IPO is received poorly from the market, the industry as a whole could suffer from the bad signal. I call this type of spillover effects as contagion effects. Thus, I argue:

H2: The competing incumbents experience positive (negative) externalities from IIPR IPO if the IPO from IIPR is perceived well (poorly) by the market.

Hsu, Reed, and Rocholl (2010) suggest that industry competitors experience negative stock price reactions to completed IPOs in the industry, and positive stock price reactions to IPO withdrawals in the industry. Lee, Bach, and Baik (2011) show that, in a highly concentrated market, a successful IPO posits a threat to the existing firms in the industry. I call this type of spillover effects as competition effects. Thus, I argue:

H3: The incumbents in the marijuana-related industry may experience negative externalities from IIPR IPO if IIPR is considered as a threat to the peer competitors by the market.

The size of IPO provides additional signaling effects. Negative reactions to downsizing IPO would suggest that contagion effects prevail. Positive reactions to downsizing IPO would suggest that competition effects triumph, as the market may not consider the new player to be a serious threat to the existing competing firms.

H4: Negative (positive) stock price reactions to IIPR downsizing suggest that contagion (competition) effects prevail.

DATA, METHODOLOGY, AND EMPIRICAL RESULTS

Data

I obtain daily stock data and quarterly firm financial data from CRSP and Compustat databases, respectively. I classify four groups as IIPR's competitors: NASDAQ/NYSE-traded marijuana common stocks, OTC marijuana stocks, healthcare REITs, and non-healthcare REITs. I consider the first three groups are direct competitors for IIPR, and the fourth group is indirect competing firms within the same REIT industry sector.

I download a comprehensive list of OTC stocks from Daily Marijuana Observer, and limit my focus to the OTC stocks with data (downloaded from Yahoo! Finance) available during the estimation period. The number of OTC stocks may vary depending on the event date being studied. In the cross-sectional analysis, I further restrict my sample to OTC stocks with data available from Compustat. The final sample used for cross-sectional analysis has 28 OTC marijuana stocks.

As stated earlier, by the end of 2016, more than half of U.S. states have legalized the medical and/or recreational usage of marijuana. Therefore, the location choice of IIPR's competing incumbent firms are likely to be endogenous determined by state-level legislation. I calculate two dummy variables, *Med_M* and *Rec_M*, to indicate whether a firm located in a U.S. state that has legalized medical and/or recreational use of marijuana. Data on firm headquarter states are obtained from Compustat.

Appendices 2, 3, and 4 provide the detailed lists on the healthcare REITs, major exchange-traded marijuana stocks, and OTC marijuana stocks³, respectively. Table 1 reports the summary statistics of the four groups of stocks as of September 2016. I find that the marijuana stocks that are traded on OTC markets are smaller firms with higher growth opportunities (lower B/M ratio) and lower profitability (lower ROA). Marijuana stocks that are traded on NASDAQ or NYSE are relatively younger firms⁴. There are no major differences between healthcare REITs and non-healthcare REITs.

TABLE 1
SUMMARY STATISTICS

Variables	All (226)			NASDAQ/NYSE stocks (13)			Healthcare REITs (21)			Non-healthcare REITs (164)		
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std
AR(-1,1)	-0.14	-0.04	14.36	-0.13	-0.04	7.42	-1.45	-0.10	4.18	-0.61	-0.09	3.74
AR(-2,2)	0.69	0.90	12.17	-0.04	0.31	9.42	0.04	1.42	6.22	0.42	0.87	5.07
Mkt Cap	20.85	21.41	2.24	19.75	19.24	2.38	21.36	21.69	1.82	21.50	21.65	1.66
Assets	20.75	21.60	2.76	19.04	18.20	2.41	21.52	21.75	1.64	21.75	21.96	1.48
Leverage	0.53	0.47	0.57	0.24	0.03	0.34	0.45	0.46	0.19	0.49	0.48	0.17
ROA	-0.21	0.004	1.74	-0.07	-0.04	0.09	0.007	0.007	0.006	0.005	0.004	0.019
B/M	0.44	0.46	0.85	0.36	0.25	0.49	0.54	0.53	0.16	0.49	0.51	0.92
Age	14	12	8.92	5	3	3.14	14	17	10.50	14	12	8.79
Rec_M	30%	0	46%	16%	0	37%	24%	0	43%	26%	0	44%
Meds_M	73%	1	44%	84%	1	37%	67%	1	47%	71%	1	45%
RE	84%	1	37%									
	OTC Stocks (28, 5 RE-OTC)											
Variables	Mean	Median	Std									
AR(-1,1)	3.70	2.48	39.69									
AR(-2,2)	3.14	1.70	31.64									
Mkt Cap	17.10	17.20	1.44									
Assets	15.12	14.93	2.16									
Leverage	0.96	0.23	1.47									
ROA	-1.74	-0.14	4.73									
B/M	0.14	0.01	0.80									
Age	19	18	1.37									
Rec_M	68%	1	47%									
Meds_M	82%	1	38%									
RE	18%	0	38%									

This table reports the summary statistics for the variables used in this analysis. *AR(-1,1)* and *AR(-2,2)* represent the 3-day and 5-day cumulative abnormal returns, respectively. *Mkt Cap* is the natural logarithm of market capitalization ($PRCCQ \times CSHOQ$). *Assets* is the natural logarithm of total amount of book assets (*ATQ*). *Leverage* is the sum of long-term debt (*DLTTQ*) and debt in current liabilities (*DLCQ*), divided by the total amount of book assets (*ATQ*). *ROA* is the quarterly return on assets (NIQ/ATQ). *B/M* is the ratio of book value of equity (*CEQQ*) to the market capitalization ($PRCCQ \times CSHOQ$). *Age* is the number of years from IPO date to Oct. 17, 2016 (IIPR IPO announcement date). *Meds_M* (*Rec_M*) is an indicator that equals to 1 if a firm is headquartered in a state where medical (recreational) use of marijuana has been legalized, and 0 otherwise. *RE* equals to 1 if a firm operates real estate business, and 0 otherwise. All fundamental variables are from the third fiscal quarter of 2016.

Methodology

CARs are estimated using the following equation:

$$Ret_{i,t} - RF_t = \alpha_i + \beta_i(Index_t - RF_t) + \beta_sSMB_t + \beta_sHML_t + \beta_sRMW_t + \beta_sCMA_t + \varepsilon_{i,t} \quad (1)$$

where Ret is the return on REIT (marijuana stock) i at day t during the estimation period. RF is the return on risk-free securities. $Index$ is the return on stock indexes, in order to facilitate comparison and interpretation of my results, I use the same $Index$, value-weighted return on all stocks listed on NYSE, NASDAQ, and AMEX, for both REITs⁵ and marijuana stocks, and OTCQX U.S. Composite Index⁶ for OTC marijuana stocks headquartered in the U.S.⁷ Finally, in addition to the value-weighted return index, I include Fama-French factors because both exchange-listed and OTC marijuana stocks are small stocks (size factor: SMB), which are likely to be affected by the sin stock anomaly, or underpricing of sin stocks due to social norms (value factor: HML), and the outperformance of sin (vice) stocks are likely explained by profitability (RMW) and investment (CMA) factors (Blitz and Fabozzi, 2017). I also include Fama-French factors for REITs for the easiness of comparison and comprehension.

The estimation period is from 250 days before the event date (Day 0) to 46 days before. Event periods mainly includes, (i) one day before the event date to one day after (-1,1), (ii) event date (0,0), (iii) event date to one day after (0,1), (iv) one day after the event date to three days after (1,3), and (v) three days after the event date to thirty days after (3,30). Three event dates related to IIPR IPOs are considered in this study, including 10/17/2016 (announcement date), 11/25/2016 (downsize), and 12/1/2016 (IPO date).⁸ The results are reported in Tables 2 – 7.⁹

In order to disentangle the effect of IIPR IPO on its competing incumbent firms, I conduct cross-sectional analysis based on the event dates (10/17, 11/9, 11/25, and 12/1). I use both the three-day cumulative abnormal returns, AR(-1,1), and the five-day cumulative abnormal returns, AR(-2,2), as my dependent variables. $DRIMCUM(Healthcare)$ is a dummy variable that equals 1 if the property type of an incumbent firm is “Healthcare” and 0 otherwise. $DRIMCUM(Other)$ is a dummy variable that equals 1 if the property type of an incumbent firm is “Non-healthcare” and 0 otherwise.¹⁰ $DRIMCUM(Marijuana)$ is a dummy variable that equals 1 if an incumbent firm is a marijuana stock and 0 otherwise. ROA , $Leverage$, and $Mkt Cap$ are the quarterly return on assets (NIQ/ATQ), the leverage ratio ((DLTTQ + DLCQ)/ATQ), and the logarithm of market capitalization (PRCCQ × CSHOQ) from the third quarter. Summary statistics and results are reported in Table 1 and 5, respectively.

Lastly, Figures 1 and 2 report the daily returns on equal or value-weighted portfolios of exchange-listed marijuana stocks, OTC marijuana stocks, SNL healthcare REITs, and SNL equity REITs from October 1, 2016 to June 30, 2017. The highlighted area represents a period over (-1,1), for four event dates adopted in my study.

Empirical Results

Cumulative Abnormal Returns

Table 2 shows the cumulative abnormal returns of the four competitor groups surrounding the announcement date of IIPR IPO (October 17, 2016). On one hand, Panel A shows the CARs of the portfolio of NASDAQ/NYSE exchange-traded marijuana stocks. Exchange-traded marijuana stocks exhibit insignificantly negative CARs surrounding the announcement date. Even though the exchange-traded marijuana stocks show certain level of significance in the positive abnormal returns shortly after the announcement (see CAR (1,3)), the overall reactions from the exchange-traded marijuana stocks are mild. On the other hand, OTC marijuana stocks show significantly positive abnormal returns surrounding the announcement of IIPR IPO. On the announcement date, the risk-adjusted abnormal return of OTC marijuana stocks is 11.55% with Patell t-statistics of 9.40. CAR (-1, 1) of OTC marijuana stocks shows a significant 26.55%. It appears that investors on the OTC market consider the news that a marijuana stock to be listed on a major stock exchange to be good news for the marijuana industry.

Panel C presents the CARs of the portfolio of healthcare REITs surrounding the announcement date. Healthcare REITs, as direct competitors of IIPR, show positive abnormal return of 1.57% on the

announcement date, and significantly positive abnormal returns in the short windows surrounding the announcement date. However, they show a highly significantly negative cumulative abnormal return of -10.52% (from Day 3 to Day 30) following the announcement. Panel D shows the CARs of non-healthcare REITs surrounding October 17. I can see that these indirect competitors of IIPR show the smallest magnitude of price reactions to the announcement of IIPR.

TABLE 2
CARS SURROUNDING THE ANNOUNCEMENT DATE (10/17/2016)

Panel A: NASDAQ/NYSE Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-2.86	13	38%	-0.83	-1.50	-1.37	-1.29
(0,0)	-1.70	13	54%	0.28	-1.47	-0.96	-1.08
(0,1)	-1.97	13	54%	0.28	-0.86	-1.06	-0.79
(-1,1)	-3.13	13	31%	-1.39	-1.07	-1.40	-0.99
(-2,2)	-1.13	13	54%	0.28	-0.26	-0.70	-0.43
(1,3)	2.40	13	77%	1.94	1.44	2.69	2.80
(3,30)	5.56	13	62%	0.83	0.98	0.69	1.06
Panel B: OTC Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	14.37	64	54%	0.69	9.06	4.86	5.30
(0,0)	11.55	64	59%	1.61	9.40	4.84	5.02
(0,1)	23.73	64	66%	2.75	13.20	4.86	5.48
(-1,1)	26.55	64	64%	2.52	12.75	5.14	5.94
(-2,2)	30.75	64	67%	2.98	10.85	5.10	6.12
(1,3)	20.34	64	57%	1.15	9.63	3.91	4.01
(3,30)	-4.85	64	39%	-1.84	5.05	-0.57	1.13
Panel C: Healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	0.50	19	52%	0.22	0.92	1.90	1.59
(0,0)	0.83	19	67%	1.53	1.10	1.43	2.38
(0,1)	1.57	19	86%	3.27	2.48	3.32	8.11
(-1,1)	1.23	19	81%	2.84	2.14	5.27	4.76
(-2,2)	2.08	19	81%	2.84	2.60	5.84	5.93
(1,3)	0.51	19	71%	1.96	1.58	0.61	2.15
(3,30)	-10.52	19	5%	-4.15	-7.26	-5.22	-4.66
Panel D: Non-healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	0.09	163	57%	1.86	1.00	0.70	1.58
(0,0)	0.33	163	77%	6.99	3.66	3.11	5.86
(0,1)	0.67	163	76%	6.67	4.72	5.43	7.43
(-1,1)	0.43	163	68%	4.66	2.56	3.00	3.99
(-2,2)	1.43	163	79%	7.45	6.63	6.22	9.47
(1,3)	0.61	163	65%	3.88	2.99	4.71	4.86
(3,30)	-3.72	163	31%	-4.81	-5.83	-4.17	-5.40

This table reports the cumulative abnormal returns of the four competitor groups surrounding the announcement date of IIPR IPO (October 17, 2016). Two Healthcare REITs (Ticker: MRT, QCP) and one non-Healthcare REIT (PKY) are excluded due to the lack of observations during estimation period. Four test statistics, including sign test, Patell test, cross-sectional test, and BMP (Boehmer, Musumeci, and Poulsen, 1991) test, are reported. Significant test statistics are in *italics*.

These findings confirm my first hypothesis that the spillover effects from IIPR IPO are greater for the directly competing firms than indirectly competing firms. The results also suggest that the directly competing incumbents on major stock exchanges experience insignificant negative externalities from IIPR IPO news, but directly competing incumbents on OTC markets or in the same REIT property sector experience positive externalities from IIPR IPO news. The significant positive spillover effects can be the results of the improvement of information transparency in marijuana stock industry. When IIPR files for IPO on NYSE, the market sees the potential of information asymmetry reduction and liquidity enhancement in this relatively new and uncertain industry. Thus, contagion effects prevail over competition effects in the OTC markets and healthcare REIT sector.

Furthermore, I investigate the information spillover from IPO size changes. I hypothesize that, if stock price reaction is negative (positive) to the news of IPO downsize, it means that contagion (competition) effects prevail (*H4*). Table 3 shows the CARs of the four portfolios surrounding the announcement that IIPR downsizes its IPO from 8.75 million shares to 5 million shares on November 25, 2016¹¹. Surprisingly, NASDAQ/NYSE exchange-traded marijuana stocks seem to be unaffected by this news. OTC marijuana stocks from Panel B show significantly positive cumulative abnormal returns within three days surrounding the downsize date. Healthcare REITs from Panel C exhibit significantly positive cumulative abnormal returns within five days surrounding the downsize date. These results imply that competition effects from IIPR IPO are more significant than contagion effects regarding the spillover effects on the IIPR IPO downsizing event. The downsizing of IIPR's IPO potentially reduces its future competitiveness within the healthcare REIT sector or the marijuana stock industry. Even though the market does not show passion about the IPO of IIPR, the competition effects from the direct competitors outweigh the contagion effects from this news. The competition effects even manifest themselves mildly in the non-healthcare REIT sectors (see Panel D).

TABLE 3
CARS SURROUNDING THE ANNOUNCEMENT OF IPO DOWNSIZE (11/25/2016)

Panel A: NASDAQ/NYSE Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-0.45	12	38%	-0.83	0.48	-0.35	0.54
(0,0)	-0.48	12	38%	-0.83	0.13	-0.54	0.17
(0,1)	0.02	12	62%	0.83	0.16	0.02	0.27
(-1,1)	0.05	12	54%	0.28	0.46	0.03	0.63
(-2,2)	-3.69	12	38%	-0.83	-0.39	-1.36	-0.44
(1,3)	-3.79	12	31%	-1.39	-0.94	-1.41	-1.00
(3,30)	4.30	12	62%	0.83	0.24	1.01	0.39
Panel B: OTC Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	9.49	73	68%	3.21	8.46	4.68	4.30
(0,0)	1.54	73	55%	0.92	0.74	1.25	0.36
(0,1)	2.92	73	58%	1.38	3.04	2.05	2.43
(-1,1)	10.88	73	70%	3.44	8.96	4.22	3.16
(-2,2)	-1.08	73	39%	-1.84	1.54	-0.45	0.72
(1,3)	-3.03	73	38%	-2.06	0.31	-1.80	0.20
(3,30)	14.10	73	54%	0.69	2.34	1.67	2.05
Panel C: Healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-0.28	19	33%	-1.53	-0.53	-1.47	-1.23
(0,0)	0.21	19	52%	0.22	0.72	1.17	1.51
(0,1)	0.51	19	67%	1.53	1.17	2.91	2.94
(-1,1)	0.02	19	62%	1.09	0.11	0.09	0.22
(-2,2)	3.68	19	81%	2.84	3.65	2.82	6.20
(1,3)	1.15	19	57%	0.65	1.02	1.65	1.27
(3,30)	5.94	19	76%	2.40	2.52	2.53	3.43
Panel D: Non-healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-0.28	163	42%	-2.17	-1.77	-2.93	-3.09
(0,0)	0.18	163	63%	3.26	1.99	2.68	3.69
(0,1)	0.75	163	80%	7.76	6.12	4.62	10.56
(-1,1)	0.28	163	67%	4.35	2.40	1.59	3.94
(-2,2)	1.92	163	83%	8.54	10.54	3.65	13.19
(1,3)	0.57	163	64%	3.57	4.41	2.41	4.57
(3,30)	-0.88	163	69%	4.81	4.94	3.60	6.56

This table reports the CARs of the four portfolios surrounding the announcement that IIPR downsizes its IPO from 8.75 million shares to 5 million shares on November 25, 2016. One marijuana stock (Ticker: FULL) is excluded because it was merged with and into Great Elm Capital Corp. (Ticker: GECC) on November 03, 2016. Two Healthcare REITs (Ticker: MRT, QCP) and one non-Healthcare REIT (PKY) are excluded due to the lack of observations during estimation period. Four test statistics, including sign test, Patell test, cross-sectional test, and BMP (Boehmer, Musumeci, and Poulsen, 1991) test, are reported. Significant test statistics are in **bold** and *italics*.

So far, I have shown that contagion effects prevail around the event of IPO announcement; while competition effects prevail around the event of IPO downsize. My next step is to examine the price reactions of the competitors from different markets and different sectors surrounding the actual IPO date. Table 4 presents the results. On December 1, 2016, IIPR eventually completed its IPO with further downsizing to 3.35 million shares. Panel A shows that exchange-traded marijuana stocks exhibit slightly significant positive CARs surrounding the IPO date (only cross-sectional test statistics show significance surrounding the IPO date). The slightly positive price reactions from the major exchange-traded marijuana stocks could indicate that competition effects prevail over contagion effects. The eventual small size of IIPR IPO does not present a credible threat to the competing incumbents on NYSE or NASDAQ. Thus, these stocks show either insignificant or slightly positive responses to the underwhelming IIPR IPO.

Panels B, C, and D tell a totally different story: OTC marijuana stocks, healthcare REITs, and non-healthcare REITs all experience highly significantly negative price reactions to the actual IPO event. It seems that the lack of enthusiasms towards IIPR has a great spillover to its directly and indirectly competing incumbents. The investors in the OTC markets and REIT sectors in general do not take it kindly with the disappointing results from IIPR IPO. The results surrounding the actual IPO date suggest that contagion effects from IIPR IPO to the OTC markets and REIT sector outweigh competition effects.

TABLE 4
CARS SURROUNDING THE IPO DATE (12/1/2016)

Panel A: NASDAQ/NYSE Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-1.16	12	38%	-0.83	-0.61	-0.76	-0.84
(0,0)	2.48	12	62%	0.83	1.19	1.88	1.40
(0,1)	3.09	12	54%	0.28	1.06	1.71	1.46
(-1,1)	-0.55	12	38%	-0.83	-0.32	-0.26	-0.44
(-2,2)	-0.26	12	46%	-0.28	0.18	-0.10	0.21
(1,3)	1.09	12	54%	0.28	0.42	0.75	0.63
(3,30)	3.55	12	62%	0.83	0.16	0.92	0.30
Panel B: OTC Marijuana stocks							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-3.25	73	38%	-2.06	-1.03	-2.45	-1.19
(0,0)	-1.82	73	36%	-2.52	-1.24	-1.77	-1.48
(0,1)	-1.82	73	39%	-1.84	-1.16	-1.07	-1.35
(-1,1)	-3.24	73	38%	-2.06	-1.07	-1.76	-1.19
(-2,2)	-7.34	73	25%	-4.36	-2.85	-3.76	-3.00
(1,3)	-0.54	73	38%	-2.06	-1.93	-0.31	-1.35
(3,30)	24.88	73	53%	0.46	3.75	2.55	3.00
Panel C: Healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-1.47	19	14%	-3.27	-4.47	-2.33	-4.83
(0,0)	-0.99	19	14%	-3.27	-3.41	-4.37	-4.74
(0,1)	0.27	19	48%	-0.22	0.45	0.78	0.59
(-1,1)	-0.21	19	33%	-1.53	-1.31	-0.33	-1.55
(-2,2)	2.32	19	62%	1.09	2.31	2.48	2.54
(1,3)	2.79	19	81%	2.84	5.96	3.31	4.15
(3,30)	4.68	19	81%	2.84	2.10	2.80	4.04
Panel D: Non-healthcare REITs							
Window	CAR	# Stocks	% Pos	Sign-test	Patell t	cross-sec t	Boehmer t
(-1,0)	-1.04	163	27%	-6.05	-9.45	-3.68	-6.63
(0,0)	-0.66	163	29%	-5.43	-7.05	-4.96	-6.81
(0,1)	0.32	163	41%	-2.33	-0.17	0.79	-0.20
(-1,1)	-0.06	163	36%	-3.57	-3.78	-0.13	-3.44
(-2,2)	0.35	163	51%	0.16	1.96	1.20	1.96
(1,3)	1.29	163	77%	6.99	7.83	6.15	9.91
(3,30)	3.59	163	75%	6.36	4.87	3.84	7.87

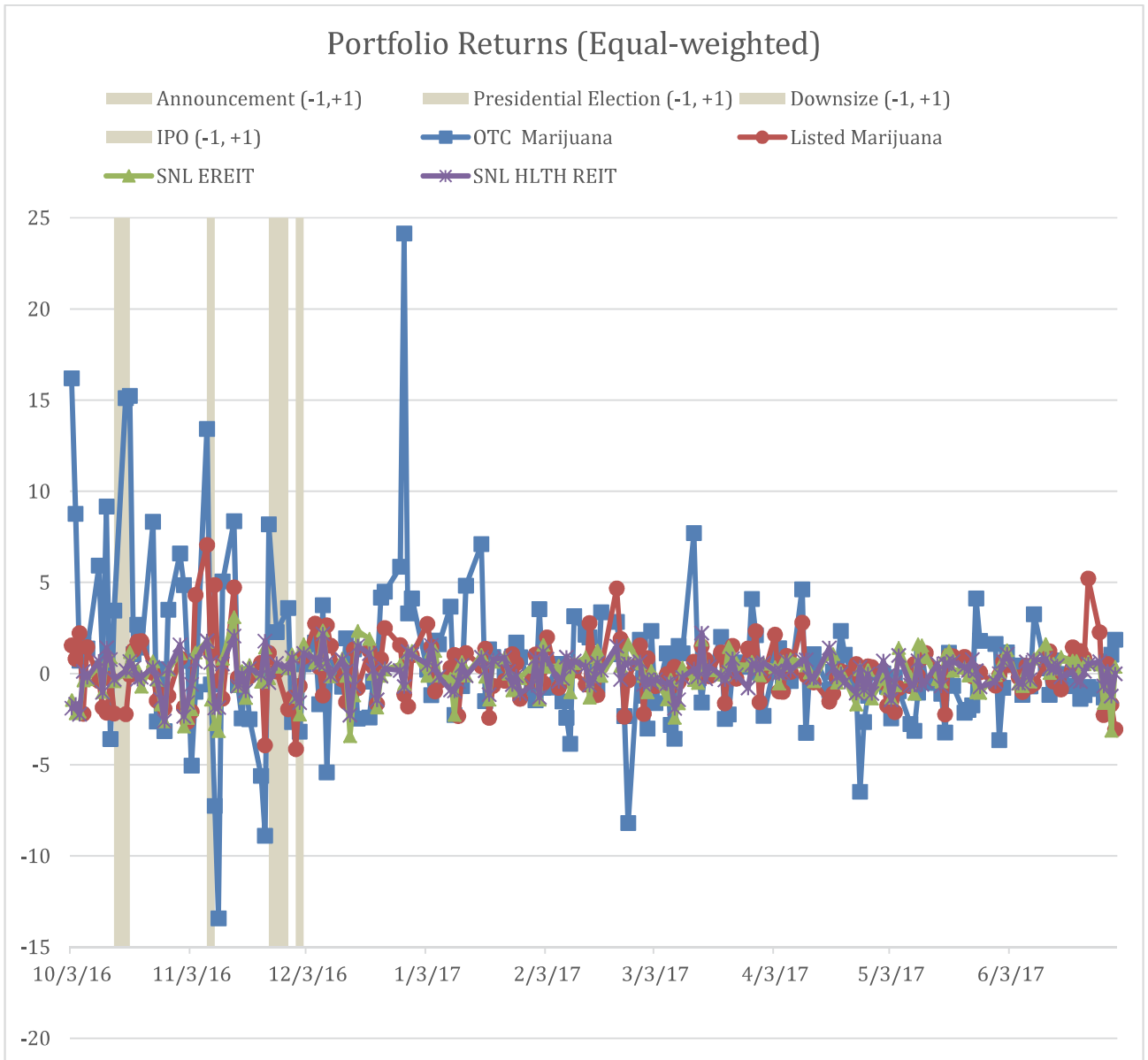
This table reports the CARs of the four portfolios surrounding the IPO date. One marijuana stock (Ticker: FULL) is excluded because it was merged with and into Great Elm Capital Corp. (Ticker: GECC) on November 03, 2016. Two Healthcare REITs (Ticker: MRT, QCP) and one non-Healthcare REIT (PKY) are excluded due to the lack of observations during estimation period. Four test statistics, including sign test, Patell test, cross-sectional test, and BMP (Boehmer, Musumeci, and Poulsen, 1991) test, are reported. Significant test statistics are in bold and *italics*.

Cross-section Regression Analysis

Figure 1 shows the daily returns on equal-weighted portfolios of exchange-traded marijuana stocks, OTC marijuana stocks, healthcare REITs, and SNL equity REITs from October 1, 2016 to June 30, 2017. Figure 2 presents the daily returns on value-weighted portfolios for the same period. The highlighted area represents a period over (-1,1), for four event dates¹² in my study. Visual examination of Figures 1 and 2

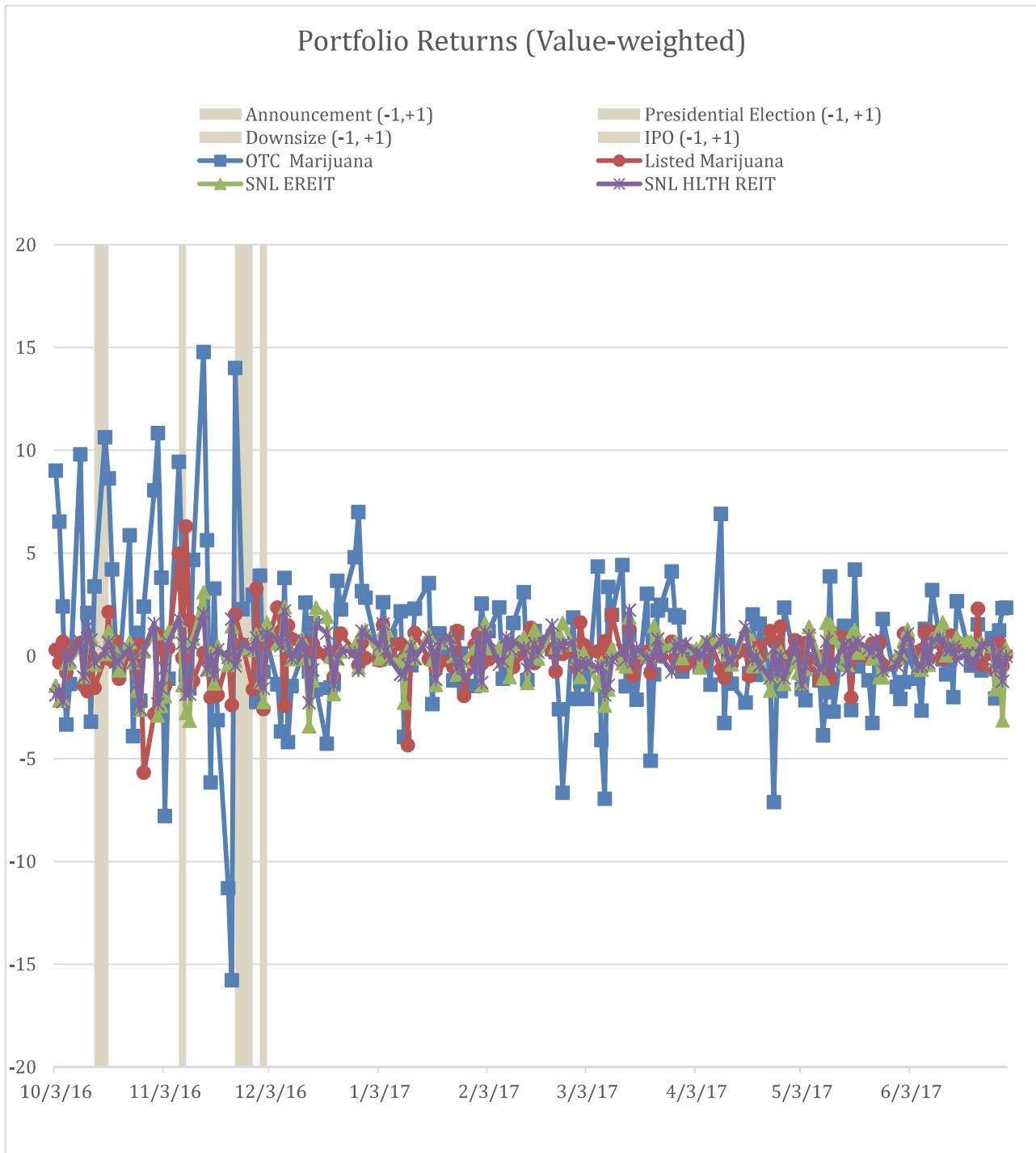
suggests that there is a cross-sectional difference between NASDAQ/NYSE marijuana stock portfolio, OTC marijuana stock portfolio, healthcare-REIT portfolio, and overall equity REIT portfolio surrounding the event dates. Therefore, in this section, I compliment my study by conducting cross-sectional analysis based on the event dates (10/17, 11/9, 11/25, and 12/1).

FIGURE 1
RETURNS OF EQUAL-WEIGHTED PORTFOLIOS



This figure shows the daily returns on equal-weighted portfolios of exchange-traded marijuana stocks, OTC marijuana stocks, SNL healthcare REITs, and SNL equity REITs from Oct. 1, 2016 to Jun 30, 2017. The highlighted area represents a period over (-1,1), for four event dates in my study.

FIGURE 2
RETURNS OF VALUE-WEIGHTED PORTFOLIOS



This figure shows the daily returns on value-weighted portfolios of exchange-traded marijuana stocks, OTC marijuana stocks, SNL healthcare REITs, and SNL equity REITs from Oct. 1, 2016 to Jun 30, 2017. The highlighted area represents a period over (-1,1), for four event dates in my study.

Extended from Lee, Bach, and Baik (2011), my models use CAR (-1,1) or CAR (-2, 2) as my main dependent variables. *DRINCUM (Healthcare)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Healthcare” and 0 otherwise.¹³ *DRINCUM (Other)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Non-healthcare” and 0 otherwise. *DRINCUM (MajorEx)* is a dummy variable that equals 1 if an incumbent firm is a publicly-listed NASDAQ/NYSE marijuana stock and 0 otherwise. The benchmark group is the OTC marijuana stocks. *ROA* is the quarterly return on assets (NIQ/ATQ). *Leverage* is the quarterly debt-to-assets ratio¹⁴. *Mkt Cap* is the logarithm of market capitalization (PRCCQ × CSHOQ) from the third quarter of year 2016. Table 5 shows the regression results.

TABLE 5
CROSS-SECTIONAL REGRESSION ANALYSIS
DIRECT COMPETITORS VS. INDIRECT COMPETITORS

Panel A: IPO Announcement Date (10/17/2016)

Variable Names	AR(-1,1)		AR(-2,2)	
<i>Test Variable</i>				
	Coefficient	t-statistics	Coefficient	t-statistics
DRINCUM (Health Care)	-28.57	-4.28	-25.56	-4.64
DRINCUM (Other)	-28.89	-5.35	-25.93	-5.82
DRINCUM (MajorEx)	-37.71	-5.49	-29.78	-5.26
<i>Control Variables</i>				
Mkt Cap	-1.429	-1.80	-0.749	-1.14
Leverage	-9.700	-3.04	0.688	0.26
ROA	-0.671	-0.71	1.677	2.15
Intercept	65.02	4.36	43.36	3.52
Adj. R-Squared	24%		23%	
Num. of Obs	214		214	

Panel B: The day after the general election (11/9/2016)

Variable Names	AR(-1,1)		AR(-2,2)	
<i>Test Variable</i>				
	Coefficient	t-statistics	Coefficient	t-statistics
DRINCUM (Health Care)	14.31	3.29	-8.244	-2.01
DRINCUM (Other)	18.56	5.29	-2.225	-0.67
DRINCUM (MajorEx)	23.25	5.07	5.908	1.36
<i>Control Variables</i>				
Mkt Cap	0.070	0.14	0.917	1.87
Leverage	-6.051	-3.15	-2.721	-1.50
ROA	0.311	0.50	0.967	1.66
Intercept	-19.83	-2.04	-18.07	-1.97
Adj. R-Squared	31%		11%	
Num. of Obs	215		215	

This table reports the cross-sectional regression results. Coefficient estimates based on *AR(-1,1)* or *AR(-2,2)* for 10/17 (announcement date), 11/9 (general election), 11/25 (first downsize date), and 12/1 (IPO date) are reported in

Panel A – D, respectively. The benchmark group is the OTC marijuana stocks. *DRIMCUM (Healthcare)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Healthcare” and 0 otherwise. *DRIMCUM (Other)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Non-healthcare” and 0 otherwise. *DRIMCUM (MajorEx)* is a dummy variable that equals 1 if an incumbent firm is a publicly-listed NASDAQ/NYSE marijuana stock and 0 otherwise. *ROA*, *Leverage*, and *Mkt Cap* are the quarterly return on assets, leverage ratio, and the logarithm of market capitalization from the third fiscal quarter of 2016.

Table 5 Panel A shows that OTC marijuana stocks experience significantly highest positive abnormal returns surrounding the IPO announcement date than all other three groups. I also find that larger and more levered firms tend to experience less impact from the announcement. This result can be interpreted as evidence of contagion effects: smaller firms tend to benefit the most from the perception of the reduction in information asymmetry when a newcomer decides to go public on a major stock exchange.

Table 5 Panel B shows that major exchange-traded marijuana stocks experience significantly more positive abnormal returns after the general election than other groups. This result may capture some of the political risk associated with the marijuana/healthcare industry. Figures 1 and 2 show that NASDAQ/NYSE exchange-traded marijuana stocks reacted positively surrounding the general election; while OTC marijuana stocks and healthcare REITs reacted negatively surrounding the general election. I conjecture that the approvals of medical/recreational marijuana usage in many states might lead to more initial public offerings at major stock exchanges as investors may see it as a more valid investment options and the growth opportunities may lead to greater liquidity and broader markets for the marijuana industry. Thus, NASDAQ/NYSE marijuana stocks embraced the general election. On the flip side, OTC marijuana stocks may face greater challenge as more capital may go to the mainstream stock markets as the investment options available to the investors may potentially increase given the trend of approvals across the states. Healthcare REITs might face a wholly different challenge from the general elections results (i.e. the future of Obamacare under the new administration).

Table 5 Panel C presents that OTC marijuana stocks, compared to other groups, show the most positive abnormal returns surrounding the downsize announcement from IIPR on November 25. This result suggests that competition effects in OTC markets take over as the direct competing incumbents on the OTC markets celebrate the news of the IPO downsizing of IIPR. Other groups of direct competing incumbents from NASDAQ/NYSE exchange-traded marijuana stocks and healthcare REITs show that they are either less affected by the downsize news or react more negatively to the news. Moreover, I find that more profitable firms (i.e. higher ROA) are less affected by the downsize decision.

Table 5 Panel D presents that OTC marijuana stocks show the most significant negative abnormal returns surrounding the completion of IIPR IPO. This could be a result from the contagion effect. IIPR’s disappointing first-day performance does not bode well with the OTC investors in the marijuana industry. Major stock exchange-traded marijuana stocks and healthcare REITs do not show consistently significant abnormal returns surrounding the completion of the IIPR IPO, even though the differences between OTC markets and major stock exchanges are significant. Moreover, more levered and more profitable firms are less excited about the IPO completion than less levered and less profitable firms. Overall, I find that there is a cross-sectional difference among different types of competitors in different markets. Firm characteristics play a significant role in price reactions to IIPR IPO news.

TABLE 6
POOLED CROSS-SECTIONAL REGRESSION ANALYSIS
DIRECT COMPETITORS VS. INDIRECT COMPETITORS

Variable Names	AR(-1,1)		AR(-2,2)	
<i>Test Variable</i>				
	Coefficient	t-statistics	Coefficient	t-statistics
DRINCUM (Health Care)	-6.018	-2.36	-6.902	-3.14
DRINCUM (Other)	-5.031	-2.39	-6.560	-3.61
DRINCUM (MajorEx)	-6.445	-2.42	-6.242	-2.75
<i>Control Variables</i>				
Mkt Cap	-0.146	-0.49	0.626	2.45
Leverage	-5.347	-4.83	-0.845	-0.88
ROA	-0.772	-2.21	0.059	0.20
Rec_M	-1.134	-1.04	-0.599	-0.64
Intercept	10.51	1.92	-5.938	-1.26
Event Dummies	Yes		Yes	
Adj. R-Squared	8%		5%	
Num. of Obs	859		861	

This table reports the pooled cross-sectional regression results. The benchmark group is the OTC marijuana stocks. *DRINCUM (Healthcare)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Healthcare” and 0 otherwise. *DRINCUM (Other)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Non-healthcare” and 0 otherwise. *DRINCUM (MajorEx)* is a dummy variable that equals 1 if an incumbent firm is a publicly-listed NASDAQ/NYSE marijuana stock and 0 otherwise. *Rec_M* is an indicator which equals to 1 if a firm is headquartered in a state where medical (recreational) use of marijuana has been legalized, and 0 otherwise. *ROA*, *Leverage*, and *Mkt Cap* are the quarterly return on assets, leverage ratio, and the logarithm of market capitalization from the third fiscal quarter of 2016. Event dummies are included.

I further my investigations to pool the series of events together to study the cross-sectional differences in terms of abnormal returns. Table 6 and Table 7 report the pooled cross-sectional analysis results. In Table 6, in addition to the variables in Table 5, I create another dummy variable, *Rec_M*, to indicate the firm headquarter location. *Rec_M* is equal to 1 if the firm headquarter is in a state where at least medical marijuana is legalized. After controlling for the event fixed effects, I find that there are significant differences between direct competitors (including major exchange-traded stocks, OTC stocks, and healthcare REITs) and indirect competitors (i.e. non-healthcare REITs).

Table 7 studies whether competitors that are involved in marijuana real estate business have significantly different price reactions towards IIPR IPO. *DRINCUM(OTC)* is a dummy variable which is equal to 1 if the stock is an OTC-listed marijuana stock, and 0 otherwise. *RE* is a dummy variable that is equal to 1 if the firm is involved in marijuana real estate business, and 0 otherwise. The cross-sectional analysis is also based on the pooled sample that includes the whole series of events of IIPR IPO. I find that OTC marijuana stocks that operate in marijuana real estate business reacted significantly more strongly to the IIPR IPO series of events. This result provides evidence that supports that IPO spillover effects are stronger for direct competing incumbents than indirect competing incumbents in relevant industries.

TABLE 7
POOLED CROSS-SECTIONAL REGRESSION ANALYSIS
COMPETITORS INVOLVED IN THE REAL ESTATE BUSINESS

Variable Names	AR(-1,1)		AR(-2,2)	
<i>Test Variable</i>				
	Coefficient	t-statistics	Coefficient	t-statistics
DRINCUM (Health Care)	-0.900	-0.54	-0.943	-0.58
DRINCUM (OTC)	4.582	2.37	-3.300	-1.28
RE			0.626	0.30
DRINCUM (OTC) × RE			20.77	4.23
<i>Control Variables</i>				
Mkt Cap	-0.142	-0.50	0.005	0.02
Leverage	-5.314	-4.91	-4.034	-3.59
ROA	-0.787	-2.28	0.159	0.40
Intercept	8.993	1.45	4.636	0.75
Event Dummies	Yes		Yes	
Adj. R-Squared	8%		11%	
Num. of Obs	859		859	

This table reports the pooled cross-sectional regression results. *DRINCUM (Healthcare)* is a dummy variable that equals 1 if the property type of an incumbent firm is “Healthcare” and 0 otherwise. *DRINCUM (OTC)* is a dummy variable that equals 1 if an incumbent firm is an OTC marijuana stock and 0 otherwise. *RE* equals to 1 if a firm operates real estate business, and 0 otherwise. *ROA*, *Leverage*, and *Mkt Cap* are the quarterly return on assets, leverage ratio, and the logarithm of market capitalization from the third fiscal quarter of 2016. Event dummies are included.

CONCLUSIONS

In this research, I investigate the price reactions of IIPR’s competing firms to IIPR IPO news. IIPR is a REIT firm that focuses on the marijuana-related real estate facilities. Its decision to IPO on NYSE reveals significant information on market perception about this budding and uncertain industry. My examination on the price reactions from IIPR’s potential competitors surrounding IIPR IPO news sheds light on the spillover effects from IPOs in an uncertain industry to existing firms.

I show that direct competing firms on the OTC markets are more affected by the IIPR IPO than other competing firms. I find that contagion effects (i.e. market perceptions and sentiments of IIPR's potentials spill over valuable information to the whole industry) outweigh competition effects (i.e. IIPR might take some market shares from existing competitors) surrounding the initial IPO announcement and the completion date of IPO. Competition effects prevail over contagion effects surrounding the IPO downsize event. I also show that firm characteristics, such as size, leverage, and ROA, are factors that have impacts on the abnormal returns surrounding the events. I hope that, through this unique case study, I can learn more about information spillover about IPOs to competing incumbents in uncertain industries.

ENDNOTES

1. Terris and Myer (1995) suggest that there is significant correlation between healthcare stocks and healthcare REITs. They indicate that their results may be more widely applicable to other single-property-type REITs. Thus, in my research, I consider both marijuana stocks and healthcare REITs as direct competitors of IIPR.
2. Please refer to <http://www.innovativeindustrialproperties.com>
3. There are dozens of marijuana stocks traded on OTC markets. However, there are only 13 marijuana stocks traded on major stock exchanges (i.e. NYSE and NASDAQ) at the time of data collection.
4. IIPR was one of the first few mainly marijuana-related firm that went public on NYSE.
5. One might argue that REIT investors using the NAREIT index to determine the performance of their REIT portfolio. I use NAREIT index as an alternative Index for healthcare and non-healthcare REITs and find the results virtually the same. Results are available upon request.
6. The OTCQX U.S. Composite Index is designed as a benchmark for tracking the overall performance of the U.S. OTC market and serves primarily as a performance benchmark for investors in OTC securities. The index highlights the most transparent, investor-focused companies trading in the OTC markets. Data on the OTCQX U.S. Composite Index is downloaded from OTCMarkets.com (<https://www.otcmartets.com/index/.OTCQX/chart>).
7. I only include OTC marijuana stocks whose headquarters are identifiable from Compustat.
8. I also investigate the event date of 11/9/2016 (the day after the presidential election) to test the implications of political uncertainty on the competing IPO effects.
9. Two Health Care REITs (Ticker: MRT, QCP) and one non-Health Care REIT (PKY) are excluded due to the lack of observations during estimation period. One marijuana stock (Ticker: FULL) is excluded because it was merged with and into Great Elm Capital Corp. (Ticker: GECC) on November 03, 2016.
10. Property types are defined as in SNL Real Estate database.
11. Subsequently, IIPR downsized its IPO again on November 29. I consider the first downsize announcement has the most signaling effect in terms of information revelation besides that the two dates.
12. I also adopt 11/9 (the day after election) to test the implications of political uncertainty on the competing IPO effects.
13. Property types are defined in SNL Real Estate Database.
14. I define debt as the sum of long-term debt and debt in current liabilities.

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APPENDIX 1

STATES THAT LEGALIZED MARIJUANA (MEDICAL AND/OR RECREATIONAL)

This table lists 28 U.S. states and Washington DC that have legalized marijuana in terms of medical use and/or recreational use by November 2016.

State	Recreational	Medical	Year
Alaska	Yes	Yes	2014
Arizona	No	Yes	2010
Arkansas	No	Yes	2016
California	Yes	Yes	2016
Colorado	Yes	Yes	2012
Connecticut	No	Yes	2012
Delaware	No	Yes	2011
Florida	No	Yes	2016
Hawaii	No	Yes	2000
Illinois	No	Yes	2013
Maine	Yes	Yes	2016
Maryland	No	Yes	2014
Massachusetts	Yes	Yes	2016
Michigan	No	Yes	2008
Minnesota	No	Yes	2014
Montana	No	Yes	2004
Nevada	Yes	Yes	2016
New Hampshire	No	Yes	2013
New Jersey	No	Yes	2009
New Mexico	No	Yes	2007
New York	No	Yes	2014
North Dakota	No	Yes	2016
Ohio	No	Yes	2016
Oregon	Yes	Yes	2014
Pennsylvania	No	Yes	2016
Rhode Island	No	Yes	2006
Vermont	No	Yes	2004
Washington	Yes	Yes	2012
Washington DC	Yes	Yes	2014

APPENDIX 2

HEALTHCARE REITS

This table reports 21 U.S. publicly-traded Healthcare REITs as of September 2016. Healthcare REITs are defined by NAREIT as equity REITs that own and manage a variety of healthcare-related properties and collect rent from tenants. Healthcare REITs' property types include senior living communities, hospitals, medical office buildings and skilled nursing facilities.

Ticker	CUSIP	Company Name
HCN	95040Q104	Welltower Inc.
HCP	40414L109	HCP, Inc.
UHT	91359E105	Universal Health Realty Income Trust
NHI	63633D104	National Health Investors, Inc.
OHI	681936100	Omega Healthcare Investors, Inc.
LTC	502175102	LTC Properties, Inc.
HR	421946104	Healthcare Realty Trust Incorporated
SNH	81721M109	Senior Housing Properties Trust
MPW	58463J304	Medical Properties Trust, Inc.
DOC	71943U104	Physicians Realty Trust
CHCT	20369C106	Community Healthcare Trust Incorporated
MRT	58409L306	MedEquities Realty Trust, Inc.
CCP	141624106	Care Capital Properties, Inc.
CTRE	14174T107	CareTrust REIT, Inc.
GBCS	37953J107	Global Healthcare REIT, Inc.
GMRE	37954A204	Global Medical REIT Inc.
HTA	42225P501	Healthcare Trust of America, Inc.
SNR	648691103	New Senior Investment Group Inc.
QCP	747545101	Quality Care Properties, Inc.
SBRA	78573L106	Sabra Health Care REIT, Inc.
VTR	92276F100	Ventas, Inc.

APPENDIX 3

MARIJUANA STOCKS

This table reports 13 U.S. publicly traded marijuana stocks on NYSE, AMEX, and NASDAQ as of September 2016.

Ticker	CUSIP	Company Name
ABBV	00287Y109	AbbVie Inc.
CARA	140755109	Cara Therapeutics, Inc.
CODI	20451Q104	Compass Diversified Holdings LLC
CRBP	21833P103	Corbus Pharmaceuticals Holdings, Inc.
FULL	359671104	Full Circle Capital Corporation
GWPH	36197T103	GW Pharmaceuticals Plc
IGC	45408X308	India Globalization Capital, Inc.
INSY	45824V209	Insys Therapeutics, Inc.
MBII	57165B106	Marrone Bio Innovations, Inc.
NTEC	M53644106	Intec Pharma Ltd.
SMG	810186106	The Scotts Miracle-Gro Company
XXII	90137F103	22nd Century Group, Inc.
ZYNE	98986X109	Zynerba Pharmaceuticals, Inc.

APPENDIX 4

MARIJUANA OTC STOCKS

This table reports 78 U.S. OTC marijuana stocks as of September 2016.

Ticker	Real Estate Business?	CUSIP Identifiable?	CUSIP (if available)	Company Name
ACAN	Y	1	030588107	Americann Inc
ACCA		1	00389L104	Acacia Diversified Hldgs Inc
ACOL		1	00485J102	Acology Inc
ADVT		0		Advantis Corp.
AERO		1	00768M202	Aerogrow International Inc
AGTK	Y	1	00856J103	Agritek Holdings Inc
AMMJ		0		American Cannabis Company, Inc.
APHQF		1	03765K104	Aphria Inc
ASBFY		0		Associated British Foods plc
ATTBF		1	00258G103	Abattis Bioceuticals Corp
BLOZF		0		Cannabix Technologies Inc.
CANN	Y	1	36930V100	General Cannabis Corp
CBDS		1	13764T105	Cannabis Sativa Inc
CBIS		1	137648101	Cannabis Science Inc
CGRW	Y	0		CannaGrow Holdings, Inc
CHUM		0		Chuma holdings, inc.
CLSH		0		CLS Holdings USA, Inc.
CNAB		1	909747107	United Cannabis Corp
CNBX		0		Cannabics Pharmaceuticals Inc.
CPMD		0		CannaPharmaRX, Inc.
CVSI		1	126654102	CV Sciences Inc
DIGP		1	253825202	Digipath Inc
DPWW	Y	0		Diego Pellicer Worldwide, Inc.
EDXC		0		ENDEXX Corp.
ERBB		0		American Green, Inc.
ETST		0		Earth Science Tech, Inc.
FTPM	Y	0		420 Property Management, Inc.
FUTL	Y	1	36117L107	Futureland Corp
GBHPPF		0		Global Hemp Group Inc.
GBLX		0		GB Sciences, Inc.
GLDFE		0		Golden Leaf Holdings Ltd.
GRCU		0		Green Cures & Botanical Distribution Inc.
GRNH		0		GreenGro Technologies, Inc.
GRWC	Y	0		Grow Condos, Inc.
HEMP		0		Hemp Inc.
HLSPY		0		Heliospectra AB
HMPQ		0		HempAmericana, Inc
HTCO		0		HempTech Corporation
IMLFF		0		InMed Pharmaceuticals Inc.
ITHUF		0		iAnthus Capital Holdings, Inc.

Ticker	Real Estate Business?	CUSIP Identifiable?	CUSIP (if available)	Company Name
IVITF		0		Invictus MD Strategies Corp.
JMDA		0		Jerrick Media Holdings, Inc.
KAYS		0		Kaya Holdings, Inc.
KSHB		1	501334106	Kush Bottles Inc
LXRP		0		Lexaria Bioscience Corp.
MCIG		1	55279L101	Mcig Inc
MDCL		0		Medicine Man Technologies, Inc.
MGWFF		1	565297108	Maple Leaf Green World Inc
MJNA		1	58463A105	Medical Marijuana Inc
MJNE	Y	0		MJ Holdings, Inc.
MNTR		0		Mentor Capital, Inc.
MSRT		0		MassRoots, Inc.
MYDX		0		MyDx, Inc.
NMUS		0		Nemus Bioscience, Inc.
NSPDF		0		Naturally Splendid Enterprises Ltd.
NTRR		0		Neutra Corp.
NXTTF		0		Namaste Technologies Inc.
OGRMF		1	68620P101	Organigram Holdings Inc
OPMZ		1	68276T100	1PM Industries Inc
OWCP		0		OWC Pharmaceutical Research Corp.
PHOT		1	39985X104	Growlife Inc
PNPL		1	72302T100	Pineapple Express Inc
PRRE	Y	0		Praetorian Property, Inc.
RSSFF		0		Affinor Growers Inc.
SPRWF		0		Supreme Pharmaceuticals Inc.
SRNA		1	86887P101	Surna Inc.
TCKF		0		Grasshopper Staffing, Inc.
TRTC		1	88102J100	Terra Tech Corp
TURV	Y	1	90207B107	Two Rivers Water & Farming
TWMJF		1	138035100	Canopy Growth Corp
USMJ		0		North American Cannabis Holdings, Inc.
VAPE		0		Vape Holdings, Inc.
VAPI		1	922097100	Vapir Enterprises Inc
VPRB		1	91831H106	VPR Brands LP
WDLF		0		Social Life Network, Inc.
ZDPY	Y	0		Zoned Properties, Inc.