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The value of academics: Evidence from academic independent director resignations in China☆

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ABSTRACT

In this paper, we use academic independent director resignations induced by the introduction of the Regulation 11 prohibiting academics from holding positions in Chinese public companies to examine their contribution to firm value. We document a negative market reaction to the issuance of the Regulation 11 and to the academic director resignations. The negative market reaction to academic director resignations is sizeable and hold when we further control for the influence of director, board, and firm characteristics. We next use heterogeneity in the market response to academic director resignations to study what the market values in academic directors. We find supportive evidence of a monitoring contribution and mixed evidence of advising and networking contributions. Finally, we show that in the two years following the issuance of the Regulation 11, companies with at least one academic director on their board prior to Regulation 11 underperform relative to companies without any academic directors. Overall, our results are consistent with a positive contribution of academic independent directors to firm value.

1. Introduction

An important stream of the finance literature studies how heterogeneity among outside directors affects the efficacy of board of directors and ultimately firm performance (e.g., Fich and Shivdasani, 2006; Anderson et al., 2011; Duchin et al., 2010; Estélyi and Nisar, 2016; Frijns et al., 2016; Adams et al., 2018; Bernile et al., 2018).

Academics represent an important portion of outside directors. In the U.S., about one third of outside directors consists of academics. Academics stand out for several reasons. They are trained to be independent and critical thinkers with their own opinions and judgements (Jiang and Murphy, 2007). Because they are less likely to be influenced by others, they could be better monitors of management decisions. As independent experts in their area of expertise, academic directors may also facilitate board access to external knowledge and bring new perspectives into the boardroom (e.g., Forbes and Milliken, 1999; Audretsch and Lehmann, 2006). As a result, academics could be valuable advisors too. Finally, academics bring their scientific network and social connections to the

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boardroom, which may facilitate the recruitment of qualified directors as well as talented graduates, and give access to university resources (e.g., Lynall et al., 2003; Trautman, 2012; Chahine and Goergen, 2013). While academics may add value to the boardroom, it is an open question whether they add more value than other types of independent directors. Relative to other independent directors, academics may lack professional expertise and exposure to real-world business decisions. They are also more likely to be captured by the additional income they derive from their directorships (Francis et al., 2015).

Whether academic independent directors contribute positively to firm value is thus an empirical question, which has received little attention so far. Fich (2005) provides evidence that stock markets do not necessarily react to the academic background of director appointees. In a more recent study, Francis et al. (2015) find that companies with directors from academia have greater investment performance and more efficient CEO monitoring. In a related study, White et al. (2014) document that the market reaction to the appointment of academic directors varies from positive to negative depending on director and firm characteristics. Finally, Fedaseyeu et al. (2018) find that academic experience is not related to total compensation per directorship, which suggests that firms do not value academic directors more. This body of empirical evidence is rather mixed and yields contradictory conclusions on the value of academic directors.

A major empirical challenge faced by researchers when assessing the contribution of academic directors to firm value is that directorships are endogenously determined (e.g., Hermalin and Weisbach, 2003; Raheja, 2005; Harris and Raviv, 2006; Wintoki et al., 2012). For instance, some companies may be more likely than others to appoint outside academic directors because of specific needs for their expertise, social connections, networks, or reputation (White et al., 2014). Likewise, prior literature shows that an important portion of directors resign from firms with weak boards and poor financial performance (Dewally and Peck, 2010). As a result, in normal times, academic appointments (resignations) cannot be deemed to be exogenous to firms' needs and performance. The market reaction that such appointments elicit is thus unlikely to be informative on the actual contribution of academic directors to firm value.[1] To assess the value of academic directors, one would ideally need to exploit changes in the number of academic directors in a firm's boardroom that are exogenous to the firm's characteristics. In this paper, we aim to do so by taking advantage of a quasi-natural experiment of academic independent director resignations in China.

We utilize the Regulation 11,[2] issued by the Chinese Ministry of Education on the 3rd of November 2015, that prohibits university employees from holding director positions in Chinese public companies. We collect information on the resignations of 2617 independent directors from Chinese public companies over the 2013–2017 period. In the six months following the issuance of the Regulation 11, 330 academics resigned, which represents 60% of the resignations of independent directors over this period versus 34% over the 2013/1-2015/10 period. The number of academic resignations is relatively the same (324), when we exclude resignations that cannot be attributed to the Regulation 11 (e.g., health and family issues).

To test whether academic independent directors contribute to firm value, we first examine the market reaction to the issuance of the Regulation 11. For companies with at least one academic director in their board prior to the issuance of the Regulation 11, the market reaction is markedly negative (−1.72%) and significant at the 1% level. Relative to companies without academic directors prior to the issuance of the Regulation 11, this market reaction is significantly more negative. Within the group of companies with at least one academic director, the market reaction is even stronger for companies with at least one academic director of a high administrative rank, which are the ones primarily targeted by the Regulation 11 (a significant difference of −0.70%). These results are consistent with a positive market valuation of the role of academic directors in the boardroom.

The Regulation 11 originally aimed to ensure that officials above a certain position (ranks 1–8),[3] who are working in institutions monitored by the Ministry of Education, cannot hold a directorship in a Chinese public company. However, it triggered a sizeable number of resignations of independent academic directors, who are not holding any meaningful administrative position (ranks 9–18) or no administrative position at all.[4] It shows that the text is open to interpretation and that it is *ex ante* unclear which academics must resign and when. The massive resignations of independent academic directors without administrative positions suggests that the text has been interpreted in a much stricter way by many companies, possibly anticipating its revision and the inclusion of a broader set of academics. For these reasons, at the time of the issuance of the Regulation 11, the market arguably could not fully price the cost of the loss of academic directors. It motivates our choice to further examine the market reaction to the actual academic director resignations induced by the Regulation 11.

We examine how the market reacts to the resignations of academic directors in the six months following the issuance of the Regulation 11.[5] Consistent with a positive market valuation of the role of academics in the boardroom, we find an average negative market reaction to academic director resignations of about −0.77%. This market reaction is significant and sizeable relative to the average unconditional market reaction to independent director resignations of −0.10% over our sample period. When we compare the market reaction to academic director resignations induced by the Regulation 11 to the market reaction to contemporaneous resignations by non-academic directors comparable in experience, gender, as well as age, and belonging to firms operating in the

[1] The assessment of the effect of academic directors on a firm's policies and performance is subject to the same caveat.

[2] Regulation 11 is a clarification of the Rule 18 issued by the Communist Party of China on October 19, 2013, which is part of an anti-corruption campaign, and prohibits government officials above a certain rank from holding positions in public firms (Hope et al. 2017; Hu et al., 2019).

[3] A rank closer to 1 means a higher administrative position.

[4] We do not document a significant difference in the market reaction to the resignations of academics with and without administrative positions, which alleviates the concern that our results could be mostly driven by official-like academic resignations.

[5] Our choice of the 6-month window is based on the pattern of the resignations of academic directors we observe post issuance of the Regulation 11 (see Table 1). It seems reasonable to assume that the bulk of the resignations triggered by the Regulation 11 took place in the months following its issuance. Our core results hold when we use longer windows of 7 to 12 months.

same industry, we still document a significant negative difference. This result holds when we match the firms with resigning directors across a wide range of firm and board characteristic.

While we document a negative market reaction to academic director regulation *post* Regulation 11, we do not find it for the academic director resignations *pre* Regulation 11 (in normal times). A likely explanation for this discrepancy is that while, *pre* Regulation 11, resigning academics can be replaced by other academic directors, *post* Regulation this is much less the case. We examine this issue empirically. We observe an important change in the replacement rate of academics before and after the introduction of the Regulation 11. While, *pre* Regulation 11, 22% of the resigning academic directors are replaced by other academic directors, *post* Regulation 11, this percentage drops to 8%. This difference is very significant. When we look at the pool of academic directors with high administrative positions (ranks 1–8), we observe that the percentage of director replacement by academics drops from 7% pre-regulation to 1% post-regulation (the difference is again highly significant). These findings are consistent with the market reacting to the loss of a specific set of skills and abilities that is much harder to replace *post* Regulation 11.

To further examine what the market values in academic directors, we consider the heterogeneity in the market response to academic director resignations due to differences among directors, boards, and firms' characteristics. We use prior literature to guide our choice of potential heterogeneity sources (e.g., Dewally and Peck, 2010; Adams and Ferreira, 2009; Anderson et al., 2011; White et al., 2014; e.g., Francis et al., 2015).

First, we document evidence of a positive market valuation of the monitoring contribution of academic directors. We find that resignation by *pure academics*, i.e., academics having as unique employer their university and as unique profession academic, elicit a stronger market reaction. Arguably, *pure academics* are less exposed to conflict of interests, and the stronger market reaction can be interpreted as the market valuing the specific monitoring contribution of this type of academics (White et al., 2014). We also document a stronger market reaction to academic resignations when the board size is bigger, the percentage of independent board member is lower, and when the CEO also holds the position of the chairman of the board. These findings are consistent with a positive market valuation of the monitoring role of academics in settings where it is much needed, that is when CEO power is stronger, boardroom coordination is harder, and the monitoring of the other directors is weaker (e.g., Jensen, 1993; Cotter et al., 1997; Eisenberg et al., 1998; Cheng, 2008; Nguyen and Nielsen, 2010; Baldenius et al., 2014). We also find that academic resignations elicit stronger market reactions in firms with relatively high free cash flows and high growth opportunities, consistent with the market reacting to a loss of a valuable source of monitoring in firms where it could have a material impact on firm value (Jensen, 1986).

Second, we document mixed evidence of a positive market valuation of the advising contribution of academic directors. We do not find a much stronger market reaction for larger and more complex firms or for firms intensive in R&D, although for these firms outside expertise should be more valuable (e.g., Boone et al., 2007; Coles et al., 2008; Linck et al., 2008; White et al., 2014). Moreover, we do not document a stronger market reaction to the resignations of academics holding a business degree, a law degree, an engineering degree, or a PhD degree.[6] Possibly, in the Chinese context, academics could have an advising contribution that slightly differs from the one expected, for example, in the U.S. market. We do find, however, a markedly stronger market reaction to the resignations of academics, who graduated from foreign universities. This finding is consistent with an advising contribution. Prior literature shows that directors with foreign experience transmit knowledge about management practices and corporate governance to firms, which in turn influences their performance and foreign investments (e.g., Masulis et al., 2012; Giannetti et al., 2015).

Third, we document mixed evidence on the positive market valuation of the networking contribution of academic directors. Within the group of academics with administrative positions, we find a much stronger market reaction to the resignations of academics occupying top administrative positions such as national and provincial leadership ones. This results is consistent with a positive valuation of the political connections attached to high administrative positions, which can grant firms some advantages such as preferential lending, government bailout, legal protection, or government contract (e.g., Faccio, 2006; Li et al., 2008; Goldman et al., 2009; Wu et al., 2012; Goldman et al., 2013; Cull et al., 2015; Wang, 2015; Fan, 2016). Yet, we do not find a significantly stronger market reaction for firms that do not have well-connected CEO, and which are not stated-owned (arguably these companies would suffer relatively more from losing political connections). When we look at the group of academic directors occupying top university administrative positions (university president to faculty deputy dean), we do not find a stronger market reaction relative to the other academic directors. This result suggests that, in the Chinese context, the market does not seem to value the loss of the academic network that could facilitate hiring talented graduates or accessing university resources (e.g., Lynall et al., 2003).

Consistent with some contributions of academic directors to the monitoring, advising, and networking roles of the board, we expect to find a tangible negative effect of the exogenous resignation of academic directors on firm performance over time. We first use a difference-in-differences regression setting to examine the effect of the Regulation 11 on companies with at least one academic director in their board prior to the issuance of the regulation (treated group) relative to companies without academic directors in their board prior to the issuance of the regulation (control group). We document a significant relative decrease in profitability (industry-adjusted ROA) of about 1% over the two years following the introduction of the Regulation 11. This finding is consistent with a positive contribution of academic to firm performance.

We complement this analysis by examining the long-term returns of a portfolio long on companies with at least one academic director prior to the issuance of the regulation and short on companies without any academic director prior to the issuance of the

[6] We also do not find significant differences in the market reaction to academic director resignations when we look at the intersection of firms with a greater need for outside expertise and resignations of academic directors more likely to bring such an expertise. Due to sample constraints, in our empirical analysis, we concentrate on one-dimensional partitions of our sample of academic independent director resignations.

regulation.[7] We provide the market with ample opportunity to react to the resignations by building the portfolio at the end of the six-month period following the issuance of the Regulation 11. We document a significant portfolio monthly alpha of −0.32% (−0.23%) in excess of the CAPM model (Carhart four-factor model). As discussed by Edmans (2011), these results can be interpreted both as an evidence of the contribution of academic directors to firm value and as an evidence of the market mispricing their contribution in the short-term.

Our paper makes several contributions to the literature. First, it adds to the literature on board heterogeneity arguing that some directors are better than others at fulfilling their role. We show that next to other types of outside directors, such as women directors (e.g., Adams and Ferreira, 2009; Farrell and Hersch, 2005), former CEO directors (e.g., Fahlenbrach et al., 2011), experts (e.g., Minton et al., 2014), foreign directors (e.g., Masulis et al., 2012), or executive of financial institutions (e.g., Booth and Deli, 1999), academic directors bring value to the boardroom. Using a setting where academics resignations are plausibly exogenous to firm characteristics, we expand previous evidence on the contribution of academic directors to firm value (e.g., Fich, 2005; White et al., 2014; e.g., Francis et al., 2015; Fedaseyeu et al., 2018).

Second, we complement the body of research on corporate governance in China.[8] Liu and Lu (2007) and Lo et al. (2010) examine the relation between earnings management and corporate governance in China. Chen et al. (2006) study whether boardroom characteristics influence corporate financial fraud in China. Liu et al. (2014) examine the effect of board gender diversity on firm performance for Chinese listed firms. Liu et al. (2015) provide the first comprehensive and robust evidence on the relationship between board independence and firm performance in China. Giannetti et al. (2015) study the impact of directors with foreign experience on firm performance in China. McGuinness et al. (2017) assess the influence of board gender on the CSR performance of Chinese listed companies. Hu et al. (2019) utilize the Rule 18 to investigate the effect of the loss of politically connected independent directors on Chinese listed companies and document a reduction in long-term debt financing and a decrease in government subsidies for nonstate-owned companies. We contribute to this growing body of knowledge by examining whether academic independent directors add value to the boardroom in the Chinese context and by providing supportive evidence that they do.

While our findings suggest that academic independent directors represent valuable assets to improve the corporate governance of Chinese public companies, our identification strategy relies on an important wave of resignations of such directors commanded by the Communist Party of China. The intended consequence of the Rule 18 and of its clarification (Regulation 11) is to prohibit official-like directors to sit on the board of Chinese public companies. As we document in our paper, an unintended effect of the Regulation 11 is the resignations of academic independent directors who held low or no administrative positions at all. A third contribution of our paper is thus to point to a potential detrimental side-effect of the Rule 18, that is the exclusion of valuable directors from the independent director job market. It highlights a potential limitation of the structuring of the boards of Chinese public companies mostly through regulation, which may result in board structures that do not match the specific needs of companies.[9]

Finally, we would like to acknowledge some limitations of our work. First, our findings apply to China. While the Chinese stock market has experienced important developments over the last decades, it still differs in many aspects to more established stock markets. There are strong institutional aspects specific to China that invite to be cautious when drawing inferences for other stock markets. More specifically, in our case, there are some discussions with respect to the exact role of independent directors and their influence on firms as many Chinese companies apparently adhere to the minimum prescribed percentage of independent directors, which suggests a box-ticking approach (e.g., Jiang et al., 2017; Jiang and Kim, 2015).

The rest of the paper is as follows. Section 2 covers the data sources and the sample construction. Section 3 explains our identification strategy. Section 4 reports and discusses our results. Section 5 concludes.

2. Data sources and sample construction

2.1. Data sources

We collect accounting and financial data for Chinese public companies from DataStream, board and director data from the Wind database, independent director resignation announcement dates from the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE)'s websites, and data on the ranking of Chinese Universities from the XDF's and Academic Ranking of World Universities' (AWRU)'s websites.

2.2. Sample construction

Our starting point is the whole universe of independent director resignations from Chinese public companies with A-shares listed

[7] As argued by Edmans (2011), long-term returns suffer fewer reverse causality issues than profits and are more directly linked to shareholder value, capturing all the channels through which losing an academic director may harm shareholder value. Although we document a negative market response to academic director resignations at the time of the issuance of the Regulation 11 and to the actual resignations, it does not preclude that the market, in the short-term, fails to fully incorporate the value the firm has lost because of these resignations. As for other intangibles, we suspect that a decrease in board monitoring, advising, or networking ability takes time to materialize in tangible outcomes that push the market to revise its expectations.

[8] See Jiang and Kim (2015) for a recent overview of corporate governance in China.

[9] As discussed by Jiang and Kim (2015), board structure in China appears mostly to be the outcome of regulations and not based on firm-specific characteristics.

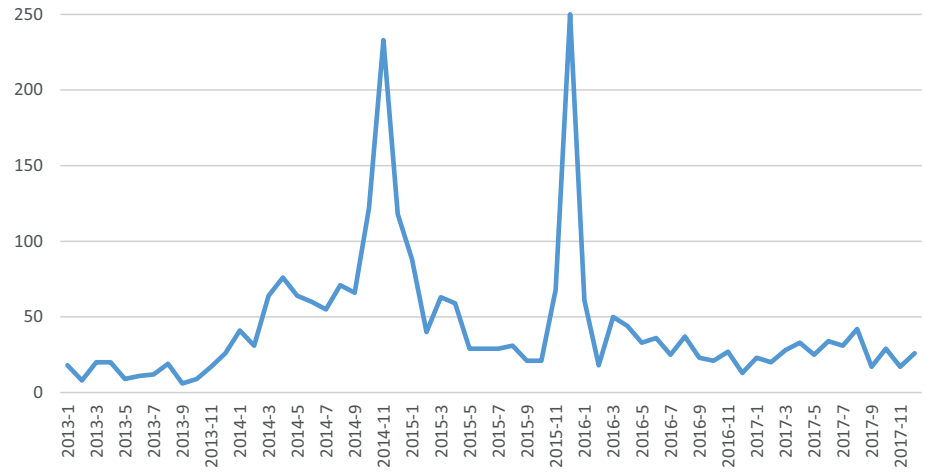

Fig. 1. Number of independent director resignations per month over the 2013–2017 period.

either on the Shanghai Stock Exchange or/and on the Shenzhen Stock Exchange over the 2013–2017 period. We manually collect the official announcement dates of director resignations on the stock exchanges' websites. We then restrict our sample to resignations for which we can compute our board and director main control variables. This procedure leaves us with a sample of 2617 independent director resignations (2114 unique directors) from 1591 unique firms over the 2013–2017 period. We classify a director as *academic* if at least one of her professions, as listed in the Wind database, is an academic profession (e.g., lecturer, senior lecturer, assistant professor, professor).

As shown in Fig. 1, independent director resignations over our sample period are clustered around two periods that correspond to the aftermath of the Rule 18 (issued on the 19/01/2013) and of its clarification, the Regulation 11 (issued on the 3/11/2015). In the next section, we discuss our identification strategy of plausibly exogenous resignations of academic independent directors utilizing the issuance of the Regulation 11.

3. Identification strategy

To assess the value academic independent directors bring to the boardroom, we use resignations of academic independent directors plausibly exogenous to firm characteristics. We utilize the Regulation 11, issued by the Chinese Ministry of Education, on the 3rd of November 2015, which prohibits academics from holding director positions in Chinese public companies and triggered an important wave of academic director resignations.

The Regulation 11 is a clarification of the Rule 18 issued by the Communist Party of China on October 19, 2013, which is part of an anti-corruption campaign, and prohibits government officials above a certain rank from holding positions in public firms (Hope et al. 2017; Hu et al., 2019). The Regulation 11 extends this prohibition specifically to university employees. It primarily targets staff members, who have an administrative rank comparable to government officials (ranks1–8, see Appendix C).

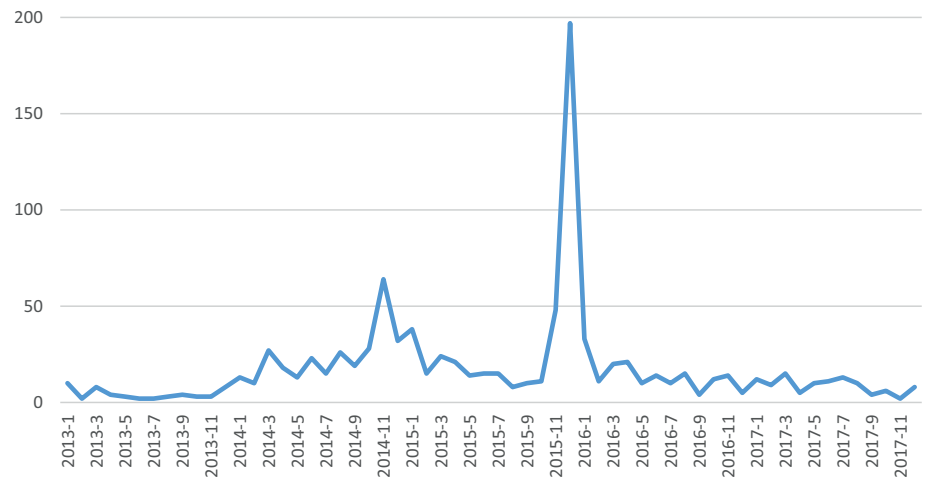

Fig. 2. Number of academic independent director resignations per month over the 2013–2017 period.

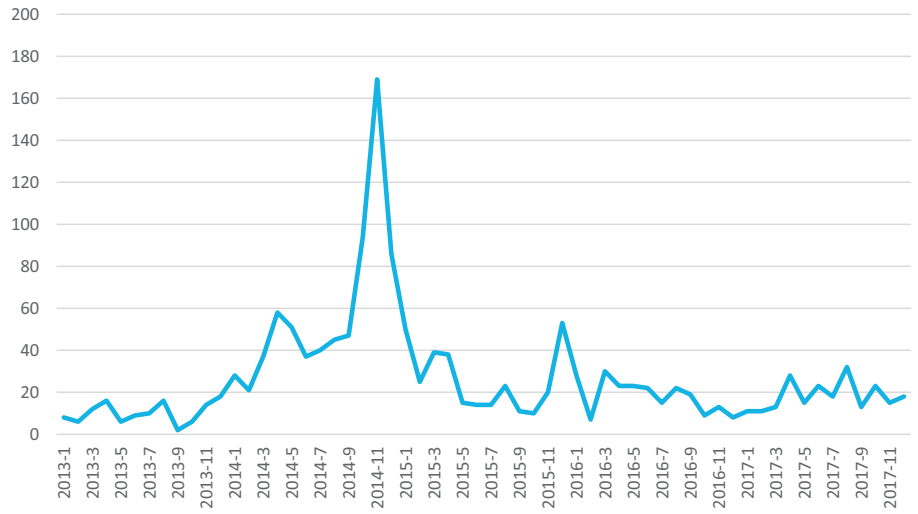

Fig. 3. Number of non-academic independent director resignations per month over 2013–2017.

A first potential concern with our identification strategy is that the market reaction to official and academic resignations could overlap, which would limit inferences on the value of academic directors. As shown in Figs. 2 and 3, when we split our sample of independent director resignations into non-academic and academic director resignations, we observe that the bulk of the non-academic resignations is concentrated in the aftermath of the Rule 18, while the bulk of the academic resignations is concentrated in the aftermath of the Regulation 11. As shown in Fig. 3, academics who happen to also be government officials already resigned in the aftermath of the Rule 18, which explained the marked increase in the number of academic resignations in the last quarter of 2014. These observations partially alleviate the concern of an overlapping effect. In addition, as shown in Fig. 3, the Regulation 11 specifically triggered an important wave of academic resignations. In the six months following the issuance of the Regulation 11 (2015/11 to 2016/4), 330 academics resigned, which represents 60% of the resignations of independent directors over this period versus 34% over the 2013/1-2015/10 period. In the following period (2016/5 to 2017/12) this percentage goes back to 35%, highlighting the particularly high number of academic director resignations occurring in the six months following the issuance of the Regulation 11. Table 1 reports the number of academic and non-academic resignations by month. The number of academic resignations culminates at 197, in December 2015, the month following the issuance of the Regulation 11, while there are only 11 academic resignations in October 2015, the month preceding the issuance of the Regulation 11. These observations provide reasonable assurance that the market reactions to the academic director resignations following the issuance of the Regulation 11 are not affected by the cofounding effect of official resignations and can be used to assess the value of academic directors.

A second potential concern with our identification strategy is that, among the group of resigning academic directors, an overwhelming portion of the directors could be official-like academics, because they are the ones primarily targeted by the Regulation 11. Because some academics are not strictly speaking officials of high ranks, they would not have resigned because of the issuance of the Rule 18 but would have resigned following the Regulation 11 that clarifies that the Rule 18 also applies to academics. If this is the case, the inference we would draw on the value of academics in China would reflect more the contribution of official-like directors than the actual contribution of academics. When we single out academics without administrative positions (see Fig. 4), we find that the number of resignations of such academics skyrockets after the issuance of the Regulation 11 and represents most of the academics resignations in the aftermath of the Regulation 11 (74%). These observations alleviate the concern that our inferences on the value of academics based on the academic resignation following the issuance of the Regulation 11 could be primarily driven by official-like academic resignations. Yet, in our analysis, we will take advantage of this source of heterogeneity in the pool of academic director resignations (*official-like* versus *pure academics*) to investigate the different contributions of academics that the market may value (i.e., networking versus advising/monitoring).

Finally, another potential concern is that some of the academic directors resigning over the 2015/11-2017/12 period may resign for reasons not related to the Regulation 11. To alleviate this concern, we restrict our sample of academic resignations to the ones plausibly caused by the Regulation 11. To that extent, we concentrate on the academic resignations occurring in the six months following the issuance of the Regulation 11[10] and for which the explicit reason of the resignation mentioned on the stock exchange's website is not a health or family issue.[11] We can identify, over the period 2015/11-2017/11, a sample of 324 academic resignations

[10] This six-month period corresponds to the abnormal surge in the number of academic director resignations post Regulation 11. It seems reasonable to assume that the bulk of the resignations triggered by the Regulation 11 took place in the months following the issuance of the regulation. Our core results hold when we use longer windows of 7 to 12 months. However, using a longer time period arguably makes us include in our analysis resignations less likely to be the result of the regulatory change.

[11] Within the 324 academics resignations in the six months following the issuance of Regulation 11 not due to health of family issues, for 234 of

Table 1
Number of independent director resignations per month over the 2013–2017 period.

Year-month	Total	Academics	Pct. academics	Non-academics	Pct. non-academics
2013-1	18	10	56%	8	44%
2013-2	8	2	25%	6	75%
2013-3	20	8	40%	12	60%
2013-4	20	4	20%	16	80%
2013-5	9	3	33%	6	67%
2013-6	11	2	18%	9	82%
2013-7	12	2	17%	10	83%
2013-8	19	3	16%	16	84%
2013-9	6	4	67%	2	33%
2013-10	9	3	33%	6	67%
2013-11	17	3	18%	14	82%
2013-12	26	8	31%	18	69%
2014-1	41	13	32%	28	68%
2014-2	31	10	32%	21	68%
2014-3	64	27	42%	37	58%
2014-4	76	18	24%	58	76%
2014-5	64	13	20%	51	80%
2014-6	60	23	38%	37	62%
2014-7	55	15	27%	40	73%
2014-8	71	26	37%	45	63%
2014-9	66	19	29%	47	71%
2014-10	122	28	23%	94	77%
2014-11	233	64	27%	169	73%
2014-12	118	32	27%	86	73%
2015-1	88	38	43%	50	57%
2015-2	40	15	38%	25	63%
2015-3	63	24	38%	39	62%
2015-4	59	21	36%	38	64%
2015-5	29	14	48%	15	52%
2015-6	29	15	52%	14	48%
2015-7	29	15	52%	14	48%
2015-8	31	8	26%	23	74%
2015-9	21	10	48%	11	52%
2015-10	21	11	52%	10	48%
2015-11	68	48	71%	20	29%
2015-12	250	197	79%	53	21%
2016-1	61	33	54%	28	46%
2016-2	18	11	61%	7	39%
2016-3	50	20	40%	30	60%
2016-4	44	21	48%	23	52%
2016-5	33	10	30%	23	70%
2016-6	36	14	39%	22	61%
2016-7	25	10	40%	15	60%
2016-8	37	15	41%	22	59%
2016-9	23	4	17%	19	83%
2016-10	21	12	57%	9	43%
2016-11	27	14	52%	13	48%
2016-12	13	5	38%	8	62%
2017-1	23	12	52%	11	48%
2017-2	20	9	45%	11	55%
2017-3	28	15	54%	13	46%
2017-4	33	5	15%	28	85%
2017-5	25	10	40%	15	60%
2017-6	34	11	32%	23	68%
2017-7	31	13	42%	18	58%
2017-8	42	10	24%	32	76%
2017-9	17	4	24%	13	76%
2017-10	29	6	21%	23	79%
2017-11	17	2	12%	15	88%
2017-12	26	8	31%	18	69%
Total	2617	1030	–	1587	–

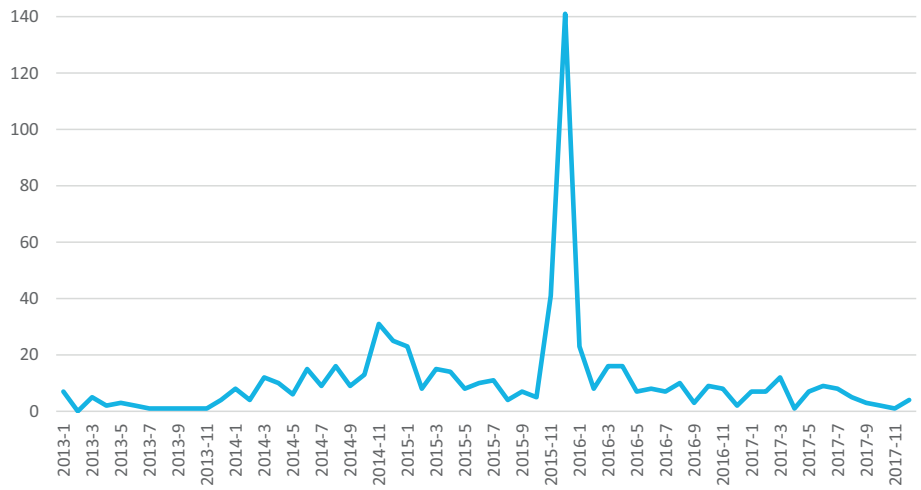

Fig. 4. Number of academic independent director resignations per month over the 2013–2017 period, for academic directors without administrative positions.

most likely caused by the Regulation 11. In our core analysis, we use this sample of resignations to draw inferences on the value of academic directors and on their contributions to the boardroom. For robustness, we also use an even narrower set of 234 academic resignations for which the official reasons stated on the stock exchange's website is explicitly the Regulation 11 (Rule 18).

4. Empirical analysis

4.1. Descriptive statistics

Our main empirical analysis is based on a sample of 2617 resignations of independent directors over the period 2013–2017 and concentrate more specifically on the academic resignations following the issuance of the Regulation 11 over the period 2015/11-2016/04. In our firm-level analysis, we rely on 8643 firm-year observations (2608 unique firms) for which we can compute our main board and firm control variables over the 2013–2017 period.

Panel A of Table 2 reports descriptive statistics on director, board, and firm characteristics for our sample of independent director resignations. Appendix A provides the variable definitions. Over the sample period, 40% of the resigning directors are academics. *Pure academics*, who have as unique profession academic and, as unique employer, a university, represent a much smaller cohort, i.e., 10% of the resigning directors. The average director in our sample is a male (90%), who is 55 years old and has been sitting on a board for more than three years. Half of the resigning directors have an administrative position. 40% of the resigning directors hold a PhD degree, which largely overlaps with the proportion of academics. 60% of the resigning directors majored in business, 10% in law, and 10% in engineering. The median board of firms with resigning directors consists of 10 members and has a proportion of independent directors of 40%. For less than one-third of the boards the firm CEO is also the chairman of the board. The median firm has a total asset of 3.20 billion Yuan, a leverage of 20%, a cash to total asset ratio of 15%, a return on asset of 3%, an equity market-to-book of 1.80, a CAPM beta of 1 and a volatility of the monthly returns of 10%. Finally, the average market reaction to a director resignation in our sample is −0.10%. The reported values are in line with prior studies on directors and boards in China (e.g., Lo et al., 2010; Liu et al., 2014; Liu et al., 2015; Giannetti et al., 2015; McGuinness et al., 2017; Hu et al., 2019).

Panel B of Table 2 reports descriptive statistics on director attributes for the group of resigning academic directors and the group of resigning non-academic directors. We observe a series of significant differences between academic and non-academic resigning independent directors. Academic directors are significantly younger (about one year) and much more likely to hold a PhD degree (74% vs 10%). They are also more likely to have majored in business and less likely to have majored in engineering. Moreover, academic directors are more likely to hold an administrative position, and within the pool of directors with administrative positions, they tend to hold administrative positions of relatively higher ranks. This finding points to a potential concern, already discussed in the previous section, that some academics can be considered as official-like directors.

(*footnote continued*)
them the reason of the resignation mentioned on the stock exchange's website explicitly refers to the Regulation 11 (or to the Rule 18). However, for the 90 remaining academic director resignations, the reason mentioned is “personal reason” or “personal job reason”, which are to be interpreted as resignations also caused by the issuance of the Regulation 11 according to Chinese insiders (see for instance http://www.xinhuanet.com/fortune/2015-11/28/c_128476697.htm). In our empirical analysis, we show that our conclusions remain qualitatively unchanged if we narrow down the list of academic resignations to the ones for which the official reason explicitly refers to the Regulation 11 (Rule 18).

Table 2
Descriptive statistics.

Panel A: Descriptive statistics for the full sample of independent director resignations

Variables	Obs.	Mean	S.D.	P25	Mdn	P75
Cumulated Raw Returns [−1,1]	2617	0.20	5.30	−2.30	0.00	2.60
Cumulated Abnormal Returns [−1,1]	2617	−0.10	4.60	−2.50	−0.30	1.80
Academics	2617	0.40	0.50	0.00	0.00	1.00
Pure Academics	2617	0.10	0.30	0.00	0.00	0.00
Director Age	2615	55	10	48	53	62
Director Male Dummy	2617	0.90	0.30	1.00	1.00	1.00
Director Tenure (in days)	2617	1259	961	555	1009	1829
Administrative Position Dummy	2617	0.50	0.50	0.00	0.00	1.00
Administrative Position Rank	1279	6.99	4.09	5.00	6.00	8.00
Degree	2163	4.04	0.93	3.00	4.00	5.00
PhD Degree	2167	0.40	0.49	0.00	0.00	1.00
Business Degree	1136	0.60	0.50	0.00	1.00	1.00
Law Degree	1136	0.10	0.40	0.00	0.00	0.00
Engineer Degree	1136	0.10	0.30	0.00	0.00	0.00
Replaced	2617	0.41	0.49	0.00	0.00	1.00
Replaced by Academic	1030	0.15	0.36	0.00	0.00	0.00
Replaced by High-Rank Academic	1030	0.04	0.20	0.00	0.00	0.00
Total Assets (in billion Yuan)	2571	29.00	0.21	1.50	3.20	7.80
Size	2571	15.20	1.50	14.30	15.00	15.90
Leverage	2560	0.23	0.19	0.06	0.20	0.36
Free Cash Flow	2445	0.00	0.07	−0.03	0.01	0.04
Return on Asset (%)	2571	3.01	6.28	0.92	2.91	5.86
Market-to-Book	2442	3.60	5.00	1.00	1.80	3.90
Stock Beta	2543	1.00	0.40	0.80	1.00	1.30
Stock Volatility	2537	0.10	0.10	0.10	0.10	0.20
Loss Dummy	2572	0.11	0.31	0.00	0.00	0.00
Tangibility	2570	0.28	0.20	0.12	0.23	0.40
Sale Growth	2571	0.16	0.46	−0.06	0.09	0.25
R&D Expenditures	2571	0.01	0.02	0.00	0.00	0.02
Board Size	2423	11.2	3.30	9.00	10.00	13.00
Pct. Independent Directors	2423	0.40	0.10	0.30	0.40	0.40
CEO Duality	2423	0.30	0.50	0.00	0.00	1.00

Panel B: Descriptive statistics on director attributes for the group of academic director resignations and non-academic director resignations

Variables	Non-academic	Obs.	Academic	Obs.	Difference	*P*-value
Director Age	55.32	1587	54.37	1030	−0.95***	0.01
Director Male Dummy	0.86	1587	0.87	1030	0.02	0.18
Director Tenure (in days)	1249	1587	1272	985	23.04	0.58
Administrative Position Dummy	0.41	1587	0.64	1030	0.23***	0.00
Administrative Position Rank	6.73	628	7.24	651	0.50**	0.03
Degree	3.55	1201	4.65	962	1.10***	0.00
PhD Degree	0.12	1201	0.74	962	0.62***	0.00
Business Degree	0.53	496	0.70	640	0.17***	0.00
Law Degree	0.16	496	0.13	640	−0.03	0.21
Engineer Degree	0.16	496	0.07	640	−0.09***	0.00

Panel C: Distribution of the administrative position ranks of the resigning academic directors

Rank of the administrative position	Freq.	Percent
1	16	1.55%
3	62	6.02%
4	38	3.69%
5	115	11.17%
6	68	6.60%
7	121	11.75%
8	133	12.91%
9	26	2.52%
10	5	0.49%
15	2	0.19%
16	7	0.68%
17	7	0.68%

(*continued on next page*)

Table 2 (*continued*)

Panel C: Distribution of the administrative position ranks of the resigning academic directors		
Rank of the administrative position	Freq.	Percent
18	51	4.95%
None	379	36.80%

Panel A reports descriptive statistics for our main variables of interest. Appendix A provides the variable definitions.
Panel B reports descriptive statistics for our main director attribute variables for the group of resigning directors who are academics and for the group of resigning directors who are not academics. It also reports the difference in mean across different variables for both groups.
Panel C reportss the distribution of the administrative position ranks among the group of academic director resignationsAppendix A provides the variable definitions. *, **, and *** denote statistical significance of the two-sample *t*-test of mean equality at the 10%, 5% and 1% level, respectively (one-sided *t*-test).

Panel C of Table 2 shows the distribution of the administrative position ranks among the group of academic director resignations. Appendix C provides the Wind database definitions of each rank. 8.5% of the academic directors hold a national leadership position and 15% hold a provincial position. For the rank 5 to 10, university administrative positions are matched to equivalent official positions in terms of benefits (salary and other treatment). 17.77% of them have an administrative position equivalent to university president or vice-president, 24.66% have an administrative position equivalent faculty dean or faculty deputy dean, and 3.01% have an administrative position equivalent to head of department or deputy head of department. Later in our analysis, we will take advantage of the variation in the university administrative positions of the resigning academics to examine whether the market value the access to university resources that some academics may facilitate. In the next subsection, we examine the market reaction to the issuance of the Regulation 11.

4.2. Market reaction to the issuance of the Regulation 11

The Regulation 11 was issued on the 3rd of November 2015. We examine the market reaction during the three trading days surrounding this event. To assess the market reaction, we consider the Cumulated Abnormal Returns (CARs) over the three days surrounding the event, whereby we define abnormal returns as daily returns in excess of a Carhart four-factor model.[12] To build the market factor, we use CSI 300 (Chinese Securities Index 300) to proxy for the market return of China A-share stocks and calculate the market factor as the CSI 300 return over the risk-free rate, measured by Chinese 3-month deposit rate. We follow Fama and French (1993) to compute the SMB and HML factors and Carhart (1997) to compute the MOM factor. For each resignation, we estimate the parameters of the four-factor model over an estimation window of $[-255, -46]$ days, then we use the coefficient estimates to compute the expected daily returns from day -1 to day 1, using the daily factor values.

Table 3 reports the results. In Panel A, we document an average negative and significant market reaction for the universe of listed Chinese companies of -1.70%. This first finding is consistent with the market reacting negatively to the loss of the specific skills and abilities academics bring to the boardroom and thus with a positive valuation of the contribution of academic directors. Note that we do not find such a market reaction to the issuance of the Rule 18, suggesting a that the market reaction is specific to Regulation 11.

In Panel B, we further examine whether the market is reacting more negatively to the issuance of the Regulation 11 for companies that have at least one academic director in their board relative to companies that do not have academic directors in their board prior to Regulation 11. We find that the market reaction for companies with at least one academic director in their board is significantly stronger (-0.21%, significantly at the 5% level). We next examine the difference in market reaction when we match treated and control companies on industry, performance, size, market-to-book, beta, return volatility, board size, and board independence. By doing so, we arguably look at the difference in market reaction between companies that benefit from the skills of academic directors (because they hired them in the first place) and comparable companies that do not benefit from their skills. Following Rosenbaum and Rubin (1983), we use a probit model to calculate propensity scores, and to find optimal matches, we use the nearest neighborhood matching technic. All matchings are conducted with replacement. As suggested by Smith and Todd (2005), in order to ensure the quality of the matching, we drop 2% of observations for which the propensity score density of the matched observations is the lowest. We find a match for 987 firms. As reported in Panel C, the difference in market reaction between treated companies and matched control companies is twice the one we document in panel B (about -0.46%), which is consistent with this setting enabling us to better capture the loss in value attached to the resignations of academics perceived by investors.

Finally, in Panel D, we compare the market reaction for companies with at least one high-administrative-position academics in their board (ranks 1–8) and companies with at least one academic in their board but without high-administrative-position academics. Results indicate that, within the group of companies with at least one academic director sitting on the board prior to the issuance of the Regulation 11, those having at least one academic director of a high administrative rank experience a stronger market reaction (difference of -0.70%, significant at the 5% level). This result is consistent with Regulation 11 targeting originally official-like academics.

While originally the Regulation 11 aimed to ensure that officials above a certain rank (1–8), who are working in institutions

[12] Our results are robust to the use of alternative event windows.

Table 3
Market reaction to the issuance of the Regulation 11.

Panel A: Market reaction to the issuance of the Rule 18 and the Regulation 11 for Chinese listed companies

	Nb. firms	CAR [−1,1]
Rule 18 21th of October 2013	2447	0.14
Regulation 11 3rd November 2015	2598	−1.62***

Panel B: Companies with academic directors versus companies without academic directors

	No academic director		At least one academic director		
	Nb. firms	CAR [−1,1]	Nb. firms	CAR [−1,1]	Difference
Issuance of Regulation 11	1217	−1.51	1381	−1.72	−0.21**

Panel C: Matched sample

	Matched firms No academic director		Treated firms At least one academic director		
	Nb. firms	CAR [−1,1]	Nb. firms	CAR [−1,1]	Difference
Issuance of Regulation 11	987	−1.30	987	−1.76	−0.46**

Panel D: Companies with high-rank academic directors versus companies without high-rank academic directors

	At least one academic director				
	No high-rank academic director		At least one high-rank academic director		
	Nb. firms	CAR [−1,1]	Nb. firms	CAR [−1,1]	Difference
Issuance of Regulation 11	1232	−1.48	149	−2.18	−0.70**

Panel A reports the market reaction to the promulgation of the Rule 18 and Regulation 11 for Chinese listed companies. The market reaction is defined as the cumulated abnormal return over the three days surrounding the resignation event, whereby an abnormal daily return is a daily return in excess of the prediction of a Carhart's four-factor model. *, **, and *** denote statistical significance of the market reaction at the 10%, 5% and 1% level, respectively (two-sided t-test).
Panel B reports the mean cumulated abnormal returns over the three days surrounding to the promulgation of the Regulation 11 for Chinese listed companies with at least one academic director in their board prior to the issuance of the Regulation 11 and for companies without academic directors in their board prior to the issuance of the Regulation 11. *, **, and *** denote statistical significance of the difference in the market reaction between both groups of companies at the 10%, 5% and 1% level, respectively (one-sided *t*-test).
Panel C reports the mean cumulated abnormal returns over the three days surrounding to the promulgation of the Regulation 11 for Chinese listed companies with at least one academic director in their board and matched companies with no academic director. We match firms across industry, performance, size, market-to-book, beta, return volatility, board size, and board independence. *, **, and *** denote statistical significance of the difference in the market reaction between both groups of companies at the 10%, 5% and 1% level, respectively (one-sided t-test).
Panel D reports the mean cumulated abnormal returns over the three days surrounding to the promulgation of the Regulation 11 for Chinese listed companies with at least one academic director in their board divided in two groups: companies with at least one academic director of a high administrative rank (1–8) and companies without an academic director of a high administrative rank. *, **, and *** denote statistical significance of the difference in the market reaction between both groups of companies at the 10%, 5% and 1% level, respectively (one-sided t-test).

monitored by the Ministry of Education, cannot hold a directorship in a Chinese public company, it triggered a sizeable number of resignations of independent academic directors, who are not holding any meaningful administrative position (ranks 9–18) or no administrative position at all.[13] It shows that the text is open to interpretation and that, *ex ante,* it was unclear which academics must resign and when. The massive resignations of independent academic directors without administrative positions suggests that the text has been interpreted in a much stricter way by many companies, possibly anticipating its revision and the inclusion of a broader set of academics. For these reasons, at the time of the issuance of the Regulation 11, the market arguably cannot fully price the cost of the loss of academic directors. Hence, there is room for a market reaction at the time of the actual resignations of academics that we can use to draw inferences on the value of academics. In the next section, we examine the market reaction to the actual academic director

[13] We do not document a significant difference in the market reaction to the resignations of academics with and without administrative positions, which alleviates the concern that our results could be mostly driven by official-like academic resignations.

Table 4
Market reaction to academic director resignations.

Panel A: Market reaction to director resignations

Independent director resignations	Nb. resignations	Mean cumulated Raw returns [−1,1]	Mean cumulated Abnormal returns [−1,1]
All Directors	2617	0.22**	−0.11
Non-Academics	1587	0.43***	0.04
All Academics	1030	−0.10	−0.34***
Academics Pre R11	511	0.44**	−0.13
Academics Post R11	324	−0.64**	−0.77***
Academics Post R11 – Explicit	234	−0.87***	−0.81***

Panel B: Alternative event windows

Resignation event window	Mean CAR to Academic Director Resignations Induced by the Regulation 11
[−2,2]	−1.11***
[−1,1]	−0.77***
[2,1]	−0.42**
[2,0]	−0.67***
[−1,0]	−0.45**
[−1,2]	−0.41**
[0,1]	−0.53***
[0,2]	−0.64**

Panel C: Unique directors

Academic Resignations	Nb. Resignations	Mean Cumulated Raw Returns [−1,1]	Mean Cumulated Abnormal Returns [−1,1]
Academics Post R11	221	−0.78**	−0.59**
Academics Post R11 – Explicit	154	−1.03***	−0.68**

Panel D: Unique firms

Independent director resignations	Nb. Resignations	Mean Cumulated Raw Returns [−1,1]	Mean Cumulated Abnormal Returns [−1,1]
Academics Post R11	257	−0.71**	−0.96***
Academics Post R11 – Explicit	183	−0.94***	−1.08***

Panel E: Market reaction to academic director resignations relative to matched control non-academic director resignations

	Control Directors		Academic Directors		Difference
Market reaction to director resignations	Mean	Obs.	Mean	Obs.	
Post R11- Cumulated Raw Returns [−1,1]	1.03	78	−1.88	78	−2.91***
Post R11- Cumulated Abnormal Returns [−1,1]	−0.34	78	−1.02	78	−0.68**

Panel F: Market reaction to academic director resignations

	Control Firms		Firms		Difference
Market reaction to director resignations	Mean	Obs.	Mean	Obs.	
Post R11- Cumulated Raw Returns [−1,1]	0.23	88	−1.44	88	−1.67**
Post R11- Cumulated Abnormal Returns [−1,1]	0.10	88	−0.87	88	−0.77*

Panel A reports the market reaction to the resignations of independent directors over the period 2013–2017 for public Chinese companies. The market reaction to a director resignation is defined as the cumulated abnormal return over the three days surrounding the resignation event, whereby an abnormal daily return is a daily return in excess of the prediction of a Carhart's four-factor model. *, **, and *** denote statistical significance of the market reaction at the 10%, 5% and 1% level, respectively (one-sided *t*-test).
Panel B reports the market reaction to the resignations of academic independent directors over the period 2013–2017 for Chinese public companies for alternative event windows. *, **, and *** denote statistical significance of the market reaction at the 10%, 5% and 1% level, respectively (one-sided t-test).

Panel C reports the market reaction to the resignations of academic independent directors induced by the Regulation 11. We consider only the first resignation of each of our sample director. *, **, and *** denote statistical significance of the market reaction at the 10%, 5% and 1% level, respectively (one-sided t-test).
Panel D reports the market reaction to the resignations of academic independent directors induced by the Regulation 11. We consider only the first resignation experienced by each of our sample firms. *, **, and *** denote statistical significance of the market reaction at the 10%, 5% and 1% level, respectively (one-sided t-test).
Panel E reports the difference in the average market reaction to the resignations of academic directors and matched control non-academic directors. Control and academic directors resign in the same month, are comparable in terms of tenure, age, gender, and belong to firms operating in the same industry in the year before their resignations. Appendix B reports descriptive statistics on director characteristics for academic and control directors before and after the matching. Detailed definitions of the variables are provided in Appendix A. *, **, and *** denote statistical significance of the mean equality test at the 10%, 5% and 1% level, respectively (one-sided).
Panel F reports the difference in the average market reaction between the resignations of academics for firms with at least one academic directors prior to the issuance of the Regulation 11 and the resignations of non-academics for matched firms without academic directors prior to the issuance of the Regulation 11. Firms are matched on industry, performance, size, market-to-book, intangible investment, beta, board size, CEO duality and board independence. Detailed definitions of the variables are provided in Appendix A. *, **, and *** denote statistical significance of the mean equality test at the 10%, 5% and 1% level, respectively (one-sided).

resignations induced by the Regulation 11.

4.3. Market reaction to academic director resignations induced by Regulation 11

To study the market reaction to director resignations, we consider the cumulated abnormal returns over the three days surrounding the resignation events. Panel A of Table 4 reports the average market reaction for the whole sample of independent director resignations, academic resignations, non-academic resignations, and the group of plausibly exogenous academic resignations. It shows that the average market reaction is not significantly negative for the whole sample of resignations and for the sample of non-academic resignations. However, academic resignations elicit, on average, a significantly negative market reaction (−0.34%) over the period 2013–2017. Importantly, in the pre-Regulation 11 period, the market reaction to academic resignation is statistically not different from zero (−0.13%). However, these resignations cannot be considered as exogenous to the performance and valuation of the firms whose directors are quitting (e.g., Hermalin and Weisbach, 2003; Raheja, 2005; Harris and Raviv, 2006; Wintoki et al., 2012). Thus, it limits the inferences we can draw for the value of academics. The market reaction is markedly different post Regulation 11. We document a significant and negative market reactions to plausibly exogenous academic resignation induced by the Regulation 11 (−0.77%). This market reaction is twice the size of the one we document for the whole sample of academic resignations. This first finding is consistent with a positive valuation by the market of the role of academic directors in the boardroom. For robustness purposes, we also compute the average market reaction to academic resignations induced by the Regulation 11 for which the reason mentioned for the resignation is explicitly the Regulation 11(Rule18). We document a market reaction of a similar magnitude (−0.81%).

In Panel B of Table 3, we show that our finding is robust to the use of alternative resignation event windows to compute the market reaction to academic director resignations induced by the Regulation 11. In Panel C of Table 3, we report the average market reaction to academic director resignations induced by the Regulation 11 for a subsample of unique directors. That is, we only consider the first resignation per director in the six months following the issuance of the Regulation 11. We do so to ensure that the market reaction we document is overly driven by specific directors. We document an average market reaction of a slightly lower magnitude that is however still significantly negative and sizeable (−0.59%). In Panel D of Table 4, we report the average market reaction to academic director resignations induced by the Regulation 11 for a subsample of unique firms. That is, we only consider the first resignation per firm in the six months following the issuance of the Regulation 11. We do so to control for the influence of firm-specific market responses. We document an average market reaction that is slightly stronger than in our baseline test (−0.96%). These robustness checks give us confidence in asserting that director resignations induced by the Regulation 11 are associated with important negative market reactions.

We next compare the market reaction to academic director resignations induced by the Regulation 11 to the market reaction to contemporaneous resignations of non-academic directors with comparable years of experience, gender, as well as age, and belonging to firms operating in the same industry. Our examination of the descriptive statistics indicates that academics are significantly younger than non-academics. Moreover, prior literature documents variations in board member contribution to firm performance based on gender and tenure (e.g., Vafeas, 2003; Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Liu et al., 2014; Huang and Hilary, 2018). We want to ensure that our findings cannot be explained away by these specific observable director attributes. We follow a similar matching procedure as the one described in section 4.3.[14] We find a match for 78 of the plausibly exogenous academic director resignations induced by the Regulation 11. Panel E of Table 4 reports the difference in the market reaction between both samples of director resignations. Results indicate that the market reaction to director academic resignations is still much more negative. The difference is statistically significant and sizeable (−0.68%).

While we control for director characteristics when we use the above matching approach, we do not explicitly control for other

[14] As reported in Appendix B, the sample of academic director resignations and the matched sample of non-academic director resignations are comparable in terms of director tenure, gender, and age.

board and firm characteristics that could influence the market reaction. An important dimension along which firms may differ is on how much they benefit from the specific skills of academic directors (as we further investigate in section 4.5). Based on prior findings, we expect the market reaction to academic director resignations for companies benefiting from their skills (shown by the fact that these firms hired them in the first place) to differ markedly to the one for resignations of non-academics in firms that are similar on aspect that can explain the presence of academics (i.e., which should have considered selecting an academic in their board) but do not benefit from their specific skills of academics (shown by the fact they did not hire academics). To ensure that those firms are comparable on observable firm and board characteristics that can explain the presence of academic directors, we match them on industry, performance, size, market-to-book, intangible investment, beta, board size, CEO duality and board independence following a procedure similar to the one discussed in section 4.3. Results are reported in Panel F of Table 4. They indicate that market reaction is much more pronounced for the resignations of academics than for resignations of non-academic in matched firms sharing similar characteristics.

Overall, the findings reported in this section support a negative market reaction to the resignations of academic directors induced by the issuance of the Regulation 11, which is consistent with a positive valuation of the role of academic directors in the boardroom. Note that we do not find a significant market reaction to academic resignations on average pre-Regulation 11. Because these resignations cannot be deemed exogenous to companies' performance and policies, they are not the focus of our study.[15] Yet, in the next section, we investigate a possible explanation for this discrepancy.

4.4. Academic director replacements

A likely explanation for the difference in market reaction to academic resignations before and after the issuance of the Regulation 11, beyond endogeneity concerns, is that whereas pre-regulation companies needing the specific set of skills of academics could replace resigning academics by other academics (explaining the absence of market reaction to the resignations), this is much less possible post Regulation 11. In this section, we examine this issue empirically. We collect the profiles of the directors joining companies' boards after the resignations of academic directors and use that information to identify instances where academic directors are replaced by other academic directors and instances where this is not the case. We acknowledge that this is not a straightforward exercise for several reasons. First, companies may not have to replace resigning directors. Second, the time period between the resignation of one director and the arrival of a new director varies across companies, with possibly other resignations taking place in-between, introducing some noise and unclarity in the replacement process.

As a rule of thumb, we consider the first director joining the company at least one year after the academic director resignation to be the replacing director. We use a delay of one year after the resignation of a director to attenuate the noise caused by director arrivals possibly triggered by former resignations. Because the regulatory shock was unexpected and academics represent an important portion of the pool of directors in China,[16] it arguably took time for companies to find suitable replacement(s), if any. We can identify a replacing director for 41% of our sample director resignations. For most of the remaining resignations, the director is not replaced. For the specific pool of academic director resignations, we find a similar percentage of replacements, i.e. 37%.

We next create a dummy variable (*Replaced by academic*) that indicates whether a resigning academic director is replaced by another academic director and examine the replacement rate of academics by academics *pre* and *post* Regulation 11. Results are reported in Table 5. We observe an important change before and after the introduction of the Regulation 11. While, *pre* Regulation 11, 22% of the resigning academic directors are replaced by other academic directors, *post* Regulation 11, this percentage drops to 8%. This difference is very significative. It does not drop to 0% arguably because of the different ways the text of the Regulation can be interpreted by companies and because of the different companies' anticipation regarding how the scope of the regulation is going to evolve. Looking at academic directors with high administrative ranks (1–8), that is the ones originally targeted by the Regulation 11, we observe that the percentage of director replacement by academics drops from 7% pre regulation to 1% post-regulation (the difference is again highly significant). The few companies that have hired an academic director with a high rank to replace another one may have tried to game the regulation because they were confronted to a limited supply of replacing independent directors.

Overall, these findings support the existence of an important change in the profiles of the directors replacing the resigning academic directors before and after the issuance of the Regulation 11. It is a potential explanation for the shift in market reaction between the pre and post Regulation 11 period (from not being significant to significantly negative). While pre regulation the skills and abilities of academics can be replaced, it becomes much less the case post regulation.

4.5. Heterogeneity in the market reaction to academic director resignations

Next, we study variations in the market response to academic director resignations induced by the Regulation 11 based on differences in director, board, and firm characteristics to identify settings where the monitoring, advising, or networking contributions of academic directors should be particularly valuable to investors. We use prior literature to guide our choice of potential heterogeneity sources (e.g., Dewally and Peck, 2010; Adams and Ferreira, 2009; Anderson et al., 2011; White et al., 2014; e.g., Francis et al., 2015). Table 6 reports descriptive statistics on the market reaction to academic resignations for different partitioning of our sample according to director, board, or firm attributes, as well as the results of two-sample *t*-tests of mean equality.

[15] Please refer to Panel A of Table 4.

[16] During the period between 2013 and 2017, around 42.8% of independent directors per firm were academic on average.

Table 5
Academic director replacements.

Panel A: Replacement rate

Academic Director Resignations	Pre Regulation 11		Post Regulation 11		
	Mean	Obs.	Mean	Obs.	Difference
Replaced by Academic	0.22	511	0.08	519	−0.14***
Replaced by Academic of High Admin. Rank	0.07	511	0.01	519	−0.06***

Panel B: Market reaction to academic director resignations conditional on replacement by another academics

	Replaced by non- academic director		Replaced by academic directors		
	Mean CAR [−1,1]	Obs.	Mean CAR [−1,1]	Obs.	Difference
Market reaction	−1.63	55	−0.60	37	−1.03*

Panel A reports the replacement of rate of resigning academic directors by other academic directors before and after the issuance of the Regulation 11 in row 1. In row 2, it reports the replacement rate of resigning academic directors by other academic directors occupying administrative positions of high ranks (1–8) before and after the issuance of the Regulation 11. Detailed definitions of the variables are provided in Appendix A. *, **, and *** denote statistical significance of the mean equality test at the 10%, 5% and 1% level, respectively (one-sided).
Panel B reports the average market reaction to academic director resignations induced by the Regulation 11 for resignations where the replacement is another academic and resignations where the replacement is not another academic director. Detailed definitions of the variables are provided in Appendix A. *, **, and *** denote statistical significance of the mean equality test at the 10%, 5% and 1% level, respectively (one-sided).

Table 6
Cross-sectional heterogeneity in the market response to academic director resignations.

	No		Yes		
	Mean CAR [−1,1]	Obs.	Mean CAR [−1,1]	Obs.	Difference
Director characteristics					
Pure Academic	−0.45	210	−1.38	114	−0.93*
Director Age > Median	−0.84	188	−0.69	140	0.15
Director Male Dummy	−0.67	40	−0.79	284	−0.12
Director Tenure > Median	−0.99	161	−0.60	158	0.39
Hold Administrative Position	−0.70	85	−0.80	239	−0.10
Hold High Administrative Position	−0.66	217	−2.21	22	−1.55*
Hold High University Administrative Position	−0.83	144	−0.73	180	0.11
Financial Connections	−0.79	314	−0.26	10	0.53
Business Degree	−1.05	64	−0.86	154	0.18
Law Degree	−0.89	184	−1.09	34	−0.20
Engineering Degree	−0.90	204	−1.16	14	−0.26
PhD Degree	−0.91	47	−0.87	259	0.05
Foreign University	−0.26	164	−2.46	16	−2.20**
Chinese Ranking (XDF)	−0.09	79	−0.50	79	−0.41
Ranked on ARWU	−0.97	201	−0.26	123	0.51
Board characteristics					
Board Size > Median	−0.26	189	−1.17	125	−0.91*
Pct. Independent Directors > Median	−1.04	161	−0.21	154	0.83*
CEO Duality Dummy	−0.30	226	−1.18	85	−0.88*
Firm characteristics					
Market Value > Median	−0.45	148	−0.51	147	−0.06
Growth Opportunities > Median	−0.26	162	−1.21	161	−0.96*
Free Cash Flow > Median	0.35	146	−1.22	145	−0.87*
Intangible Investment > Median	−0.84	162	−0.70	162	0.14
Politically-Connected CEO	−0.76	286	−0.88	38	−0.12
State-Owned Firm	−0.78	200	−0.69	124	0.08

This table reports mean differences in the market reaction to academic director resignations induced by the Regulation 11 across several sample splits based on director and firm attributes. Each row corresponds to a different partitioning. *, **, and *** denote statistical significance of the two-sample t-test of mean equality at the 10%, 5% and 1% level, respectively (one-sided *t*-test).

First, we investigate the potential monitoring contribution of academic directors. Among the pool of outside directors, academics may stand out for several reasons. Academics are trained to be independent and critical thinkers with their own opinions and judgements (Jiang and Murphy, 2007). Because they are less likely to be influenced by others, they could be better monitors of management decisions. In our sample of resigning academics directors, we expect academics to be less likely to be exposed to conflict of interests, and hence to be better monitors (White et al., 2014). Arguably, within the group of academics, *pure academics*, in the sense that their only profession is academic and their only employer is a university, should be even less likely to be exposed to conflict of interests. As reported in Table 6, the average market reaction to *pure academic* resignations is significantly stronger than for the rest of the academics (−1.38% versus −0.45%), which is consistent with the market valuing a monitoring contribution of some academic directors.

In addition, we expect the market to value more the monitoring role of academics in settings where it is much needed, that is when CEO power is stronger, boardroom coordination is harder, or the monitoring of the remaining directors is weaker (e.g., Jensen, 1993; Cotter et al., 1997; Eisenberg et al., 1998; Cheng, 2008; Nguyen and Nielsen, 2010; Baldenius et al., 2014). In line with our expectation, we document a significantly stronger market reaction to academic resignations for firms with above-median board size (−1.17% vs. -0.26%), below-median proportion of intendent director (−1.04% vs −0.21%), and for firms where the CEO is also the chairman of the board (−1.18% vs −0.30%).

We also document a stronger market reaction for firms with high growth opportunities and above-median free cash flow, which can be interpreted as the market discounting more heavily the loss of academic directors for firms undertaking new projects or investments and for firms where the CEO has relatively more cash to use at her discretion, which in both cases call for a more efficient monitoring (Jensen, 1986).

The body of evidence we document indicates that the negative market reaction to academic resignations is stronger in settings where their monitoring contribution should be more valuable, which supports a positive market valuation of the monitoring contribution of academic directors.

Second, we examine the potential advising contribution of academic directors. As independent experts in their area of expertise, academic directors may facilitate board access to external knowledge and bring new perspectives into the boardroom (Forbes and Milliken, 1999; Audretsch and Lehmann, 2006). As a result, they could be valuable advisors. If this is the case, we expect to find a stronger market reaction to academic resignations from larger and more complex firms or for firms intensive in R&D, because for these firms outside expertise should be more valuable (e.g., Boone et al., 2007; Coles et al., 2008; Linck et al., 2008; White et al., 2014). As reported in Table 6, however, we do not find supportive evidence. The market reaction for above- and below-median firms in terms of intangible investment and market capitalization is not significantly different. Furthermore, contrary to prior literature (White et al., 2014), we do not find a stronger market reaction to academic resignations for academics holding business, law, or engineering degrees, neither do we for academics holding PhD degrees.

While these findings can be interpreted as the market not valuing the advising contribution of academics to the boardroom, they may also point to a source of valuable expertise in the Chinese context that differs from the U.S. context. In that direction, we find a markedly stronger market reaction to academic resignations for academics who graduated from foreign universities. This is consistent with an advising contribution of academics based on their knowledge acquired through a foreign academic experience. Prior literature shows that directors with foreign experience transmit knowledge about overseas management practices and corporate governance to firms, which in turn influences their performance and investments (e.g., Masulis et al., 2012; Giannetti et al., 2015). The evidence we provide on the market reaction to academic resignations in settings where their advising contribution should be more valuable is thus mixed.

Third, we study the potential networking contribution of academic directors. Academics, as other independent directors, bring their network and social connections to the boardroom, which may facilitate the recruitment of qualified directors as well as talented graduates, and give access to university resources (e.g., Lynall et al., 2003; Trautman, 2012; Chahine and Goergen, 2013). In particular, official-like academics are likely to contribute more to firm value through their political connections which can grant firms some advantages such as preferential lending, government bailout, legal protection, or government contract (e.g., Faccio, 2006; Li et al., 2008; Goldman et al., 2009; Wu et al., 2012; Goldman et al., 2013; Cull et al., 2015; Wang, 2015; Fan, 2016). As reported in Table 6, we do not document a significant difference in the mean market reaction to resignations of academics with or without an administrative position. In both cases the market reaction is around −0.75%, which alleviates the concern that official-like academic resignations may drive our results. Yet, within the group of academics with administrative positions, we find a much stronger market reaction to the resignations of academics occupying top administrative positions such as national and provincial leadership ones. This is consistent with a contribution to firm value through the political connections attached to high administrative positions.

To further examine the potential networking contribution of resigning academics, we partition the academic director resignations induced by the Regulation 11 according to whether the company's CEO is already well-connected (identified by the CEO administrative rank) and whether the company is state-owned. Arguably companies that are not already well politically connected through their CEO or shareholders would suffer relatively more from losing political connections. Yet, we do not observe a significantly stronger market reaction to academic resignations for firms that do not have well-connected CEOs or are not state-owned, which is inconsistent with a contribution to firm value of academics through political connections.[17]

[17] Another way academic director may have a networking contribution is by facilitating access to financing by sitting on boards of financial institutions. However, in our restricted sample of academic resignations induced by the Regulation 11, we only have 10 instances where this is the case, which limits our ability to draw inferences.

When we consider the group of academic directors occupying top administrative university positions (university president to faculty deputy-dean), we do not find a stronger market reaction relative to the other academic directors. This finding suggests that the market does not value the loss of the academic network that could facilitate hiring of talented graduates or accessing university resources (e.g., Lynall et al., 2003).

Overall, the market reaction to academic resignations we document in settings where their networking contribution should be more valuable is mixed.

4.6. Long-term effect of academic director resignations on firm performance

So far, we have documented a negative market reaction to the issuance of the Regulation 11 and to the induced academics resignations. We have also shown that the market reaction is even more negative in settings where the monitoring, advising, and networking contributions of academics should be more valuable. These results are consistent with a positive market valuation of the influence of academic directors on firm value. Consistently, we expect to observe tangible effects of academic director resignations on firm performance in the years following the resignations.

To investigate this issue empirically, we employ a difference-in-differences regression setting, where we use return on asset (ROA) as our proxy for firm performance (e.g., Frijns et al., 2016). We examine the effect of the Regulation 11 on the performance of companies with at least one academic director in their board prior to the issuance of the Regulation 11 (treated group) relative to the performance of companies with no academic board director in their board prior to the issuance of the Regulation 11 (control group). More specifically, we use the following model:

$$\begin{aligned}\Delta Adjusted\ ROA_{it} &= Post\ Regulation\ 11_t + Treated_i + Post\ Regulation\ 11_t\ X\ Treated_i + \Delta Adjusted\ ROA_{it-1} + Loss\ Dummy_{it-1} + \Delta Size_{it} + \Delta \\ &\quad Market\ to\ Book_{it} + \Delta Leverage_{it} + \Delta\ Beta_{it} + \Delta Sales\ Growth_{it} + \Delta Tangibility_{it} + \Delta R\&D \\ &\quad Expenditures_{it} + Year\ Fixed\ Effects + \varepsilon_{it} \end{aligned} \quad (1)$$

Where we explain changes in industry-median-adjusted ROA by a set of standard control variables (Freeman et al., 1982) and an interaction term capturing the effect of the regulatory change on treated companies. *Treated* is a dummy variable that takes the value one if a company has at least one academic board member prior to the introduction of the Regulation 11 (treated) and equals to zero is this not the case (control). *Post Regulation 11* is a dummy variable that takes the value one in the two years following the introduction of the Regulation 11 (2016 and 2017) and 0 in the two years preceding its introduction (2013 and 2014). The estimate of the coefficient on *Treated X Post Regulation 11* gives the average change in performance for firms affected by the regulation relative to firms that are not in the two years following the introduction of the Regulation 11. The rest of the control variables are defined in Appendix A.

To estimate model (1), we perform an OLS estimation and use standard errors robust to heteroskedasticity and clustered by firm. The results of the accounting performance regression are reported in Table 7, Panel A. They indicate that companies affected by the regulatory change experience a decrease of their return on asset relative to unaffected companies of about −0.50% per year on average, that is −1.00% in total. This finding is consistent with a detrimental effect of the Regulation 11 on firm performance due to the resignation of valuable directors. When we expand our core specification by adding board level controls such as board size, CEO duality and board independence, our results remain qualitatively the same.

4.7. Long-term effect of academic director resignations on firm value

We complement this analysis by examining the long-term returns. As argued by Edmans (2011), long-term returns suffer fewer reverse causality issues than profits and are more directly linked to shareholder value, capturing all the channels through which losing an academic director may harm shareholders value. Although we document a negative market response to academic director resignations at the time of the issuance of the Regulation 11 and to the actual resignations, it does not preclude that the market, in the short-term, fails to fully incorporate the impact of these resignations on firm value. As for other intangibles, we suspect that a decrease in board monitoring, advising, or networking ability takes time to materialize in tangible outcomes that push the market to revise its expectations.

We built our portfolio as follows. We create a portfolio that is long on treated firms (firms that have at least one academic director before the issuance of the Regulation 11) and short on control firms (firms that do not have academic directors before the issuance of the Regulation 11). We then give the market ample opportunity to react to the resignations by starting to accrue portfolio returns at the end of the six-month period following the issuance of the Regulation 11. We do so to ensure that the long-term return of the portfolio is not contaminated by the short-term market reactions we document. We then compute the value weighted returns of the portfolio for each month over the [+6 months, + 24 months] period relative to the issuance of the Regulation 11, that is from May 2016 to December 2017, over 18 months.

Panel B of Table 7 shows the portfolio's raw average long-term return and its average performance in excess of the one predicted by standard market models. To compute the portfolio alpha on the CAPM (Carhart four-factor) model, we run OLS regressions of the portfolio monthly returns on the market factor (market factor plus the SMB, HML and MOM factors). Standard errors are calculated using Newey and West (1987), which allows for the residuals to be heteroskedastic and serially correlated. We document a significant

Table 7
Long-term effect of academic director resignations on firm value.

Panel A: Firm profitability

ΔAdjusted ROA (%)	(1)	(2)
Post Regulation 11	−0.508	−0.492
	(0.378)	(0.381)
Treated	−0.137	−0.149
	(0.177)	(0.177)
Post Regulation 11 X Treated	−0.563**	−0.574**
	(0.264)	(0.265)
L. Δ Adjusted ROA	−0.303***	−0.303***
	(0.036)	(0.036)
L. Loss Dummy	4.824***	4.813***
	(0.418)	(0.418)
Δ Beta	−0.666	−0.677*
	(0.409)	(0.409)
Δ Size	0.784**	0.784*
	(0.399)	(0.400)
Δ Market to Book	−0.114***	−0.112***
	(0.0426)	(0.0425)
Δ Leverage	−7.314***	−7.330***
	(1.380)	(1.374)
Δ Sales Growth	0.457**	0.447**
	(0.204)	(0.204)
Δ Tangibility	−7.488***	−7.478***
	(1.851)	(1.844)
Δ R&D Expenditure	19.87	19.96
	(16.34)	(16.27)
Δ Board Size		0.368
		(0.361)
Δ Board Independence		0.876
		(0.951)
CEO Duality		−0.0420
		(0.149)
Observations	3605	3605
Year Fixed Effects	Yes	Yes
Firm Cluster	Yes	Yes
R-squared	0.317	0.340

Panel B: Long-term returns analysis

	(1) Mean raw monthly return	(2) Mean monthly return in excess of the market return	(3) Portfolio alpha CAPM Model	(4) Portfolio alpha Carhart Four-Factor Model
Average Portfolio Return [+6 months, +24 months] (%)	0.33***	−0.84***	−0.32***	−0.23**

Panel A reports the results of a difference-in-differences regression of model (1). We regress the change in return on asset on the interaction term between *Treated*, which takes the value 1 for firms with at least one academic director in their board prior to the issuance of the Regulation 11 and 0 for firms without academic directors in their boards prior to the issuance of the Regulation 11, and *Post*, which takes the value 1 in the two years following the regulatory change and 0 in the two years preceding it, plus control variables. Detailed definitions of the variables are provided in Appendix A. We do not report constant terms. Standard errors are robust to heteroskedasticity and clustered by firm. They are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.
Panel B reports the average long-term monthly returns of a portfolio long on firms with at least one academic director in their board prior to Regulation 11 and short on firms with no academic directors in their board prior to Regulation 11. Returns are weighted by the market value of the stocks at the time of the portfolio formation. We examine the portfolio performance over the [+6 months, +24 months] window. Column 1 reports the average raw monthly return. Column 2 reports the average monthly return in excess of the market return. Column 3 reports the average monthly return that is not explained away by the CAPM model (alpha). Column 4 reports the average monthly return that is not explained away by Cahart's four-factor model (alpha). *, **, and *** denote statistical significance of the mean long-term return at the 10%, 5% and 1% level, respectively (one-sided t-test).

portfolio monthly alpha of −0.32% (−0.23%) in excess of the CAPM model (Carhart four-factor model). As discussed by (Edmans, 2011), these results can be interpreted both as an evidence of the contribution of academic directors to firm value and as an evidence of the market mispricing their contribution in the short-term.

5. Conclusions

It is an open question whether academics add value to the boardroom. A key empirical challenge to address this question is to find a setting in which academic resignations (appointments) are plausibly exogenous to the firms under scrutiny. Otherwise, the market reaction to resignations (appointments) is unlikely to be informative about the market perception of the value of academic directors. In this paper, we utilize academic independent director resignations induced by the introduction of the Regulation 11, which prohibits academics from holding positions in Chinese public companies, to examine their contribution to firm value.

Consistent with a positive contribution of academic directors to firm value, we document a negative market reaction to the issuance of the Regulation 11 and to the academic director resignations. We next use the heterogeneity in the market response to academic director resignations to study what the market values in academic directors. We find supportive evidence of a monitoring contribution and mixed evidence of advising and networking contributions (depending on the firms and academics attributes).

Finally, we document some evidence supportive of material long-term consequences of academic resignations on firm profitability, which supports a positive value contribution of academic directors. We also show that although the market reacts negatively to academic resignations in the short-term, it does not seem to fully price the negative impact it may have on firm value at the time of the resignation. We document significant lower long-term returns for firms affected by the regulatory change relative to firms unaffected by it.

Our paper adds to the literature on board heterogeneity by showing that academics represent valuable independent directors. It complements a growing body of research on corporate governance in China and shows a negative side-effect of the structuring of boards of public companies in China mostly through regulation.

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Appendix A. Variable definitions

Variable	Definition	Source
Market Reaction		
Cumulated Raw Returns [−1,1]	Cumulated returns minus risk-free rate over the three days surrounding the event.	DataStream
CAR[−1,1]	Cumulated returns minus risk-free rate in excess of the Carhart's four-factor model prediction.	
Firm Variables		
Size	Natural logarithm of the market capitalization.	
Cash	Cash and equivalent divided by total assets.	DataStream
Leverage	Short-term and long-term liabilities divided by total assets.	
Market-to-book	Market value of equity divided by book value of equity.	
Profitability	Net income divided by total assets.	
Growth Opportunities	Capital expenditures divided by sales.	
Intangible Investment	R&D plus SG&A spending scaled by total assets.	
Free Cash Flow	Net operating profit after taxes minus net investment in operating capital, scaled by total assets.	
Stock Volatility	Standard deviation of stock returns over last 36 months.	
Stock Beta	CAPM Beta estimated by regressing the excess stock returns on excess market returns over the last 36 months, whereby we use the CSI 300 (Chinese Securities Index 300) to proxy for the market return of China A-share stocks and we use China 3-month deposit rate as risk-free rate.	
Tangibility	Total assets minus intangible assets and liabilities, then divided by total assets	
Sale Growth	Change of sales revenue from last year to this year divided by sales last year	
R&D Expenditures	R&D expenditures scaled by total assets. We set its value to 0 if missing and SG&A spending are not missing.	
Loss Dummy	Dummy variable that takes the value one if net income is negative and 0 otherwise.	
Board Variables		
Board Size	Number of directors of the board.	Annual reports/ Company's website
CEO Duality	Dummy variable that takes the value one if the CEO and the Chair are the same person and zero otherwise.	
Pct. Independent Directors	Percentage of independent directors sitting on the board.	

Director Variables		
Academic	Dummy variable that takes the value one if the director has an academic profession. Academic professions include lecturer, senior lecturer, associate professor, and professor.	Wind Database
Pure Academic	Dummy variable that takes the value one if the director has an academic profession which is his/her only known profession and if his/her only known employer is a university.	
Administrative Position Rank	Rank of the highest administrative position held by the director. Refer to Appendix C for further information.	
Administrative Position Dummy	Whether the director hold an administrative position. Refer to Appendix C for further information.	
Director Age	The director's age at the time he/she resigned, in years.	
Director Male	Dummy variable equal to 1 if the director is a male, and 0 otherwise.	
Director Tenure	Number of days since the nomination of director.	
Degree	Highest academic degree held by the director. 5 stands for a Doctoral degree, 4 stands for a Master degree, 3 stands for a Bachelor degree, 2 stands for a Junior college diploma, 1 stands for a technical secondary school diploma.	
PhD Degree	Dummy variable that equals 1 if the director holds a PhD degree, and 0 otherwise.	
Business Degree	Dummy variable that equals 1 if the director majored in business, and 0 otherwise.	
Law Degree	Dummy variable that equals 1 if the director majored in law, and 0 otherwise.	
Engineering Degree	Dummy variable that equals 1 if the director majored in engineering, and 0 otherwise.	
Foreign University	Dummy variable that equals 1 if the director graduated from a foreign university.	
Chinese Ranking (XDF)	Ranking of the Chinese University employing the director according to XDF.cn. XDF is the leading provider of private education in China and publishes one of the most influential local ranking of the Chinese Universities.	XDF's Website
Ranked on ARWU	Whether the University employing the director is ranked on the *Academic Ranking of World Universities (Shanghai Ranking)*.	ARWU's Website
Financial Connections	Dummy variable which equals to one if a director is also sitting on the board of other companies in financial industries, otherwise zero.	Wind Database and China Securities Regulatory Commission's website
Politically-Connected CEO	Dummy variable which equals to one if a CEO occupies an administrative position of high rank (1–5).	Wind Database
State-Owned	Dummy variable which equals to one if a company's ultimate controlling owner is local/central government institutions, otherwise zero	Wind Database
Replaced	Dummy variable that indicate whether a resigning director has been replaced.	Wind Database
Replaced by Academic	Dummy variable that indicates, within the universe of directors for which we can find a replacement, those replaced by academics.	
Replaced by High-Rank Academic	Dummy variable that indicates, within the universe of directors for which we can find a replacement, those replaced by academics also occupying an important administrative position (rank 1–8).	

Appendix B. Differences in director characteristics for academic director resignations induced by the Regulation 11 and control non-academic director resignations before and after matching

Please refer to Table 4, Panel E, for further information.

Director Resignations Post Regulation 11	Obs.	Male	Age	Tenure (days)
Before Matching				
Non-Academics	167	0.84	50.95	1180
Academics	324	0.88	52.85	1103
After Matching				
Non-Academics	78	0.83	52.55	1254
Academics	78	0.81	53.55	1282

Appendix C. Administrative positions

This appendix reports the different administrative positions and associated ranks of our sample directors, as provided by the Wind database.

Rank	Administrative position
1	National leadership position
2	National deputy leadership position
3	Provincial leadership position
4	Deputy provincial leadership position
5	Bureau level leadership position/University president
6	Deputy bureau level leadership position/University vice-president
7	County level leadership positions/Faculty dean
8	Deputy county level leadership positions/Faculty deputy-dean
9	Township section-level leadership position/Head of Department

10	Deputy township section-level leadership positions/Deputy head of department
11	Bureau level position without leadership
12	Deputy bureau level position without leadership
13	County level positions without leadership
14	Deputy county level positions without leadership
15	Township section-level position without leadership
16	Deputy township section-level position without leadership
17	Senior clerk
18	Junior clerk

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