Shell Games: The Long-Term Performance of Chinese Reverse-Merger Firms

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ABSTRACT: We examine the financial health and performance of reverse mergers (RMs) that became active on U.S. stock markets between 2001 and 2010, particularly those from China (around 85 percent of all foreign RMs). As a group, RMs are early-stage companies that typically trade over the counter. However, Chinese RMs (CRMs) tend to be more mature and less speculative than either their U.S. counterparts or a group of exchange-industry-size-matched firms. As a group, CRMs outperformed their matched peers from inception through the end of 2013, even after including most of the firms accused of accounting fraud. CRMs that receive private investment in public equity (PIPE) financing from sophisticated investors perform particularly well. Overall, despite the negative publicity, we find little evidence that CRMs are inherently toxic investments. Our results shed light on the risk-performance trade-off for CRMs, as well as the delicate balance between credibility and access in well-functioning markets.

Keywords: *reverse mergers; listing requirements; Chinese firms; accounting fraud; cash flow life cycle; private investment in public equity (PIPE) financing.*

JEL Classifications: *G34; M41; N20.*

I. INTRODUCTION

Well-functioning markets require both credibility and access. On the one hand, security markets require sufficient regulation to establish credibility—to convey a sense of fairness, transparency, and trustworthiness to both investors and listing firms. On the other hand, these markets also need to provide adequate investor access: to multiple counterparties, sufficient liquidity, and an attractive set of securities. Laws aimed at increasing one dimension (e.g., market credibility through more stringent disclosure/reporting or listing requirements) can often lead to a reduction in another (e.g., the number of potentially attractive firms on the exchange).

This delicate balance between credibility and access is in sharp relief as regulators (and investors) in developed countries evaluate firms from emerging economies. On the one hand, companies from emerging markets often offer access to more attractive growth opportunities. On the other hand, these companies may operate in countries with much weaker governance structures and regulatory safeguards. A central challenge for both U.S. regulators and investors is how to judiciously assess the risks and rewards of such firms.

In this study, we provide empirical evidence on a particularly controversial case involving a subset of Chinese firms listed in the United States. Since the end of 2000, hundreds of Chinese companies have gone public on U.S. stock exchanges, most doing so through a "reverse merger" (RM).[1] This rapid growth in the number of Chinese RMs (CRMs) listed on U.S. markets drew considerable media attention recently when a number of them were accused of accounting fraud. In June 2011, the Securities and Exchange Commission (SEC) issued a blanket warning to investors against investing in firms listing via RMs. In the same year, over 20 U.S.-listed CRMs were either delisted or halted from trading, while a number of others had auditor changes or were the target of high-profile short sellers.[2]

The recent waves of negative publicity have not only tarnished the reputation of CRMs, but also directly impacted the pricing of other Chinese companies listed in the United States, including many that have not been accused of any wrongdoing (Darrough, Huang, and Zhao 2013).[3] Since 2011, U.S. regulatory actions, along with the pervasively negative sentiment toward CRMs, have effectively frozen the flow of Chinese listings into U.S. markets. In fact, the direction of the overall flow had largely reversed, as a number of Chinese firms publicly listed in the U.S. have been taken

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[1] A reverse merger, also referred to as a "reverse takeover" or a "backdoor listing," is a process whereby a private company is merged into a public company and the private company's management team takes over the combined publicly traded company. At the time of the merger, the public company is typically a "shell" company (i.e., a non-operating entity that has gone through bankruptcy and is now dormant). The U.S. Public Company Accounting Oversight Board (PCAOB) reports that between 2007 and 2011, over 150 Chinese companies, worth $12.8 billion, entered U.S. markets through RMs (compared to only 50 Chinese firms that filed for IPOs over this time period).

[2] See Meagher (2011), McCoy and Chu (2011), and Atkins (2011) for examples of media reports on CRMs. High-profile research reports put out by short sellers include the J Capital Research (2011) report on China Green Agriculture, and the Muddy Waters Research (2011) report on Sino-Forest, a Toronto-listed CRM, and multiple reports by Citron Research (see: http://www.muddywatersresearch.com/company/tre/). These reports have triggered a backlash in China. In a September 5, 2012 editorial, China's official Xinhua news service complained such reports are a "malicious act" by U.S. firms seeking to "poison reputations of China start-ups for profit" (see: http://news.xinhuanet.com/english/china/2012-09/05/c_131830262.htm). In the same month, more than 60 Chinese business leaders set up a website decrying deliberate acts of "short and distort" by Citron Research against Chinese companies (see: http://www.citronresearch.com/archives/).

[3] In a landmark case settled recently (August 2, 2013), the SEC reversed an earlier NASDAQ decision to delist Clean Tech, a CRM that designs and manufactures steel towers for wind turbines. Although this decision exonerates Clean Tech, it might not be the end of the dispute. In December 2011, Clean Tech filed a civil lawsuit against NASDAQ for damages caused by the delisting (Yin 2013).

private through acquisitions.[4] Even as U.S. regulators review current listing requirements for foreign entrants entering the country via RMs, Chinese firms have been going home in record numbers.[5]

In this study, we examine a research question central to the current controversy: what is the long-term performance of Chinese reverse-merger firms? In other words, even taking into consideration the set of well-publicized accounting fraud cases, have CRMs as an asset class substantially underperformed matching firms already trading on the same U.S. exchanges? Surprisingly, despite the broadly negative publicity (some of which originates from short sellers), thus far, no systematic analysis has been conducted on the overall performance of CRMs.[6]

Our research question has a significant bearing on the bilateral relation between China and the U.S., which is so crucial to the global economy. Until the recent impasse, Chinese firms have dominated foreign-based RM activities in the United States.[7] On the one hand, appetite for Chinese equity is high, as many U.S. investors hope to participate in the high-growth Chinese economy; on the other hand, persistent worries remain that well-publicized corporate governance problems in China are being imported to U.S. markets through these "backdoor listings."[8] In short, both regulators and investors need more evidence on the risk and return trade-off posed by RMs and, in particular, RMs from China.

In this study, we conduct an in-depth analysis of the long-term performance of RM firms (and, in particular, CRMs), with a view toward informing both regulatory and investment decisions in the U.S. The main economic question we seek to answer is whether CRMs are as toxic an investment vehicle as recent media reports suggest, and whether their post-listing performance, as a group, is attributable to their country of origin. The accounting integrity and corporate governance problems with Chinese firms are well documented. However, there are a number of other economic factors that could portend favorable performance from the pool of CRMs listed in the U.S. We carefully explore this possibility.

Several factors suggest that at least some of the Chinese start-ups arriving in the U.S. via the RM route could represent draws from an attractive candidate pool. First, the rapid development of China's economy has given rise to many promising start-ups. Second, until recently, private equity and venture capital funds were relatively scarce in China, leaving many entrepreneurs in want of capital. Over the past decade, the number of firms in China that could potentially be eligible for

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[4] To our knowledge, only two new Chinese firms have publicly listed in the U.S. from July 2011 to the end of 2012. Over the same period, according to Mergermarket, 46 Chinese companies announced going-private plans from U.S. stock exchanges, with 25 announcements in 2012 alone. A number of these deals are already consummated. For example, in March 2012, Zhongpin (a NASDAQ-listed CRM) was acquired at $13.50 per share, representing a 58.5 percent premium over its end-of-2011 price. In January 2013, Fushi Copperweld, another NASDAQ-listed CRM, was taken private at $9.50 per share (a premium of 26.3 percent relative to its closing price at the end of 2011).

[5] An example of the increased regulation faced by RM firms is the new SEC "seasoning" requirement (passed on November 8, 2011) that calls for all RM firms to trade in the OTC market for at least one full year before uplisting in a higher exchange.

[6] While media reports often claim CRMs perform poorly, the evidence to date has been largely anecdotal. In those few instances where large-sample statistics are computed, CRMs have been compared to established U.S. stocks, or to newly listed Chinese IPOs, both of which are much larger and more liquid to begin with. For example, Alpert and Norton (2010) compare the first-three-year returns on 158 CRMs to the Halter Index (an index of U.S.-listed Chinese ADRs [American depositary receipts] dominated by names like Baidu.com and China Mobile), and to the Russell 2000 (an index of well-established U.S. small-cap stocks).

[7] Over our sample period (January 2001 to December 2010), about 85 percent of all foreign-based RMs in the U.S. were from China. The total market capitalization on the RM firms' first 10-K dates was $38.2 billion for the full sample, $19.2 billion for U.S. RMs, and $15.9 billion for CRMs.

[8] Recent studies that document the corporate governance and accounting problems in China include Jiang, Lee, and Yue (2010), Jian and Wong (2010), Piotroski and Wong (2012), and Piotroski and Zhang (2014).

IPOs (initial public offerings) has far outnumbered the actual firms allowed to IPO each year.[9] In addition, the IPO process in China involves bright-line profitability and firm size requirements that are much more stringent than those in the U.S.[10] As a result, promising high-growth firms that do not meet these conditions would need to seek listing elsewhere. In short, despite the negative publicity generated by highly salient anecdotes, the overall quality of CRMs as an investment vehicle is an open empirical question.

To address this issue, we use a carefully constructed (partially hand-collected) dataset of RMs that became active on U.S. stock markets between 2001 and 2010. Our analyses focus on two related issues. First, in general, how have RMs fared relative to a group of industry-date-size-matched control firms from the same exchange? Second, what is the incremental effect of the "China Factor"—i.e., how has the confluence of economic factors associated with CRMs incrementally impacted the quality of these particular offerings?

Our research design is motivated by a need to distinguish between: (1) problems that are common to all RMs, and (2) problems that plague CRMs in particular. This distinction is important because prior studies consistently find sharp differences between IPO firms and RM firms.[11] Although IPO and RM are sometimes portrayed as alternative ways for a private firm to go public, in fact, a majority of RM firms were never IPO-eligible and their owners/managers never had the luxury of this choice.[12] Whereas most IPOs begin their life in one of the National Market System (NMS) exchanges, including NYSE, AMEX, or NASDAQ, most RMs begin trading on the OTC Bulletin Board (OTCBB) or as Pink Sheet stocks. Therefore, IPO firms are a particularly poor benchmark by which to evaluate the aftermarket performance of RM firms.

Using a population of control firms that more closely mirror their *ex ante* risk attributes, we provide new evidence on the aftermarket performance of RMs. Specifically, we employ an algorithm that pairs each RM with a control firm matched on exchange (the listing venue), industry (48 industry classifications in Fama and French [1997]), date (of the RM's first 10-K filing), and size (the market capitalization).[13] We then compare various financial health and performance metrics for these two samples at the reporting date of the RM's initial 10-K filing, as well as at each of the next three anniversary dates. We evaluate RM performance using a host of measures, including market-based metrics (such as post-listing stock returns, survival rates, changes in bid-ask spread, upward/downward exchange mobility, and percentage of going-concern qualified audit

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[9] Using data collected by China's National Bureau of Statistics (NBS), Piotroski and Zhang (2014) assemble a sample of non-public Chinese firms that are *ex ante* qualified to engage in an IPO on China's stock exchanges. In China, all industrial companies with sales of more than RMB 5,000,000 are required to report their financial data to the NBS via a standardized set of financial forms. Their sample of "exchange eligible firms" consists of 28,152 firm-year observations over the period 2001 to 2008, where the underlying non-public industrial firm was financially eligible to engage in a Chinese IPO at the start of the calendar year. Of these observations, only 440 firms subsequently engaged in an IPO offering in one of China's two domestic stock exchanges.

[10] For example, companies seeking a listing on either the Shanghai or Shenzhen stock exchange (including Shenzhen's GEM market for small to medium-sized firms) must have a three-year minimum track record during which: (1) cumulative earnings exceed RMB 30,000,000 and are positive for all three years, and (2) either cumulative net operating cash flows must exceed RMB 50,000,000 or cumulative revenue must exceed RMB 300,000,000 for the past three years. There are other minimum threshold requirements related to total equity value and the proportion of intangible assets (see Zou 2013).

[11] See, for example, Brau, Francis, and Kohers (2003), Poulsen and Stegemoller (2008), and Brown, Ferguson, and Lam (2010). As a group, RM firms are much smaller, less profitable, face faster cash burn, have fewer financing options, are at an earlier stage in terms of development, and tend to be in more highly leveraged industries. In short, RMs are much more cash-strapped and speculative in nature than IPOs.

[12] RMs involving a special purpose acquisition company (SPAC) are an exception to this general rule. Although they are technically RMs, most SPACs are much more similar to self-registered IPOs (see, e.g., Feldman 2009).

[13] Because most RMs trade on OTCBB or Pink Sheet, information about their historical exchanges and stock returns is not available in the CRSP database. To ensure proper matching, we collect this information for both the RM sample and the eligible matching firms from their 10-K filings.

opinions), operating performance metrics (profitability, operating cash flow, business life cycle, and ability to raise private investment in public equity [PIPE] financing from sophisticated investors), and financial risk metrics (long-term leverage and short-term liquidity).

In evaluating the health and performance of RMs, we are particularly interested in isolating a "China Factor." We do so by comparing CRMs to: (1) a set of U.S. RMs listed over the same time period, (2) a set of publicly traded control firms matched on exchange-industry-date-size, and (3) the same set of U.S. RMs, after adjusting for the effects of exchange-industry-date-size using a difference-in-differences research design. To ensure that we include the effect of the alleged frauds, we trace the entire list of CRMs suspected of accounting fraud to our sample, and extend all our tests through to the end of 2013 (after the SEC issued its blanket warning against all RMs). We also update the listing status of the potential fraudulent CRMs in our sample to December 2013.[14]

Our results confirm prior findings that RMs tend to be small and illiquid stocks to begin with, that most begin their life on OTCBB or Pink Sheet, and that they are prone to default and/or delisting over time. However, after controlling for exchange, industry, size, and date, we find no evidence that RMs are more problematic than other publicly listed firms in terms of subsequent operating performance and stock returns. In fact, the RMs in our sample outperform their control firms over the three years after the RM's first 10-K filing in terms of survival rate, ability to move up in exchange tiers, and increases in market liquidity.

Interestingly, the better performance of the RMs is largely due to CRMs. At the beginning of their public life, CRMs have higher market capitalization, lower leverage, higher profitability, and more positive operating cash flows than U.S. RMs. Over the next three years, CRMs continue to fare better than either their U.S. counterparts or a group of exchange-industry-date-size-matched firms. The CRM advantage is multi-dimensional, and is evident in terms of profitability, current ratio, book leverage, operating cash flows, upward mobility in exchange tiers, percentage of firms with qualified audit opinions, survival rate, and market liquidity, as well as stock returns. Contrary to the popular media perception that CRMs are inherently toxic (e.g., Alpert and Norton 2010), we find no evidence that CRMs are systematically more problematic than similar firms already trading on the same exchange.

A key reason for this better performance appears to be the relative maturity of the CRMs. Using a cash flow-based measure of business life cycle (Dickinson 2011), we show that CRMs are typically more mature and further developed than either the U.S. RMs or the matching control firms. In general, the RMs from China are better capitalized, have more positive operating cash flows, and are more likely to be categorized as a Growth- or Mature-stage firm (versus an Introductory-stage firm). Over the next three years, CRMs are also much more likely to survive and move up in exchange tiers. This is consistent with our conjecture that CRMs, as an asset class, derive from a less speculative pool of candidates than firms already trading on the same U.S. exchanges.

We also examine the extent to which firm characteristics at the first 10-K date might serve as early indicators of these firms' future prospects. We find some (weak) evidence that more profitable, less levered, and larger RMs have a greater likelihood of success. More importantly, we show that CRM firms that raise funds through PIPE financing prior to their first 10-K filing are generally more successful in the future.[15] This finding is analogous to a key result in the venture capital (VC)

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[14] Our sample includes 42 (81 percent) of the total 52 CRMs accused of fraud by the SEC, U.S. media, or short sellers since January 2001. We trace the status of each of these firms to December 2013, and include their performance in our CRM results. As of this writing, despite having their trading suspended, a number of these firms have not actually been convicted of any wrongdoing by the SEC.

[15] As discussed in more detail later (Figure 1 and Section III), in an RM, financing and public listing are two separate events. Most RMs (65 percent of those in our sample) undergo a round of PIPE before filing their first 10-K. Participants in a PIPE are sophisticated "Accredited Investors," who receive equity at a negotiated (typically discounted) valuation.

literature, whereby early-stage VC participation is associated with both a higher propensity to go public and superior post-IPO performance (Brav and Gompers 1997; Tian 2011). In our case, CRMs that receive PIPE financing earn higher future returns, and are more likely to move up in exchange tiers. These results are robust to a host of control variables (such as profitability, leverage, life-cycle stage, nature of the audit report, and firm size). Overall, our evidence suggests that participation by sophisticated private equity investors in a CRM serves as a quality filter for these firms.

One possible concern with our findings is that the accounting frauds perpetuated by CRMs are too elaborate to be detected within a three-year post-listing period. We mitigate this problem to some degree by examining multiple measures of firm health and performance, many of which are not based on accounting numbers. For example, at each anniversary date, we examine firms' operating cash flows, audit opinion (qualified or clean), market liquidity, stock return, and survival rate, as well as exchange mobility. Nevertheless, it is still possible that the CRMs, as a group, are "fooling the market" for longer than three years.

To directly address this possibility, we searched multiple channels to identify CRMs that were accused of fraud by the SEC, the U.S. media, or short sellers. Our search spans the period between January 2001 and October 2012 and results in a set of 52 firms (see Appendix A).[16] We find that 42 (81 percent) of these firms are in our sample of CRMs. Among these, 35 were demoted to Pink Sheet and 11 had their registrations revoked by the SEC by December 2013.[17] We then recalculate our results for all RM firms from inception (the first 10-K date) to the end of 2013. These tests show that, collectively, the survival rate and exchange mobility of the CRMs (including the 42 CRMs accused of fraud) are still better than both their control firms and U.S. RMs. Moreover, despite the recent negative publicity, the returns of the CRMs are statistically indistinguishable from their control firms.

Our main results are robust to various perturbations in research design. For example, using a difference-in-differences (DID) test, we show that while U.S. RMs slightly underperform their control firms, CRMs generally outperform their matching peers on most dimensions. These findings continue to hold when we conduct multivariate regressions that further control for any residual differences between the control firms and the RMs in terms of firm size and life-cycle stage.[18] Moreover, we find that CRMs outperform U.S. RMs conditional on survival and that U.S. RM returns do not include a greater preponderance of right-tailed (favorable) outliers. Thus, the superior performance of the CRMs does not appear to be driven by differences in either probability of survival or distributional skewness.[19]

Taken together, our findings help to put into perspective concerns with CRMs. Chen et al. (2013) show that CRMs have low financial reporting quality. Our findings complement their study in that we also document a high incidence of fraud among CRMs. However, our results also show that despite these governance weaknesses and accounting quality problems, many CRMs, in fact, offer attractive investment opportunities to U.S. investors. Interestingly, it appears that U.S. PIPE

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[16] This is the most extensive list that we are aware of, and the total corroborates well with other studies that gather similar data from various media or SEC sources (e.g., Darrough et al. 2013; Chen, Cheng, Y. Lin, Y-C. Lin, and Xiao 2013; Siegel and Wang 2013).

[17] Section 12(j) of the Exchange Act authorizes the SEC to revoke the registration of a security if the issuer fails to comply with the federal securities laws. Broker-dealers cannot execute any trades in stocks whose registration has been revoked pursuant to Section 12(j).

[18] The inclusion of additional size and cash flow life cycle control variables biases against CRMs, which are typically larger and more mature. However, our goal is also to understand whether the outperformance of CRMs is driven entirely by these factors. Our results suggest that this is not the case.

[19] In addition, we find that CRMs still outperform U.S. RMs after adjusting for the market return from each firm's country of domicile (i.e., after removing the effect of overall Chinese stock market performance from CRM returns).

investors, in particular, have some skill in identifying the better CRMs early in their public life. While legitimate issues remain with the structural integrity of corporate governance in Chinese firms, our evidence indicates that the current Sino-phobic reaction to CRMs may be overblown.

The remainder of our study is organized as follows. Section II provides institutional background on RMs, surveys the prior literature, and develops our main hypotheses. Section III describes our sample selection and data-collection process. Section IV discusses our empirical results. Finally, Section V summarizes these findings and considers implications for investors, regulators, and future research.

II. BACKGROUND AND LITERATURE REVIEW

Reverse Mergers

A reverse merger is the culminating event in a series of economic decisions involving several key players. On the demand side, the owners/operators of a private company in need of capital decide to go public and engage a financial intermediary (a "shell promoter") to assist them with an RM transaction. On the supply side, a market exists for the sale of publicly listed shell companies.[20] Typically, the existing shell is a relic from a previously failed business. During bankruptcy proceedings, the shareholders of the former company agree to certain concessions in exchange for a share in any profits gained if/when the shell is sold.[21] These events are depicted in Figure 1, which we discuss in more detail in Section III.

Prior studies have addressed both the supply and the demand side of the market for RMs. On the supply side, Floros and Sapp (2011) and Gleason, Rosenthal, and Wiggins (2005) investigate the business of investing in shell companies. Floros and Sapp (2011), in particular, note that private firms going public via RMs are often motivated by the need to quickly secure financing through PIPEs and the desire to make acquisitions using stock as payment. Floros and Sapp (2011) show that when a takeover agreement is consummated, the average shell firms' three-month abnormal returns are 48.1 percent, reflecting the compensation to investors for shell stock illiquidity and the uncertainty of finding an RM suitor.

On the demand side, prior studies have largely focused on the motivation for using an RM rather than an IPO from the perspective of the private firm. For example, Brau et al. (2003), Poulsen and Stegemoller (2008), and Brown et al. (2010) identify a number of factors associated with this choice, including industry concentration, current cost of debt, relative "hotness" of the IPO market, and insider ownership percentage. In the same spirit, Adjei, Cyree, and Walker (2008) show that RM firms are typically smaller, younger, riskier, and have poorer *ex ante* performance. Within three years of listing, 42 percent of the RMs in their sample are delisted, compared to 27 percent of matched IPOs.[22]

Although RMs are generally cheaper and quicker than traditional IPOs,[23] a number of studies (particularly those by practitioners and legal scholars) warn of the risks and costs facing private

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[20] The SEC defines a "shell company" as a registrant with no or nominal operations and either no or nominal assets, assets consisting solely of cash and cash equivalents, or assets consisting of any amount of cash and cash equivalents and nominal other assets (see: https://www.sec.gov/rules/final/33-8587.pdf).

[21] Although the firm is operationally dormant, it is allowed to maintain its publicly listed status on OTCBB or Pink Sheet if it continues to pay an annual registration fee.

[22] Since their sample consists of firms listed on the NYSE, AMEX, and NASDAQ, "delisting" in their context includes demotions to OTCBB or Pink Sheet status.

[23] Underwriting costs for an IPO typically ranges from 7 percent to 12 percent of the total offer, while the price for purchasing a shell company is generally around $50,000 to $500,000. At the same time, unlike an IPO, an RM can be completed within weeks (see, e.g., Atkins 2011).

firms that elect the RM route (e.g., Sjostrom 2008; Feldman 2009). Typically, the amount of capital raised via an RM is much less than what would be available from an IPO, as initial financing often depends on private sources arranged by the promoter. In the aftermarket, liquidity can be minimal. In addition, as a publicly listed firm, a new RM faces significant ongoing regulatory costs, which can be onerous for a small firm with cash constraints.[24]

The central finding that emerges from these studies is that RM firms are strikingly different from IPO firms. RM firms tend to be at an earlier stage and more speculative than their IPO peers, and typically face tighter financing constraints. Many also have a pressing need to provide their employees with liquidity for their equity stake in the firm. They have self-selected into the RM process not because they would not have preferred to go public via an IPO, but because for most of them, an IPO was never a realistic option.[25]

In light of the foregoing, we argue that a proper assessment of RMs' aftermarket performance calls for a comparison, not between RMs and IPOs, but between RMs and firms with similar *ex ante* risk profile. We address this problem using a detailed and partially hand-collected dataset that controls for exchange, industry, date of filing, and firm size.

The China Factor

The recent rash of accounting frauds in CRMs has brought the need for tighter regulation of these firms into the limelight. In June 2011, the SEC issued a general warning advising against investing in firms listing via an RM. During 2011, more than 20 U.S.-listed CRMs were delisted or halted from trading. Some of these were accompanied by research reports by well-known short sellers. The general perception, fueled by multiple media reports, is that CRMs are inherently toxic.

The case against the CRMs is based on two key arguments. First, it is alleged that a weak regulatory environment and a "wild west" mentality give rise to rampant fraud in China—a perception no doubt reinforced by recent concerns about the safety of Chinese toys and food exports. Second, it has been shown that stronger Chinese firms come into the U.S. via IPOs, and that the CRM candidates may be looking to skirt regulatory scrutiny via a "backdoor listing."[26] For example, Jindra, Voetmann, and Walking (2012) find that larger, more reputable Chinese firms are significantly less likely to go public via RMs, and Chen et al. (2013) show that CRMs exhibit lower financial reporting quality than Chinese ADR firms.

As an emerging economy, China has less stringent corporate governance norms and weaker minority shareholder protection laws than most developed countries. These problems are well documented, and are the impetus for a wide-ranging agenda for regulatory reform in China.[27] On the other hand, there are also compelling reasons why CRMs might not be as toxic as they are portrayed in the media. First, China has experienced explosive growth and, until recently, the access to alternative capital sources (e.g., private equity and venture capital funds) has been quite limited. This increases the likelihood that CRMs are derived from a pool of relatively high-quality candidates. Second, the IPO markets in China are highly competitive and Chinese listing standards require bright-line profitability tests that are much more stringent than U.S. requirements. In recent years, many

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[24] The ongoing costs of a public listing weigh disproportionately on small firms (Leuz, Triantis, and Wang 2008; Marosi and Massoud 2007). Iliev (2010) shows that the compliance costs of Sarbanes-Oxley (SOX) also fall disproportionally on smaller firms.

[25] Compared to their IPO counterparts, operators/owners of a private firm engaged in an RM generally have weaker bargaining power in their negotiations with PIPE investors (see Chaplinsky and Haushalter 2010).

[26] This argument applies equally to U.S. RMs, of course. For example, Givoly, Hayn, and Lourie (2014) show that similar to CRMs, U.S. RMs have lower reporting quality than their industry-size-matched peers.

[27] See Allen, J. Qian, and M. Qian (2005), Jian and Wong (2010), Jiang et al. (2010), Piotroski and Wong (2012), and Piotroski and Zhang (2014).

thousands of IPO-eligible firms in China (based on the local bright-line criteria) remain unlisted. Thus, a typical CRM is likely to be further along the development life cycle than its U.S. counterpart. Third, the RM route to a U.S. listing is not trivial for a Chinese firm. In addition to the usual hurdles faced by U.S. RMs, CRMs must first register with China's State Administration of Foreign Exchange (SAFE) (see Feldman 2009, Chapter 5). They then have to arrange to be acquired by a foreign-based entity (typically based in the Cayman Islands or some other offshore locales). Finally, Chinese firms that take the U.S. RM route voluntarily expose themselves to U.S. listing regulations and the scrutiny of short sellers (short selling was prohibited in China during our sample period).

The evidence in Darrough et al. (2013) further thickens the plot. The authors examine the spillover effect of recent negative news of CRM frauds. They show that the negative news had a dampening effect on the share prices of both the accused firms and other seemingly legitimate CRMs and Chinese IPOs. However, it appears that this spillover effect did not carry over to U.S. RMs and RMs from other countries. They conclude that the negative market reaction appears to be China-focused, rather than RM-focused.

Prior evidence regarding the alleged inferior accounting quality of CRMs is mixed. On the one hand, Chen et al. (2013) show that CRMs exhibit lower financial reporting quality than both U.S. RMs and Chinese ADRs. On the other hand, Siegel and Wang (2013) find that although entry timing is associated with various corporate governance measures for RMs (early entrants exhibit better quality than latecomers), the firms' origin from China is not associated with these measures. Similarly, Givoly et al. (2014) find that CRMs have comparable earnings quality to all other RMs, including those from the U.S.

In sum, while each of these related studies sheds some new light on CRMs, none of them examine the overall performance of CRMs as an asset class. We recognize that CRMs may exhibit serious financial reporting problems. Our aim is to provide evidence on their performance within the context of these potential problems.

III. SAMPLE SELECTION AND DATA DESCRIPTION

We obtain our sample of reverse mergers from the DealFlow Media (DFM) *Reverse Merger Report* (Meagher 2011).[28] Figure 1 depicts three key events in the formation of an RM firm. The first event in an RM is the acquisition of a "shell company." This transaction itself does not give birth to an operating entity—in fact, most shell exchanges do not. This is because shells are traded much like website domain names, and most such exchanges are between shell vendors/speculators. If the acquiring company in a shell transaction does not subsequently file a 10-K, then the transaction is unlikely to be an entry point for a private company to go public. Among the 1,608 RM transactions between January 2001 and December 2010 in the original DFM sample, only 489 RMs subsequently filed a 10-K as reported by Compustat. Of these, we are able to find the requisite financial information and a suitable matching control firm for 424 RMs.

The next step in an RM's development often involves a round of PIPE financing by "Accredited Investors."[29] Most (65 percent) of the RMs in our sample received PIPE financing before filing the initial 10-K report. The DFM database does not have good coverage of PIPE

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[28] An alternative source to identify RMs is the Thomson Reuters SDC Platinum database. The DFM sample has two important advantages over the SDC sample. First, while SDC defines private firms' country based on headquarters' addresses, DFM defines it based on the location of the private firm's main operations (important in our analysis of the country of origin). Second, compared to the SDC database, the DFM sample has a more complete and accurate listing of RMs.

[29] The SEC rules define an "Accredited Investor" as either an institution with assets in excess of $5,000,000, or an individual with a net worth in excess of $1,000,000 or annual income exceeding $200,000 or $300,000 jointly with his or her spouse (see: http://www.sec.gov/investor/alerts/ib_accreditedinvestors.pdf).

FIGURE 1
Key Stages in a Reverse Merger

Stage 1 Purchase of a Shell Company	Stage 2 Private Financing (PIPE)	Stage 3 Filing of the First 10-K Form
An RM occurs when a shell firm is acquired by a private corporate entity. DealFlow Media reports 1,608 such acquisitions between January 2001 and December 2010. • Over our sample period, the number of RMs increases significantly since 2004. • In 2010, the number of RMs reaches its peak of 257. • We only retain the last deal if a company completes multiple reverse mergers. As a result, 37 observations are deleted.	In an RM deal, the public listing and the financing transaction are two separate events. In most cases, the initial capital is raised via PIPE. • In our final sample of 424 RMs, 277 (or 65%) firms raised PIPE financing before filing the first 10-K. • Participants in a PIPE are sophisticated "Accredited Investors", who receive equity at a negotiated (typically discounted) valuation. • The SEC rules define an "Accredited Investor" as either an institution with assets in excess of $5,000,000, or an individual with a net worth in excess of $1,000,000 or annual income exceeding $200,000 or $300,000 jointly with his or her spouse. • PIPE investors can sell the shares on public markets either via an effective registration statement or after a holding period under Rule 144.	Few RMs actually become active entities. Among the 1,608 RMs in Stage 1, only 489 observations have post-RM data on the COMPUSTAT Fundamentals Annual database. • The mean and median time between the date of the RM and the reporting date of the company's first 10-K filing are 310 and 226 calendar days, respectively. • Our sample consists of 424 RMs that filed a post-RM 10-K, and have a control firm matched on reporting date, industry, exchange, and size.

This figure depicts the three stages in the formation of an RM firm, as well as the number of firms in the *DealFlow Media* database at each stage. Stage 1 is the completion of an RM transaction, defined as the acquisition of a shell company by another private corporate entity. Stage 2 is a potential round of private investment in public equity (PIPE) financing. Stage 3 is the filing of the first 10-K by a firm identified earlier as an RM.

information prior to 2008. Therefore, we collect this information for each of our sample of 424 RM firms by examining the sources of cash flow in their first 10-K filing, and tracing these disclosures to footnotes that describe the financing transaction.

Funding in a PIPE transaction comes from sophisticated investors (often hedge funds, private equity firms, or high-net-worth individuals) who receive shares at a negotiated (often discounted) valuation. These shares are restricted and may not be sold to the general public until either: (1) a registration statement is declared effective by the SEC, or (2) the passage of a certain time period specified by Rule 144 (typically, six months to one year). For each firm that had PIPE financing, we also collect the filing date and the effective date of the registration statement for each PIPE transaction, if it is available on the EDGAR website.

The third stage in the process is the filing of a 10-K. Operating business entities traded on the NYSE, AMEX, NASDAQ, and OTCBB are obligated to file quarterly, annual, and other regular reports with the SEC, and are subject to other rules regarding insider trading, soliciting proxies, and the like.[30] As discussed earlier, we view the filing of a 10-K as an indication that the RM firm is serious about accessing public capital markets. A total of 489 RMs did so in our sample period.[31]

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[30] Most companies that trade on Pink Sheet can do so without reporting to the SEC. If a company does an IPO, then it is subject to reporting requirements only for one year. After that year, the company can cease reporting and the stock can continue to trade on Pink Sheet. The only requirement is that certain basic information be provided to brokerage firms making a market in the company's stock.

[31] In the case of shell companies that completed more than one RM, we only retain the last deal. As a result, 37 RM transactions (related to 35 unique shell companies) were excluded from the final sample. We examined these firms' SEC filings and found that they had multiple RMs because the earlier RMs did not result in a viable business operation. As a robustness test, we restrict our sample to firms that only completed one RM, and the results are virtually identical.

The mean and median time between the merger date and the reporting date of the first 10-K are 310 and 226 calendar days, respectively.

Note that neither the shell transaction nor the PIPE financing actually involves raising funds from the general investing population. Of the 424 RMs in our final sample, 277 (or 65 percent) raised PIPE financing between the merger date and the first 10-K date. Among these, only 163 filed registration statements that were declared effective by the SEC. Of the 277 RMs with PIPEs, only 35 had PIPE share resale dates that were earlier than the first 10-K date.[32] In other words, the public *may* have had access to the restricted PIPE shares prior to the 10-K date for only 35 out of the 424 RMs. Even in these instances, it is hard to pinpoint when the access to the restricted shares was first made available. For these reasons, we believe the reporting date of the first 10-K is a reasonable starting date for our analysis.[33]

To reduce the effects of outliers, we winsorize all financial variables using 1 percent and 99 percent cutoff values, based on the annual Compustat population. We also manually check firms' 10-K filings to ensure that the extreme values of financial variables (e.g., |return on assets| > 1 or leverage > 1) are not caused by data error.

Central to our research design is a matching algorithm that selects a control firm (CL) for each RM in our sample. To construct the control group, for every RM firm, we identify all firms from the same industry (Fama and French 1997) and exchange (NYSE/AMEX, NASDAQ, OTCBB, and Pink Sheet) that also filed 10-Ks in the same year as the RM's first 10-K filing (hereafter, Year T). To ensure that we are not comparing one RM firm to another RM firm, we exclude firms that completed an RM during our sample period from the pool of eligible control firms. We then define the matched CL as the firm with a market value of equity closest to the RM firm as of the end of Year T. This algorithm ensures that the matched CL is a non-RM firm from the same industry, is listed on the same exchange, and is the closest match to the target RM firm in terms of market capitalization.[34]

We also employ a cash flow-based proxy of firm life cycle developed by Dickinson (2011). Dickinson (2011) categorizes firms into five stages based on the patterns of cash flows from operating, investing, and financing activities: Introduction, Growth, Mature, Shake-out, and Decline (for details of the classification scheme, see Dickinson [2011, 1974]). We use this measure for two reasons. First, we want to document descriptive differences between CRMs and U.S. RMs in terms of their level of maturity or stage of development at the point of public listing. Second, we want to ensure that our results are not driven by the differences in business life-cycle stages between the RMs and the CLs.[35]

Because most RMs trade on the OTC markets, their historical exchanges are not available in CRSP. We collect these data from the RMs' 10-K filings. For CLs, we first rely on the historical

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[32] The first share resale date is either: (1) six months after the PIPE date, or (2) the effective date of the registration statement.

[33] In our robustness tests, we also include the returns for RMs and CLs before the first 10-K date to ensure that our results are not affected by the omission of this time period.

[34] We do not further narrow down the control firms by "historical origin" (i.e., whether they were once downgraded from the main exchange or whether they were originally an OTC IPO stock) for two reasons. First, a firm's origin is difficult to define when some have moved between exchange tiers several times, and others have gone through restructuring, bankruptcy, or mergers and acquisitions (M&A). Second, our main research interest is in isolating an RM effect, and given the already limited pool of potential CL firms, additional constraints can reduce the quality of our industry-exchange-size matching scheme.

[35] We do not match RMs with CLs on firm age, because the age of the private firm in an RM is not publicly available. Moreover, the age of the CL is also dubious. A CL that existed for a long time on Compustat may nevertheless have undergone reorganization, M&A, or bankruptcy and, thus, is a young firm in terms of business life cycle. This is not a trivial concern because most of the CLs trade on the OTC markets, and are more likely to have experienced such life events.

TABLE 1

Sample Description

Panel A: Distribution of RM Firms by Country

	No. of Observations	Total Market Capitalization ($mil)
From U.S.	251	19,195
From China	146	15,911
From other countries	27	3,072
Total	424	38,178

Panel B: Distribution of RM Firms by Year of Merger

	Original Sample from DFM	Our Sample	
Year of RMs		No. of RMs	Days2Filing
2001	9	4	421
2002	25	13	319
2003	58	22	323
2004	199	67	463
2005	210	68	323
2006	210	72	277
2007	229	66	236
2008	211	59	192
2009	200	29	187
2010	257	24	171
Total	1,608	424	289

This table provides an overview of the number of RMs in our sample, distributed by country of origin (Panel A) and by year of merger (Panel B). Our sample consists of all U.S.-listed RMs between 2001 and 2010 from DealFlow Media's (DFM) *Reverse Merger Report* (Meagher 2011) that filed a post-RM 10-K, and have a control firm matched on reporting date, industry, exchange, and size. Country classification is based on the location of the main operations of the private firm in an RM. Total market capitalization is measured on the first 10-K date. Days2Filing refers to the average number of calendar days between the merger date and the reporting date of the firm's first post-RM 10-K filing.

stock exchange information in CRSP, which covers stocks traded on AMEX, NYSE, or NASDAQ. Firms not covered by CRSP typically trade on OTCBB or Pink Sheet. To ascertain their listing exchange, we manually examine each prospective CL's 10-K filings. If a prospective firm turns out to be a mismatch (e.g., the CL is listed on OTCBB while the RM is listed on Pink Sheet), then we continue down the list of prospects until we exhaust the entire pool of 10-K filers in the potential control group. Overall, we are able to match 424 RMs with CLs.

Table 1 provides an overview of the number of RMs in our sample, distributed by country of origin (Panel A) and by year of merger (Panel B). As Panel A shows, U.S. RMs constitute nearly 60 percent of the observations, while CRMs account for 34 percent of the sample (or about 85 percent of all foreign RMs). Panel A also reports total market capitalization (MCAP) measured on the first 10-K date: $38.2 billion for the full sample, with U.S. RMs and CRMs accounting for 50 percent and 42 percent, respectively. As Panel B shows, the number of RMs in the original DFM sample increases significantly since 2004 and reaches a peak of 257 in 2010. The pattern is

consistent with findings in other studies (e.g., Siegel and Wang 2013). Days2Filing refers to the number of calendar days between the merger date and the reporting date of the first 10-K filing. On average, the sample RM firms file their first 10-K within one calendar year after the merger date.

We rely on DataStream rather than CRSP for stock return and price information because most of the RMs and CLs trade on the OTC markets. To compute the annual buy-hold returns, we extract raw monthly returns from DataStream (data type = RI) and adjust the raw returns for delisting and acquisition. To make these adjustments, we begin with the "inactive date" identified by DataStream. We then match this information to our hand-collected exchange and listing status to determine whether this "inactive date" was triggered by a delisting or an acquisition. Following Gerakos, Lang, and Maffett (2013), we set delisting returns to −100 percent.[36] For acquisitions, we collect the acquisition prices and redistribute (reinvest) the final liquidation value equally in all the other firms in the same group. For example, if an RM firm is acquired, then its liquidation value is reinvested into all the remaining RMs in the sample. We then compute the annual buy-hold returns for each of the next three years starting four months after the first 10-K reporting date.

To ensure that our sample includes CRMs accused of fraud, we identify 52 CRMs that were cited by the SEC, U.S. media, security class action litigations, or short-seller reports from January 2001 to October 2012, as being under suspicion of fraud. We trace the status of these CRMs to December 2013. Appendix A lists each of these 52 firms, together with various descriptive statistics, including the RM date, the date trading was halted on the NMS exchanges, the date the stock was added on Pink Sheet, the date the stock was delisted by the NMS, and whether the registration was revoked by the SEC, which marks the firm's disappearance from public sight.[37] Note that only ten of these 52 firms are not in our sample (five because they are not in DFM, four due to missing Compustat data, and one because the RM deal was completed prior to our sample period). In short, our sample includes the vast majority of the CRMs that are the subject of the recent wave of negative publicity.

IV. EMPIRICAL RESULTS

Key Firm Characteristics in the Year of the RM's First 10-K Filing
RMs versus CLs

To evaluate RMs' risk and performance, we compare a number of metrics, including capital structure, corporate liquidity, market liquidity, operation, audit opinion, and business life cycle, between RMs and CLs in the year of the RM's first 10-K filing. The results are reported in Panel A of Table 2. The matching algorithm controls quite well for size in the two groups. The mean MCAP of RMs is about $90 million, while the mean MCAP of CLs is around $83 million, suggesting that both RMs and CLs tend to be small firms. The difference between the two groups is not statistically significant (t = 0.41).

In terms of capital structure and corporate liquidity, RMs have similar leverage (*LEV*) and current ratio (*CR*) as CLs. It is worth mentioning that the mean *LEV* in Table 2, Panel A, measured

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[36] Results are robust if we set delisting returns to −55 percent, as in Shumway and Warther (1999), or to 0 percent.

[37] We search multiple channels to identify CRMs that were accused of fraud by the SEC, the U.S. media, or short sellers between January 2001 and October 2012. We complement our list using the list in Siegel and Wang (2013), which includes companies that experienced formal enforcement actions (e.g., SEC trading suspension, SEC litigation, and private litigation) from January 1996 to September 2012. We do not base our sample solely on the list in Siegel and Wang (2013) because some of the firms we identify are missing from their list. While probably not exhaustive, we suspect this list captures most of the CRMs swept up in the scandal during our sample period. For comparison, Darrough et al. (2013) report 70 such firms from 2000 to 2011 (although they do not list the names).

TABLE 2

Key Firm Characteristics in the Year of the RM's First 10-K Filing

Panel A: Summary Statistics for RMs and CLs in the Year of the RM's First 10-K Filing

		RMs (n = 424)		CLs (n = 424)		Diff.	
		Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Size	*MCAP* ($million)	90.04	45.65	83.33	30.55	6.72 (0.41)	15.09*** (3.07)
Capital Structure	*LEV*	1.68	0.49	1.43	0.50	0.26 (1.04)	−0.02 (−0.12)
Corporate Liquidity	*CR*	3.13	1.43	3.78	1.43	−0.64 (−1.34)	0.00 (0.52)
Market Liquidity	*SPREAD* (%)	25.09	21.58	15.36	7.37	9.73*** (5.45)	14.21*** (6.50)
Operation	*ROA*	−1.71	−0.24	−1.34	−0.17	−0.36 (−1.53)	−0.07 (−0.08)
	CFO	−0.60	−0.15	−0.57	−0.08	−0.03 (−0.35)	−0.08 (−1.16)
Audit Opinion	*AUQ*	0.49	0.00	0.50	0.50	−0.01 (−0.38)	−0.50 (−0.38)
Life-Cycle stage	*INTRODUCTION*	0.50	0.50	0.49	0.00	Diff. in distribution:	
	GROWTH	0.20	0.00	0.12	0.00	$\chi^2 = 33.87$	
						p = 0.000	
	MATURE	0.06	0.00	0.17	0.00		
	SHAKE-OUT	0.07	0.00	0.06	0.00	Fisher's exact test:	
						p = 0.000	
	DECLINE	0.17	0.00	0.16	0.00		

Panel B: Summary Statistics for CRMs and U.S. RMs in the Year of the First 10-K Filing

		CRMs (n = 146)		U.S. RMs (n = 251)		Diff.	
		Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Size	*MCAP* ($million)	108.98	74.48	76.47	28.38	32.51** (2.37)	46.10*** (4.93)
Capital Structure	*LEV*	0.51	0.34	2.31	0.66	−1.80*** (−5.72)	−0.32*** (−6.77)
Corporate Liquidity	*CR*	3.87	2.06	2.52	1.07	1.35** (2.38)	0.99*** (5.27)
Market Liquidity	*SPREAD* (%)	31.77	29.54	20.33	13.95	11.44*** (4.72)	15.59*** (4.54)
Operation	*ROA*	−0.08	0.12	−2.57	−0.73	2.49*** (8.52)	0.85*** (13.38)
	CFO	−0.01	0.05	−0.95	−0.38	0.94*** (9.56)	0.43*** (11.72)

(continued on next page)

TABLE 2 (continued)

		CRMs (n = 146)		U.S. RMs (n = 251)		Diff.	
		Mean	Median	Mean	Median	Mean	Median
Audit Opinion	*AUQ*	0.23	0.00	0.60	1.00	−0.37*** (−7.92)	−1.00*** (−7.11)
Life-Cycle stage	*INTRODUCTION*	0.27	0.00	0.63	1.00		
	GROWTH	0.44	0.00	0.06	0.00		
	MATURE	0.13	0.00	0.02	0.00		
	SHAKE-OUT	0.09	0.00	0.06	0.00		
	DECLINE	0.07	0.00	0.24	0.00		
Private Equity Financing	*PIPE*	0.55	1.00	0.71	1.00	−0.16*** (−3.20)	0.00*** (−3.24)

Diff. in distribution:

$\chi^2 = 122.06$
p = 0.000

Fisher's exact test:

p = 0.000

Panel C: Summary Statistics of Non-Missing Private Equity Financing for CRMs and U.S. RMs before the First 10-K Filing

	CRMs (n = 80)		U.S. RMs (n = 178)		Diff.	
	Mean	Median	Mean	Median	Mean	Median
TPIPE ($million)	10.50	7.58	8.75	3.27	1.75 (0.80)	4.31*** (3.84)
TPIPE2M	0.48	0.10	0.32	0.09	0.16 (0.65)	0.01 (0.44)

***, ** Denote two-tailed statistical significance at the 0.01 and 0.05 levels, respectively.
t-statistics and Wilcoxon z-statistics for the differences in mean and median are reported in parentheses.
This table compares a number of key firm characteristics for RMs and CLs (Panel A) and for CRMs and U.S. RMs (Panel B) in the year of the RM's first 10-K filing (Year T), and reports the statistics of non-missing private equity financing between the merger date and the reporting date of the first post-RM 10-K filing for CRMs and U.S. RMs (Panel C). For every RM firm, we identify all firms from the same industry and exchange that also filed a 10-K in Year T. We then define the matched CL as the firm with a market value of equity (MCAP) closest to the RM firm as of the end of Year T. Firm life cycle is measured using the cash flow-based proxy developed by Dickinson (2011). Each life-cycle stage (i.e., *INTRODUCTION, GROWTH, MATURE, SHAKE-OUT,* and *DECLINE*) is an indicator variable set to 1 if the observation is in that stage, and 0 otherwise.

Variable Definitions:
LEV = total short-term and long-term debts divided by total assets;
CR = total current assets divided by total current liabilities;
SPREAD = the monthly closing spread divided by the midpoint of bid and ask prices (i.e., $100 * (ASK − BID)/(MID)$), averaged over the 12 months of Year T;
ROA = income before extraordinary items divided by total assets;
CFO = cash flow from operations divided by total assets;
AUQ = an indicator variable set to 0 if the auditor issues an unqualified audit opinion, and 1 otherwise;
PIPE = an indicator variable set to 1 if the RM firm raises equity financing through private placements between the merger date and the reporting date of the first 10-K filing, and 0 otherwise;
TPIPE = the total amount of private equity financing; and
TPIPE2M = *TPIPE* scaled by MCAP.

as the sum of short-term and long-term debts divided by total assets, is 1.68 for RMs and 1.43 for CLs. These statistics indicate that the average firms in both groups are highly levered and, in fact, close to insolvency. We use *SPREAD* to measure market liquidity, which is the difference between a stock's monthly closing ask price and bid price divided by the bid-ask midpoint, averaged over the 12 months of the year. The mean *SPREAD* is 25.09 percent for RMs and 15.36 percent for CLs, with the difference significant at the 1 percent level (t = 5.45). The bid-ask spreads are quite high even by the OTC standard. For example, Ang, Shtauber, and Tetlock (2013) report that mean *SPREAD* is 15 percent for a sample of OTC stocks from 1977 to 2008.

We use income before extraordinary items divided by total assets (*ROA*) and cash flow from operations divided by total assets (*CFO*) to measure operating performance. The summary statistics in Table 2, Panel A show that both the RMs and CLs are dominated by loss firms. The mean *ROA*s are −1.71 and −1.34 and the mean *CFO*s are −0.60 and −0.57 for RMs and CLs, respectively. The results suggest that many of these firms are not likely to survive as going concerns. Indeed, about 50 percent of both RMs and CLs receive qualified audit report (*AUQ*). Based on a cursory review, a majority of these audit reports express concerns about the firms' ability to continue as going concerns. Finally, nearly 50 percent of both RMs and CLs are at the Introduction stage, suggesting that both groups are dominated by early-stage, speculative firms.[38] Compared to CLs, RMs are more (less) likely to be at the Growth (Mature) stage. A Chi-square test ($\chi^2 = 33.87$) rejects that the distributions by life-cycle stages are the same in the two groups.

Overall, the results in Panel A of Table 2 show that at their first 10-K filing, the RMs are speculative investments highly prone to default and/or bankruptcy risk. They tend to have extremely small market capitalization and high leverage. Most of these firms would not pass the stringent IPO requirements of NMS. At the same time, these RMs are not notably worse than the CLs matched by our algorithm. In short, both RM and CL firms reflect the risks inherent in investing in early-stage penny stocks that populate OTCBB and Pink Sheet.

CRMs versus U.S. RMs

Panel B of Table 2 reports the comparison of performance metrics between CRMs and U.S. RMs at their first 10-K filing. The mean MCAP is $108.98 million for CRMs and $76.47 million for U.S. RMs, with the difference significant at the 5 percent level (t = 2.37). Compared to their U.S. peers, CRMs are much less financially constrained, as shown by their significantly lower mean *LEV* (0.51 versus 2.31) and much higher mean *CR* (3.87 versus 2.52). However, CRMs have lower market liquidity than U.S. RMs at their first 10-K filing. The mean *SPREAD* is 31.77 percent for CRMs, compared to 20.33 percent for U.S. RMs.

Also in Panel B of Table 2, CRMs also appear healthier than U.S. RMs in terms of operating performance, as witnessed by their much higher mean *ROA* (−0.08 versus −2.57) and mean *CFO* (−0.01 versus −0.95). At least half of the CRMs are profitable (median *ROA* = 0.12) and generate positive operating cash flows (median *CFO* = 0.05). In contrast, the median *ROA* and *CFO* for U.S. RMs are still significantly negative (−0.73 and −0.38, respectively). Auditor reports also confirm that CRMs have a better outlook than U.S. RMs. For 60 percent of U.S. RMs, auditors express concerns about the company's ability to operate as a going concern. The percentage among CRMs is much lower, at 23 percent. Compared to U.S. RMs, CRMs are more likely to be at a healthy life-cycle stage (i.e., Growth or Mature), with a Chi-square test ($\chi^2 = 122.06$) strongly rejecting that the distributions by life-cycle stages are identical in the two groups. Finally, 55 percent of the CRMs

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[38] For comparison, Dickinson (2011) reports that only 12 percent of the firms trading on NMS are at Introduction stage, 34 percent at Growth stage, 41 percent at Mature stage, 8 percent at Shake-out stage, and 5 percent at Decline stage.

raise PIPE financing between the merger date and the reporting date of the first 10-K, which is significantly lower than the 71 percent for U.S. RMs.

Panel C of Table 2 provides more statistics of the PIPE financing by RMs. We report the total dollar amount of PIPE financing (*TPIPE*) and the total amount scaled by MCAP (*TPIPE2M*) for the 80 CRMs and 178 U.S. RMs that raise capital via PIPEs between the merger date and the first 10-K date. Compared to U.S. RMs, CRMs raise more capital via PIPEs in terms of absolute dollar amount, as shown by the significant difference in median *TPIPE* between the two groups. However, the difference disappears when the amount of PIPE financing is deflated by MCAP.

Overall, the results in Panels B and C of Table 2 show that at the beginning of their public life, a typical CRM looks much healthier than a typical U.S. RM. U.S. RMs are smaller, have much poorer operating performance, are more likely to be at early or final stage of their life, and appear decidedly more problematic than CRMs. In terms of raising capital, CRMs are less likely than U.S. RMs to obtain financing via PIPEs.

Survival Rates and Subsequent Changes in Listing Exchange

The results in Table 2 indicate that the RMs and CLs are highly prone to bankruptcy risk. In this section, we analyze the survival rates and the changes in listing exchange for these firms. We also compare the survival rates between CRMs and U.S. RMs.

RMs versus CLs

Panel A of Table 3 reports the distribution by exchange for RMs and CLs in the year of the RM's first 10-K filing (i.e., Year T), as well as the three years thereafter. Because we match RMs with CLs on exchange, both groups have identical distribution in Year T. The results show that in Year T, 88.0 percent of the RMs trade on OTCBB; 6.8 percent trade on the NMS; and the remainder trade on Pink Sheet (PINK).

In Year T+1, the paths of the RMs and CLs diverge. Although both groups have more firms trading on NMS, in Table 3, Panel A, the percentage is higher among RMs (20.8 percent versus 16.3 percent). Compared to CLs, fewer RMs trade on PINK (6.6 percent versus 11.3 percent), or disappear because the company has the shares deregistered due to bankruptcy, the stock's registration is revoked by the SEC (DEAD), or are acquired (ACQ). A Chi-square test ($\chi^2 = 17.25$) rejects the null that the distributions by exchange tiers are the same in the two groups. These results suggest that at the one-year anniversary date, RMs generally perform better than CLs in terms of survival rate and upward mobility.

The same trend continues over the next two years. In Panel A of Table 3, by the end of Year T+3, 33.3 percent of the RMs trade on NMS, compared to 20.8 percent of the CLs. These firms are the crown jewels of the RM population in the sense that they not only survive, but also pass, the strict listing requirements of the NMS exchanges. By the end of Year T+3, a majority of the RMs still trade on the OTC markets: 32.8 percent on OTCBB (38.2 percent for CLs) and 30.2 percent on PINK (28.8 percent for CLs). Most of these firms are still struggling to find a viable business model and are probably close to the end of their public life. The remaining RMs are either acquired (0.5 percent versus 4.2 percent for CLs) or dead (3.2 percent versus 8.0 percent for CLs).[39]

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[39] The percentage of DEAD RMs is much smaller than the failure rate (43 percent) reported in Adjei et al. (2008). The main reason is that they start with the RMs trading on NMS and score an RM as a failure if the stock is delisted to the OTC markets. In our sample, we treat a firm as DEAD if it disappears from the public sight for reasons other than acquisition.

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TABLE 3

An Analysis of Survival Rate and Changes in Exchange over the Three Years after the RM's First 10-K Filing

Panel A: Distribution by Exchange for the RMs and Their CLs

Venue	Year T — RMs or CLs	Year T+1 — RMs	Year T+1 — CLs	Year T+1 — Diff.	Year T+2 — RMs	Year T+2 — CLs	Year T+2 — Diff.	Year T+3 — RMs	Year T+3 — CLs	Year T+3 — Diff.
NMS	6.8%	20.8%	16.3%		34.2%	19.6%		33.3%	20.8%	
OTCBB	88.0%	72.4%	69.6%	$\chi^2 = 17.25$, p = 0.002	47.6%	51.2%	$\chi^2 = 36.51$, p = 0.000	32.8%	38.2%	$\chi^2 = 35.30$, p = 0.000
PINK	5.2%	6.6%	11.3%		16.3%	21.5%		30.2%	28.8%	
ACQ		0.0%	0.9%		0.2%	2.5%		0.5%	4.2%	
DEAD		0.2%	1.9%		1.7%	5.2%		3.2%	8.0%	
Total	100%	100%	100%		100%	100%		100%	100%	
Fisher's exact test:				p = 0.001			p = 0.000			p = 0.000

Panel B: Distribution by Exchange for the CRMs and U.S. RMs

Venue	Year T — CN	Year T — US	Year T — Diff.	Year T+1 — CN	Year T+1 — US	Year T+1 — Diff.	Year T+2 — CN	Year T+2 — US	Year T+2 — Diff.	Year T+3 — CN	Year T+3 — US	Year T+3 — Diff.
NMS	4.1%	8.3%		26.1%	19.1%		51.4%	27.1%		51.4%	24.7%	
OTCBB	93.2%	84.9%	$\chi^2 = 6.02$, p = 0.049	71.2%	72.5%	$\chi^2 = 6.81$, p = 0.078	37.7%	53.4%	$\chi^2 = 24.49$, p = 0.000	25.4%	37.1%	$\chi^2 = 32.01$, p = 0.000
PINK	2.7%	6.8%		2.7%	8.0%		10.3%	17.1%		22.6%	32.7%	
ACQ	0.0%	0.0%		0.0%	0.0%		0.0%	0.4%		0.0%	0.7%	
DEAD	0.0%	0.4%		0.0%	0.4%		0.6%	2.0%		0.6%	4.8%	
Total	100%	100%		100%	100%		100%	100%		100%	100%	
Fisher's exact test:			p = 0.052			p = 0.052			p = 0.000			p = 0.000

This table assesses survival rate and changes in exchange at the RMs' three-year anniversary dates. Panel A presents the proportion of RMs and CLs in each of three exchange tiers: (1) the National Market System (NMS; consisting of NYSE/AMEX and NASDAQ); (2) the OTC Bulletin Board (OTCBB); and (3) the OTC Pink Sheet (PINK), as well as the proportion of firms that are either acquired (ACQ) or deregistered due to bankruptcy or registration revoked by the SEC (DEAD). Panel B reports the corresponding results for CRMs and U.S. RMs.

FIGURE 2
Changes in Exchange for Reverse Mergers and Control Firms
Panel A: Proportion of Firms that Moved Up or were Acquired
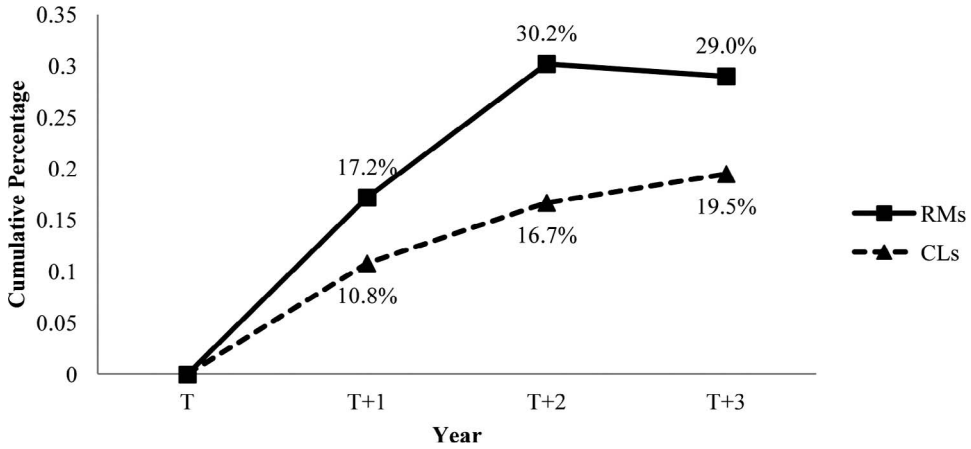
Panel B: Proportion of Firms that Moved Down or were Dead
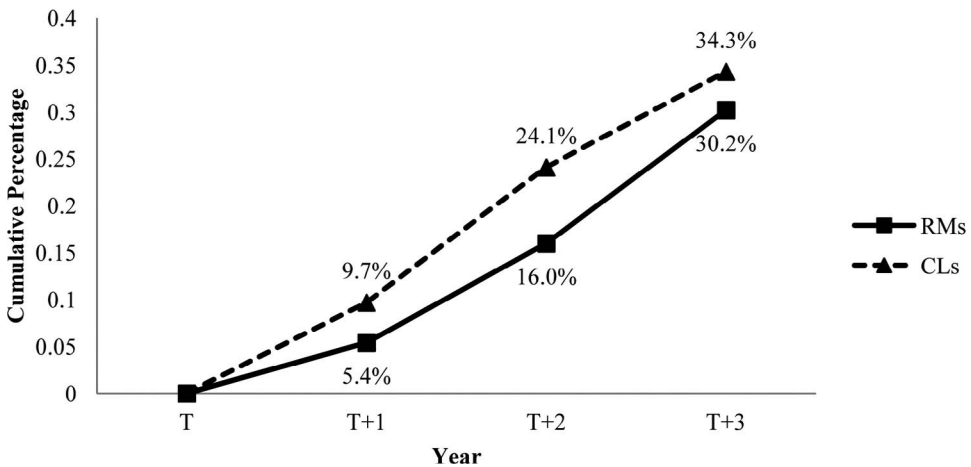
These figures depict the cumulative directional change in exchange listings for RMs and CLs in the three years after the RM's first 10-K filing. Year T is the year that each RM filed its first 10-K. For every RM firm, we identify all firms from the same industry and exchange that also filed a 10-L in Year T. We then define the matched CL as the firm with a market value of equity closest to the RM firm as of the end of Year T. Panel A presents the proportion of firms that moved up in terms of their exchange tier (e.g., from Pink Sheet to OTCBB or NMS, or from OTCBB to NMS) or were acquired. Panel B presents the proportion of firms that moved down (e.g., from NMS to OTCBB or Pink Sheet, or from OTCBB to Pink Sheet) or were dead.

Figure 2 clearly depicts the differences between RMs and CLs in terms of their upward (Panel A) and downward (Panel B) mobility within the exchange tiers. We define an upward moving as if a firm moves from PINK to OTCBB or NMS, or from OTCBB to NMS, or if the firm is acquired. We define a downward moving as if a firm moves from NMS to OTCBB or PINK, or from OTCBB

to PINK, or if it is dead.[40] There are clearly more RMs moving up in exchange tiers than CLs. For example, at the end of Year T+3, 29.0 percent of the RMs trade on a higher tier than their initial exchange. In contrast, only 19.5 percent of the CLs move up in the exchange tiers. It also appears that fewer RMs move down in exchange tiers than CLs, but the difference is smaller. Later, we formally test the differences between RMs and CLs in the upward and downward mobility in Table 4.

CRMs versus U.S. RMs

We also compare the survival rates and changes in listing exchange between CRMs and U.S. RMs. Panel B of Table 3 reports the distribution by exchange for the two groups. In Year T, 93.2 percent of the CRMs trade on OTCBB, and only 4.1 percent trade on NMS, with the remainder quoted on PINK. In contrast, the distribution is more diverse for U.S. RMs, with 8.3 percent trading on NMS, 84.9 percent on OTCBB, and 6.8 percent on PINK. A Chi-square test ($\chi^2 = 6.02$) rejects the null that CRMs and U.S. RMs have same distributions by exchange in Year T.

Although there are fewer CRMs trading on NMS than U.S. RMs in Year T, in Panel B of Table 3, the CRMs catch up very quickly. By the end of Year T+1, 26.1 percent of CRMs trade on NMS, compared to 19.1 percent of U.S. RMs. By the end of Year T+3, the percentage of the CRMs trading on NMS is more than twice as many as the percentage of the U.S. RMs (51.4 percent versus 24.7 percent). Compared to their U.S. counterparts, CRMs are less likely to be defunct (0.6 percent versus 4.8 percent for U.S. RMs). These results show that CRMs not only appear healthier on Day 1, they also continue to perform better, in terms of avoiding default and delisting risk, than U.S. RMs.

Figure 3 clearly shows the difference between CRMs and U.S. RMs in terms of their movement up (Panel A) and down (Panel B) exchange tiers. Consistent with Panel B of Table 3, nearly half (49.3 percent) of the CRMs have moved to a higher-tiered exchange by the three-year anniversary date. In contrast, only 19.1 percent of the U.S. RMs have moved up, or have been acquired. CRMs are also more successful in avoiding downward moving: 22.6 percent of the CRMs were trading on a lower exchange tier at their three-year anniversary date, compared to 32.7 percent of the U.S. RMs.

To formally test the differences in upward and downward mobility between RMs and CLs, we estimate the following regression:

$$UP_{(t,t+i)} = \alpha + \beta_1 RM_t + \beta_2 INTRODUCTION_t + \beta_3 GROWTH_t$$
$$+ \beta_4 MATURE_t + \beta_5 SHAKE\text{-}OUT_t + \beta_6 SIZE_t + \varepsilon_{t+i} \quad (i = 1, 2, 3) \tag{1}$$

$$DOWN_{(t,t+i)} = \alpha + \beta_1 RM_t + \beta_2 INTRODUCTION_t + \beta_3 GROWTH_t$$
$$+ \beta_4 MATURE_t + \beta_5 SHAKE\text{-}OUT_t + \beta_6 SIZE_t + \varepsilon_{t+i} \quad (i = 1, 2, 3) \tag{2}$$

where *UP* (*DOWN*) is an indicator variable set to 1 if the firm moves up (down) in exchange tiers or is acquired (DEAD), and 0 otherwise; *RM* is an indicator variable set to 1 for RMs, and 0 for CLs; *INTRODUCTION, GROWTH, MATURE,* and *SHAKE-OUT* are the indicator variables for the respective life-cycle stages; *SIZE* is the logarithm of MCAP. The variable of interest is β_1. Based on the results in Figure 2, we expect β_1 to be positive in Equation (1) and negative in Equation (2).

Panel A of Table 4 reports the logistic regression results of Equation (1) and Equation (2). As expected, β_1 is significantly positive in Equation (1) in all three time periods, suggesting that RMs

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[40] We treat OTCBB as a higher exchange tier than PINK because firms traded on OTCBB are subject to more requirements (e.g., be current in the SEC filings). Alternatively, we define *UP* as firms move from the OTC markets to NMS or are acquired, and *DOWN* as firms move from NMS to the OTC markets or are dead. The results are similar.

TABLE 4
Comparison of Upward and Downward Mobility Controlling for Firm Size and Life-Cycle Stages

Panel A: Logistic Regression Comparing the RMs and Their CLs

	Move from T to T+1		Move from T to T+2		Move from T to T+3	
	UP	*DOWN*	*UP*	*DOWN*	*UP*	*DOWN*
Intercept	-3.55***	-1.74***	-2.97***	-0.71***	-2.95***	0.15
	(80.08)	(23.75)	(85.31)	(7.76)	(83.13)	(0.43)
RM	0.45**	-0.63**	0.72***	-0.49***	0.49***	-0.17
	(4.55)	(5.23)	(16.65)	(7.43)	(8.04)	(1.24)
INTRODUCTION	0.14	-0.28	0.09	0.18	0.21	-0.06
	(0.18)	(0.62)	(0.11)	(0.51)	(0.61)	(0.07)
GROWTH	0.04	0.17	0.76**	0.03	0.92***	-0.31
	(0.01)	(0.15)	(6.35)	(0.01)	(9.04)	(1.31)
MATURE	0.09	-0.22	0.43	-0.15	0.80**	-0.60**
	(0.05)	(0.21)	(1.53)	(0.19)	(5.64)	(3.95)
SHAKE-OUT	0.09	-0.54	0.44	-0.09	0.65*	-0.57
	(0.03)	(0.65)	(1.25)	(0.05)	(2.75)	(2.45)
SIZE	0.38***	-0.10	0.31***	-0.16***	0.31***	-0.19***
	(25.19)	(1.87)	(26.04)	(9.73)	(27.15)	(17.11)

Panel B: Logistic Regression Comparing the CRMs and U.S. RMs

	Move from T to T+1		Move from T to T+2		Move from T to T+3	
	UP	*DOWN*	*UP*	*DOWN*	*UP*	*DOWN*
Intercept	-1.76***	-3.19***	-2.83***	-2.39***	-1.27***	-2.58***
	(97.17)	(37.14)	(105.80)	(16.96)	(69.36)	(37.51)
	-1.66***	-0.99***	-1.44***	-2.93***	-0.72***	-0.08
	(92.99)	(7.40)	(80.72)	(41.34)	(28.87)	(0.07)
CN	0.60**	0.51	-0.51	-0.44	1.24***	0.88***
	(5.21)	(2.49)	(0.92)	(0.47)	(30.50)	(10.26)
	-0.36	-0.06	1.41***	1.05***	-0.51**	-0.24
	(1.37)	(0.03)	(37.64)	(14.10)	(4.50)	(0.68)
INTRODUCTION	0.50	-0.43	0.36	-0.09	0.46	-0.29
	(1.25)	(0.54)	(0.93)	(0.06)	(1.36)	(0.93)

TABLE 4 (continued)

	Move from T to T+1		Move from T to T+2		Move from T to T+3	
	UP	*DOWN*	*UP*	*DOWN*	*UP*	*DOWN*
GROWTH	0.33	−0.35	0.80*	−0.58	0.86*	−0.62
	(0.39)	(0.17)	(3.34)	(1.04)	(3.52)	(2.14)
MATURE	−0.37	−0.27	0.44	0.10	0.56	−0.38
	(0.22)	(0.05)	(0.61)	(0.02)	(0.91)	(0.44)
SHAKE-OUT	0.29	−0.55	0.18	−0.48	0.33	−0.45
	(0.19)	(0.23)	(0.10)	(0.48)	(0.32)	(0.77)
SIZE	0.30***	−0.04	0.29***	−0.19**	0.31***	−0.13*
	(9.48)	(0.09)	(12.75)	(5.20)	(13.71)	(3.52)

***, **, * Denote two-tailed statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Wald χ^2 statistics are reported in parentheses.

This table compares the upward and downward mobility in exchange tiers between RMs and CLs over the three years after the RM's first 10-K filing (Year T). Panel A reports logistic regression results comparing RMs with CLs. Panel B reports logistic regression results comparing CRMs with U.S. RMs. Firm life cycle is measured using the cash flow-based proxy developed by Dickinson (2011). Each life-cycle stage (i.e., *INTRODUCTION*, *GROWTH*, *MATURE*, *SHAKE-OUT*, and *DECLINE*) is an indicator variable set to 1 if the observation is in that stage in Year T, and 0 otherwise.

Variable Definitions:

UP = an indicator variable set to 1 if a firm moves from PINK to OTCBB or NMS, or from OTCBB to NMS, or if the firm is acquired, and 0 otherwise;

DOWN = an indicator variable set to 1 if a firm moves from NMS to OTCBB or PINK, or from OTCBB to PINK, or if the firm is dead, and 0 otherwise;
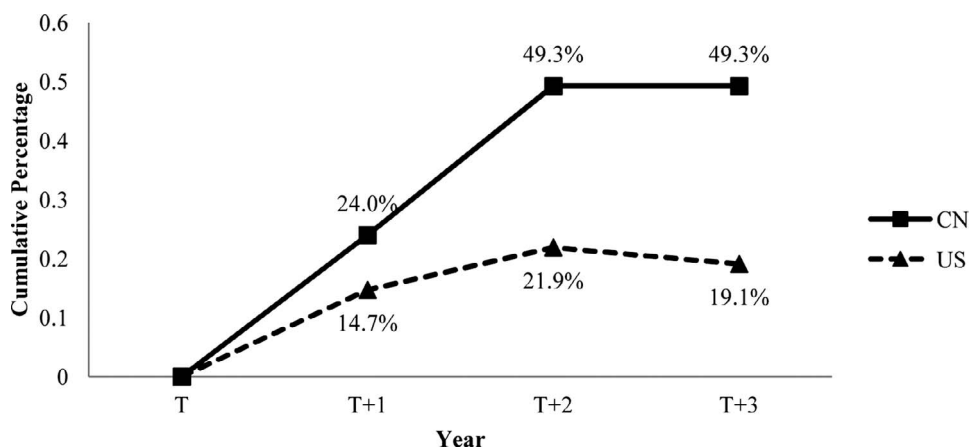
RM = an indicator variable set to 1 for RMs, and 0 for CLs;

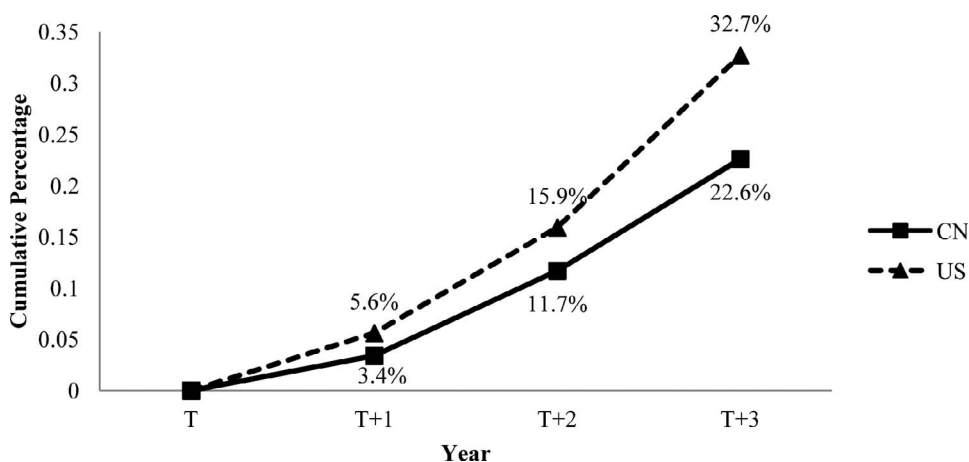*CN* = an indicator variable set to 1 for CRMs, and 0 for U.S. RMs; and

SIZE = the logarithm of firms' market value of equity at the end of Year T.

FIGURE 3
Changes in Exchange for Chinese and U.S. RMs

Panel A: Proportion of Firms that Moved Up or were Acquired

Panel B: Proportion of Firms that Moved Down or were Dead

These figures depict the cumulative directional change in exchange for CRMs and U.S. RMs. The sample includes 146 CRMs and 251 U.S. RMs. Year T is the year that each RM filed its first post-RM 10-K. Panel A presents the proportion of firms that moved up in terms of their exchange tiers (e.g., from Pink Sheet to OTCBB or NMS, or from OTCBB to NMS) or were acquired. Panel B presents the proportion of firms that moved down (e.g., from NMS to OTCBB or Pink Sheet, or from OTCBB to Pink Sheet) or were dead.

are more likely to move up in exchange tiers over the three years subsequent to their first 10-K filing, after controlling for the differences in firm life cycle and size. On the other hand, RMs are less likely to move down in exchange tiers in the first two years, as shown by the significantly negative β_1 in Equation (2) in the first two time periods. However, the difference in downward mobility between RMs and CLs is no longer significant by the end of Year T+3.

To compare CRMs and U.S. RMs, we replace the variable *RM* in Equation (1) and Equation (2) with *CN,* an indicator set to 1 for CRMs, and 0 for U.S. RMs, and estimate the regression within the RM sample. Panel B of Table 4 reports the results. For each time period, we first run the regression with *CN* as the sole predictor. Consistent with results in Figure 3, the coefficient on *CN* is significantly positive in the upward mobility regression in all three time periods, and significantly negative in the downward mobility regression by the end of Year T+3. We next run the regression with controls for life cycle and size. This test penalizes the country factor to some extent as we show that CRMs are bigger and more likely to be at a healthy stage (i.e., *GROWTH* and *MATURE*) than U.S. RMs. The results show that if we hold the size and life cycle constant, then CRMs are still much more likely to move up in exchange tiers than U.S. RMs, although the difference is not significant in the first year. On the other hand, the difference in downward mobility between the two samples disappears.

To summarize, the evidence so far suggests that RMs and CLs have similar characteristics in Year T except for market liquidity and the compositions in the *GROWTH* and the *MATURE* stages. Over the next three years, RMs have a significantly higher survival rate and upward mobility than CLs even after controlling for the differences in life-cycle stage. The comparison in Year T between CRMs and U.S. RMs shows that CRMs are much healthier than U.S. RMs in terms of market capitalization, financial constraint, operating performance, and business life cycle. CRMs also have a much higher survival rate and are more likely to move up in exchange tiers over the next three years.

Next, we compare the future performance between RMs and CLs and between CRMs and U.S. RMs, conditioning on both RMs and their matched CLs surviving at the end of Year T+3. This comparison will bias the results in favor of the CLs and the U.S. RMs, as they are more likely to fail. However, we perform the comparison to examine whether the U.S. RMs as a group have more positively skewed performance (i.e., whether the U.S. RM population contains a greater proportion of "lottery picks").

Comparison of Future Performance

As shown in Panel B of Table 2 and Panel B of Table 3, CRMs are generally larger in terms of market capitalization and are more likely to trade on OTCBB than their U.S. peers. To eliminate the effects of size, exchange, time, and industry on performance, we employ a difference-in-differences approach (DID) to compare future performance between CRMs and U.S. RMs. The sample for this test consists of 80 CRMs and 118 U.S. RMs with matched CLs that have non-missing financial data from Year T+1 to Year T+3. Panel A of Table 5 reports univariate comparison. For each performance metric, the value of the CLs is subtracted from the value of the RMs. The first (second) column under each year reports the summary statistics of the paired difference between Chinese (U.S.) RMs and their matched CLs. A positive (negative) number indicates that the value of the RMs is higher (lower) than the value of the CLs. The third column under each year reports the difference between the first and the second columns (i.e., the DID). A positive (negative) number in the third column indicates that the value of the CRMs is higher (lower) than the value of the U.S. RMs after controlling for the effects of size, exchange, industry, and time.

Panel A of Table 5 shows that CRMs have significantly higher *ROA* and *CFO* than their CLs in each of the three years. For example, the means of the paired differences in *ROA* between CRMs and CLs are 0.73, 0.69, and 0.90 in Years T+1, T+2, and T+3, respectively. All of these differences are significant at the 1 percent level. CRMs have fewer firms receiving qualified audit opinion (*AUQ*) than their CLs in all three years. However, the difference is not significant in Year

TABLE 5
Difference-in-Differences Comparison of Future Performance between Chinese and U.S. RMs

Panel A: Univariate Comparison of the CRMs, U.S. RMs and Their CLs

Variable		Year T+1 CN-CL	Year T+1 US-CL	Year T+1 DID	Year T+2 CN-CL	Year T+2 US-CL	Year T+2 DID	Year T+3 CN-CL	Year T+3 US-CL	Year T+3 DID
ROA	Mean	0.73***	−0.52	1.25** (2.38)	0.69***	−0.51	1.20** (2.41)	0.90***	−1.01**	1.91*** (3.38)
	Median	0.22***	−0.31**	0.53*** (4.27)	0.14***	−0.12	0.26*** (3.76)	0.16***	−0.10*	0.26*** (3.55)
CFO	Mean	0.39***	−0.20	0.59*** (2.81)	0.35***	−0.25	0.60*** (3.14)	0.42***	−0.12	0.54*** (2.80)
	Median	0.10***	−0.13**	0.23*** (4.59)	0.13***	−0.09*	0.22*** (3.91)	0.10***	−0.03	0.13*** (3.06)
AUQ	Mean	−0.20***	0.02	−0.22** (−2.19)	−0.13*	0.07	−0.20** (−1.98)	−0.10	0.00	−0.10 (−1.09)
	Median	0.00***	0.00	0.00** (−2.11)	0.00*	0.00	0.00** (−1.94)	0.00	0.00	0.00 (−1.15)
SPREAD	Mean	1.13	0.65	0.48 (0.16)	−11.38***	1.48	−12.86*** (−2.75)	−18.42***	−1.32	−17.10*** (−3.00)
	Median	0.32	0.53	−0.21 (−0.17)	−0.54	0.71	−1.25** (−2.05)	−2.27***	0.27	−2.54*** (−2.77)

For the paired difference (e.g., CN-CL): ***, **, * denote two-tailed statistical significance of the mean or the median at the 0.01, 0.05, and 0.10 levels, respectively.
For DID: t-statistics (Wilcoxon z-statistics) for the differences in mean (median) are reported in parentheses, and ***, **, * denote two-tailed statistical significance of the two-sample tests at the 0.01, 0.05, and 0.10 levels, respectively.

Panel B: Multivariate Regressions

	ROA T+1	*ROA* T+2	*ROA* T+3	*CFO* T+1	*CFO* T+2	*CFO* T+3	*AUQ* T+1	*AUQ* T+2	*AUQ* T+3	*SPREAD* T+1	*SPREAD* T+2	*SPREAD* T+3
Intercept	−2.83*** (−5.09)	−1.77*** (−3.57)	−2.03*** (−3.47)	−0.96*** (−4.47)	−0.90*** (−4.59)	−0.76*** (−4.07)	0.74*** (3.83)	0.38 (1.01)	1.27*** (10.51)	37.86*** (14.45)	42.84*** (11.73)	55.99*** (11.63)

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TABLE 5 (continued)

	ROA			CFO			AUQ			SPREAD		
	T+1	T+2	T+3	T+1	T+2	T+3	T+1	T+2	T+3	T+1	T+2	T+3
RM	−0.29	−0.33	−0.85**	−0.09	−0.16	−0.04	−0.03	0.13	−0.17	1.91	0.65	−2.06
	(−0.72)	(−0.91)	(−1.99)	(−0.55)	(−1.11)	(−0.26)	(0.01)	(0.24)	(0.39)	(0.92)	(0.23)	(−0.56)
CN	0.85*	0.51	0.20	0.27	0.23	0.08	0.02	−0.30	−0.31	0.86	5.75*	4.00
	(1.88)	(1.27)	(0.42)	(1.53)	(1.46)	(0.50)	(0.00)	(0.95)	(0.98)	(0.37)	(1.77)	(0.90)
RM * CN	0.56	0.75*	1.53**	0.29	0.34*	0.33*	−0.79*	−0.50	−0.03	4.53	−7.08*	−11.75*
	(0.85)	(1.68)	(2.19)	(1.54)	(1.68)	(1.67)	(2.90)	(1.13)	(0.01)	(1.32)	(−1.70)	(−1.89)
INTRODUCTION	0.81*	0.21	0.87*	0.19	0.22	0.04	−0.01	−0.03	−0.04	−4.17*	−5.93*	−4.18
	(1.73)	(0.51)	(1.77)	(1.07)	(1.31)	(0.25)	(0.00)	(0.01)	(0.02)	(−1.80)	(−1.84)	(−0.96)
GROWTH	2.04***	1.12**	1.43**	0.81***	0.73***	0.49**	−0.36	−0.83*	−0.71*	−5.23*	−8.67**	−1.68
	(3.35)	(2.06)	(2.23)	(3.44)	(3.42)	(2.37)	(0.74)	(3.81)	(2.88)	(−1.74)	(−2.10)	(−0.31)
MATURE	2.19***	1.41**	1.87***	0.90***	0.82***	0.63***	−1.11**	−1.03**	−1.43***	−1.55	−8.21*	−3.04
	(3.39)	(2.44)	(2.75)	(3.60)	(3.60)	(2.90)	(5.59)	(4.82)	(8.88)	(−0.48)	(−1.86)	(−0.51)
SHAKE-OUT	2.28***	1.43***	2.04**	0.84***	0.73***	0.39	−0.65	−1.04*	−0.99*	−4.93	−2.38	1.62
	(3.00)	(2.11)	(2.55)	(2.91)	(2.78)	(1.56)	(1.55)	(3.62)	(3.39)	(−1.27)	(−0.46)	(0.24)
SIZE	0.02	0.00	−0.05	−0.02	0.00	0.01	−0.17**	−0.08	−0.24***	−5.14***	−4.77***	−6.90***
	(0.20)	(−0.04)	(−0.42)	(−0.51)	(−0.12)	(0.38)	(5.18)	(1.01)	(9.25)	(−10.40)	(−7.21)	(−7.43)
Adj. R²	10.0%	6.8%	6.3%	11.4%	11.7%	7.5%	—	—	—	16.6%	10.1%	12.1%

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests.
t-statistics (or Wald χ^2 statistics if AUQ is the dependent variable) are reported in parentheses.
This table reports a difference-in-differences (DID) comparison of future performance between CRMs and U.S. RMs. To assess the future performance at the RMs' three-year anniversary dates, we require that both the RM and the matched CL have non-missing financial data from Year T+1 to Year T+3. The sample consists of 80 CRMs and 118 U.S. RMs with their matched CLs. Panel A reports univariate comparison. For each performance measure, the value of the CLs is subtracted from the value of the RMs to eliminate the effects of year, industry, exchange, and firm size.
Panel B reports multivariate regression results. Firm life cycle is measured using the cash flow-based proxy developed by Dickinson (2011). Each life-cycle stage (i.e., *INTRODUCTION, GROWTH, MATURE, SHAKE-OUT*, and *DECLINE*) is an indicator variable set to 1 if the observation is in that stage in Year T, and 0 otherwise.

T+3. Moreover, CRMs have comparable market liquidity to CLs in year T+1, but become more liquid than CLs in Years T+2 and T+3, with the difference significant at the 1 percent level for both years.

In contrast to CRMs, Table 5, Panel A shows that U.S. RMs generally have lower *ROA* and *CFO* than their CLs. U.S. RMs are comparable to their CLs in terms of market liquidity and the percentage of firms receiving a qualified audit opinion. The DID comparison shows that CRMs have significantly higher *ROA* and *CFO* than their U.S. peers after eliminating the effects of size, exchange, time, and industry. CRMs are also less likely to receive a qualified audit opinion than U.S. RMs, although the difference is not significant in Year T+3. Finally, CRMs become more liquid than U.S. RMs over time, consistent with the better upward mobility of CRMs shown in Table 4.

Panel B of Table 5 reports multivariate regression results. For each performance metric, we estimate the following regression:

$$VAR_{(t+i)} = \alpha + \beta_1 RM_t + \beta_2 CN_t + \beta_3 RM*CN_t + \beta_4 INTRODUCTION_t$$
$$+ \beta_5 GROWTH_t + \beta_6 MATURE_t + \beta_7 SHAKE\text{-}OUT_t + \beta_8 SIZE_t + \varepsilon_{t+i} \quad (i = 1, 2, 3)$$

(3)

where *VAR* represents each performance metric; *CN* is an indicator set to 1 for CRMs and their matched CLs, and 0 for U.S. RMs and their matched CLs. Using this model specification, we are able to compare the future performance of CRMs and U.S. RMs while controlling for the differences in life cycle, as shown in Table 2. The variable of interest is β_3, the coefficient of *RM* ∗ *CN*, which measures the DID comparison.

As Panel B of Table 5 shows, β_3 is positive and statistically significant in Years T+2 and T+3 when the performance metric is *ROA* or *CFO*. The results suggest that CRMs still report significantly higher earnings and cash flows than their U.S. peers in Years T+2 and T+3, after eliminating the effects of size, exchange, time, industry, and business life cycle. When the performance metric is *AUQ*, β_3 is negative, but only statistically significant in Year T+1. This suggests that CRMs are still less likely to receive a qualified audit opinion than U.S. RMs in Year T+1 if both groups are at the same life-cycle stage. Finally, when the performance metric is *SPREAD*, β_3 is negative and statistically significant except for Year T+1. This confirms that CRMs experience faster market liquidity improvements than U.S. RMs.

In short, the results of the DID analyses in Table 5 suggest that CRMs generally fare much better than U.S. RMs after taking into account the confounding effects of size, exchange, time, industry, and business life cycle.

Comparison of Future Stock Returns

Annual Buy-Hold Raw Returns

Next, we compare future stock returns realized by RMs and CLs. We caution that due to the low stock prices prevalent in all these samples, return calculations are extremely noisy, and comparisons of actual returns may not be as meaningful as other performance metrics that are already reported. Nevertheless, it seems important to understand how investors in the CRM and U.S. RM samples have fared relative to those in the CL sample.

Panel A of Table 6 presents the comparison of the return distributions between CRMs and U.S. RMs. The return distributions of both CRMs and U.S. RMs exhibit great positive skewness and large variance. For example, in Year T+1, the 95th percentile of the annual buy-hold return distribution is 349 percent for CRMs and 234 percent for U.S. RMs, respectively. The interquartile range is 124 percent for CRMs and 78 percent for U.S. RMs. On average, CRMs earned 32 percent while U.S. RMs earned 5 percent in Year T+1, although the difference is not

TABLE 6

A Comparison of Future Stock Returns between Chinese RMs, U.S. RMs, and Their Respective Matching Firms

Panel A: Future Stock Returns of the CRMs and U.S. RMs After the First 10-K Filing

		Mean	95th	90th	75th	Median	25th	10th	5th
Year T+1	CN	0.32**	3.49	1.60	0.58	−0.24**	−0.66	−0.85	−0.96
	US	0.05	2.34	1.35	0.00	−0.43***	−0.78	−0.96	−0.99
	Diff.	0.27				0.19***			
		(1.32)				(2.88)			
Year T+2	CN	0.13	2.47	1.61	0.34	−0.34***	−0.70	−0.88	−0.93
	US	−0.07	2.55	0.91	0.00	−0.50***	−0.79	−0.96	−1.00
	Diff.	0.20				0.16***			
		(1.23)				(2.65)			
Year T+3	CN	−0.09	2.56	0.89	0.00	−0.41***	−0.70	−0.89	−0.98
	US	−0.16**	1.50	0.84	0.13	−0.42***	−0.65	−0.90	−0.98
	Diff.	0.07				0.01			
		(1.25)				(1.26)			
Three-Year Cumulative	CN	−0.17	1.41	0.64	−0.15	−0.71***	−0.91	−0.99	−1.00
	US	−0.32***	2.30	0.53	−0.49	−0.86***	−0.99	−1.00	−1.00
	Diff.	0.15				0.15***			
		(0.60)				(3.46)			

***, **, * Denote two-tailed statistical significance of the mean and the median at the 0.01, 0.05, and 0.10 levels, respectively.

Panel B: Future Stock Returns Adjusted for the RM's Domicile Country Market Index Return

		Mean	95th	90th	75th	Median	25th	10th	5th
Year T+1	CN	0.10	2.46	1.00	0.24	−0.29***	−0.70	−0.83	−0.95
	US	−0.02	2.13	1.12	0.01	−0.47***	−0.80	−0.96	−0.99
	Diff.	0.12				0.18**			
		(0.62)				(2.05)			
Year T+2	CN	−0.03	1.80	1.31	0.11	−0.41***	−0.69	−0.88	−0.93
	US	−0.14	2.10	0.75	−0.09	−0.49***	−0.77	−0.95	−1.00
	Diff.	0.11				0.08*			
		(0.71)				(1.74)			
Year T+3	CN	−0.15	1.48	0.47	−0.05	−0.41***	−0.66	−0.86	−0.96
	US	−0.29**	1.26	0.65	0.01	−0.51***	−0.83	−1.00	−1.00
	Diff.	0.17				0.10*			
		(1.25)				(1.68)			
Three-Year Cumulative	CN	0.08	1.11	0.36	−0.43	−0.76**	−0.95	−0.98	−1.00
	US	−0.41***	1.69	0.39	−0.48	−0.88***	−0.99	−1.00	−1.00
	Diff.	0.49				0.12***			
		(1.11)				(2.63)			

***, **, * Denote two-tailed statistical significance of the mean and the median at the 0.01, 0.05, and 0.10 levels, respectively.

TABLE 6 (continued)

Panel C: Difference-in-Differences Comparison of Future Returns between CRMs and U.S. RMs

		Mean	95th	90th	75th	Median	25th	10th	5th
Year T+1	RM-CL	0.15	3.27	1.77	0.56	−0.08	−0.61	−1.25	−1.81
	CN-CL (a)	0.11	3.70	1.91	0.84	0.03	−0.56	−1.23	−2.57
	US-CL (b)	0.16	2.89	1.69	0.40	−0.18**	−0.59	−1.22	−1.54
	DID (a − b)	−0.06				0.21*			
		(−0.21)				(1.68)			
Year T+2	RM-CL	0.13*	2.15	1.37	0.49	0.00	−0.51	−0.93	−1.20
	CN-CL (a)	0.31**	2.73	1.78	0.74	0.09	−0.43	−0.85	−1.31
	US-CL (b)	0.06	1.98	0.88	0.40	−0.02	−0.50	−0.90	−1.13
	DID (a − b)	0.25				0.11*			
		(1.58)				(1.87)			
Year T+3	RM-CL	−0.02	1.64	1.05	0.38	−0.12*	−0.51	−0.97	−1.70
	CN-CL (a)	0.06	2.01	1.11	0.31	−0.13*	−0.53	−0.97	−1.36
	US-CL (b)	−0.02	1.64	1.17	0.38	−0.08*	−0.59	−1.15	−1.84
	DID (a − b)	0.08				−0.05			
		(0.64)				(−0.39)			
Three-Year Cumulative	RM-CL	0.07	1.87	1.05	0.29	−0.02	−0.55	−1.12	−2.00
	CN-CL (a)	0.10	1.72	1.33	0.49	0.00	−0.60	−1.14	−2.02
	US-CL (b)	0.03	1.87	0.87	0.21	−0.03*	−0.50	−1.04	−1.84
	DID (a − b)	0.07				0.03			
		(0.24)				(1.02)			

***, **, * Denote two-tailed statistical significance of the mean and the median at the 0.01, 0.05, and 0.10 levels, respectively.

For the DID measures, ***, **, * denote two-tailed statistical significance of the difference in mean (median) at the 0.01, 0.05, and 0.10 levels, respectively, using two-sample t-tests (Wilcoxon Rank-Sum test).

The t-statistics for the difference in mean and Wilcoxon Rank-Sum test z-statistics for the difference in median are reported in parentheses.

This table compares future stock returns between CRMs and U.S. RMs over the three years after the RM's first 10-K filing (Year T). The raw monthly returns are extracted from DataStream (data type = RI) and adjusted for delisting and acquisition. We set all delisting returns equal to −100 percent. For acquisitions, we collect the acquisition prices and the liquidation value is reinvested equally in all the other firms in the same group. We report results over the 12 months starting four months after Years T, T+1, and T+2, respectively, and the three-year cumulative returns. In Panel A, table values represent summary statistics for the RMs' raw returns. In Panel B, table values represent each RM's raw return minus the return of the market index for the country of domicile: that is, the China A-share index return for CRMs and the S&P 500 index return for U.S. RMs. In Panel C, we report summary statistics for the paired differences in future returns between RMs and their controls firms (CLs), as well as a difference-in-differences (DID) comparison between CRMs and U.S. RMs.

statistically significant. The median annual return is −24 percent for CRMs, compared to −43 percent for U.S. RMs (Wilcoxon z-statistic on the difference is 2.88). Overall, CRMs earn higher stock returns in Year T+1 than U.S. RMs, with similar results over the next two years. Focusing on the three-year cumulative returns for the two groups, CRMs, on average, lose 17 percent of shareholders' value, while U.S. RMs, on average, lose 32 percent. The median three-year cumulative returns are −71 percent and −86 percent for CRMs and U.S. RMs, respectively, with the difference significant at the 1 percent level (z = 3.46). Overall, our results show that the typical RM loses value for investors over the three years after their first 10-K filing. However, the distribution is highly positively skewed, and CRMs collectively report significantly higher returns than U.S. RMs.

Annual Returns Adjusted for the RM's Domicile Country Market Index Return

A potential concern of the results in Panel A of Table 6 is that the stronger market performance of CRMs stems from the booming Chinese economy over the sample period.[41] To examine this possibility, we use two market index returns, the China A-share index and the S&P 500 index, to proxy for the macroeconomic conditions in China and the U.S., respectively. We then compare the two RM samples using returns adjusted for the RM's domicile country market index return. The results are reported in Panel B of Table 6. In general, the adjustment indeed has bigger impact on CRMs than U.S. RMs. However, after controlling for the macroeconomic conditions in both countries, CRMs still collectively report higher returns than U.S. RMs, with the difference significant in all three years. Overall, the results in Panel B of Table 6 indicate that the superior market performance of CRMs is not driven entirely by the booming Chinese economy.

Difference-in-Differences Analysis of Stock Returns

Finally, we also use a DID approach to eliminate the confounding effects of size, exchange, time, and industry on stock returns. Panel C of Table 6 reports the summary statistics of the paired differences in future stock returns between RMs and their matching control firms (CLs), as well as a DID comparison between CRMs and U.S. RMs. The results show that after controlling for the confounding effects of size, exchange, time, and industry, CRMs as a group still earn higher returns than U.S. RMs. For example, in Year T+1, the median CRM outperformed its matching control firm by 3 percent, while the median U.S. RM underperformed its control firm by 18 percent. The difference of 21 percent is statistically significant at the 10 percent level (Wilcoxon $z = 1.68$). Cumulatively over the three years, the DID comparison also favors the CRMs, although the difference is not statistically significant. Once again, we find little evidence in market performance to support the notion that CRMs are inherently more toxic.

Predicting Future Prospects of CRMs and U.S. RMs

In this section, we examine whether the RMs' characteristics at the inception can help investors predict the future prospects of these firms. The outcome measures we examine include upward/ downward exchange mobility and cumulative stock return from Year T to T+3. We adjust the RM's cumulative return by its matched CL's return over the same period (denoted as RETCLA), and by the return of the market index for the RMs' country of domicile (denoted as RETMKA). We regress these outcome variables measured as of the end of Year T+3 on the RMs' characteristics in Year T, which include *ROA, AUQ, LEV,* an indicator of the firm's life-cycle stage, *SIZE,* and *PIPE* (the indicator of PIPE financing before filing the first 10-K).

In Panel A of Table 7, we report the results for CRMs. Among the firm characteristics as of Year T, we find some (weak) evidence that CRMs with higher *ROA,* lower *LEV,* or larger *SIZE* have more positive prospects. The most consistent predictor of future success over the next three years is *PIPE*. Specifically, CRMs with early PIPE financing are more (less) likely to move up (down) in exchange tiers. Moreover, these CRMs also earn higher control-adjusted and market-adjusted returns. These findings are analogous to prior studies in the VC literature. For example, Brav and Gompers (1997) and Tian (2011) show that early-stage VC financing is positively associated with start-ups' propensity to go public and their post-IPO performance.

In Panel B of Table 7, we report the results for U.S. RMs. We find some (weak) evidence that U.S. RMs with clean audit opinions, lower leverage, or larger size have more positive prospects.

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[41] According to Yahoo Finance, the China A-share market index increased by 32.13 percent from 2001 to 2010. In contrast, the S&P 500 index dropped by 3.14 percent over the same period.

TABLE 7

Predicting Future Prospects of Chinese and U.S. RMs

Panel A: Predicting Future Outcome of CRMs

	UP	*DOWN*	*RETCLA*	*RETMKA*
Intercept	−1.68*	−1.25	−3.64**	−0.08
	(2.70)	(1.64)	(−2.46)	(−0.14)
ROA	2.71**	0.74	−0.84	1.01***
	(4.72)	(1.27)	(−1.06)	(3.65)
AUQ	−0.71	0.33	−0.06	0.07
	(1.80)	(0.40)	(−0.07)	(0.25)
LEV	0.92	0.96*	−0.88	−0.96***
	(1.19)	(2.68)	(−1.17)	(−3.69)
INTRODUCTION	0.16	−0.04	4.04***	0.12
	(0.03)	(0.00)	(2.94)	(0.24)
GROWTH	0.36	−0.54	3.62***	0.37
	(0.17)	(0.43)	(2.74)	(0.78)
MATURE	−0.21	−0.24	4.33***	1.07**
	(0.05)	(0.07)	(2.95)	(2.03)
SHAKE-OUT	−1.11	0.04	4.07**	0.29
	(1.04)	(0.00)	(2.44)	(0.49)
SIZE	0.19	0.02	0.15	0.13*
	(2.00)	(0.02)	(0.75)	(1.86)
PIPE	0.71**	−0.67*	0.36*	0.47**
	(3.98)	(2.81)	(1.86)	(2.01)

Panel B: Predicting Future Outcome of U.S. RMs

	UP	*DOWN*	*RETCLA*	*RETMKA*
Intercept	−2.87***	−0.77	0.15	−0.27
	(13.39)	(2.56)	(0.23)	(−0.95)
ROA	−0.01	0.01	0.07	0.01
	(0.04)	(0.02)	(1.09)	(0.52)
AUQ	−0.58	0.72**	−0.05	−0.39**
	(2.18)	(4.42)	(−0.11)	(−2.03)
LEV	−0.13	0.09**	−0.02	−0.01
	(1.26)	(4.06)	(−0.43)	(−0.50)
INTRODUCTION	0.08	−0.03	−0.43	−0.13
	(0.02)	(0.01)	(−0.91)	(−0.61)
GROWTH	−0.82	0.28	−0.39	−0.31
	(0.81)	(0.20)	(−0.46)	(−0.83)
MATURE	0.51	−0.29	3.75***	0.33
	(0.17)	(0.06)	(2.66)	(0.57)
SHAKE-OUT	0.84	−0.67	0.36	−0.07
	(0.60)	(0.31)	(0.28)	(−0.12)
SIZE	0.27**	−0.12	0.02	−0.02
	(4.02)	(1.55)	(0.17)	(−0.44)
PIPE	1.06**	−0.30	0.31	0.36*
	(4.22)	(0.79)	(0.69)	(1.78)

***, **, * Denote two-tailed statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

(continued on next page)

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TABLE 7 (continued)

Wald χ^2 statistics (or t-statistics if *RETCLA* or *RETMKA* is the dependent variable) are reported in the parentheses. This table reports the regression results of the outcome measures of CRMs and U.S. RMs in Year T+3 on the firms' characteristics in Year T (i.e., the year of the RM's first 10-K filing). Firm life cycle is measured using the cash flow-based proxy developed by Dickinson (2011). Each life-cycle stage (i.e., *INTRODUCTION, GROWTH, MATURE, SHAKE-OUT,* and *DECLINE*) is an indicator variable set to 1 if the observation is in that stage in Year T, and 0 otherwise.

Variable Definitions:
UP = an indicator variable set to 1 if a firm moves from PINK to OTCBB or NMS, or from OTCBB to NMS, or if the firm is acquired over the three years from Year T to T+3, and 0 otherwise;
DOWN = an indicator variable set to 1 if a firm moves from NMS to OTCBB or PINK, or from OTCBB to PINK, or if the firm is dead, and 0 otherwise;
RETCLA = the RM's cumulative stock return over the three years starting four months after Year T, adjusted by the matched CL's return over the same period;
RETMKA = the RM's cumulative stock return over the three years starting four months after Year T, adjusted by the return of the market index for the country of domicile; that is, the China A-share index return for CRMs and the S&P 500 index return for U.S. RMs;
ROA = income before extraordinary items divided by total assets of Year T;
AUQ = an indicator variable set to 0 if auditor issues an unqualified audit opinion for Year T, and 1 otherwise;
LEV = total short-term and long-term debts divided by total assets of Year T;
SIZE = the logarithm of firms' market value of equity at the end of Year T; and
PIPE = an indicator variable set to 1 if the RM firm raises equity financing through private placements between the merger date and the reporting date of the first 10-K filing, and 0 otherwise.

The PIPE variable also has some ability to predict upward exchange mobility and market-adjusted returns for U.S. RMs, but the results are generally weaker than what we find for CRMs.

Snapshot at the End of 2013

In early June 2011, the SEC warned investors against investing in firms listing via RMs. In the same year, over 20 U.S.-listed CRMs were either delisted or halted from trading, while a number of others had auditor changes or were the target of short sellers. In Appendix A, we report 52 CRMs accused of fraud by the media, short sellers, or the SEC from January 2001 to October 2012.[42] Our sample includes 42 of these firms.

As shown in Appendix A, a vast majority of the fraud firms were demoted to Pink Sheet by the end of 2013. In the aftermath of these scandals, CRMs, as a group, were put under the spotlight, and heavily scrutinized by investors, stock exchanges, and regulators. During this process, all U.S.-listed Chinese companies, including non-fraudulent RMs and IPOs, suffered for the sins of the few, while U.S. RMs and RMs from other countries were largely spared (see Darrough et al. 2013). As a robustness test, we imposed the maximum penalty on RMs, particularly CRMs, by examining their survival rate at the end of 2013 and their cumulative stock returns from the inception (Year T) to the end of 2013.

Panel A of Table 8 presents the distribution by exchange of the RMs and CLs in Year T and at the end of 2013. Although RMs and CLs started off on the same exchange, RMs were more likely to trade on NMS (20.5 percent versus 15.1 percent), and less likely to be acquired (4.5 percent

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[42] Note that nine of the 52 CRMs (China Automotive Systems, New Energy Systems Group, Fushi Copperweld, Gulf Resources, Orient Paper, China Marine Food Group, China Green Agriculture, SkyPeople Fruit Juice, and Yongye International) were accused of fraud by short sellers or class action litigations. The companies' stock prices dropped significantly following the issuance of short-sale reports or the filing of litigation. However, as of December 2013, the SEC and the listing stock exchanges had not found any wrongdoing in these companies. Among them, New Energy Systems Group and China Marine Food Group voluntarily delisted their stocks from the NYSE, while the remaining seven firms were still trading on their respective NMS exchanges.

TABLE 8
Survivorship and Cumulative Stock Return from Inception to 2013

Panel A: Distribution by Exchange for the RMs and Their CLs as of the End of 2013

	Full Sample (424 RMs/CLs)				Chinese RMs (146 RMs/CLs)				U.S. RMs (251 RMs/CLs)			
	Year T	2013			Year T	2013			Year T	2013		
	RMs or CLs	RMs	CLs	Diff.	RMs or CLs	RMs	CLs	Diff.	RMs or CLs	RMs	CLs	Diff.
NMS	6.8%	20.5%	15.1%		4.1%	28.8%	15.1%		8.4%	16.3%	14.3%	
OTCBB	88.0%	7.1%	5.4%	$\chi^2 = 23.40$	93.2%	12.3%	8.9%	$\chi^2 = 27.26$	84.9%	4.8%	3.2%	$\chi^2 = 7.35$
				p = 0.000				p = 0.000				p = 0.118
PINK	5.2%	47.2%	39.9%		2.7%	40.4%	29.5%		6.8%	50.2%	45.8%	
				Fisher's exact test:				Fisher's exact test:				Fisher's exact test:
ACQ		4.5%	10.6%	p = 0.000		4.1%	10.3%	p = 0.000		4.4%	10.0%	p = 0.117
DEAD		20.8%	29.0%			14.4%	36.3%			24.3%	26.7%	
Total	100%	100%	100%		100%	100%	100%		100%	100%	100%	

Panel B: Logistic Regression of Upward and Downward Mobility

	RMs versus CLs		CRMs versus CLs		U.S. RMs versus CLs		CRMs versus U.S. RMs	
	UP	DOWN	UP	DOWN	UP	DOWN	UP	DOWN
Intercept	−2.40***	1.86***	−2.22***	2.10***	−2.74***	2.00***	−2.59***	1.22***
	(60.83)	(51.03)	(14.67)	(15.27)	(44.21)	(35.63)	(33.10)	(10.41)
RM	−0.02	−0.04	0.42*	−0.36	−0.06	−0.01	−0.07	−0.01
	(0.01)	(0.05)	(2.99)	(1.81)	(0.06)	(0.00)	(0.10)	(0.00)
CN							0.03	−0.02
							(0.02)	(0.01)
RM * CN							0.60*	−0.26
							(2.73)	(0.58)

TABLE 8 (continued)

	RMs versus CLs		CRMs versus CLs		U.S. RMs versus CLs		CRMs versus U.S. RMs	
	UP	*DOWN*	*UP*	*DOWN*	*UP*	*DOWN*	*UP*	*DOWN*
INTRODUCTION	-0.08	-0.01	0.48	-0.97*	-0.37	0.37	-0.08	-0.06
	(0.08)	(0.00)	(0.79)	(3.81)	(1.23)	(1.86)	(0.08)	(0.06)
GROWTH	0.51*	-0.42	0.61	-0.93*	0.38	-0.24	0.40	-0.34
	(2.79)	(2.40)	(1.15)	(3.11)	(0.73)	(0.39)	(1.41)	(1.35)
MATURE	0.57*	-0.60**	0.71	-1.29**	0.42	-0.28	0.46	-0.57*
	(3.07)	(4.25)	(1.44)	(5.64)	(0.79)	(0.47)	(1.76)	(3.34)
SHAKE-OUT	0.66*	-0.52	0.44	-1.00	1.04**	-0.63	0.68*	-0.67*
	(3.11)	(2.34)	(0.41)	(2.56)	(4.35)	(1.81)	(2.94)	(3.44)
SIZE	0.26***	-0.28***	0.12	-0.16**	0.38***	-0.37***	0.26***	-0.28***
	(19.26)	(29.04)	(1.91)	(3.97)	(19.80)	(26.34)	(16.96)	(27.05)
TLAG							0.02	0.11***
							(0.29)	(7.54)

Panel C: Cumulative Stock Return from the First 10-K Date to 2013

	Mean	Median	5th	10th	25th	75th	90th	95th
RM-CL	0.08	0.00	-1.83	-1.31	-0.47	0.07	1.12	2.58
CN-CL	0.14	0.00	-1.83	-1.10	-0.38	0.22	1.76	2.58
US-CL	0.05	0.00	-1.64	-1.41	-0.48	0.06	0.81	2.08

Panel D: Cumulative Stock Return from the Reverse Merger Date to 2013

	Mean	Median	5th	10th	25th	75th	90th	95th
RM-CL	0.36*	0.00	-2.80	-1.61	-0.51	0.17	1.86	4.33
CN-CL	0.55*	0.00	-3.36	-1.58	-0.48	0.42	2.51	6.62
US-CL	0.21	0.00	-1.93	-1.50	-0.50	0.06	1.31	3.08

***, **, * Denote two-tailed statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. Wald χ^2 statistics are reported in the parentheses.

TABLE 8 (continued)

This table reports survivorship, exchange mobility, and cumulative stock return of RMs and CLs from the year of the RM's first 10-K filing (Year T) to the end of 2013. Panel A presents the proportion of RMs and CLs in each of three exchange tiers: NMS, OTCBB, PINK, as well as the proportion of firms that are either acquired (ACQ) or deregistered due to bankruptcy or registration revoked by the SEC (DEAD). Panel B reports the logistic regressions of upward and downward mobility as of the end of 2013. Panel C (Panel D) reports the paired difference of cumulative stock returns of RMs and CLs over the period starting four months after Year T (five trading days after the reverse-merger date) to the end of 2013. The raw monthly returns are extracted from DataStream (data type = RI) and adjusted for delisting and acquisition. We set all delisting returns equal to −100 percent. For acquisitions, we collect the acquisition prices, and the liquidation value is reinvested equally in all the other firms in the same group. Firm life cycle is measured using the cash flow-based proxy developed by Dickinson (2011). Each life-cycle stage (i.e., *INTRODUCTION, GROWTH, MATURE, SHAKE-OUT*, and *DECLINE*) is an indicator variable set to 1 if the observation is in that stage in Year T, and 0 otherwise.

Variable Definitions:

UP = an indicator variable set to 1 if a firm moves from PINK to OTCBB or NMS, or from OTCBB to NMS, or if the firm is acquired, and 0 otherwise;
DOWN = an indicator variable set to 1 if a firm moves from NMS to OTCBB or PINK, or from OTCBB to PINK, or if the firm is dead, and 0 otherwise;
RM = an indicator variable set to 1 for RMs, and 0 for CLs;
CN = an indicator variable set to 1 for CRMs, and 0 for U.S. RMs;
SIZE = the logarithm of firms' market value of equity at the end of Year T; and
TLAG = the number of years between the first 10-K date and the end of 2013.

versus 10.6 percent) or dead (20.8 percent versus 29.0 percent) than CLs. Moreover, 47.2 percent of RMs and 39.9 percent of CLs were quoted on Pink Sheet at the end of 2013. A Chi-square test ($\chi^2 =$ 23.40) rejects the null that the two groups have same distributions by exchange in 2013.

The next set of results in Panel A of Table 8 shows that although only 4.1 percent of the CRMs started on one of the NMS exchanges, 28.8 percent were trading on NMS by the end of 2013, compared to 15.1 percent in the CL group. Consistent with the fact that most of the fraudulent CRMs were demoted to Pink Sheet by the end of 2013, the proportion of Pink Sheet firms in the CRMs (40.4 percent) is higher than that in the CL group (29.5 percent). However, the proportion of firms that were actually dead by the end of 2013 was significantly lower among the CRMs (14.4 percent) than in the CL group (36.3 percent). Overall, CRMs outperformed their CLs in terms of survival rate and upward mobility, even after the strongly negative publicity associated with 2010 and 2011.

For reference, we also compare U.S. RMs with their CLs. Our results in Table 8, Panel A show that the two groups had similar distributions by exchanges as of the end of 2013 ($\chi^2 = 7.35$). Approximately 16 percent of the firms in each group were traded on NMS, 50 percent were quoted on Pink Sheet, and 24 percent were dead.

In Panel B of Table 8, we use regression analysis to compare the upward and downward mobility of RMs and CLs while controlling for the differences in firm life cycle. The first column shows that RMs and CLs have similar upward mobility scores as of the end of 2013, as indicated by the insignificant coefficients on the *RM* indicator. The coefficient on *RM* in the upward mobility regression is positive and statistically significant at the 10 percent level ($\chi^2 = 2.99$) in the CRM sample, but negative and insignificant in the U.S. RM sample, indicating that CRMs have superior upward mobility than their control firms.

Finally, we adopt the DID approach to compare CRMs with U.S. RMs. To control for the difference in merger year between CRMs and U.S. RMs, we add the variable *TLAG,* which measures the number of years between the first 10-K date and December 31, 2013. In the upward mobility regression in Panel B of Table 8, the coefficient on the interaction term between *RM* and *CN* is positive and significant at the 10 percent level ($\chi^2 = 2.73$), indicating that CRMs dominated U.S. RMs in terms of upward mobility as of the end of 2013.[43]

In Panel C of Table 8, we compare the cumulative stock returns of RMs and CLs from Year T to the end of 2013. The paired differences between RMs and CLs have a positive, yet insignificant, mean of 8 percent. The median of the paired differences is 0 percent, suggesting that RMs and CLs perform similarly in terms of creating value for the shareholders. The mean and median of the paired differences between CRMs and CLs are 14 percent and 0 percent, respectively, with neither statistic being significant. Despite suffering from extremely negative public sentiment, CRMs still generated comparable stock returns to their CLs. The comparison between U.S. RMs and their CLs yields similar results.

One potential concern of the results in Table 8, Panel C is that some RM investors may lose their investment before the firm files the first 10-K. To address this concern, we expand the return measurement window of RMs and CLs to include the period before the first 10-K date. Specifically,

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[43] As a robustness test, we also model the hazard rate of *DEAD,* an indicator variable that assumes a value of 1 when the firm is deregistered due to either bankruptcy or SEC action, and 0 otherwise. To conduct this test, we track the time from Year T through to the deregistration event (*DEAD*) for each *RM* and *CL,* through to the end of 2013. Our (untabulated) results show that RMs have significantly lower hazard rates than CLs, which is driven primarily by the CRMs. In contrast, the difference in hazard rates between U.S. RMs and their controls is statistically insignificant. Moreover, when we conduct a DID comparison, we find that the CRMs have significantly lower hazard rates than U.S. RMs. In other words, after controlling for the effects of exchange, industry, time, size, and life-cycle stage, CRMs are less likely to be deregistered than U.S. RMs, even after the rash of CRM scandals since 2011. In short, the hazard rate models essentially confirm the survival rate results that are reported.

we compare the cumulative stock returns of RMs and CLs over the period starting five trading days after the reverse-merger date to the end of 2013. As the results in Panel D of Table 8 show, when the stock returns prior to the first 10-K date are included, RMs actually outperform CLs. For example, the mean of the paired differences between RMs and CLs is 36 percent and statistically significant at the 10 percent level. A closer look shows that the outperformance is mainly due to CRMs. The means of the paired differences between RMs and CLs are 55 percent (significant at the 10 percent level) and 21 percent (statistically insignificant) for the CRM and U.S. RM subsamples, respectively. These results are consistent with findings in prior studies that stock prices of the RMs increase significantly after a reverse-merger agreement is consummated. For example, Floros and Sapp (2011) show that the average abnormal returns over the 30 days after the merger date are 32.7 percent.

The results in Table 8 reinforce the evidence from prior tests. In sum, we find no evidence that CRMs are inherently more toxic than other similarly sized, publicly listed firms from the same industry and exchange.

V. CONCLUSIONS

This study examines the financial health and performance of reverse mergers (RMs) that became active on U.S. stock markets between 2001 and 2010, particularly those from China (around 85 percent of all foreign RMs). Our analysis is motivated by a need to distinguish between: (1) problems that are common to all RMs, and (2) problems that plague CRMs in particular. Prior studies that examine the aftermarket performance of RMs have generally compared them to IPOs. Although IPO and RM are sometimes portrayed as alternative ways for a private firm to go public, in fact, a majority of RM firms were never IPO-eligible. Whereas most IPOs begin their life on the NYSE, AMEX, or NASDAQ, most RMs begin trading on the OTC Bulletin Board or as "Pink Sheet" stocks. Therefore, IPO firms are an inappropriate benchmark by which to evaluate the aftermarket performance of RM firms.

By identifying a population of control firms that more closely mirror their *ex ante* risk attributes, we provide new evidence on the aftermarket performance of RMs. Specifically, we employ an algorithm that pairs each RM with a control firm matched on exchange (the listing venue), industry (48 industry classifications in Fama and French [1997]), date (of the RM's first 10-K filing), and size (the market capitalization). We then compare various financial health and performance metrics for these two samples at the reporting date of the RM's first 10-K filing and at each of the next three anniversary dates.

Our results show that RMs are generally small, cash-constrained, early-stage firms that are highly illiquid and prone to financial distress. However, the same is true of their matched control firms. Over the next three years, RMs are more likely to move up in exchange tier than their control firms (29.0 percent versus 19.5 percent), and are less likely to move down (30.2 percent versus 34.3 percent). Overall, we find little evidence that RMs are more problematic than the control firms.

Perhaps more importantly, we find no evidence that the aftermarket performance of CRMs is any worse than that of the control firms. Splitting the sample of RMs between the U.S. and China, we show that while U.S. RMs generally underperform their control firms, CRMs typically outperform. CRMs are healthier than U.S. RMs on Day 1 (they are larger, less levered, more profitable, less likely to have a qualified audit opinion, and more likely to be at the Growth or Mature stage of the business life cycle). Over the next three years, the performance of the two groups diverges even further. While 49.3 percent of the CRMs move up in exchange tier, only 19.1 percent of the U.S. RMs do so. The CRMs also outperform the U.S. RMs in terms of their profitability, cash flows, likelihood of receiving a qualified audit opinion, survival rate, and changes in market liquidity. These improvements are reflected in future returns, as CRMs produce

comparable returns as their control firms over the next three years, while U.S. RMs generally underperform. We show that only a small portion of this return difference is attributable to differences in exposure to the Chinese economy. Our results are robust to multivariate controls for any residual differences in firm size and the cash flow life-cycle stage of each firm.

Overall, these findings help put into perspective concerns with Chinese firms that recently listed in the U.S. The current Sino-phobic reaction to CRMs appears to be overblown. The structural integrity of corporate governance and internal control of Chinese firms remain legitimate issues. However, these problems do not imply that CRMs are inherently toxic. Across a wide range of performance metrics, CRMs are healthier and perform better post-listing. Extending our tests to the end of 2013, the long-term performance of CRMs is still better than either their control group or their U.S. counterparts. These results hold despite the fact that our CRM sample includes 42 (or 81 percent) of the firms that have been accused of financial misconduct. In sum, we find virtually no evidence that the long-run performance of CRMs, as an asset class, is worse than comparable U.S. firms.

We hasten to point out that our findings do not imply that the U.S. listing requirements of RM firms are adequate, or that the governance problems associated with Chinese firms are unimportant. On the contrary, our evidence shows that a substantial proportion of CRMs do succumb to accounting fraud. Going forward, tighter international cooperation will almost certainly be required to ensure that the perpetrators of these frauds will be held accountable for their actions, whether they reside in the U.S. or abroad. In addition, diplomacy will also be needed to resolve the current standoff over the right of U.S. regulators to inspect audit work performed in China.[44] Thus, much work remains to be done on the regulatory front.

Nevertheless, the magnitude of the net economic losses to U.S. investors is clearly a relevant input in regulatory deliberations about market access versus credibility. To the extent that our evidence helps to put these economic losses into context, we believe these findings will inform future deliberations. At the same time, we think it is important to separate out the regulatory/ performance issues associated with RMs (and OTC firms) from those associated with the country of origin. Our findings do not attribute additional investor damage to RMs originating from China *per se*. Instead, they point to a different source of risk endemic to OTC/Pink Sheet stocks in general. These results suggest that future regulatory efforts might be more productively focused on risks associated with stocks in these markets, rather than solely on issues specific to China.

Our finding that PIPE financing is a leading indicator of CRM success may be of interest to not only investors, but regulators as well. A key feature of RMs is that the public listing is a distinct and separate event from the financing. Our evidence suggests that early participation in an RM by "accredited" (high net worth or institutional) investors may serve as a private-sector monitoring device or quality control indicator. This result suggests a form of market-based, rather than regulation-based, solution to the problem of quality assurance among RM registrants. In the case of RMs, perhaps laws mandating better disclosure and facilitating private enforcement through liability rules would prove more beneficial than laws mandating more stringent public enforcement (La Porta, Lopez-De-Silanes, and Shleifer 2006).

Finally, we hope these results will stimulate more research on the delicate calculus of market regulation. More stringent disclosure requirements and improved reporting quality are desirable qualities, but at what cost? In the case of CRMs, it seems that the very rules designed to keep out the "bad" firms may also limit access to many "good" ones. At a minimum, it seems that further research may be needed before concluding that much harm has come from allowing CRMs into U.S. markets.

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[44] As we go to print, progress is being made on both fronts. See, for example, Michaels and Katz (2014).

REFERENCES

Adjei, F., K. Cyree, and M. Walker. 2008. The determinants and survival of reverse mergers versus IPOs. *Journal of Economics and Finance* 32 (2): 176–194.

Allen, F., J. Qian, and M. Qian. 2005. Law, finance, and economic growth in China. *Journal of Financial Economics* 77 (1): 57–116.

Alpert, B., and L. Norton. 2010. Beware this Chinese import. *Barron's Magazine* (August 26).

Ang, A., A. Shtauber, and P. Tetlock. 2013. Asset pricing in the dark: The cross-section of OTC stocks. *Review of Financial Studies* 26 (12): 2985–3028.

Atkins, M. 2011. Accounting fraud in U.S.-listed Chinese companies. *Financier Worldwide* (September). Available at: http://infoseekchina.blogspot.ca/2011/10/accounting-fraud-in-us-listed-chinese.html

Brau, J., B. Francis, and N. Kohers. 2003. The choice of IPO versus takeover: Empirical evidence. *Journal of Business* 76 (4): 583–612.

Brav, A., and P. Gompers. 1997. Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies. *Journal of Finance* 52 (5): 1791–1821.

Brown, P., A. Ferguson, and P. Lam. 2010. *Choice between Alternative Routes to Go Public: Backdoor Listing versus IPO*. Working paper, UNSW Australia and University of Technology Sydney.

Chaplinsky, S., and D. Haushalter. 2010. Financing under extreme risk: Contract terms and returns to private investments in public equity. *Review of Financial Studies* 23 (7): 2789–2820.

Chen, K. C., Q. Cheng, Y. C. Lin, Y-C. Lin, and X. Xiao. 2013. *Financial Reporting Quality of Chinese Reverse Merger Firms: The Reverse Merger Effect or the China Effect?* Working paper, Singapore Management University.

Darrough, M., R. Huang, and S. Zhao. 2013. *The Spillover Effect of Fraud Allegations against Chinese Reverse Mergers*. Working paper, Baruch College–CUNY and Oakland University.

Dickinson, V. 2011. Cash flow patterns as a proxy for firm life cycle. *The Accounting Review* 86 (6): 1969–1994.

Fama, E., and K. French. 1997. Industry costs of equity. *Journal of Financial Economics* 43 (2): 153–193.

Feldman, D. 2009. *Reverse Mergers and Other Alternatives to Traditional IPOs*. Second edition. New York, NY: Bloomberg Press.

Floros, I., and T. Sapp. 2011. Shell games: On the value of shell companies. *Journal of Corporate Finance* 17 (4): 850–867.

Gerakos, J., M. Lang, and M. Maffett. 2013. Post-listing performance and private sector regulation: The experience of London's alternative investment market. *Journal of Accounting and Economics* 56 (Supplement): 189–215.

Givoly, D., C. Hayn, and B. Lourie. 2014. *Importing Accounting Quality: The Case of Foreign Reverse Merger*. Working paper, The Pennsylvania State University and University of California, Los Angeles.

Gleason, K., L. Rosenthal, and R. Wiggins. 2005. Backing into being public: An exploratory analysis of reverse takeovers. *Journal of Corporate Finance* 12 (1): 54–79.

Iliev, P. 2010. The effect of SOX Section 404: Costs, earnings quality, and stock prices. *Journal of Finance* 65 (2/3): 1163–1196.

J Capital Research. 2011. *Why We're Short China Green Agriculture (CGA)*. Available at: http://www.thefinancialinvestigator.com/wp-content/uploads/2011/05/CGA_Report_January-2011.pdf

Jian, M., and T. J. Wong. 2010. Propping through related party transactions. *Review of Accounting Studies* 15 (1): 70–105.

Jiang, G., C. Lee, and H. Yue. 2010. Tunneling through intercorporate loans: The China experience. *Journal of Financial Economics* 98 (1): 1–20.

Jindra, J., T. Voetmann, and R. Walking. 2012. *Reverse Mergers: The Chinese Experience*. Working paper, The Ohio State University.

La Porta, R., F. Lopez-De-Silanes, and A. Shleifer. 2006. What works in securities laws? *Journal of Finance* 61 (1): 1–32.

American Accounting Association

Leuz, C., A. Triantis, and T. Y. Wang. 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations. *Journal of Accounting and Economics* 45 (2/3): 181–208.

Marosi, A., and N. Massoud. 2007. Why do firms go dark? *Journal of Financial and Quantitative Analysis* 42 (2): 421–442.

McCoy, K., and K. Chu. 2011. Disappointment in a shell: Special report. *USA Today* (December 27): Section B.

Meagher, B. 2011. *The Reverse Merger Report Vol. VII (1)*. DealFlow Media (January 13).

Michaels, D., and A. Katz. 2014. U.S. audit watchdog optimistic on ending China standoff. *Bloomberg*. Available at: http://www.bloomberg.com/news/articles/2014-02-05/u-s-audit-watchdog-s-chief-optimistic-on-ending-china-standoff

Muddy Waters Research. 2010. *Muddy Waters Initiating Coverage on ONP—Strong Sell*. Available at: http://www.muddywatersresearch.com/research/orient-paper-inc/initiating-coverage-onp/

Piotroski, J., and T. J. Wong. 2012. Institutions and the information environment of Chinese listed firms. In *Capitalizing China,* edited by Fan, J., and R. Morck. Chicago, IL: University of Chicago Press.

Piotroski, J., and T. Zhang. 2014. Politicians and the IPO decision: The impact of impending political promotions on IPO activity in China. *Journal of Financial Economics* 111 (1): 111–136.

Poulsen, A., and M. Stegemoller. 2008. Moving from private to public ownership: Selling out to public firms versus initial public offerings. *Financial Management* 37 (1): 81–101.

Shumway, T., and A. Warther. 1999. The delisting bias in CRSP's NASDAQ data and its implications for the size effect. *The Journal of Finance* 54 (6): 2361–2379.

Siegel, J., and Y. Wang. 2013. *Cross-Border Reverse Mergers: Causes and Consequences*. Working paper, Harvard University and Boston University.

Sjostrom, W. 2008. The truth about reverse mergers. *Entrepreneurial Business Law Journal* 2 (2): 743–759.

Tian, X. 2011. The causes and consequences of venture capital stage financing. *Journal of Financial Economics* 101 (1): 132–159.

Yin, D. 2013. In rare move, SEC reverses NASDAQ's delisting of Chinese company. *Forbes* (August 2). Available at: http://www.forbes.com/sites/davidyin/2013/08/02/in-rare-move-sec-reverses-nasdaqs-delisting-of-chinese-company/

Zou, D. 2013. *The China Stock Exchange—IPO Overview*. Mimeograph by Boss and Young. Available at: http://www.legalink.ch/Root/Sites/legalink/Resources/Questionnaires/IPOs/Asia/Legalink%20IPO_China.pdf

APPENDIX A

CRMs Accused of Fraud by the Media, Short Sellers, or the SEC from January 2001 to October 2012, with Listing Status Updated to December 2013

No.	Name	Reverse Merger Date	Exchange Prior to Citation/Report	Trading Halted by NMS	Added to Pink Sheet	Delisted by NMS	Registration Revoked by the SEC*	In Sample?
1.	Subaye, Inc.	2000/12/21	NASDAQ	2011/04/07	2011/06/24	2011/11/10	—	No[m]
2.	China Automotive Systems Inc.	2003/03/05	NASDAQ	—[a]	—	—	—	Yes
3.	New Energy Systems Group	2003/12/03	NYSE	2013/04/17	2013/05/06	2013/04/23[b]	—	Yes
4.	China Expert Technology Inc.	2004/02/09	OTCBB	—[c]	2007/09/21	—	2011/03/25	Yes
5.	Bodisen Biotech, Inc.	2004/02/12	AMEX	2007/03/20	2007/04/02	2007/04/24	—	Yes
6.	China North East Petroleum Holdings Limited	2004/03/29	AMEX	2012/03/01	2012/06/21	2012/07/06	2013/04/05	No[d]
7.	Advanced Battery Technologies, Inc.	2004/04/21	NASDAQ	2011/11/15	2011/11/30	2011/12/16	—	Yes
8.	China Energy Savings Technology Inc.	2004/06/18	NASDAQ	2006/02/15	2006/05/19	2006/05/19	2006/12/08	Yes
9.	China Education Alliance, Inc.	2004/12/13	NYSE	2011/12/21	2011/12/29	2012/01/11	—	Yes
10.	China Digital Media Corp.	2004/12/28	OTCBB	—[c]	—	—	2011/02/14	No[e]
11.	China Agritech, Inc.	2005/02/03	NASDAQ	2011/03/14	2011/05/20	2011/07/13	2012/10/17	Yes
12.	Puda Coal, Inc.	2005/07/15	AMEX	2011/04/11	2011/08/18	2011/09/12	—	Yes
13.	Fushi Copperweld, Inc.	2005/11/11	NASDAQ	—[f]	—	—	—	Yes
14.	China Natural Gas, Inc.	2005/12/06	NASDAQ	2011/09/21	2012/03/08	2012/04/20	—	Yes
15.	China Medicine Corporation	2006/02/08	OTCBB	—[c]	2011/05/20	—	—	Yes
16.	China-Biotics, Inc.	2006/03/23	NASDAQ	2011/06/15	2011/07/01	2011/07/11	2013/11/04	Yes
17.	ShengdaTech, Inc.	2006/03/31	NASDAQ	2011/03/15	2011/06/10	2011/12/16	—	Yes
18.	Asia Biotechnology Group Inc.	2006/05/08	PINK	—[c]	2007/03/15	—	2008/10/16	No[e]
19.	China Sky One Medical, Inc.	2006/05/30	NASDAQ	2012/02/15	2012/03/07	2012/03/14	—	Yes
20.	Greater China Media & Entertainment Corp.	2006/06/14	PINK	—[c]	2009/06/24	—	2012/03/16	No[d]
21.	Wonder Auto Technology, Inc.	2006/06/22	NASDAQ	2011/05/06	2011/09/12	2012/01/06	2012/11/16	Yes
22.	Universal Travel Group	2006/07/12	NYSE	2011/04/11	2012/05/07	2012/04/26	2013/09/27	Yes
23.	Duoyuan Printing, Inc.	2006/10/06	NYSE	2011/04/01	2011/04/04	2011/10/06	—	Yes
24.	Sino Clean Energy Inc.	2006/10/18	NASDAQ	2012/05/21	2012/09/25	2012/12/07	—	Yes
25.	AgFeed Industries, Inc.	2006/10/31	NASDAQ	2011/12/19	2012/02/10	2012/02/10	—	Yes
26.	Fuqi International, Inc.	2006/11/20	NASDAQ	2011/03/29	2011/03/29	2011/06/03	2013/07/01	No[d]

(continued on next page)

APPENDIX A (continued)

No.	Name	Reverse Merger Date	Exchange Prior to Citation/Report	Trading Halted by NMS	Added to Pink Sheet	Delisted by NMS	Registration Revoked by the SEC*	In Sample?
27.	Gulf Resources, Inc.	2006/12/10	NASDAQ	—[g]	—	—	—	Yes
28.	Long-e International, Inc.	2006/12/29	PINK	—[c]	2007/05/22	—	2012/04/11	No[e]
29.	A-Power Energy Generation Systems, Ltd.	2007/02/09	NASDAQ	2011/06/27	2011/09/26	2012/04/13	2013/04/24	No[d]
30.	China Ritar Power Corp.	2007/02/16	NASDAQ	2011/04/18	2011/06/23	2011/07/05	2013/10/22	Yes
31.	China Organic Agriculture	2007/03/15	OTCBB	—[c]	2011/04/26	—	2013/05/30	Yes
32.	Jiangbo Pharmaceuticals, Inc.	2007/10/01	NASDAQ	2011/05/31	2011/08/04	2011/10/06	2013/07/03	Yes
33.	RINO International Corp.	2007/10/05	NASDAQ	2010/11/17	2010/12/08	2010/12/20	—	Yes
34.	China Integrated Energy, Inc.	2007/10/23	NASDAQ	2011/04/20	2011/06/15	2011/11/10	—	Yes
35.	Orient Paper, Inc.	2007/10/30	AMEX	—[h]	—	—	—	Yes
36.	China Marine Food Group	2007/11/23	AMEX	2013/11/12	2013/11/13	2013/11/12[i]	—	Yes
37.	China Valves Technology, Inc.	2007/12/18	NASDAQ	2012/07/13	2012/09/21	2012/09/21	—	Yes
38.	China Green Agriculture	2007/12/26	NYSE	—[j]	—	—	—	Yes
39.	China Changjiang Mining & New Energy Company, Ltd.	2008/02/04	OTCBB	—[c]	2011/04/07	—	—	Yes
40.	SkyPeople Fruit Juice, Inc.	2008/02/26	NASDAQ	—[k]	—	—	—	Yes
41.	Yuhe International, Inc.	2008/03/12	NASDAQ	2011/06/17	2011/07/21	2011/12/16	—	Yes
42.	Yongye International, Inc.	2008/04/17	NASDAQ	—[l]	—	—	—	Yes
43.	Nivs Intellimedia Technology Group, Inc.	2008/07/25	AMEX	2011/03/24	2011/06/23	2011/07/19	2013/09/16	Yes
44.	Deer Consumer Products, Inc.	2008/09/03	NASDAQ	2012/08/13	2013/01/11	2013/03/22	—	Yes
45.	ZST Digital Networks, Inc.	2009/01/09	NASDAQ	2012/03/27	2012/04/26	2012/04/16	—	Yes
46.	China Electric Motor, Inc.	2009/05/06	NASDAQ	2011/03/31	2011/06/14	2011/10/06	—	Yes
47.	China MediaExpress Holdings, Inc.	2009/10/15	NASDAQ	2011/03/11	2011/05/19	2011/12/16	2012/08/28	No[d]
48.	China Intelligent Lighting and Electronics, Inc.	2010/01/15	AMEX	2011/03/24	2011/06/17	2011/07/19	2013/09/16	Yes
49.	Keyuan Petrochemicals, Inc.	2010/04/22	NASDAQ	2011/04/01	2011/10/07	2012/04/13	—	Yes
50.	China Century Dragon Media, Inc.	2010/04/30	AMEX	2011/03/21	2011/06/17	2011/10/07	—	Yes
51.	Heli Electronics Corp.	2010/06/15	OTCBB	—[c]	2011/03/25	—	2012/03/02	No[e]
52.	CleanTech Innovations, Inc.	2010/07/02	NASDAQ	2011/03/02	2011/03/02	2011/12/16	—	Yes

The table is ordered by the date of RM.

* When a company's registration is revoked by the SEC, its stock can no longer be publicly traded even on Pink Sheet.

[a] Sued in security class action litigation on October 25, 2011 for fraudulent reporting. The company's stock was still trading on NASDAQ as of December 2013.

[b] Sued in security class action litigation on February 10, 2012 for fraudulent reporting. The company voluntarily delisted its stocks from the NYSE in April 2013, citing that "the current U.S. capital market is not suitable for small-cap Chinese companies like New Energy" (see http://www.marketwired.com/press-release/new-energy-systems-group-voluntarily-applying-to-delist-from-nyse-mkt-newn-newn-1778499.htm).

APPENDIX A (continued)

[c] The company was traded on OTCBB or PINK prior to citation/report. Thus, there is no trading halt date or delisting date by NMS for the company.

[d] The observation was missing in the original DealFlow Media's reverse-merger report.

[e] The financial data are missing from Compustat.

[f] Muddy Waters Research published a short-sale report on Fushi Copperweld in April 2012. The company's stock was still trading on NASDAQ as of December 2013.

[g] Glaucus Research published a short-sale report, "Another Day, Another Fraud: Latest Chinese Fraud Du Jour: Gulf Resources: Gulf Resources (GFRE), Price Target $0.00." The company's stock was still trading on NASDAQ as of December 2013 (see: http://glaucusresearch.com/download/GlaucusResearch-Gulf_Resources-GFRE-Strong_Sell-April_26_2011.pdf).

[h] Muddy Waters Research (2010) initiated "Strong Sell" coverage on Orient Paper on June 28, 2010, alleging that "We are confident that ONP is a fraud. Its purpose is to raise and misappropriate tens of millions of dollars." The company's stock was still trading on NYSE/AMEX as of December 2013.

[i] China Marine Food Group was under pressure from short sellers several times throughout 2010, who identified that the company's financial statements filed with the Chinese State Administration for Industry and Commerce ("SAIC") differed substantially from the financial statements filed with the SEC. The company voluntarily delisted its stocks from the NYSE/AMEX in November 2013, citing cost savings as the main reason.

[j] China Green Agriculture was the target of J Capital Research's (2011) report, "Why We're Short China Green Agriculture (CGA)." The SEC launched investigations into the company's disclosure practices. The company's stock was still trading on NYSE as of December 2013.

[k] Sued in security class action litigation on April 20, 2011 for fraudulent reporting. The company's stock was still trading on NASDAQ as of December 2013.

[l] Sued in security class action litigation on May 26, 2011 for fraudulent reporting. The company's stock was still trading on NASDAQ as of December 2013.

[m] The RM was completed prior to 2001, the starting year of our sample period.