

内控信息披露、企业过度投资与财务危机

—来自中国上市公司的经验证据*

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摘要

与现有关于信息披露影响企业投资效率的文献不同,本文从内控信息披露角度研究企业投资效率,考察了企业内控信息披露与过度投资及财务风险之间的内在联系。研究发现:(1)内控披露水平的提高有助于降低企业内控治理方面的信息不对称程度,减轻因信息不对称滋生或助长的代理问题,从而抑制企业过度投资;(2)过度投资易使企业陷入财务危机,过度投资越严重,企业陷入财务危机的可能性越大;(3)内控信息披露能减少企业因过度投资带来的负面影响,降低企业陷入财务危机的可能性。本研究丰富了信息披露与投资效率方面的文献,证实了内控信息披露的重要性,表明当前监管机构加强企业内控披露的决策是有助于保护投资者利益的。本研究为实务界和监管机构制定有关内部控制和投资者保护方面的政策提供了一个有益的视角。

关键词:内部控制、信息披露、过度投资、财务危机

中图分类号:F23、C93、F06

* 本文系国家自然科学基金项目“上市公司内部控制与投资者保护”(批准号70972076)、“银行贷款、商业信用与上市公司内部控制”(批准号71002110)及教育部人文社会科学基金项目“内部控制、过度投资与财务危机”(批准号09YJA790199)研究成果。作者感谢教育部博士研究生学术新人奖及笹川优秀青年奖学基金资助,感谢编辑和二匿名审稿人的修改意见,感谢美国威斯康星大学商学院程强教授对本文的悉心指导,感谢美国罗得岛大学工商管理学院林秉旋教授提供的有关资料及建议,感谢美国亚历桑那大学商学院李真教授、新加坡南洋理工大学商学院张怀教授、香港中文大学经济与财务学院王丛教授、香港科技大学商学院葛锐博士对本文的评论与建议。作者文责自负。

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一、引言

有效的投资是公司成长的主要动因和未来现金流增长的重要基础(杨华军和胡奕明, 2007)。然而, 近年来我国上市公司投资效率普遍不高(姜付秀等, 2009), 非效率投资行为普遍存在(张纯和吕伟, 2009), 过度投资现象严重(李鑫和徐向艺, 2008)。已有的一系列研究表明, 企业面临的信息不对称是影响企业投资效率的重要因素之一(Antle and Eppen, 1985; Healy and Palepu, 2001; Biddle and Hilary, 2006; Biddle *et al.*, 2009)。

上市公司内控信息披露水平的提高将有助于降低公司内控治理方面的信息不对称程度, 那么, 上市公司这种内控透明度的增加在现实中是否有利于提高公司投资效率? 若果真如此, 监管机构大力加强企业内部控制建设、要求企业提高内控披露的努力也就更加物有所值。然而, 据我们文献检索, 国内外鲜有文献提供关于内控信息披露影响企业投资效率方面的经验证据, 亦鲜有文献探讨内控披露与企业投资及财务风险之间的内在联系。

与现有关于信息披露影响企业投资效率方面的文献(如Biddle and Hilary, 2006; Biddle *et al.*, 2009; 张纯和吕伟, 2009)不同, 本文着重于从企业内控信息披露的角度研究企业投资效率, 我们不仅考察了内控信息披露对企业过度投资的影响, 还进一步考察了过度投资可能导致的财务风险及内控信息披露在控制风险方面所起的作用。之所以选择内控信息披露作为切入点, 主要是考虑到内控信息相对于财务信息有其特殊的一面, 因其体现了企业治理层面、管理层面和业务层面的整体运作信息, 这些信息贯穿企业决策、执行和监督全过程, 是难以从会计盈余质量等方面的信息中捕捉到的。内部控制信息是众多公司“私人”信息中对投资者、债权人以及市场监管者最为重要的信息之一(李馨弘和马庆国, 2007)。

企业投资具有经济后果, 它可能影响到企业的业绩, 也会对企业风险产生一定的影响, 若不重视对风险的控制, 过度的投资将可能使企业陷入财务危机, 甚至陷入破产境地。但从已有的文献看, 国内外学术界更多关注的是企业投资对企业绩效或企业价值的影响, 而其对企业风险所可能产生的影响却讨论较少。现实中, 我们必须意识到的是: 诸多企业失败并非因为企业业绩不好或者说没有创造价值, 而是因为对风险的把握和控制方面出现了问题(姜付秀等, 2009), 美国的次贷危机便是佐证。因此, 对企业过度投资可能导致的财务危机问题有必要单独进行研究, 内控信息披露从中所起的作用亦值得深入探讨。

基于以上讨论分析, 本文拟尝试回答以下三个问题: 第一, 企业内控信息披露水平的提高能否对企业的投资起到正面影响, 减轻企业因信息不对称滋生或助长的代理问题, 从而抑制企业过度投资? 第二, 过度投资是否会加大企业陷入财务危机的可能性? 第三, 不同内控信息披露水平的企业所实施的投资战略是否对企业陷入财务危机产生了一定的影响, 即企业内控信息不对称程度的减小能降低企业因过度投资而导致的财务风险吗?

借鉴Richardson(2006)的研究模型, 本文以中国上市公司2000—2008年的数据为样本, 对企业层面上的过度投资程度进行了估算。然后, 我们采用深圳市迪博企业风险管理技术有限公司2007—2008年上市公司内控信息披露数据,⁵就内控信

⁵ 部分成果发表在2008年6月24日的《中国证券报》上。

息披露对企业过度投资的影响、过度投资对企业财务风险的影响，以及内控信息不对称程度的降低在缓解企业因过度投资带来的财务风险中所起的作用进行了实证研究。结果发现，内控信息披露水平的提高有助于减少企业内控治理方面的信息不对称程度，减轻了企业因信息不对称滋生或助长的代理问题，有效地抑制了企业过度投资行为，降低了企业因过度投资而可能带来的财务风险。

本文的主要贡献在于：第一，首次从内部控制信息披露角度研究了企业过度投资问题，探讨了内控治理信息不对称对企业过度投资的影响；第二，与已有关于过度投资方面文献不同，我们更加关注企业风险，研究了过度投资可能导致的财务风险及内控信息披露在控制风险方面所起的作用。此外，本文的研究证实了内控信息披露的重要性，表明当前监管机构加强企业内控信息披露的决策是有助于保护投资者利益的。我们的研究为有关实务界和当前监管机构制定有关内部控制和投资者保护方面的政策提供了一个有益的视角。

后文结构安排如下：第二部分对相关文献进行了简要回顾；第三部分，我们结合相关理论及中国的现实情况，提出了本文的假设；第四部分是研究设计；第五部分报告了本文的实证结果；最后是本文的研究结论。

二、文献回顾

关于公司信息披露与资本市场运作特性之间的关系问题，一直是近年来会计、金融与财务研究的重点领域之一。Rajan and Zingales (2000) 的研究表明，为保证其正常运行，财务系统需要一套能够提升透明度的信息披露系统。Healy and Palepu (2001) 在总结前人文献时指出，会计透明度应该能够通过改善契约和监督质量来减少逆向选择（如倾向于以过高的价格发行证券）和道德风险（如用现有资产在职消费）。这样，更高的会计质量就能够通过减少以上信息不对称导致的各种摩擦（逆向选择和道德风险）来提高企业投资效率（Biddle and Hilary, 2006; Biddle *et al.*, 2009）。

类似的文献还相当丰富，如Amihud and Mendelson (1986)、Welker (1995) 的研究论证了信息披露水平越高的公司在证券市场中的买卖价差越小，即资本成本中的信息不对称部分更小。Bhushan (1989)、Lang and Lundholm (1993)、Lang and Lundholm (1996) 的研究表明，公司信息披露程度越高，证券分析师和投资者对公司的收益预测就越精确。Botosan *et al.* (1997)、Bhattacharya *et al.* (2003)、Francis *et al.* (2004) 的研究发现，公司会计透明度越高，其权益资本成本就越低。汪炜和蒋高峰 (2004) 认为，公司自愿性披露水平的提高有助于降低权益资本成本。曾颖和陆正飞 (2006) 的研究表明，信息披露质量与公司边际股权融资成本负相关，等等。

Biddle and Hilary (2006)，以及Biddle *et al.* (2009) 的研究以公司投资效率为核心，补充和拓展了以上关于信息透明度为什么会影响资本市场运作特性方面的研究，他们的研究实证检验和分析了为什么财务信息质量与公司层面的资本投资效率有关。Biddle and Hilary (2006) 的研究发现：更高的会计盈余质量能够通过减少经理人与外部资本供给者的信息不对称来提高企业投资效率，并且这种影响在一个资金供给交易比较公平的国家（相对于需要债权人提供更多资本的国家）里将更加强烈。

他们指出,经理和外部资本投资者间信息不对称性的存在使市场产生摩擦,如果拥有具备完善监督体系的高质量会计,就不会产生代理问题,⁶从而保证投资的效率。Biddle *et al.* (2009)的研究进一步表明,财务信息质量同公司过度投资和投资不足有密切联系。总之,Biddle and Hilary(2006),以及Biddle *et al.* (2009)的研究支持了Jensen(1986, 1993)关于经理人与股东间代理问题会导致公司非效率投资的假设,同时也为本文内控信息披露的研究提供了理论基础。

在过度投资方面,国外也有大量的研究成果,但已有文献侧重于对过度投资的动因进行分析。如,Richardson(2006)认为公司拥有自由现金流会造成其过度投资;Inderst and Klein(2007)认为,在内部竞争和投资新项目可获得奖励机会的驱动下,经理人有过度投资的倾向;Hart and Moore(1995)认为经理有建造“企业帝国”的强烈动机;Dow *et al.* (2005)认为管理者存在过度投资的倾向,只要有多余的现金流就会倾向于投资更多的项目;Malmendier and Tate(2005)认为管理者过度自信会导致公司投资决策更加激进,等等。国内关于过度投资的文献也较丰富,主要研究了公司治理、负债融资、现金股利等对过度投资的影响,如唐雪松等(2007)、童盼和陆正飞(2005)、魏明海和柳建华(2007)、杨华军和胡奕明(2007)等。另外,张纯和吕伟(2009)研究了信息披露与信息中介对企业过度投资的影响。但从已有文献看,国内外鲜有文献从内控信息披露角度研究企业过度投资问题,并且考察相应的财务风险。

与上述文献不同,考虑到企业内控信息的重要性及其与盈余信息的显著区别,本文拟从企业内控制信息披露的角度研究企业投资效率,我们不仅考察了内控信息披露对企业过度投资的影响,还进一步考察了过度投资可能导致的财务风险及内控信息披露在控制风险方面所起的作用。

三、制度背景与理论分析

(一) 制度背景

安然、世通等上市公司系列财务丑闻事件沉重打击了投资者信心。为恢复投资者信心、保护投资者利益,美国于2002年颁布了萨班斯—奥克斯利法案(简称SOX)。SOX的颁布引起了国内外理论界和实务界对内部控制的高度关注。就在SOX对在美国上市内地公司生效的当天,我国财政部等五部门联合发起成立了企业内部控制标准委员会,提出了“建立一套以防范风险和控制舞弊为中心、以控制标准和评价标准为主体的内部控制制度体系”的目标。此举被认为中国版SOX酝酿的开始。2008年6月28日,我国财政部等五部门联合发布了被喻为中国版SOX的《企业内部控制基本规范》,⁷要求“上市公司应当对本公司内部控制的有效性进行自我评价,披露年度自我评价报告,并可聘请具有证券、期货业务资格的中介机构对内部控制的有效性进行审计。”这表明强化企业内部控制信息披露已日益成为中国政府提高公司治理水平的重要手段。

⁶ Antle and Eppen(1985)为这一观点提供了一个正式的模型。

⁷ 2008年6月28日,我国财政部、证监会、审计署、银监会、保监会五部门联合发布了该内控规范,考虑到企业适应该法案需要一定过程,后来该法案实施日期得以推迟,预计将于2011年起开始正式实施。因此,在我们的样本中,所披露的内控信息仍带有自愿的性质。

在各国监管机构高度关注企业内部控制建设的同时，面对席卷全球的金融危机，美国、日本、韩国、澳大利亚等国陆续推出了一系列救市方案。中国政府也于2008年11月公布了高达4万亿元人民币的经济刺激计划。该巨额投资计划的启动，在刺激地方政府投资热情的同时，无疑将使企业界兴起新一轮的投资热潮。⁸据国家统计局公布的国民经济运行情况数据，去年上半年，我国投资拉动GDP增长6.2个百分点，对经济增长的贡献率高达87.6%，消费拉动GDP近3.8个百分点，而国外需求对经济增长的贡献率为负值，下拉GDP增长负2.9%，全年的数据与上半年类似。这些数据表明，以往拉动经济的“三驾马车”，投资、消费和出口，对经济增长的贡献发生了显著变化，呈现出投资强力驱动经济的特点。

因此，在当前的背景下，风险防范与投资问题（尤其是投资效率问题）已成为国民经济中需要关注的两大热点。关注风险防范问题，切实帮助企业提高风险防范能力，才能更好地从微观层面防范金融风暴对我国的冲击。关注投资问题（尤其是投资效率问题），能否在全球金融危机中保持理性的投资方式，确保4万亿元的投资效率，成为对中国政府落实科学发展观的重大考验。

本文的研究，着眼于探讨内控信息披露、企业过度投资与财务危机之间的内在联系，将为风险防范与投资问题（尤其是投资效率问题）的研究，提供一定的证据。

（二）理论分析

在Modigliani and Miller (1958)所描述的完美世界里，企业的投资决策取决于项目的净现值，企业会把资金投资于净现值大于零的项目。相应地，企业的投资支出总额也仅由企业面临的投资机会集决定，与其他因素无关。然而，现实市场存在摩擦，如：面临融资约束（不能够从外部获得投资所需资金）的公司需要依赖于更多的内部资金，这些公司是难以达到最优投资规模的（Fazzari *et al.*, 1988）。在现实世界中，财务学者们普遍认为，企业的资本投资决策将深受代理问题的影响（Stein, 2003）。

关于代理问题，Berle and Means (1932)首先指出，所有权、经营权分离导致了股东、经理利益的不一致。这种利益的不一致，势必导致经理的决策偏离股东价值最大化目标（Jensen and Meckling, 1976），如，追求在职消费、将自由现金流投资于净现值为负的项目，从而引发过度投资。Jensen (1986, 1993)的研究表明，企业经理一般具有过度投资冲动，他们有动机去做大公司并且使其偏离最优规模，因为经理能够从控制更多的资源中获取更大的私人利益，经理的这种追求投资规模而非投资效益的特征被称为“经理帝国主义”。

信息不对称的存在一方面可以直接导致以上代理问题，另一方面可使因代理问题导致的过度投资现象更加严重。Blanchard *et al.* (1994)考察了经理在收到一笔不

⁸ 虽然政府投资往往是指政府购买，或者基础设施建设，但政府购买的标的最终来源于企业，政府投资会拉动企业投资，政府进行基础设施建设所需的原材料及其他物资最终也是来源于企业，尽管基础设施建设表面上只会带动与其相关的企业发展，但企业之间的联系是普遍存在的。此外，中国不少上市公司的母公司为国有企业，受政府影响较大。因此，企业投资决策受政府投资决策影响较大。

会改变企业投资机会集的现金横财时会做些什么；在不存在信息不对称的完美市场里，经理应该把这笔现金还给投资者；然而，与之背道而驰的是，他们发现经理倾向于把这笔资金投资于典型的易失败项目。Blanchard *et al.* (1994)的以上发现表明信息不对称的存在会产生道德风险，从而使代理人(经理)违背委托人(股东)的目标，导致企业过度投资。Biddle and Hilary (2006)指出，经理和外部资本投资者间信息不对称性的存在使市场产生摩擦，如果拥有具备完善监督体系的高质量会计，就不会产生代理问题，从而保证投资效率。张纯和吕伟(2009)的研究也表明，降低信息不对称程度能够使外部投资者更好地监督企业管理层，避免其进行过度投资。

此外，在信息不对称存在时，由于经理比投资者掌握有更多关于公司前景的信息，他们倾向于以高于公司实际价值的价格卖出股票，理性的投资者就会做出反应，增加公司的资本成本，这样就减少了企业外部的资金来源。这种因信息不对称产生的问题，即为逆向选择。逆向选择增加了市场的摩擦，减少了公司可从资本市场获得的外部资金，这使得经理面临更大的融资约束(Myers and Majluf, 1984)，结果将导致经理不愿在没有投资机会时把过多的现金返还给投资者，⁹而是想方设法把多余的现金用于与私人利益有关的非效率投资，导致经理滥用现金流(如追求在职消费、建立经理帝国等)，从而引发过度投资。

以上分析表明，信息不对称会滋生或助长代理问题，进而导致企业过度投资。Biddle and Hilary (2006)，以及Biddle *et al.* (2009)的研究从盈余信息披露角度支持了这一命题，表明更高质量的盈余信息披露可抑制企业的过度投资行为。那么，内控信息披露也能起到提高企业投资效率的作用吗？内控信息不同于一般的财务报表信息，财务报表信息反映了公司的财务数据以及所有与财务状况和经营成果有关的重要事项，而内部控制信息反映了确保公布的财务状况和经营成果准确、公司运转正常的控制体系以及监督体系(包括公司治理)的建立健全情况。其不同之处体现于内部控制的五大要素，即内部环境、风险评估、控制活动、信息沟通和监督检查。企业内部环境的好坏，决定了公司投资决策的可靠性和合理性，例如一个“一言堂”的董事会，没有良好的制衡机制，很可能造成低效的投资决策；从过度投资和财务危机的角度来看，若公司具有良好的风险评估体系，便能够从早期的经济活动中发现问题，及时矫正投资决策，减少损失；过度投资如何不演化成巨大的财务危机，控制活动是相当重要的一个环节；信息在收集和传递过程中不准确，会造成投资的低效；而内部监督是企业对内部控制建立与实施情况进行监督检查，及时发现和改进投资缺陷的关键环节。

从以上内控的五大要素分析可以看出，内部控制的内容已远不局限于财务报告的范畴，内控信息的披露使得投资者和监管部门全面获悉公司为了合理保证经营效率与效果、财务报告的可靠性、法律法规的遵循而设计的相互关联的“保障机制”的建立和运作情况。如《企业内部控制基本规范》所指出，内部控制由企业董事会、监事会、经理层和全体员工实施，贯穿决策、执行和监督全过程，覆盖企业及其所属单位的各种业务和事项，在实施过程中坚持制衡性原则，即“内部控制应当在治理结构、机构设置及权责分配、业务流程等方面形成相互制约、相互监督，同时兼顾

⁹ 当然，在企业有投资机会但缺乏资金时，信息不对称引起的融资约束也可能导致企业投资不足，但这不影响我们关于过度投资的假设，我们后文的实证研究是针对过度投资样本组进行的。

运营效率。”¹⁰内部控制作为企业运作的一种内在制度安排，具有制约、监督企业管理层各方生产经营决策、提高经营效率(包括投资效率)的作用。所以，内控信息具有财务报告所不能提供的额外信息，这些信息对于识别企业的整体运作效率及风险控制状况，起着至关重要的作用。

因此，同会计盈余信息相比，企业内控信息同样重要，因为企业内控信息包含了公司治理层面、管理层面和业务层面的公司整体运作信息，这些信息贯穿企业决策、执行和监督全过程，是难以从会计盈余质量等方面的信息中捕捉到的。正如李馨弘和马庆国(2007)所说，内控信息是众多公司“私人”信息中对投资者、债权人以及市场监管者最为重要的信息之一。然而，这些信息往往是上市公司掌握而投资者(尤其是中小投资者)不了解的信息，并且这部分信息投资者很难从其他途径获得。在这种情况下，内控信息披露构成了公司内控治理信息的重要来源，为投资者判断企业内部控制的性质、强度、过程和质量提供了便利。由此可见，更高质量的内控披露无疑可使投资者更加了解公司的内控治理情况，并及时发现公司治理层面、管理层面及业务层面的薄弱控制环节，增强股东监督管理层投资活动的的能力，防范管理层道德风险，从而抑制企业过度投资行为。

此外，根据Myers and Majluf(1984)，资金供给者和公司之间信息不对称的存在使得投资者难以判断筹措资金的公司是否是一家优质公司，会计盈余的表面信息甚至会让投资者误把劣质公司当成优质公司，导致公司由于暂时的错误定价获得过多的资金，进而为管理层过度投资创造条件。内控披露可减轻这种问题，因为在某种程度上，公司所披露的内控体系状况不仅有助于投资者评价公司的风险，亦有助于其判断公司财务报告信息的质量。而且，之前的一系列研究表明，投资者需要补偿关于公司财务报告信息的风险和不确定性(e.g. Easley and O'Hara, 2004; Francis *et al.*, 2005; Ecker *et al.*, 2006; Lambert *et al.*, 2007)。因此，内控信息透明度的增加将提高投资者判断公司风险及财务报告信息不确定性的能力，使得公司难以通过暂时的错误定价发行证券而获得过多的现金流，从而切断过度投资的资金来源。

综上，内控信息披露有助于降低公司内控治理方面的信息不对称程度，有助于委托人更全面地了解企业的内控治理和运营状况，更好地监督代理人，也可更好地减少以上提到的市场摩擦，缓解企业代理冲突，从而提高企业投资效率，抑制企业的过度投资行为。因此，我们提出如下假设：

假设1：内控信息披露有助于降低公司内控治理方面的信息不对称程度，减轻因信息不对称滋生或助长的代理问题，从而可提高企业投资效率，抑制企业过度投资。

企业正常的投资将为企业带来价值，而过度投资将为企业带来损失。Higgins and Schall(1975)认为，企业过度的投资扩张可能加大企业的破产风险。对于过度投资的企业来说，它们的投资扩张可能只是为了满足经理们在职消费、建立帝国的愿望，是在不考虑企业及市场实际情况下所进行的非效率投资；同时资本市场的摩擦及公司内控治理结构的不健全、内控披露制度的不完善使得这种非效率投资难以得到有效的监督；并且那些期望做大做强、建立私人王国的经理们为了私人利益，在投资扩张时往往会过于重视规模与速度，而低估企业风险，或忽略对企业风险的控制。所有这些都可能导致过度投资的企业陷入财务危机，且过度投资越严重，陷入财

¹⁰ 参见《企业内部控制基本规范》第一章。

务困境的可能性就越大。因此，我们提出如下假设：

假设2：过度投资易使企业陷入财务危机，过度投资越严重，企业陷入财务危机的可能性越大。

综上所述，我们认为，既然内控信息披露可以通过减少信息不对称和缓解代理冲突，对企业过度投资行为发挥积极影响，内控信息披露就可相应地减小企业因过度投资带来的负面影响，降低企业陷入财务危机的可能性。内控信息披露可能从以下两个方面影响财务风险。一方面，内控披露可以通过抑制过度投资，实现降低财务危机的效果，这一结论可以从前两个假设递推而得。

另一方面，财务危机发生的原因，除了投资活动本身的失误如过度投资等外，投资者对公司失去信心，公司无法获得足够的现金流支持也是很重要的原因。如三九帝国的崩塌也是由于集团过度投资后被几家银行逼债所致。当公司已经发生了低效率的投资时，如果能够准确及时地披露内控信息，减少信息不对称的程度，投资者仍然会对公司及时矫正投资决策、将风险控制可在承受的范围之内抱有信心，不会立刻撤资或逼债，这样就会大大降低公司因投资资金断裂而引发财务危机的概率。基于以上两个方面的分析，我们提出第三个假设：

假设3：内控信息披露可减轻企业因过度投资带来的负面影响，降低企业陷入财务危机的可能性。

四、研究设计

我们的研究设想是，首先借鉴 Richardson (2006) 的模型，估算出企业正常的资本投资水平，用企业实际的资本投资水平与估算的资本投资水平之差（即回归残差）代表企业的投资过度程度 (*Over_Inv*)。然后，我们用估算得到的过度投资变量 *Over_Inv* 作为因变量，对多个内控信息披露的代理变量及若干控制变量进行回归，以考察内控透明度或内控信息不对称对企业过度投资的影响。随后，我们以财务风险指数 *Z_Score* 和公司是否被 ST 或 PT 为判定标准，把样本上市公司的财务风险状况分为三种情况（被 ST 或 PT 的公司；*Z_Score* < 1.8 的公司和 *Z_Score* ≥ 1.8 的公司），¹¹ 应用 Ordered-logit 模型，考察过度投资对企业财务危机的影响及内控信息不对称程度在其中所起的作用。

（一）资本投资的计量模型

Richardson (2006) 通过一个模型估算出企业正常的资本投资水平，然后，用该回归模型得出的残差作为投资过度和投资不足的代理变量，进而考察了自由现金流量对企业过度投资的影响。由 Richardson (2006) 开创的这一模型在 Verdi (2006) 等研究中得到了应用。本文亦采用 Richardson (2006) 的模型来估算企业的投资过度程度。企业正常的资本投资水平估计模型如下：

$$\begin{aligned}
 Inv_t = & a_0 + a_1 Growth_{t-1} + a_2 Lev_{t-1} + a_3 Cash_{t-1} + a_4 Age_{t-1} + a_5 Size_{t-1} \\
 & + a_6 Ret_{t-1} + a_7 Inv_{t-1} + \sum Industry + \sum Year + \varepsilon
 \end{aligned}
 \tag{1}$$

¹¹ 关于 *Z_Score* 临界值的设置，主要参考了姜付秀等 (2009) 的研究。

表 1 变量定义一览表

<i>Inv</i>	(当期固定资产净额 - 上期固定资产净额 + 当期长期投资净额 - 上期长期投资净额 + 当期无形资产净额 - 上期无形资产净额) / 平均总资产。
<i>Growth</i>	销售收入增长率或Tobin-Q值(用 <i>Q</i> 表示)。其中, Tobin-Q = (股权市值 + 净债务市值) / 期末总资产, 非流通股市值用净资产代替计算。
<i>Lev</i>	年末的资产负债率。
<i>Cash</i>	现金与短期投资之和同总资产的比率。
<i>Age</i>	截至年末的公司上市年龄的自然对数。
<i>Size</i>	年末公司总资产的自然对数。
<i>Ret</i>	考虑现金红利再投资的年个股回报率。
<i>Residue</i>	模型(1)的回归残差。
<i>Over_Inv</i>	过度投资量, 等于模型(1)中大于0的回归残差。
<i>Ic_Dis_Score</i>	内控五大要素信息披露的总得分。
<i>Ic_Dis_Dum</i>	内控披露虚拟变量, 当 <i>Ic_Dis_Score</i> 大于其中位数时取1, 否则取0。
<i>Certif</i>	内控鉴证报告披露虚拟变量, 披露鉴证报告时取1, 否则取0。
<i>FCF</i>	自由现金流量, 等于公司经营现金流量减折旧、摊销和预期的新增投资之后的余额与平均总资产的比例。其中, 新增投资为模型(1)估算的预期资本投资。
<i>Adm</i>	管理费用占主营业务收入的比率。
<i>Orecta</i>	大股东占款代理变量, 等于(其他应收款 - 其他应付款) / 总资产。
<i>Z_Score</i>	$(0.012 \times \text{营运资金} / \text{总资产} + 0.014 \times \text{留存收益} / \text{总资产} + 0.033 \times \text{息税前利润} / \text{总资产} + 0.006 \times \text{股票总市值} / \text{负债账面价值}) \times 100 + 0.999 \times \text{销售收入} / \text{总资产}$ 。
<i>Z_Dum</i>	若公司被ST或PT, 取-1; 除了ST或PT情况外, 若 <i>Z_Score</i> < 1.8, 取0, 若 <i>Z_Score</i> ≥ 1.8, 取+1。
<i>Roa</i>	(营业利润 + 财务费用) / 总资产平均余额。
<i>Stkpro</i>	高管持股比例, 等于高级管理人员持股数 / 总股数。
<i>Ctrlr</i>	实际控制人性质, 若为国有, 取1; 否则, 取0。
<i>Direpro</i>	独立董事人数占董事总人数比例。
<i>Compensation</i>	前三名高管薪酬总额。 ¹²
<i>Boardsize</i>	董事会规模, 等于董事会董事总人数。
<i>Director_Manager</i>	董事长与总经理兼任情况, 兼任取1, 否则取0。
<i>Losses</i>	若公司当年和上年剔除非常项目收入后的净利润 < 0, 取1, 否则取0。
<i>Acquisition</i>	若公司2006—2008年发生过重组或兼并的成功交易, 取1, 否则取0。
<i>Industry</i>	行业虚拟变量, 行业按证监会的分类标准(除制造业继续划分为小类外, 其他行业以大类为准), 共有20个行业虚拟变量。
<i>Year</i>	年度虚拟变量, 控制不同年份宏观经济因素的影响。

¹² 参考辛清泉等(2007)的研究, 我们也曾采用该变量的自然对数, 研究结论并未发生实质性变化。

模型(1)中各变量含义如下： Inv_t 为 t 年资本投资量； $Growth_{t-1}$ 代表企业增长机会，企业的增长机会越多，其资本投资量应该越大，我们分别使用 $t-1$ 年末的Tobin-Q和 $t-1$ 年的销售增长率衡量企业增长机会； Lev_{t-1} ， $Cash_{t-1}$ ， Age_{t-1} ， $Size_{t-1}$ ， Ret_{t-1} ， Inv_{t-1} 分别代表企业 $t-1$ 年末的资产负债率、现金持有量、公司规模、股票收益和资本投资。根据现有投资方面的文献(如Fazzari *et al.*, 1988; Barro, 1990; Bates, 2005; Lamont, 2000)， Lev_{t-1} 和 Age_{t-1} 与资本投资量呈负向关系，而 $Cash_{t-1}$ ， $Size_{t-1}$ ， Ret_{t-1} ， Inv_{t-1} 将对资本投资产生正向影响。另外，模型中还加入了行业变量(*Industry*)和年度变量(*Year*)，以控制行业效应和年度效应对企业投资的影响。

通过采用沪深两市A股上市公司2000—2008年的数据对模型(1)进行回归，我们可以得到各个企业 t 年预期的资本投资量，随后，用各个企业 t 年的实际投资量减预期投资量，便可得到各个企业在 t 年的剩余投资量。如果该剩余投资量大于0，则表示企业过度投资，其值即为我们所估计的 $Over_Inv$ ； $Over_Inv$ 越大，表明企业过度投资越严重。文中各变量的具体定义和计算参见表1。

(二) 内控信息披露水平的计量

根据我国《企业内部控制基本规范》，内部控制包括内部环境、风险评估、控制活动、信息与沟通和内部监督五大要素，深圳市迪博企业风险管理技术有限公司围绕该五大要素，在参考国内外内部控制相关标准的基础上，制定了上市公司内部控制评价指标体系，包括内控五大要素方面的近六十项指标。根据这些指标，通过搜集上市公司年报、季报、中报、公司治理、内控自我评估报告、内控鉴证报告等方面资料，建立了上市公司2007年和2008年的内控信息披露评价指数，我们以该评价指数所含五大要素的总得分来衡量企业内控信息披露水平或是内控信息透明度。

另外，由于上市公司披露的内控鉴证报告与其他内控披露信息有所区别，系经外部审计师鉴证后的内控披露信息，我们在后文的实证研究中对上市公司是否披露鉴证报告单独进行了研究。关于深圳市迪博企业风险管理技术有限公司对样本上市公司内控信息披露评价的总体情况，请参见表2。从表2可见，在内控五大要素得分中，2008年每一要素的平均得分都比2007年高；在披露内控鉴证报告方面，样本上市公司2007年和2008年分别有159家、211家披露了内控鉴证报告，分别占当年的14.20%和17.99%，披露比例呈逐年上升趋势。表2反映了在监管机构大力推进企业内部控制建设的努力下，企业总体的内控信息披露水平得到了提高，提升了内控透明度，在一定程度上降低了企业内控治理方面的信息不对称程度。

(三) 公司财务风险的计量

对于企业财务风险变量，我们以 Z_Score ¹³以及公司是否被ST或PT为判定标准，¹⁴设置 Z_Dum 三维虚拟变量来加以衡量，具体设置方式如下：若公司被ST或PT，我们认为其财务风险较大，已陷入财务危机， Z_Dum 取-1；若 Z_Score 小于1.8，我们认为公司财务状况欠佳，易陷入财务危机， Z_Dum 取0；若 Z_Score 值大于1.8，我们认为公司财务状况良好，发生财务危机的可能性较小， Z_Dum 取+1。

¹³ Z_Score 模型是以多变量的统计方法为基础，以破产企业为样本，通过大量的实验，对企业的运行状况、破产与否进行分析、判别的系统。纽约大学斯特恩商学院教授Edward Altman在1968年就对美国破产和非破产生产企业进行观察，综合考虑了企业的资产规模、变现能力、获利能力、财务结构、偿债能力等方面的因素，对数十个财务指标经过数理统计筛选，最终建立了著名的五变量 Z_Score 模型。参见Altman(1968)的研究。如姜付秀等(2009)所指出， Z_Score 模型在美国、澳大利亚、巴西、加拿大、英国、法国、德国、爱尔兰、日本和荷兰得到了广泛的应用。

¹⁴ 增加考虑被ST或PT判定标准，主要是参考了吴世农和卢贤义(2001)、陈晓(2003)以及吴世农和章之旺(2005)关于财务困境的界定。

表2 上市公司内控信息披露概况

A栏：2007年度内控五大要素信息披露得分情况						
内控要素	样本数	平均值	中位数	标准差	最小值	最大值
内部环境	1222	4.33	4	2.84	0	15
风险评估	1222	0.19	0	0.73	0	7
控制活动	1222	3.13	3	2.37	0	10
信息沟通	1222	1.24	1	0.91	0	5
监督检查	1222	1.39	1	1.3	0	6
B栏：2008年度内控五大要素信息披露得分情况						
内控要素	样本数	平均值	中位数	标准差	最小值	最大值
内部环境	1277	7.33	7	3.72	2	22
风险评估	1277	0.68	0	1.39	0	9
控制活动	1277	6.14	6	2.52	0	14
信息沟通	1277	1.66	2	1.1	0	5
监督检查	1277	3.34	3	2.29	0	10
C栏：披露内控鉴证报告情况						
	样本数	未披露	披露	披露比例	未披露比例	总比例
2007年	1222	1052	170	13.91%	86.09%	100%
2008年	1277	1048	229	17.93%	82.07%	100%

关于 Z_Score 的计算公式详见表1，该值越大，说明财务状况越好，越不容易陷入财务危机。根据 Altman (1968) 模型，美国企业 Z_Score 值的临界值为 1.8。尽管 Z_Score 值的判断标准在各国间有相当的差异，但近年来从澳大利亚、巴西、加拿大、法国、德国、爱尔兰、日本和荷兰等国企业“财务失败组”的 Z_Score 值看，其平均值都低于临界值 1.8。考虑到以上各国情况，同时参考姜付秀等 (2009) 关于财务困境指标的的设置方法，我们以 1.8 为临界值，来判断企业的财务风险状况。此外，我们增加考虑了 ST 或 PT 公司，¹⁵ 把 ST 或 PT 公司归为财务风险最大的一组。

(四) 内控信息披露与企业过度投资

在企业过度投资变量和内控信息披露变量都确定以后，我们便可使用如下模型考察内控信息不对称对资本投资的影响：

$$Over_Inv = b_0 + b_1 Ic_Dis_Score + Controls + \sum Industry + \sum Year + \Psi \quad (2a)$$

$$Over_Inv = a_0 + a_1 Ic_Dis_Dum + Controls + \sum Industry + \sum Year + u \quad (2b)$$

$$Over_Inv = c_0 + c_1 Certif + Controls + \sum Industry + \sum Year + \varphi \quad (2c)$$

具体变量定义参见表1。这里，因变量即为过度投资变量 $Over_Inv$ (其中 $Over_Inv = 0$ ，若 $Residue \leq 0$ ； $Over_Inv = Residue$ ，若 $Residue > 0$)，测试变量指内控信

¹⁵ 关于 Z_Score 及其所设置临界值的可靠性，我们查看了 ST 或 PT 公司的 Z_Score 值，发现其近 99.9% 的公司 Z_Score 值都小于 1.8，这符合吴世农和卢贤义 (2001)、陈晓 (2003) 以及吴世农和章之旺 (2005) 关于财务困境的界定，亦表明姜付秀等 (2009) 关于 Z_Score 临界值的设置是较为合理的。

息披露相关指标，我们分别把 Ic_Dis_Score 、 Ic_Dis_Dum 和 $Certif$ 信息披露指标作为测试变量。 $Controls$ 是一组控制过度投资的变量，参考 Richardson (2006)、Ang *et al.* (2000)、辛清泉等 (2007) 以及姜国华和岳衡 (2005) 的研究，我们使用自由现金流量 (FCF)、管理费用率 (Adm)、大股东占款 ($Orecta$)、高管持股比例 ($Stkpro$)、高管薪酬 ($Compensation$)、董事会规模 ($Boardsize$) 和独立董事比例 ($Direpro$) 作为控制变量，此外，我们还控制了实际控制人性质 ($Ctrlr$)、当期投资 (Inv)、¹⁶ 以及董事长与总经理兼任情况 ($Director_Manager$)。同样地，我们在模型中也加入了行业 ($Industry$) 和年度 ($Year$) 虚拟变量。

由于因变量 $Over_Inv$ 在 0 处被截断 (Left-truncated)，意味着用普通最小二乘法 (OLS) 回归所得系数将是偏的，为避免这种截断偏误，我们采用 Tobit 回归来估计模型 (2a)、(2b) 和 (2c)。

(五) 内控信息披露、企业过度投资与财务危机

前文分析表明，内控信息披露会影响企业内控治理方面的信息不对称性，减轻因信息不对称滋生或助长的代理问题，从而影响企业的投资效率，进而影响到企业的财务风险。由于财务风险指标 Z_Dum 所反映的三种企业财务风险状态 -1、0、+1 分别表示被 ST 或 PT 公司、 Z_Score 小于 1.8 公司及 Z_Score 大于 1.8 公司三类公司的财务风险水平，这三类公司的风险水平是呈顺序递减的，所以这里我们采用 Ordered-logit 模型来估计内控信息披露与过度投资对企业财务风险的影响，具体模型设定如下：

$$\Pr (Z_Dum \geq J) = \lambda_0 + \lambda_1 Over_Inv + \lambda_2 Ic_Disclosure_Variable + Controls + \sum Industry + \sum Year + \xi, J = 0, 1 \quad (3a)$$

$$\Pr (Z_Dum \geq J) = \eta_0 + \eta_1 Over_Inv + \eta_2 Ic_Disclosure_Variable * Over_Inv + Controls + \sum Industry + \sum Year + \nu, J = 0, 1 \quad (3b)$$

这里， Z_Dum 分别取 -1、0、+1，具体变量定义参见表 1，模型 (3a) 中的测试变量包括 $Over_Inv$ 和 $Ic_Disclosure_Variable$ ，后者指内控信息披露有关测试变量，我们分别采用了 Ic_Dis_Score 、 Ic_Dis_Dum 、 $Certif$ 指标，考察内控披露对企业财务危机的影响。此外，为测试内控信息披露对抑制企业过度投资，进而缓解企业财务危机的作用机制，我们用模型 (3b) 分别考察了以上三个内控披露变量与过度投资变量 $Over_Inv$ 的交叉乘积项对企业财务危机的影响，其中 $Ic_Disclosure_Variable * Over_Inv$ 即指相应的交叉乘积变量，包括 $Ic_Dis_Score * Over_Inv$ 、 $Ic_Dis_Dum * Over_Inv$ 、 $Certif * Over_Inv$ 。

¹⁶ Richardson (2006) 模型是在预测了均值后，以残差作为过度投资值，这是一种均值相对指标，这种衡量过度投资的方式往往会使当期实际投资水平越高，偏离均值的幅度越大，所估计的过度投资量也越大，这很可能会高估当期实际投资水平高的企业的过度投资程度。为了说明企业的过度投资程度并不是由这种估计偏差造成的，我们在过度投资方程中控制了当期的实际投资水平。为进一步检验结论的可靠性，我们也考虑不控制当期实际投资水平，在后文敏感性分析部分探讨了其他过度投资衡量方式的实证情况，研究结论未发生实质性变化。

关于模型(3a)、(3b)中的控制变量(*Controls*)，我们参考姜付秀等(2009)关于企业财务风险的方程设定，控制了如下变量：高管持股比例(*Stkpro*)、实际控制人性质(*Ctrlr*)、高管薪酬(*Compensation*)、董事会规模(*Boardsize*)、成长性(*Growth*)、企业规模(*Size*)、债务比例(*Level*)、以及行业(*Industry*)和年度(*Year*)。此外，我们认为盈利能力(*Roa*)是决定企业财务风险状况的重要因素，故亦加以控制。另外，我们还控制了董事会与总经理兼任情况(*Director_Manager*)。

(六) 样本选取和数据来源

关于资本投资方程有关数据，我们的初始样本包括2000—2008年中国沪深股票市场的所有A股上市公司，在剔除了金融行业上市公司及其他相关数据缺失的公司后，我们用于估计资本投资模型的样本数为10185(选用Tobin-Q变量时，样本数为9187)。该类数据来自CSMAR数据库，除内控披露数据外，本文中其他变量的数据来自CSMAR和Wind数据库。我们采用Cook(1977)程序计算极端值的百分比，发现极端值约占总样本的5%，因此我们对本文所使用到的主要连续变量按上下2.5%的比例进行了Winsorize处理，以消除极端值的影响。

关于内控信息披露有关数据，深圳市迪博企业风险管理技术有限公司提供的数据初始样本包括2007—2008年沪深两市A股共3099家上市公司，与资本投资模型样本中2007—2008年投资数据匹配合并后，得到2499家数据匹配完整的上市公司，即为我们的最终样本。表3反映了内控披露初始样本中部分数据被合并剔除的情况，从中可见，总的缺失样本共544家(不含金融行业)，其中新上市公司(IPO公司)306家，占了近60%，这些公司上年度数据缺失，我们予以剔除，由于IPO公司在信息披露方面的要求不同于其他公司(比如：证监会强制要求IPO公司披露内控鉴证报告)，我们认为剔除这些公司将有助于使本文的研究结论更加稳健。其余缺失样本主要由相关变量数据缺失的公司组成，由于所占比例相对较小，我们认为这些缺失样本难以对本文的研究结论产生系统性的影响。

表3 内控披露数据的样本筛选过程

	2007	2008	合计
总样本	1,497	1,602	3,099
金融行业公司	28	28	56
新上市公司	229	77	306
相关变量数据缺失公司	18	220	238
最终样本	1,222	1,277	2,499

表4 资本投资模型的回归结果

变量	预符	<i>Growth</i> = 销售增长率		<i>Growth</i> = Tobin-Q	
		系数	T统计量	系数	T统计量
Constant	?	-0.140	-5.45***	-0.226	-7.06***
<i>Growth</i> _{<i>t-1</i>}	+	0.014	5.45***		
<i>Q</i> _{<i>t-1</i>}	+			0.012	4.33***
<i>Level</i> _{<i>t-1</i>}	-	-0.037	-5.77***	-0.031	-4.47***
<i>Cash</i> _{<i>t-1</i>}	+	0.071	5.87***	0.064	5.08***
<i>Age</i> _{<i>t-1</i>}	-	-0.030	-13.92***	-0.031	-14.19***
<i>Size</i> _{<i>t-1</i>}	+	0.010	7.89***	0.013	8.94***
<i>Ret</i> _{<i>t-1</i>}	+	0.013	5.46***	0.011	4.44***
<i>Inv</i> _{<i>t-1</i>}	+	0.024	2.10**	0.033	2.87***
行业		控制		控制	
年度		控制		控制	
Observations		10185		9187	
Adjusted R-squared		0.139		0.125	

注：***、**、*分别表示1%、5%、10%统计水平下显著，双尾检验。系数的标准误为稳健标准误，时间序列依赖性(time series dependence)经Cluster修正(Rogers, 1993; Petersen, 2009)。

五、实证结果及分析

(一) 变量估算结果与描述性统计

表4是资本投资模型的回归结果，从中容易发现，包括Tobin-Q在内的所有变量回归系数都有预期的符号，且在1%水平下显著，这与Richardson(2006)的经验证据完全相符。因此，我们认为这二种模型都可用来衡量企业预期资本投资水平。考虑到在中国新兴加转轨的证券市场里，股权分置、“消息”市、“政策”市等因素交织在一起，使得Tobin-Q可能并不是企业增长机会的良好替代(辛清泉等，2007)，我们选用以销售增长率(*Growth*)衡量企业增长机会的模型(1)来估算企业过度投资。

表5报告的是主要变量的描述性统计结果。从A栏可见，内控披露的平均得分约为15分，5%分位数为3，95%分位数为32，标准差为9，说明不同上市公司之间内控信息披露水平有相当差异。由于*Z_Dum*的取值为-1、0和+1，从*Z_Dum*的平均值0.1和中位数0可见，相当部分上市公司财务状况欠佳，可能面临财务风险。从C栏各变量的相关系数可见，过度投资样本组中上市公司的过度投资变量*Over_Inv*与内控信息披露水平显著负相关，这初步表明上市公司内控信息披露可抑制企业过度投资。

此外，对比表5的B栏和C栏，不难发现B栏中全样本投资残差*Residue*与企业风险变量*Z_Dum*无关，但C栏中过度投资样本组投资残差*Over_Inv*却与*Z_Dum*显著负相关，这初步说明企业的投资大小与企业风险并无直接关系，只有过度投资才会加大企业陷入财务危机的可能性。另外，B栏和C栏关于内控信息披露的指标均与*Z_*

Dum 正相关，说明不管企业是否过度投资，内控信息不对称程度的减少均能对企业财务风险状况起到正面影响。

表5 主要变量的描述性统计

A 栏：均值、中位数、标准差及分位数 (全样本)

	平均值	中位数	标准差	5%分位数	95%分位数
<i>Ic_Dis_Score</i>	14.88	13	8.69	3	32
<i>Ic_Dis_Dum</i>	0.47	0	0.5	0	1
<i>Over_Inv</i>	0.08	0.05	0.09	0	0.31
<i>Z_Dum</i>	0.08	0	0.51	-1	1

B 栏：相关系数矩阵 (全样本)

	<i>Ic_Dis_Score</i>	<i>Ic_Dis_Dum</i>	<i>Residue</i>	<i>Z_Dum</i>
<i>Ic_Dis_Score</i>	1.00			
<i>Ic_Dis_Dum</i>	0.82***	1.00		
<i>Residue</i>	0.02	0.01	1.00	
<i>Z_Dum</i>	0.14***	0.12***	-0.001	1.00

C 栏：相关系数矩阵 (过度投资样本)

	<i>Ic_Dis_Score</i>	<i>Ic_Dis_Dum</i>	<i>Over_Inv</i>	<i>Z_Dum</i>
<i>Ic_Dis_Score</i>	1.00			
<i>Ic_Dis_Dum</i>	0.82***	1.00		
<i>Over_Inv</i>	-0.05**	-0.05**	1.00	
<i>Z_Dum</i>	0.13***	0.13***	-0.10***	1.00

注：***、**、*分别表示1%、5%、10%统计显著。

(二) 内控信息披露与企业过度投资：回归结果

表6报告了内控信息披露对企业过度投资的影响。*Ic_Dis_Dum*、*Ic_Dis_Score*、*Certif*三个内控信息披露指标的系数均显著为负，表明内控信息披露越多，公司内控治理方面的信息不对称程度就越低，企业就越不容易出现非效率投资，这支持了前文关于内控信息披露能有效减轻因信息不对称滋生或助长的代理问题，从而抑制企业过度投资的假设。此外，衡量是否披露内控鉴证报告的变量*Certif*与企业过度投资负相关，这说明企业自愿披露内控鉴证报告也可作为一种治理机制，以提高企业投资效率，抑制企业的过度投资行为。

从表6控制变量回归结果看，自由现金流量(*FCF*)越高，过度投资越严重，这和Jensen (1986)的理论分析以及Richardson (2006)的经验证据一致。同时，管理费用率(*Adm*)越高，投资过度也越严重；大股东占款(*Orecta*)同投资过度呈负相关，这可能是因为大股东占款导致了上市公司资金紧缺，由此削减了资本投资所致。此

外，高管持股比例 (*Stkpro*)、高管薪酬 (*Compensation*) 和董事会 (*Boardsize*) 均同企业过度投资负相关，表明这些公司治理因素在一定程度上起到了抑制企业过度投资的作用。

表6 内控信息披露与企业过度投资：Tobit模型回归结果

变量	模型 (2a)		模型 (2b)		模型 (2c)	
	系数	稳健Z值	系数	稳健Z值	系数	稳健Z值
Constant	0.029	3.59***	0.026	3.49***	0.024	3.06***
<i>Ic_Dis_Score</i>	-0.000	-3.15***				
<i>Ic_Dis_Dum</i>			-0.004	-2.61***		
<i>Certif</i>					-0.010	-5.70***
<i>FCF</i>	0.069	8.77***	0.068	8.72***	0.068	8.71***
<i>Adm</i>	0.040	6.49***	0.041	6.59***	0.040	6.68***
<i>Orecta</i>	-0.065	-4.80***	-0.066	-4.89***	-0.063	-4.75***
<i>Inv</i>	0.985	134.34***	0.985	133.96***	0.986	137.58***
<i>Stkpro</i>	-3.282	-3.94***	-3.356	-4.04***	-3.631	-4.42***
<i>Ctrlr</i>	0.003	1.73*	0.003	1.69*	0.003	1.93*
<i>Direpro</i>	-0.029	-1.75*	-0.028	-1.71*	-0.027	-1.67*
<i>Compensation</i>	-0.000	-6.68***	-0.000	-6.73***	-0.000	-6.66***
<i>Boardsize</i>	-0.002	-5.14***	-0.002	-5.08***	-0.002	-4.97***
<i>Director_Manager</i>	0.000	0.09	0.000	0.10	0.000	0.09
						0.08
行业	控制		控制		控制	
年度	控制		控制		控制	
Observations	2499		2499		2499	
Pseudo R-squared	14.87		14.85		14.93	

注：***、**、*分别表示1%、5%、10%统计显著，双尾检验，我们采用Intreg回归得到经稳健标准误修正的Z统计量，时间序列依赖性(time series dependence)经Cluster修正(Rogers, 1993; Petersen, 2009)。

(三) 内控信息披露、企业过度投资与财务危机：回归结果

表7报告了财务风险方程的Ordered-logit模型回归结果，反映了内控信息披露与企业过度投资对企业财务危机的影响。可以看到，方程(1)至方程(6)中，*Over_Inv*都同企业财务风险 (*Z_Dum*) 呈显著负相关关系，表明过度投资恶化了企业的财务状况，易使企业陷入财务危机。从方程(1)、(2)、(3)中三个内控信息披露指标 (*Ic_Dis_Dum*、*Ic_Dis_Score*、*Certif*) 的回归系数来看，其符号都显著为正，表明内控信息不对称程度的减小有助于降低企业财务风险。观察方程(4)、(5)、(6)中内控信息披露指标与过度投资变量的交叉乘积项 (*Ic_Dis_Score*Over_Inv*、*Ic_Dis_*

$Dum*Over_Inv$ 、 $Certif*Over_Inv$), 可发现其回归系数均显著为正, 表明随着信息不对称程度的减小, $Over_Inv$ 变量对 Z_Dum 的影响减少了, 即内控信息披露有助于缓解过度投资带来的负面影响, 降低企业陷入财务危机的可能性。

(四) 敏感性分析

1. 自选择问题

由于在我们的样本中, 所披露的内控信息仍带有自愿的性质, 公司在权衡其他因素后, 可能降低或提高其内控信息披露水平, 导致信息披露更透明并不意味着内部控制的措施更多, 这可能使我们的样本存在一种潜在的自选择偏差。为此, 我们在计量上采用了二种方法来控制这种自选择问题。第一, 我们采用了 Heckman (1979) 的二阶段回归方法 (Heckman's Two-step)。首先, 我们参考 Dolye *et al.* (2007) 关于内控信息披露决定因素的方程, 应用 Probit 回归估计出企业内控信息披露水平高低的概率, 从第一阶段回归中, 我们识别出公司信息披露好坏的概率, 然后我们计算出 Inverse Mills Ratio (参见 Heckman 1979; Leuz and Verrecchia 2000), 在控制 Inverse Mills Ratio 的基础上, 重新对相应的过度投资和财务风险方程进行回归分析。其结果 (参见表 8 和表 9) 仍然支持了我们前文的研究结论。

第二, 我们采用了 Lalonde (1986) 所命名的匹配倾向评分方法 (Propensity Score Matching), 该方法在 Morsfield and Tan (2006) 以及 Doyle *et al.* (2007) 中得到了应用。其原理是: 通过创建一个同高信息披露样本组有相同预测概率的低信息披露样本组来控制自选择问题。根据以上第一阶段回归中得到的预测概率和计算得到的倾向分 (Propensity Score), 我们通过创建匹配样本来控制自选择问题。在本文中, 我们分别把 Ic_Dis_Dum 等于 1 和 $Certif$ 等于 1 所组成的样本公司看作是高信息披露组, 分别根据 Ic_Dis_Dum 和 $Certif$ 创建了相应的低信息披露样本控制组。然后, 我们再对所得到的匹配样本进行回归分析, 其结果 (参见表 8 和表 9) 仍然支持了我们前文的研究结论。

2. 内生性问题

除了以上敏感性测试外, 我们也尝试探讨了有关内生性的问题。以往关于信息披露影响企业投资效率的文献较少提及信息披露与企业投资之间可能存在的内生性问题, 考虑到企业的信息披露、投资效率与财务风险状况之间可能两两相互作用, 从而使得用单一方程回归得出的残差项与解释变量相关, 导致用单一方程回归得到的估计系数将是偏的, 我们参考姜付秀等 (2009)、叶康涛等 (2007) 的研究, 采用 3SLS 回归来控制这种可能的偏差 (关于 3SLS 解决内生性问题的详细解释, 可参见 Maddala (1983))。首先, 我们参考 Doyle *et al.* (2007) 关于内控披露决定因素的研究, 设定了内控信息披露方程, 随后我们在原有过度投资和财务风险方程的基础上加入了相应的内生变量, 组成联立方程 (具体方程变量见表 7), 用三阶段最小二乘法 (3SLS) 进行了回归分析。具体回归结果见表 10。

表7 财务风险方程 Ordered-logit 模型回归结果

变量	模型 (3a)			模型 (3b)		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Over_Inv</i>	-6.139*** (-6.40)	-6.083*** (-6.30)	-6.050*** (-6.30)	-7.985*** (-6.20)	-7.195*** (-6.49)	-6.498*** (-6.78)
<i>Ic_Dis_Score</i>	0.029*** (2.73)					
<i>Ic_Dis_Dum</i>		0.450** (2.46)				
<i>Certif</i>			0.456** (2.10)			
<i>Ic_Dis_Score*Over_Inv</i>				0.136** (2.18)		
<i>Ic_Dis_Dum*Over_Inv</i>					2.645** (2.12)	
<i>Certif*Over_Inv</i>						3.584** (1.98)
<i>Growth</i>	0.036 (0.18)	0.023 (0.11)	0.025 (0.12)	0.035 (0.17)	0.031 (0.15)	0.027 (0.13)
<i>Level</i>	-3.788*** (-5.40)	-3.764*** (-5.39)	-3.698*** (-5.25)	-3.746*** (-5.35)	-3.743*** (-5.35)	-3.745*** (-5.34)
<i>Size</i>	0.379*** (3.45)	0.370*** (3.35)	0.374*** (3.40)	0.387*** (3.51)	0.379*** (3.44)	0.380*** (3.44)
<i>Roa</i>	20.292*** (9.99)	20.349*** (9.95)	20.373*** (10.01)	20.276*** (10.08)	20.325*** (10.04)	20.321*** (10.06)
<i>Stkpro</i>	56.394 (0.69)	59.313 (0.74)	86.714 (1.08)	83.517 (1.04)	79.109 (0.98)	87.686 (1.09)
<i>Ctrlr</i>	0.316 (1.44)	0.323 (1.48)	0.308 (1.40)	0.331 (1.52)	0.338 (1.55)	0.313 (1.42)
<i>Compensation</i>	0.000** (2.49)	0.000** (2.55)	0.000** (2.57)	0.000*** (2.63)	0.000*** (2.63)	0.000*** (2.68)
<i>Boardsize</i>	-0.003 (-0.07)	-0.004 (-0.07)	-0.008 (-0.15)	-0.006 (-0.13)	-0.006 (-0.11)	-0.008 (-0.15)
<i>Director_Manager</i>	-0.532* (-1.88)	-0.537* (-1.91)	-0.541* (-1.91)	-0.553* (-1.96)	-0.553** (-1.96)	-0.571** (-2.02)
行业	控制	控制	控制	控制	控制	控制
年度	控制	控制	控制	控制	控制	控制
Observations	1114	1114	1114	1114	1114	1114
Pseudo R-squared	0.321	0.320	0.319	0.318	0.319	0.318

注：***、**、*分别表示1%、5%、10%统计显著，双尾检验。括号内是Z统计量。系数的标准误差为稳健标准误，时间序列依赖性(time series dependence)经Cluster修正(Rogers, 1993; Petersen, 2009)。

表8 控制自选择后的内控披露与过度投资：Tobit模型回归结果

自选择控制方法 变量	Inverse Mill's Ratio		Propensity Score Matching	
	<i>Over_Inv</i>	<i>Over_Inv</i>	<i>Over_Inv</i>	<i>Over_Inv</i>
Constant	-0.083*** (-6.70)	-0.164*** (-21.67)	0.018** (2.45)	0.008 (0.65)
<i>Ic_Dis_Dum</i>	-0.003** (-2.16)		-0.003** (-2.20)	
<i>Certif</i>		-0.002* (-1.93)		-0.005** (-2.24)
<i>FCF</i>	0.059*** (8.74)	0.036*** (7.25)	0.059*** (9.05)	0.066*** (5.42)
<i>Adm</i>	0.024*** (4.35)	-0.009** (-2.27)	0.050*** (8.74)	-0.000 (-0.01)
<i>Orecta</i>	-0.046*** (-4.24)	0.004 (0.51)	-0.074*** (-6.22)	-0.060** (-2.51)
<i>Inv</i>	0.984*** (146.98)	1.017*** (196.26)	0.986*** (138.45)	0.992*** (85.44)
<i>Stkpro</i>	9.644*** (7.23)	-2.993*** (-6.68)	-2.709*** (-5.92)	-3.301*** (-3.18)
<i>Ctrlr</i>	0.007*** (4.82)	0.016*** (14.88)	0.005*** (3.23)	0.007*** (2.72)
<i>Direpro</i>	0.009 (0.63)	0.051*** (4.69)	-0.008 (-0.54)	-0.008 (-0.33)
<i>Compensation</i>	0.000*** (5.30)	0.000*** (8.20)	-0.000*** (-9.40)	-0.000** (-2.07)
<i>Boardsize</i>	-0.003*** (-7.55)	-0.000 (-0.40)	-0.002*** (-6.09)	-0.002*** (-3.97)
<i>Director_Manager</i>	-0.008*** (-4.16)	-0.002 (-1.16)	0.001 (0.53)	-0.003 (-0.76)
<i>Mills</i>	0.010*** (10.92)	0.074*** (35.97)		
行业	控制	控制	控制	控制
年度	控制	控制	控制	控制
Observations	2499	2499	2370	798
Pseudo R-squared	15.19	17.75	21.56	17.04

注：***、**、*分别表示1%、5%、10%统计显著，双尾检验。括号内是T统计量。我们采用Intreg回归得到截断模型系数的稳健标准误及Z统计量与Tobit回归结果无实质性差异。

表9 控制自选择后的财务风险方程 Ordered-logit 模型回归结果

自选择控制方法	Inverse Mill's Ratio			Propensity Score Matching			
	Z_Dum	Z_Dum	Z_Dum	Z_Dum	Z_Dum	Z_Dum	
<i>Over_Inv</i>	-5.950*** (-6.15)	-7.027*** (-6.31)	-6.057*** (-6.26)	-6.266*** (-5.37)	-7.718*** (-5.99)	-5.826* (-1.95)	-8.857** (-2.47)
<i>Ic_Dis_Dum</i>	0.440** (2.41)			0.520*** (2.60)			
<i>Ic_Dis_Dum*Over_Inv</i>		2.556** (2.05)			2.950** (2.23)		
<i>Certif</i>			0.373* (1.72)			0.942*** (2.71)	
<i>Certif*Over_Inv</i>				2.730 (1.51)			6.439* (1.86)
<i>Growth</i>	0.300 (1.10)	0.309 (1.13)	-0.176 (-0.84)	-0.151 (-0.64)	-0.115 (-0.49)	-0.605 (-1.23)	-0.574 (-1.16)
<i>Level</i>	-3.308*** (-4.44)	-3.287*** (-4.40)	-2.433*** (-3.15)	-3.262*** (-4.17)	-3.242*** (-4.10)	-0.424 (-0.29)	-0.291 (-0.20)
<i>Size</i>	0.079 (0.33)	0.088 (0.37)	0.129 (0.98)	0.413*** (3.78)	0.410*** (3.72)	0.087 (0.38)	0.072 (0.32)
<i>Roa</i>	19.939*** (9.81)	19.916*** (9.89)	19.978*** (9.78)	22.272*** (9.53)	22.121*** (9.56)	30.584*** (6.29)	30.442*** (6.42)

自选择控制方法 变量	Inverse Mill's Ratio		Propensity Score Matching	
	Z_Dum	Z_Dum	Z_Dum	Z_Dum
<i>Stkpro</i>	-514.366 (-1.17)	73.943 (0.86)	148.115*** (2.63)	-128.258 (-0.69)
<i>Cirtler</i>	0.224 (0.97)	0.034 (0.14)	0.083 (0.38)	-0.420 (-1.01)
<i>Compensation</i>	-0.000 (-0.44)	0.000 (1.34)	0.000*** (2.72)	0.000** (1.97)
<i>Boardsize</i>	0.050 (0.76)	-0.034 (-0.65)	-0.005 (-0.10)	0.092 (0.97)
<i>Director_Manager</i>	-0.205 (-0.56)	-0.516* (-1.85)	-0.733** (-2.37)	-0.376 (-0.65)
<i>Mills</i>	-4.403 (-1.45)	-1.830*** (-3.46)	-1.834*** (-3.46)	-0.451 (-0.78)
行业或年度	控制	控制	控制	控制
Observations	1114	1114	1068	364
Pseudo R-squared	0.323	0.328	0.339	0.382

注：***、**、*分别表示1%、5%、10%统计显著，双尾检验。括号内是Z统计量。系数的标准误为稳健标准误，时间序列依赖性(time series dependence)经Cluster修正(Rogers, 1993; Petersen, 2009)。

表10 内控信息披露、企业过度投资与财务风险联立方程回归结果

变量	内控披露方程		过度投资方程		风险方程	
	系数	Z统计量	系数	Z统计量	系数	Z统计量
Constant	17.3504	7.19***	0.2247	4.34***	-1.1202	-3.14***
<i>Over_Inv</i>	-1.3350	-0.54			-0.5406	-2.76***
<i>Ic_Dis_Score</i>			-0.0095	-4.61***	0.0429	2.87***
<i>Z_Dum</i>	3.6983	4.33***	0.0221	1.71*		
<i>Ctrlr</i>	0.8397	1.67*	0.0094	1.21	0.0084	0.21
<i>Compensation</i>	0.0000	0.97	0.0000	0.19	0.0000	1.51
<i>Boardsize</i>	-0.1970	-1.59	-0.0028	-1.47	0.0017	0.18
<i>Director_Manager</i>	-0.3875	-0.58	-0.0060	-0.59	-0.0617	-1.21
<i>Stkpro</i>	812.7038	3.51***	7.0147	1.66*	-36.0695	-1.44
<i>Age</i>	-2.5091	-10.59***				
<i>Losses</i>	-0.2048	-1.16				
<i>Acquisition</i>	-0.1305	-0.76				
<i>Direpro</i>	-8.0383	-2.19**	-0.0935	-1.48		
<i>Growth</i>	-0.2585	-2.24**			0.0269	0.84
<i>Level</i>					-0.4654	-6.65***
<i>Size</i>	0.5028	7.71***			0.0257	1.66*
<i>Roa</i>					2.2540	7.57***
<i>FCF</i>			0.0317	5.27***		
<i>Inv</i>			0.9351	26.29***		
<i>Adm</i>			0.0244	2.88***		
<i>Orecta</i>			-0.0089	-0.95		
行业	控制		控制		控制	
年度	控制		控制		控制	
Observations	1114		1114		1114	
Chi2	672.6***		672.6***		279.2***	
Adjusted R-squared	0.27		0.37		0.004	

注：***、**、*分别表示1%、5%、10%统计显著，双尾检验。其中内控披露方程、过度投资方程和财务风险方程的因变量分别为*Ic_Dis_Score*、*Over_Inv*和*Z_Dum*。

从表10可见，在内控披露方程中，*Z_Dum*的系数显著为正，表明财务风险状况越好的公司越可能披露多的内控信息，而过度投资变量*Over_Inv*的系数虽然为负，但并不显著，表明企业投资效率的高低并不直接影响其内控披露水平。从过度投资方程看，*Ic_Dis_Score*系数显著为负，表明内控透明度的增加有助于抑制企业过度投资行为。从风险方程看，*Over_Inv*系数显著为负，而*Ic_Dis_Score*显著为正，表明过度投资易使企业陷入财务危机，而内控披露有助于减轻企业的财务风险。这些结果均支持了我们前文的研究结论。

此外，我们把风险方程中的内控披露指标替换为交叉乘积项*Ic_Dis_*

$Score * Over_Inv$, 结果该系数符号仍显著为正, 表明内控信息披露能减轻企业因过度投资而导致的财务风险。在联立方程中, 我们也曾用其他二个内控披露指标 Ic_Dis_Dum 和 $Certif$ 分别替换 Ic_Dis_Score , 发现这些指标与 $Over_Inv$ 的交叉乘积项符号依然显著为正, 这些结果均支持了前文关于“内控信息披露水平的提高有助于降低企业因过度投资而带来的财务风险”的假设。

3. 内控披露信息与一般财务披露信息的区别

相对于一般财务披露信息而言, 内控披露信息含有增量信息吗? 若没有, 本文的研究结论, 可能并不是因为内控信息披露所引起的。为了回答这一问题, 我们补充了内控信息与财务报表信息之间相关性的检验。首先, 我们采用二种方法来估计盈余信息质量: (1) 参考 Caramanis and Lennox (2008)、Kothari *et al.* (2005) 以及夏立军 (2003) 的研究, 对 Jones (1991) 模型进行逐年分行业回归, 把其所估计出的残差 (可操控性应计利润) 的绝对值作为衡量企业盈余信息质量的代理变量 (DA); (2) 参考 Dechow and Dichev (2002)、Ball and Shivakumar (2006), 以及 Wang (2006) 的研究, 采用修正的 DD 模型所估计出的残差的绝对值来衡量盈余信息质量 (DA)。

然后, 我们比较了盈余信息质量 DA 与各内控信息披露变量之间的关系, 并且在控制盈余信息质量 DA 的情况下, 重新对相应的过度投资方程和财务风险方程进行了回归分析。我们发现, 采用二种方法所估计出的 DA 均与各内控信息披露变量负相关, 即内控信息披露越好, 盈余操纵程度越小, 盈余信息质量越高。但在控制了会计盈余信息 DA 变量后, 前文研究结论并未发生实质性变化。这表明, 内控信息确实与一般的财务信息不同, 这些信息贯穿企业决策、执行和监督全过程, 是难以从会计盈余质量等方面的信息中捕捉到的。

此外, 我们也尝试采用 Tobit 和 Ordered-logit 逐步回归法考察放入 DA 控制变量后, 加入各内控披露变量是否显著增加了模型的解释力, 结果发现, 在控制 DA 基础上, 各内控披露变量具有显著的边际贡献, 放入内控披露变量后模型的解释力有显著增加, 这亦在一定程度上表明, 内控信息披露具有一般财务信息披露所不能捕捉到的增量信息。

4. 过度投资的行业因素

Richardson (2006) 模型的原理是通过模型 (1) 来预测期望正常值, 但不同行业的投资, 例如高科技企业和传统制造业相比, 其决定机理存在较大差异, 仅用虚拟变量控制行业因素得到的预测误差仍可能是较大的。因此, 我们采用 Richardson (2006) 模型分别对每一个行业进行回归分析, 计算出公司的过度投资程度 ($Over_Inv$), 然后我们采用此方法计算得出的 $Over_Inv$ 变量对前文的过度投资方程和财务风险方程重新进行了回归分析, 研究结论亦未发生实质性变化。

5. 宏观因素的影响

Richardson (2006) 模型是在预测了均值后, 以残差作为过度投资值, 这是一个均值相对指标, 模型中并未控制宏观因素的影响, 如果存在一个年份上市公司普遍存在过度投资, 则该指标的预测值可能会偏高, 进而低估过度投资, 造成误差。

因此，有必要在该模型中控制宏观因素对企业投资的影响。我们参考Altamuro and Beatty (2010)关于控制宏观因素的方法，在Richardson (2006)回归模型中控制了市场的无风险利率和综合年市场回报率。我们以各年的市场无风险基准利率和考虑现金红利再投资的综合A股年市场回报率作为宏观因素的替代变量，加入相应的过度投资和财务风险方程，结果发现，上市公司的过度投资行为确实与宏观因素有关，当综合市场回报率高时，过度投资现象更加严重，而市场无风险利率与过度投资负相关，但是，在控制这些宏观因素后，我们的研究结论并未发生实质性变化。

6. 其他过度投资的衡量方式

Richardson (2006)模型是在预测了均值后，以残差作为过度投资值，这是一个均值相对指标，这种衡量过度投资的方式往往会使当期实际投资水平越高，偏离均值的幅度越大，所估计的过度投资量也越大，这很可能会高估当期实际投资水平高的企业的过度投资程度。为进一步检验研究结论的可靠性，我们采用另外二种截然不同的过度投资衡量方式，重新考察了内控信息披露与过度投资之间的关系。

首先，我们考察了内控信息披露与投资—现金流敏感性之间的关系。Vogt (1994)通过在投资模型中加入Tobin-Q与自由现金流的交互项，来判断企业是否过度投资。当交互项的系数为负时，表示随着投资机会的减少，公司的投资支出却随着现金流的增加而增加，即随着投资机会的减少，投资—现金流的敏感性反而增加了。这很可能意味着，经理滥用了现金流，将公司现金流投资于非盈利最大化项目甚至是净现值为负的项目，从而导致过度投资。

根据Jensen (1986)和Vogt (1994)，当公司有充足现金流时，过度投资现象将更加严重，因此，我们重点考察了高现金流组公司。我们按自由现金流(FCF)的中位数分组，把样本公司中FCF大于中位数的公司归为高现金流组，参考Vogt (1994)的模型考察了公司的投资—现金流敏感性。我们发现， $Q*FCF$ 的系数显著为负，表明随着投资机会的减少，投资现金流的敏感性反而增加了，说明即使公司在投资机会减少的情况下，其投资支出仍随着现金流的增加而增加，公司存在过度投资行为。

进一步，我们发现， Ic_Dis_Dum 、 Ic_Dis_Score 、 $Certif$ 与 $Q*FCF$ 三维交互项系数均为正，其中 Ic_Dis_Score 、 $Certif$ 与 $Q*FCF$ 的交互乘积项系数是显著的，这在一定程度上表明，随着内控信息披露的提高，拥有充足现金流公司的过度投资程度减少了，这与我们前文关于内控披露有助于抑制企业过度投资的假说是一致的。如Jensen (1986)和Vogt (1994)所指出，过度投资现象可能会在公司拥有充足现金流时显得突出，对于低现金流组公司，我们并没有发现公司以投资—现金流敏感性方式衡量的过度投资现象。总体而言，这些结果并没有改变我们前文的研究结论。

其次，我们参考Biddle *et al.* (2009)的研究，通过以下模型来衡量企业的预期投资水平，其中， $Investment_{i,t+1}$ 是总的投资， $SalesGrowth_{i,t}$ 是销售收入增长率。

$$Investment_{i,t+1} = \beta_0 + \beta_1 * SalesGrowth_{i,t} + \varepsilon_{i,t+1}$$

Biddle *et al.* (2009)对该模型进行了逐年分行业回归(剔除当年行业内观察数小于20的样本)，然后他们把残差按从小到大顺序排列，等分为四组，把中间二组归

为正常投资组(赋值 $Inv_Dum=2$)，把第四组归为过度投资组(赋值 $Inv_Dum=3$)，把第一组归为投资不足组(赋值 $Inv_Dum=1$)。随后，在控制一系列相关变量的情况下，他们以 Inv_Dum 作为因变量，对其进行了 Multinomial-logit 回归分析。我们参考他们关于过度投资与投资不足的衡量方法和 Multinomial-logit 的模型设定，进行了 Multinomial-logit 多元回归分析。结果发现，相对于正常投资组而言， Ic_Dis_Dum 、 Ic_Dis_Score 变量的系数在投资不足组和过度投资组中均显著为负($Certif$ 的系数不显著，但因其反映的仅仅是内控披露信息变量 Ic_Dis_Score 中的一部分，这并不影响我们整体的研究结论)，这表明在保持其他变量不变的情况下，若公司提高其内控披露水平，则其出现在投资不足组或过度投资组的概率将显著降低，即内控披露越好的公司，越不可能出现在非正常投资组，这也支持了我们前文关于内控信息披露有助于抑制企业过度投资的假说。

7. 其他财务风险的衡量方式

我们也曾尝试采用其他衡量方法来测试企业的财务风险。首先，我们参考 Andrade and Kaplan (1998)，把财务危机定义为公司的付息纳税前利润不足于支付其利息费用。具体做法为，当公司被 ST 或 PT 时，认为公司已陷入财务困境，取 $Zdd = -1$ ；当公司并未被 ST 或 PT 但其付息纳税前利润不足于支付利息(财务费用)时，认为公司面临财务困境，取 $Zdd = 0$ ；其他情况则认为公司财务状况较好，取 $Zdd = 1$ 。

其次，我们也参考了 Dahiya *et al.* (2003) 定义财务危机的方法，把财务危机定义为公司没有足够的现金流支付到期债务。具体做法为，当公司被 ST 或 PT 时，认为公司已陷入财务困境，取 $Zdd = -1$ ；当公司并未被 ST 或 PT 但其经营活动产生的现金流量净额不足于支付利息(财务费用)时，认为公司面临财务困境，取 $Zdd = 0$ ；其他情况则认为公司财务状况较好，取 $Zdd = 1$ 。

我们分别采用以上二种方法衡量企业财务风险，重新进行了回归分析，整体而言其回归结果仍然支持了前文的研究结论。

8. 内控披露指标的衡量

因本文的关键数据来自于深圳迪博咨询公司，其处理方法、过程、以及结果并不是公开可得。为进一步检验前文的结论，我们也尝试通过手工收集数据，采用自建内控披露指标数据库的方式进行研究。由于内部控制五大要素中，“控制活动”是实施内部控制的具体方式，企业是否过度投资与其控制活动密切相关。因此，我们以内部控制五大要素中的控制活动要素为核心，建立了控制活动信息披露指数。具体建立方法参见表 11，我们把控制活动信息披露分解为该表中的 13 个要素点，判断企业对每个要素点是否进行了披露，若披露则得 1 分，否则得 0 分，随后我们以累计得分作为企业的控制活动信息披露指数。由于数据搜集工作量较大，我们仅选择了制造业上市公司作为我们的检验样本，2007—2008 年制造业上市公司共有 1,437 个观测值。我们参照前文的研究模型和方法，对制造业上市公司的自建样本指标进行了回归分析，研究结论仍未发生实质性变化。

表 11 自建指标：内部控制之控制活动要素点

控制活动披露内容	
1	披露了不相容职务分离的相关情况
2	披露了授权的相关规定
3	对于重大的业务和事项实行集体决策审批或者联签制度
4	披露了重要业务活动的控制制度
5	建立了重大风险预警机制
6	建立了突发事件应急处理机制
7	定期开展运营情况分析，发现存在的问题，及时查明原因并加以改进。
8	建立和实施绩效考评制度
9	建立了财产日常管理制度和定期清查制度
10	没有出现过未经授权审批人员接触和处置财产的情况（未披露即视同没有出现）
11	实行全面预算管理制度
12	企业各级管理人员没有出现越权行为（未披露视同没有）
13	披露了会计机构的设置和会计负责人的职务资格

另外，为了更好地理解二组不同指标之间的异同，我们把自建内控披露指标与深圳迪博咨询公司内控披露指标作了对比，结果发现，二类指标高度相关，其相关系数高达0.8776，且在1%水平下显著，这表明，深圳迪博咨询公司建立的内控披露指标颇具一定的可信度。

9. 滞后期内控披露对当期投资及财务风险的影响

我们进一步考察了上期内部控制信息披露对企业当过度投资的影响。结果发现，整体而言，滞后一期的内部控制信息披露对企业当期过度投资的影响并不显著，这可能是因为，从信息经济学的角度看，内控披露信息能够迅速被市场吸收，其在减少信息不对称中所发挥的作用并不需要相当长的时间滞后。

另外，我们也检验了上一期的过度投资与当期的财务风险之间的关系。我们发现，在财务风险方程中，滞后一期的过度投资系数并不显著，表明滞后一期的过度投资与当期财务风险并没有直接关系，不过上一期的财务风险会影响当期的财务风险，因此，上一期的过度投资会通过影响上一期的财务风险来影响企业当期的财务状况。

10. 其他敏感性测试

前文关于过度投资的衡量，系采用销售增长率(*Growth*)作为企业增长机会指标通过模型(1)计算而得的，我们也曾尝试用Tobin-Q值指标衡量企业增长机会计算企业过度投资量，研究结论并未发生实质性变化。另外，有些学者(如杨华军和胡奕明，2007)采用经营活动现金流量减去预期资本投资后的净额表示自由现金流(*FCF*)，考虑到自由现金流在资本投资决策中的重要性，我们也采用该方法衡量

FCF，重新进行回归分析，研究结论并未发生实质性变化。

此外，在估计资本投资模型时，我们采用的是2000—2008年的数据，这期间经历了股权分置改革，股改从2005年上半年开始，考虑到制度变迁可能对上市公司投资模式产生影响，我们也曾尝试采用股改开始后2005—2008年的数据估计资本投资模型，研究结论未发生实质性改变。最后，我们也尝试按上下1%的比例对主要连续变量的极端值进行Winsorize处理，研究结论亦未发生实质性变化。

基于以上敏感性分析，我们认为前文的研究结论是比较稳健的。

六、研究结论

与现有关于信息披露影响企业投资效率方面的经典文献不同，本文从企业内控信息披露角度研究企业投资效率，考察了内控信息披露与企业过度投资及财务风险之间的内在联系。我们更加关注非效率投资带来的财务风险，不仅考察了内控信息披露对企业过度投资的影响，还进一步考察了过度投资可能导致的财务风险及内控信息披露在控制风险方面所起的作用。我们的研究表明：第一，内控信息披露水平的提高有助于降低企业内控治理方面的信息不对程度，减轻了企业因信息不对称滋生或助长的代理问题，有效地抑制了企业过度投资行为；第二，过度投资易使企业陷入财务危机，过度投资越严重，企业陷入财务危机的可能性越大；第三，内控信息披露有助于减轻企业因过度投资带来的负面影响，降低企业陷入财务危机的可能性。

本文首次从内控信息披露角度研究企业过度投资问题，考察了内控信息披露与企业过度投资及财务风险之间的内在联系。本文的研究丰富了现有关于信息披露影响投资效率方面的文献，证实了企业内控信息披露的重要性，表明当前监管机构加强企业内控信息披露的决策是有助于保护投资者利益的。我们的研究为实务界和当前监管机构制定有关内部控制和投资者保护方面的政策提供了一个有益的视角。

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Internal Control Disclosure, Firm Over-investment, and Financial Crisis: Evidence from Chinese Listed Companies*

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Abstract

Unlike the extant literature discussing the effect of information disclosure on firm investment efficiency, this paper studies the topic from the perspective of internal control disclosure. It examines the relationships between internal control disclosure, over-investment, and financial crisis. The results show that (1) raising the level of internal control disclosure helps reduce information asymmetry in internal control governance and the agency problem generated or exacerbated by information asymmetry, thereby effectively suppressing the over-investment behaviour of enterprises; (2) over-investment tends to cause firms to fall into a financial crisis, with higher over-investment leading to the greater possibility that such will happen; and (3) internal control disclosure helps to reduce the negative impact of over-investment and to lower the likelihood of a firm falling into a financial crisis. Our study enriches the existing literature on information disclosure

* This paper is funded by the projects of the China National Natural Science Foundation “Internal Control of Listed Companies and Investors Protection” (Project No. 70972076) and “Bank Loans, Trade Credit and Listed Companies’ Internal Control” (Project No. 71002110), and by the project of the Humanities Social Science Foundation of the Ministry of Education “Internal Control, Over-investment, and Financial Crisis” (Project No. 09YJA790199). We appreciate the support from the Academic New Distinguished Scholar Prize 2010 for PhD candidates offered by the Ministry of Education, PRC, and the support of the Ryoichi Sasakawa Young Leaders Fellowship Fund 2010. We also sincerely thank the two anonymous referees and the executive editor for their valuable advice, Professor Qiang Cheng at the School of Business, University of Wisconsin, for his guidance, Professor Bingxuan Lin at the College of Business Administration, University of Rhode Island, for his related reference and advice, Professor Zhen Li at the Business School, University of Arizona, Professor Huai Zhang at the Business School, Nanyang Technological University, Professor Cong Wang at the Department of Finance, The Chinese University of Hong Kong, and Dr Ge Rui at the Business School, Hong Kong University of Science and Technology, for their review and advice. We are responsible for any flaws in this paper.

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affecting investment efficiency, confirms the importance of internal control disclosure, and shows that the regulatory authority's decision to require firms to strengthen internal control disclosure is helpful in protecting investors' benefits. The paper also provides a useful perspective for practitioners and regulatory agencies in developing policies with regard to internal control and investor protection.

Keywords: Internal Control, Information Disclosure, Over-investment, Financial Crisis

CLC codes: F23, C93, F06

I. Introduction

Efficient investment is a major incentive for a company's growth and an important foundation for any increase in future cash flow (Yang and Hu, 2007). But in recent years, some common problems among Chinese listed companies have appeared, such as low investment efficiency, inefficient investment behaviour, and severe over-investment. Existing research shows that information asymmetry is an important element affecting a firm's investment efficiency (Antle and Eppen, 1985; Healy and Palepu, 2001; Biddle and Hilary, 2006; Biddle *et al.*, 2009).

Although raising the level of the internal control disclosure of listed companies helps reduce information asymmetry in internal control governance, will this kind of improvement in internal control contribute to the growth of firm investment efficiency in reality? If so, it would certainly be worthwhile for the regulatory authority to require firms to strengthen internal control construction and disclosure. Our literature review, however, shows that hardly any literature offers evidence of how internal control disclosure affects firm investment efficiency or discusses the inner relations between internal control disclosure, firm investment, and financial risk.

Unlike the extant literature (e.g. Biddle and Hilary, 2006; Biddle *et al.*, 2009; Zhang and Lu, 2009) that discusses the effect of information disclosure on firm investment efficiency, this paper studies the matter mainly from the perspective of internal control disclosure. We not only discuss how such disclosure affects a firm's over-investment, but also study the financial risks that over-investment brings and ways in which internal control disclosure helps to control risks. We choose internal control disclosure as a breakthrough point since, compared with financial information, internal control information is special in that it reflects the overall operational information of firm governance, management, and transactions, which run through the whole process of firm decisions, execution, and supervision; at the same time it is also difficult to capture from information on earnings quality. Nonetheless, among all of a firm's private information, internal control information is the most important for investors, creditors, and market supervisors (Li and Ma, 2007).

Firm investment has an economic impact on firm performance and risk; companies may likely fall into a financial crisis, or even go bankrupt, if they do not pay great

attention to risk control. As the extant literature shows, however, Chinese and international academics are more concerned over how firm investment affects firm value and performance and less over how it affects firm risk. In reality, we must realise that many companies fail not because they perform badly or cannot create value, but because they have failed to control risk well, such as in the US sub-prime crisis. Therefore, research is necessary to study, respectively, how problems of financial crisis arise from firm over-investment, and what role internal control information plays in this process.

In line with the above discussion and analysis, this paper attempts to answer the following three questions: First, can a higher level of internal control disclosure have positive effects on firm investment, reduce the agency problem generated or exacerbated by information asymmetry, and thereby effectively suppress the over-investment behaviour of enterprises? Second, will over-investment increase the likelihood of a company falling into a financial crisis? Third, will the investment strategies firms implement under different levels of internal control disclosure affect the possibility of their falling into a financial crisis; that is to say, could reducing internal control information asymmetry lower the financial risk caused by over-investment?

Referring to the research model of Richardson (2006), this paper first estimates the extent of firm over-investment based on the data of listed companies in China between 2000 and 2008. Later, we use the internal control disclosure data of Shenzhen Dibo Technology Co. Ltd. between 2007 and 2008 to carry out an empirical study on how internal control disclosure affects firm over-investment,⁵ how over-investment affects firm financial risk, and how reducing the asymmetry of internal control information helps lower the financial risk caused by over-investment. The results show that raising the level of internal control disclosure helps reduce information asymmetry in internal control governance and the agency problem generated or exacerbated by the asymmetry, as well as effectively suppressing the over-investment behaviour of enterprises. In addition, internal control disclosure helps lower the likelihood that a firm will fall into a financial crisis.

The main contribution of this paper lies in the following: First, it discusses for the first time how the asymmetry of internal control information affects firm over-investment from the perspective of internal control disclosure; second, it pays more attention to business risk, and studies how over-investment affects financial risk and how internal control disclosure affects risk control. In addition, this study confirms the importance of internal control disclosure, indicating that the regulatory authority's decision requiring firms to strengthen internal control disclosure is helpful in protecting investors' benefits. This paper also provides a useful perspective for practitioners and regulatory agencies in developing policies with regard to internal control and investor protection.

⁵ Some results were published in *China Securities Journal*, 24 June 2008.

The remainder of the paper proceeds as follows. Section II gives a brief review of the relevant literature. Section III puts forward the hypotheses after applying the relevant theory with reference to the reality in China. Section IV describes the research design. Section V presents the empirical results. Section VI concludes.

II. Literature Review

The relationship between corporate information disclosure and the characteristics of the capital market has always been a key area in accounting, monetary, and financial research. Rajan and Zingales (2000) show that to ensure its normal operation, the financial system requires an information disclosure system that enhances transparency. After summarising previous studies, Healy and Palepu (2001) point out that accounting transparency should be able to reduce adverse selection (such as tending to issue securities at higher prices) and moral hazard (such as using existing assets to create job consumption) by perfecting contracts and supervising quality. Thus, higher accounting quality can improve firm investment efficiency by reducing the above conflicts caused by information asymmetry (adverse selection and moral hazard) (Biddle and Hilary, 2006; Biddle *et al.*, 2009).

Much similar literature, such as Amihud and Mendelson (1986) and Welker (1995), demonstrates that a higher degree of information disclosure leads to a smaller bid-ask spread in the stock market, that is, less information asymmetry. Bhushan (1989) and Lang and Lundholm (1993, 1996) show that securities analysts and investors offer more accurate earnings forecasts as the degree of information disclosure increases. Botosan *et al.* (1997), Bhattacharya *et al.* (2003), and Francis *et al.* (2004) reveal that higher accounting information transparency leads to a lower cost of equity capital. Zeng and Lu (2006) find a negative correlation between quality of information disclosure and the marginal cost of equity financing.

Emphasising the efficiency of firm investment, Biddle and Hilary (2006) and Biddle *et al.* (2009) complement and expand upon the above studies to explain why information transparency affects the characteristics of the capital market, and empirically show a correlation between the quality of financial information and the efficiency of capital investment. They also show that better earnings quality improves the efficiency of a firm's investment by narrowing the information asymmetry between managers and external capital providers, and that this effect is greater among countries where the capital supply deals are comparatively fair (compared with countries that require creditors to offer more funds). Furthermore, they point out that information asymmetry between managers and external capital investors creates frictions in the market; also, if high-quality accounting existed with a perfect monitoring system, the agency problem would not exist, and thus the efficiency of investment would be assured. The authors further indicate that a close relationship exists between the quality of financial information and a firm's over- and

under-investment.⁶ All in all, their studies not only support the hypothesis of Jensen (1986, 1993) that the agency problem between managers and shareholders leads to non-efficient investments, but also provide the theoretical basis for this paper.

Although plenty of Western research has provided results on over-investment, the literature has focused mainly on the analysis of incentives for over-investment. For example, Richardson (2006) finds that a firm's free cash flow leads to over-investment. Inderst and Klein (2007) find that managers tend to over-invest when prompted by awards for investing in new projects or when under an internal competitive environment. Hart and Moore (1995) point out that managers are strongly motivated to build a "business empire". Dow *et al.* (2005) hold the opinion that managers have a tendency to over-invest and are inclined to invest in more projects as long as they have excess cash flow. Malmendier and Tate (2005) believe that a firm's investment decisions become more radical if the managers are overconfident. Many studies also examine over-investment in China, which include mainly research on how corporate governance, debt financing, and cash dividends affect over-investment, such as Tang (2007), Tong and Lu (2005), Wei and Liu (2007), and Yang and Hu (2007). Moreover, Zhang and Lu (2009) discuss how information disclosure and an information intermediary impact a firm's over-investment. But examining the extant literature, we find almost no research studying the over-investment of firms from the perspective of internal control disclosure and considering their financial risk.

Unlike the above literature, we take the significant difference between the importance of a firm's internal control information and earnings into account, and study the efficiency of a firm's investment from the perspective of internal control disclosure. We not only discuss how such disclosure affects a firm's over-investment, but also study the financial risks that over-investment brings and ways in which disclosure helps control risks.

III. Institutional Background and Theoretical Analysis

3.1. Institutional Background

After a series of financial scandals in listed companies, such as Enron and WorldCom, dealt a hard blow to investor confidence, in 2002 the United States enacted the Sarbanes-Oxley Act (hereinafter SOX), which greatly drew people's attention to internal control in both theoretical and practical fields at home and abroad. As soon as SOX came into effect, China's Ministry of Finance, together with four other departments, set up the Internal Control Standards Committee, which was considered preparation for China's own SOX, to establish an internal control system that included mainly control criteria, evaluation criteria, risk prevention, and fraud control. On 28 June 2008, the five departments jointly issued the so-called Chinese SOX – the *Basic Norms for Enterprise*

⁶ Antle and Eppen (1985) provide a formal model for this viewpoint.

Internal Control, which requires listed companies to undertake an annual self-evaluation of the effectiveness of their internal control and disclose their assessment; they may also hire intermediary agencies with securities and futures business qualifications to audit this effectiveness.⁷ These are all signs that enhancing internal control disclosure has become an important way for the Chinese government to improve corporate governance.

Just as regulators in various countries were paying great attention to the construction of corporate internal control, the United States, Japan, Korea, and Australia successively launched a series of rescue plans to cope with the global financial crisis. In November 2008, the Chinese government also announced an economic stimulus package of four trillion renminbi. The start of the plan has not only stimulated local governments' enthusiasm to invest more, but also created a new investment boom in the business community.⁸ According to the data on national economic performance published by the National Bureau of Statistics, in the first half of 2009, investment contribution to the economic growth rate was 87.6 percent, driving gross domestic product (GDP) growth by 6.2 percentage points. Consumption has driven the GDP by nearly 3.8 percentage points, whereas the contribution of foreign demand to the economic growth rate has been negative, with a drop in negative GDP growth of 2.9 percentage points. The annual data have been found similar, meaning that the three main elements of investment, consumption, and exports, which used to be the troika pulling economic growth, have significantly changed their contribution to economic growth, so that now it is investment that is strongly driving the economy.

Thus, under the current background, risk prevention and investment (especially investment efficiency) have become two hot spots in the national economy. Only by paying close attention to the issue of risk prevention and by helping firms improve their capacity to prevent risk can we better protect the economy from a financial crisis at the micro level. Keeping an eye on the issue of investment (especially investment efficiency) and maintaining rational investment amid the global financial crisis to ensure the investment efficiency of 4 trillion renminbi have become major challenges for the Chinese government in implementing the scientific concept of development.

This paper focuses on the intrinsic link between the disclosure of internal control, a firm's over-investment, and financial crisis, aiming to provide evidence for risk prevention and investment (especially investment efficiency).

⁷ On 28 June 2008, the Ministry of Finance, CSRC, Auditing Administration, CBRC, and the China Insurance Regulatory Commission jointly issued these norms. Considering that it takes time and some procedures for enterprises to adopt these norms, the implementation date has been postponed to 2011. So the internal control disclosure is somewhat voluntary in our sample.

⁸ Although government investments are often referred to government purchases or construction of infrastructure, the ultimate objects of government purchases are sourced from enterprises; therefore, government investments will boost enterprise investments. Moreover, the raw materials and other necessary goods that government infrastructure requires are also obtained from enterprises. Although apparently the construction of infrastructure will promote the development of related enterprises only, links between enterprises are widespread. In addition, the parent companies of many listed companies in China are state-owned, and so these listed companies are greatly influenced by the government. Thus, business investment decisions are influenced by government investment decisions.

3.2. Theoretical Analysis

In the perfect world described by Modigliani and Miller (1958), a firm's investment decisions depend on a project's net present value, in that a firm will invest in a project where this value is positive. Meanwhile, the firm's total investment spending is decided only by the investment opportunities it faces. In the real market, however, there is friction; firms facing financing constraints rely more on internal funds, and they find it difficult to achieve the optimal scale of investment (Fazzari *et al.*, 1988). Financial scholars, moreover, generally agree that in the real world, the agency problem greatly affects a firm's investment decisions (Stein, 2003).

As far as the agency problem is concerned, Berle and Means (1932) first note that the separation of ownership and operational rights leads to inconsistent interests between shareholders and managers. These inconsistent interests inevitably cause manager decisions to deviate from the objective of maximising shareholder value (Jensen and Meckling, 1976), such as pursuing job consumption and investing free cash flow into projects with a negative net present value, leading to over-investment. Jensen (1986, 1993) suggests that managers generally rush to over-invest; because they have incentives to expand their company, they thus cause the company to deviate from the optimal scale, because they can obtain more private interests from controlling more resources. This characteristic of pursuing the investment scale rather than investment efficiency is called "managerial imperialism".

Asymmetric information further leads to more agency problems on the one hand, and more serious over-investment phenomena caused by these problems on the other. Blanchard *et al.* (1994) study what managers do after receiving funds that are unable to change a firm's investment opportunity set. In a perfect market without information asymmetry, managers should return the funds to investors. The authors find, however, that managers are inclined to use these funds to invest in typical failure-prone projects. This finding shows that information asymmetry creates moral hazard, thus causing agents (managers) to deviate from the goal set by the clients (shareholders), and leading firms to over-invest. Biddle and Hilary (2006) point out that information asymmetry between managers and external capital investors leads to frictions in the market, but if a firm has high-quality accounting with a sound supervisory system, the agency problem does not emerge, thus assuring better investment efficiency. Zhang and Lu (2009) also find that lower information asymmetry leads external investors to supervise managers better so as to prevent them from over-investing.

In addition, when information asymmetry exists, managers are inclined to sell stocks when the price is higher than the actual value of the company, because they have more information about the firm's future than do investors. Rational investors will then respond by increasing the firm's capital cost; thus, the external capital source is being reduced. This problem caused by information asymmetry is called adverse selection. Adverse selection increases a market's frictions, reduces the external funding that firms

can obtain in the capital market, and causes managers to face greater financing constraints (Myers and Majluf, 1984). Therefore, managers are reluctant to return excess funds back to investors when no investment opportunity presents itself;⁹ instead they try their best to use the extra funds to invest in non-efficient projects closely related to their private interests, leading to misuse of cash flow (such as job consumption and managerial imperialism) and over-investment.

The above analysis shows that information asymmetry contributes to the existence or exacerbation of the agency problem and leads to a firm's over-investment. Biddle and Hilary (2006) and Biddle *et al.* (2009) support this proposition from the perspective of earnings disclosure, finding that a higher level of earnings disclosure prevents a firm from over-investing. So, can internal control disclosure also help improve a firm's investment efficiency? Unlike financial information that reflects a firm's financial data and all important issues related to a firm's financial condition and operational results, internal control information reflects the accuracy of the financial condition and operational results published and the soundness of the firm's control and supervisory system (including corporate governance). The difference is reflected in the five elements of internal control, namely the internal environment, risk assessment, control activities, information communication, and supervision. The quality of the internal environment determines the reliability and rationality of investment decisions; it is well established that an autocratic board of directors without good checks and balances is likely to result in inefficient investment decisions. From the perspective of over-investment and financial crisis, if a firm has a good risk assessment system, it can then identify problems in early economic activities, rectify investment decisions in time, and reduce loss. Control activities play an important role in preventing over-investment from evolving into a huge financial crisis. An inaccurate collection or transmission of information will lead to low efficient investment. Internal supervision is the key to timely discovery and improvement of investment defects during firm supervision and checking of the construction of internal control.

From the above analysis of the five elements of internal control, we see that the content of internal control is not limited to the scope of financial reports. The disclosure of internal control makes it possible for investors and supervisors to fully understand the construction and operation of the interrelated security mechanisms that a firm designs to guarantee operational efficiency, the reliability of financial reports, and compliance with laws and regulations. For example, the *Basic Norms for Enterprise Internal Control* points out that internal control is implemented by a firm's board of directors, board of supervisors, managers, and the whole staff; internal control should go through the whole process of decision, implementation, and supervision, and cover all business and issues

⁹ Of course, when an enterprise has investment opportunities but lacks funds, financing constraints caused by information asymmetry can also cause enterprise investment inadequacy, but this does not affect our hypotheses of excessive investment. We use sample groups of excessive investment to do the empirical research.

of the firm and its respective units. Internal control follows the principle of checks and balance in the process of implementation; that is, it should formulate mutual constraints and mutual supervision between the governance structure, institutional arrangements, division of responsibilities, and business process, while paying attention to operational efficiency.¹⁰ As a kind of internal institutional arrangement, internal control has the effect of restricting and supervising all production and management decisions made by managers while improving operational efficiency, including investment efficiency. Therefore, internal control information provides some extra information that cannot be found in financial reports, and such information plays a significant role in identifying a firm's overall operational efficiency and risk control conditions.

Therefore, compared with accounting earnings information, a firm's internal control information is important as well, for it reflects the overall operational information at the corporate governance level, the management level, and the business level. But although internal control information runs through the whole process of firm decisions, execution, and supervision, it is difficult to capture from the information of earnings quality. As Li and Ma (2007) point out, internal control information is the most important information for investors, creditors, and market supervisors among all of a firm's private information. That information, however, is generally maintained not by investors (especially small investors) but by listed companies and is hard to obtain in other ways. Under this circumstance, the disclosure of internal control information is important for internal corporate governance, providing convenience for investors to judge the properties, strength, process, and quality of a firm's internal control. Thus, a higher level of internal control disclosure will help investors know more about a firm's internal corporate governance; discover control weaknesses at the corporate governance, management, and business levels; and strengthen the capability of shareholders to supervise the firm's investment activities in order to prevent the moral hazard of managers, thereby inhibiting the firm's over-investment.

Moreover, according to Myers and Majluf (1984), information asymmetry between capital providers and firms makes it hard for investors to judge whether the company raising money is of high quality. Accounting earnings information can even cause investors to mistakenly consider a bad company a good one, allowing the company to obtain excessive funds owing to the temporary mispricing, and thus creating conditions for the managers to over-invest. Internal control disclosure could mitigate this problem, for it helps investors not only assess a firm's risk, but also judge the quality of the firm's financial reports. In addition, previous studies show that investors must compensate for the risk and uncertainty in a firm's financial reports (e.g. Easley and O'Hara, 2004; Francis *et al.*, 2005; Ecker *et al.*, 2006; Lambert *et al.*, 2007). Therefore, raising the transparency of internal control information would help investors improve their ability to judge the risk and uncertainty in a firm's financial reports, making it harder for the

¹⁰ Referring to Chapter 1 of the *Basic Norms for Enterprise Internal Control*.

firm to obtain excessive cash flow by issuing securities through temporary mispricing, and thereby cutting off the capital source of over-investment.

To sum up, internal control disclosure helps reduce information asymmetry in internal control governance. Meanwhile, clients can fully understand a firm's internal corporate governance and operational situation and better supervise agents so as to reduce the market frictions mentioned above and ease agency conflicts, thereby improving a firm's investment efficiency and effectively suppressing the over-investment behaviour of the enterprise. Therefore, we make the following hypothesis:

H1: Internal control disclosure helps reduce information asymmetry in internal control governance and the agency problem generated or exacerbated by information asymmetry, thereby effectively suppressing the over-investment behaviour of enterprises.

Normal investment brings value to firms, while over-investment creates losses. Higgins and Schall (1975) find that a firm's excessive investment expansion may increase the risk of bankruptcy. For over-investing firms, this kind of investment expansion may be used merely to fulfil the managers' desire to consume at work or to build an empire; these are inefficient investments without consideration of the firm and the real market situation. Meanwhile, frictions in the capital market, an unsound internal corporate governance structure, together with an imperfect system of internal control disclosure, make it difficult to monitor inefficient investments effectively. Moreover, those managers who expect to run a business big and strong and to build a private kingdom will generally attach great importance to scale and speed during investment expansion for their private interests, while underestimating or neglecting control of the firm's risk. All this may lead over-investing enterprises to fall into a financial crisis; also, the more serious the over-investment, the higher the probability the firm will get into a financial predicament. Therefore, we make the following hypothesis:

H2: Over-investment tends to cause firms to fall into a financial crisis. The more seriously a firm over-invests, the more likely it will fall into a financial crisis.

To sum up, since internal control disclosure can reduce information asymmetry, ease agency conflicts, and have a positive impact on a firm's over-investment, we believe that such disclosure could help reduce the negative impact of over-investment and lower the likelihood that the firm will fall into a financial crisis. Internal control disclosure may affect financial risk in the following two respects. On the one hand, internal control could reduce financial crises by effectively suppressing over-investment, a conclusion that can be deduced from the previous two hypotheses. On the other hand, apart from mistakes in investment activities (such as over-investment), the loss of investor confidence in a firm,

meaning that a firm is unable to obtain sufficient cash flow support, is also an important reason for the emergence of a financial crisis. For example, the 999 Enterprise Group went bankrupt after being pressed by several banks to repay debts after the group over-invested. When a firm has already made inefficient investments, investors will still be confident that the firm can rectify the investment decisions and control risk within an affordable range if it accurately reveals internal control information in time to reduce information asymmetry; they will not then withdraw capital or press the firm to repay debts, thus greatly reducing the possibility of a financial crisis caused by capital fracture. Drawing on the above two aspects, we make our third hypothesis:

H3: Internal control disclosure helps to reduce the negative impact of over-investment and to lower the likelihood that a firm will fall into a financial crisis.

IV. Research Design

First, we follow the model of Richardson (2006) to estimate a firm's normal level of capital investment, and then use the difference between the firm's actual and estimated level of such investment to stand for an excessive level of investment (*Over_Inv*). Second, we use *Over_Inv* as an independent variable to regress on several proxy variables of internal control disclosure and control variables in order to observe how the transparency or information asymmetry of internal control affects a firm's over-investment. Third, we group the situations of the financial risk of listed companies into three categories (ST or PT companies, companies with $Z_Score < 1.8$, and companies with $Z_Score \geq 1.8$), based on the firm's financial risk index Z_Score , or whether a firm has been specially treated (ST) or particularly transferred (PT).¹¹ We then apply the ordered-logit model to observe how over-investment affects a firm's financial crisis and what effect the information asymmetry of internal control has during the process.

4.1. Econometric Model of Capital Investment

Richardson (2006) creates a model to estimate the normal level of a firm's capital investment, then uses the residual of the regression model as a proxy variable for over-investment and under-investment, and subsequently observes the effect of free cash flow on a firm's over-investment. Other studies, such as Verdi (2006), apply Richardson's model. We adopt the same model to estimate the extent of a firm's over-investment. We estimate a firm's normal level of capital investment as follows:

$$\begin{aligned}
 Inv_t = & a_0 + a_1 Growth_{t-1} + a_2 Lev_{t-1} + a_3 Cash_{t-1} + a_4 Age_{t-1} + a_5 Size_{t-1} \\
 & + a_6 Ret_{t-1} + a_7 Inv_{t-1} + \sum Industry + \sum Year + \varepsilon
 \end{aligned}
 \tag{1}$$

¹¹ For the set of critical values of Z_Score , we refer to Jiang *et al.* (2009).

Table 1 Variable Definitions

<i>Inv</i>	(Current net value of fixed assets – previous net value of fixed assets – previous net value of long-term investment – previous net value of intangible assets + current net value of long-term investment + current net value of intangible assets) / average total assets.
<i>Growth</i>	The growth rate of sales or the value of Tobin's Q (<i>Q</i>). Tobin's Q = (market value of stock ownership + market value of net debt) / ending total assets; net assets is a substitute for market value of non-tradable stock ownership.
<i>Lev</i>	Asset-liability ratio by year end.
<i>Cash</i>	The ratio of cash plus short-term investment to total assets.
<i>Age</i>	The natural logarithm of a firm's listing age by year end.
<i>Size</i>	The natural logarithm of a firm's total assets by year end.
<i>Ret</i>	Yearly rate of return per share with cash dividends reinvested.
<i>Residue</i>	Regression residuals of Model (1).
<i>Over_Inv</i>	Excessive volume of investment, equal to the regression residuals of values above 0 in Model (1).
<i>Ic_Dis_Score</i>	Total scores of the five elements of internal control disclosure.
<i>Ic_Dis_Dum</i>	Dummy variable of internal control disclosure; when <i>Ic_Dis_Score</i> is higher than its median, it takes the value of 1, and otherwise 0.
<i>Certif</i>	Dummy variable of internal control disclosure; it takes the value of 1 when the firm discloses the Internal Control Authentication Report, and otherwise 0.
<i>FCF</i>	Free cash flow, equal to the ratio of the firm's operating cash flow minus depreciation, amortisation, and expected newly increased investment to average total assets.
<i>Adm</i>	The percentage of management expenses in main business income.
<i>Orecta</i>	Proxy variable for fund appropriation by the largest shareholder, equal to the ratio of other receivables minus other payables to total assets.
<i>Z_Score</i>	$(0.012 \times \text{working capital} / \text{total assets} + 0.014 \times \text{retained earnings} / \text{total assets} + 0.033 \times \text{profit before interest and tax} / \text{total assets} + 0.006 \times \text{aggregate market value of stocks} / \text{carrying value of liabilities}) \times 100 + 0.999 \times \text{sales income} / \text{total assets}$.

Table 1 Variable Definitions (continued)

<i>Z_Dum</i>	If a company has been specially treated or particularly transferred, it takes the value of -1; otherwise, if <i>Z_Score</i> < 1.8, it takes the value of 0, and if <i>Z_Score</i> ≥ 1.8, it takes the value of +1.
<i>Roa</i>	(Operating profit + financial expenses) / average balance of total assets.
<i>Stkpro</i>	Senior executives' shareholding ratio, equal to the ratio of number of shares held by senior executives to total number of shares.
<i>Ctrlr</i>	Nature of actual controller; if owned by the government, it takes the value of 1, and otherwise 0.
<i>Direpro</i>	Percentage of number of independent directors among total number of board directors.
<i>Compensation</i>	Total salaries of the three leading senior executives. ¹²
<i>Boardsize</i>	Size of the board of directors, equal to the total number of board members.
<i>Director_Manager</i>	Concurrent holding of the positions of board chairman and general manager; it takes the value of 1 when the board chairman is also the general manager, and otherwise 0.
<i>Losses</i>	If a firm's net profit for the current and previous years is less than 0 after excluding income of extraordinary items, it takes the value of 1, and otherwise 0.
<i>Acquisition</i>	If a firm has made successful transactions of restructuring or acquisitions between 2006 and 2008, it takes the value of 1, and otherwise 0.
<i>Industry</i>	Industrial dummy variable; the industries are classified based on the criteria set by the China Securities Regulatory Commission (CSRC) (the manufacturing industry is classified into sub-sectors, while the other industries are classified into main sectors); there are 20 industrial dummy variables altogether.
<i>Year</i>	Year dummy variable, to control for the effect of macroeconomic factors in different years.

¹² Referring to Xin *et al.* (2007), we also adopt the natural logarithm of this variable, and the results are similar.

Definitions of variables in Model (1) are described as follows: Inv_t stands for the amount of capital investment in year t . $Growth_{t-1}$ stands for a firm's growth opportunity; more opportunities will lead to larger amounts of capital investment. We use the value of Tobin's Q and sales growth rate by the end of year $t-1$ to measure a firm's growth opportunity. Lev_{t-1} , $Cash_{t-1}$, Age_{t-1} , $Size_{t-1}$, Ret_{t-1} , and Inv_{t-1} respectively represent the asset-liability ratio, cash holdings, company scale, stock yield, and capital investment. According to the existing literature on investment (e.g. Fazzari *et al.*, 1988; Barro, 1990; Bates, 2005; Lamont, 2000), Lev_{t-1} and Age_{t-1} show a negative relationship with capital investment, whereas $Cash_{t-1}$, $Size_{t-1}$, Ret_{t-1} , and Inv_{t-1} have a positive effect on the same. Also, we include industry and year variables to control for the effect of industry and year on a firm's investment.

Using the data collected from A-share listed companies in Shanghai and Shenzhen between 2000 and 2008 to regress on Model (1), we obtain the expected amount of each firm's capital investment by the end of year t . We then subtract this amount from the actual investment amount to obtain the residual amount of capital investment at the end of year t . An amount higher than 0 means that the firm is over-investing, while the value of $Over_Inv$ equals the residual amount; a larger value for $Over_Inv$ means a higher level of over-investment. Table 1 describes the definitions and calculations of other variables.

4.2. Measurement of the Level of Internal Control Disclosure

According to the *Basic Norms for Enterprise Internal Control*, internal control consists of internal environment, risk assessment, control activities, information communication, and supervision and checks. Shenzhen Dibo Technology Co., Ltd., has developed an assessment indicator system for listed companies based on these five elements and with reference to domestic and foreign relevant standards of internal control. The system consists of nearly 60 indexes with regard to these five elements. According to these indexes, Shenzhen Dibo Technology built the assessment index for the internal control disclosure of listed companies for 2007 and 2008 by collecting data from annual reports, quarterly reports, interim statements, corporate governance and self internal control assessment reports, and internal control authentication reports of the listed companies. We use the total scores of the five elements included in these indexes to measure the level or the transparency of a firm's internal control.

Table 2 Overview of Internal Control Information Disclosure of Listed Companies

Panel A: Scores of the Five Elements of Internal Control in Year 2007

Internal control elements	Samples	Mean	Median	Standard deviation	Min	Max
Internal environment	1222	4.33	4	2.84	0	15
Risk assessment	1222	0.19	0	0.73	0	7
Control activities	1222	3.13	3	2.37	0	10
Information communication	1222	1.24	1	0.91	0	5
Supervision and checks	1222	1.39	1	1.3	0	6

Panel B: Scores of the Five Elements of Internal Control in Year 2008

Internal control elements	Samples	Mean	Median	Standard deviation	Min	Max
Internal environment	1277	7.33	7	3.72	2	22
Risk assessment	1277	0.68	0	1.39	0	9
Control activities	1277	6.14	6	2.52	0	14
Information communication	1277	1.66	2	1.1	0	5
Supervision and checks	1277	3.34	3	2.29	0	10

Panel C: Disclosure of Internal Control Authentication Report

Internal control elements	Samples	Undisclosed	Disclosed	Percentage of disclosure	Percentage of non-disclosure	Total percentage
2007	1222	1052	170	13.91%	86.09%	100%
2008	1277	1048	229	17.93%	82.07%	100%

In addition, since external auditors audit the reports of internal control authentication disclosed by listed companies, these reports differ from other internal control disclosures. Therefore, we do separate research on whether listed companies disclose the authentication reports in the latter part of this empirical study. Table 2 summarises the assessment of internal control disclosure by listed companies performed by Shenzhen Dibo Technology. As it shows, the average score of every element in 2008 is higher than that in 2007; also, 155 and 211 firms disclosed their internal control authentication reports in 2007 and 2008, accounting for 14.20 per cent and 17.99 per cent, respectively. The disclosure percentage trends upwards year by year. Table 2 reflects the fact that as regulators vigorously promote the establishment of internal control systems in firms, the overall level of internal control disclosure and firm transparency improves, thus reducing information asymmetry in internal control governance.

4.3. Measurement of Financial Risk

For the variable of a firm's financial risk, we set up a three-dimensional dummy variable Z_Dum to measure financial risk based on a firm's Z_Score ,¹³ and on whether the firm is ST or PT.¹⁴ Specific settings are as follows. If a firm is ST or PT, we consider that it has comparatively higher risk and has already fallen into financial crisis, and Z_Dum will take the value of -1. If the value of Z_Score is lower than 1.8, we consider that its financial situation is not good and that it is inclined to fall into financial crisis; Z_Dum then takes the value of 0. If the value of Z_Score is higher than 1.8, we consider the firm's financial situation to be good and the possibility of falling into financial crisis low; Z_Dum will then take the value of +1.

Table 1 shows the computing formula for Z_Score . The larger this value, the better a firm's financial situation, and the harder it will be for the firm to fall into a financial crisis. According to Altman's (1968) model, the critical value of US enterprises is 1.8. Although the standard values of Z_Score are quite different among various countries, it appears that its average value is lower than 1.8 when we look to the "financial failure group" of companies in Australia, Brazil, Canada, France, Germany, Ireland, Japan, and the Netherlands. Considering the situation in various countries, and with reference to the methods used by Jiang *et al.* (2009) to set indicators for financial distress, we choose 1.8 as the critical value to judge a firm's financial risk condition. Moreover, we also take into account companies that are ST or PT,¹⁵ and classify them as the group having the largest financial risk.

4.4. Internal Control Disclosure and Over-investment

After setting the variables for internal control disclosure and corporate over-investment, we can observe how information asymmetry affects a firm's over-investment through the following models:

$$Over_Inv = b_0 + b_1 Ic_Dis_Score + Controls + \sum Industry + \sum Year + \Psi \quad (2a)$$

$$Over_Inv = a_0 + a_1 Ic_Dis_Dum + Controls + \sum Industry + \sum Year + u \quad (2b)$$

$$Over_Inv = c_0 + c_1 Certif + Controls + \sum Industry + \sum Year + \varphi \quad (2c)$$

¹³ The Z_Score model uses the multivariate statistical method and takes bankrupt enterprises as samples. It is a system of discriminant analysis to judge an enterprise's operational condition or the question of whether the enterprise will go bankrupt through a large number of experiments. Professor Edward Altman of the Business School, New York University, observed bankrupt enterprises and non-bankrupt production enterprises in 1968, and considered the asset scale, liquidity, profitability, financial structure, debt repaying ability, and other factors to finally establish the famous Z_Score model with five variables through the mathematical statistical screening of dozens of financial indicators. Please see Altman (1968) for details. Jiang *et al.* (2009) point out that the Z_Score model is widely used in the United States, Australia, Brazil, Canada, Britain, France, Germany, Ireland, the Netherlands, and Japan.

¹⁴ To take ST or PT as decision criteria, we refer mainly to the financial distress defined by Wu and Lu (2001), Chen (2003), and Wu and Zhang (2005).

¹⁵ As for the reliability of Z_Score and the critical value, we check the Z_Score values of ST or PT companies and find that in most of these companies (99.9%) they are less than 1.8, which is consistent with Wu and Lu (2001), Chen (2003), and Wu and Zhang (2005) on the definition of financial distress; this also shows that the critical value of Z_Score set by Jiang *et al.* (2009) is reasonable

Table 1 describes specific variable definitions. For the above models, the over-investment variable is the dependent variable, in which $Over_Inv = 0$ if $Residue \leq 0$, and $Over_Inv = Residue$ if $Residue > 0$. Test variables, consisting of information disclosure indexes such as Ic_Dis_Score , Ic_Dis_Dum , and $Certif$, are relevant indexes of internal control disclosure. Controls is a group of variables controlling for over-investment. We use free cash flow (FCF), the management expenses ratio (Adm), fund appropriation by the largest shareholder ($Orecta$), the shareholding ratio of senior executives ($Stkpro$), compensations of senior executives ($Compensation$), size of the board of directors ($Boardsize$), and the proportion of independent directors ($Direpro$) as control variables with reference to Richardson (2006), Ang *et al.* (2000), Xin *et al.* (2007), and Jiang and Yue (2005). Moreover, we add variables for the nature of the actual controller ($Ctrlr$), for current investment (Inv),¹⁶ and for concurrent holding of the positions of board chairman and general manager ($Director_Manager$). Meanwhile we also include dummy variables for industry ($Industry$) and year ($Year$) in the model.

The dependent variable ($Over_Inv$) is left-truncated at 0, implying that OLS coefficients would be biased. To avoid this truncation bias, we use the Tobit regression to estimate Models (2a), (2b), and (2c).

4.5. Internal Control Disclosure, Over-investment, and Financial Crisis

As seen from the above analyses, raising the level of internal control disclosure helps to reduce information asymmetry in internal control governance and to mitigate the agency problem generated or exacerbated by information asymmetry, thereby affecting a firm's investment efficiency and subsequently the firm's financial risk. Because we use "-1, 0, +1" to represent respectively ST or PT companies, companies with $Z_Score < 1.8$, and those with $Z_Score \geq 1.8$, the level of financial risk is in decreasing order along these three types of companies; therefore, we take the ordered-logit model to estimate how internal control and over-investment affect a firm's financial risks. We set specific models as follows:

$$\Pr (Z_Dum \geq J) = \lambda_0 + \lambda_1 Over_Inv + \lambda_2 Ic_Disclosure_Variable + Controls + \sum Industry + \sum Year + \xi, J = 0, 1 \quad (3a)$$

$$\Pr (Z_Dum \geq J) = \eta_0 + \eta_1 Over_Inv + \eta_2 Ic_Disclosure_Variable * Over_Inv + Controls + \sum Industry + \sum Year + \nu, J = 0, 1 \quad (3b)$$

¹⁶ Richardson's (2006) model takes residuals to represent the value of excessive investment after predicting the average value. This is a relative index of average value. This way of measuring excessive investment often creates a higher level of current actual investment; the greater the deviation from the mean, the greater the amount of over-investment estimated. This probably overestimates the degree of excess investment for those enterprises with high levels of current actual investment. To show that the degree of excess investment is not caused by the estimation error, we control for the level of current actual investment in the over-investment equation. To further test the reliability of our conclusions, we do empirical research with other models measuring over-investment in the sensitivity analysis section, and the results still support our conclusions.

We assign the values of Z_Dum as -1, 0, and +1 according to a firm's financial risk. Table 1 gives specific variable definitions. Test variables in Model (3a) include $Over_Inv$ and $Ic_Disclosure_Variable$, the latter of which means the test variable relating to internal control disclosure. We adopt indexes, such as Ic_Dis_Score , Ic_Dis_Dum , and $Certif$, to study the effect of internal control disclosure on corporate financial crisis. Furthermore, to test the mechanism of how internal control disclosure suppresses a firm's over-investment, thereby easing corporate financial crisis, we set Model (3b) to study how the interaction terms between the above three variables of internal control disclosure and the variable of over-investment affect corporate financial crisis; $Ic_Disclosure_Variable*Over_Inv$ stands for the interaction terms concerned, including $Ic_Dis_Score*Over_Inv$, $Ic_Dis_Dum*Over_Inv$, and $Certif*Over_Inv$.

With regard to the control variables (*Controls*) in Models (3a) and (3b), we control for the following variables with reference to the equation on corporate financial risk provided by Jiang *et al.* (2009): shareholding ratio of senior executives ($Stkpro$), nature of the actual controller ($Ctrlr$), compensation of senior executives ($Compensation$), size of the board of directors ($Boardsize$), growth ($Growth$), firm size ($Size$), debt ratio ($Level$), industry ($Industry$), and year ($Year$). In addition, we think that profitability is an important factor for determining a firm's financial risk condition, so we control for it as well, as we do for the situation where the board chairman concurrently holds the position of general manager.

4.6. Sample Selection and Data Source

As for the data for the equation on capital investment, we include all A-share companies listed in the Shanghai and Shenzhen stock markets in our initial sample. After eliminating listed companies in the financial industry and other companies that lack relevant data, the sample we use to estimate the capital investment model consists of 10,185 companies (when adopting the variable of Tobin's Q, the sample is 9,187). These data are taken from the CSMAR database, while the data for the other variables are taken from the Wind and CSMAR databases, except for the data of internal control disclosure. When we adopt the procedures of Cook (1977) to calculate the percentage of extreme values, we find that these values account for nearly 5 per cent of the total sample; therefore, we winsorise the main continuous variables used in this paper by the upper and lower 2.5 per cent, so as to eliminate the effect of extreme values.

As for the initial samples relating to internal control disclosure, the data offered by Shenzhen Dibo Technology consist of 3,009 listed companies in the Shanghai and Shenzhen stock markets for 2007 and 2008. After merging samples for the capital investment model with investment data for 2007 and 2008, we obtain the final sample of

2,499 listed companies that can provide complete matched data. Table 3 shows how some data of internal control disclosure are eliminated in the initial samples. The total number of missing samples is 544 (excluding the financial industry), among which newly listed companies (IPO companies) account for nearly 60 per cent. We eliminate these newly listed companies because they have not provided data for the previous year. Because the requirements for IPO companies differ from other companies (e.g. the CSRC requires IPO companies to disclose their internal control authentication reports), the conclusion of this paper will be more robust if these companies are eliminated. Other missing samples are mainly companies whose data of relevant variables are not available. Considering that these companies make up a comparatively small proportion only, we do not think that omitting these companies will have a systematic effect on our research conclusions.

Table 3 Sample Selection Process of Internal Control Disclosure Data

	2007	2008	Total
Total sample	1,497	1,602	3,099
Companies in the financial industry	28	28	56
Newly listed companies	229	77	306
Companies without data for relevant variables	18	220	238
Final sample	1,222	1,277	2,499

V. Empirical Results and Analysis

5.1. Estimated Results of Variables and Descriptive Statistics

Table 4 shows the regression results of the capital investment model. We easily find that all regression coefficients of the variables, including Tobin's Q, have their expected signs and are significant under the level of 1 per cent, which is fully consistent with the empirical evidence provided by Richardson (2006). Therefore, we believe that both models can be used to measure a firm's expected level of capital investment. Taking into account the emerging and transitional securities market in China, we judge that Tobin's Q is probably not a good substitute for a firm's growth opportunities (Xin *et al.*, 2007), since the Chinese markets are easily affected by factors such as the split share structure, market news, and government policies; therefore, we choose the growth rate (*Growth*) to measure a firm's growth opportunities in Model (1) to estimate a firm's over-investment.

Table 5 shows the descriptive statistics of the main variables. Column A shows that the average score of internal control is about 15, the quantile of 5 per cent is 3, the quantile of 95 per cent is 32, and the standard deviation is 9. The data show that significant differences exist between levels of internal control disclosure among listed companies. Since the value of *Z_Dum* is -1, 0, or +1, the average value of *Z_Dum* of 0.1 and the median of 0 indicate that a great number of listed companies are operating

under bad financial conditions and may face financial risk. The related coefficient in Column C shows that the variable for over-investment (*Over_Inv*) in the sample group of over-investment has a negative correlation with the level of internal control disclosure, which is a preliminary indication that such disclosure can suppress over-investment.

In addition, when comparing Column B with Column C in Table 5, we find that investment residuals (*Residue*) in the total sample have no correlation with the variable for firm risk (*Z_Dum*), while investment residuals (*Over_Inv*) for the over-investment sample in Column C are negatively correlated with *Z_Dum*. This is a preliminary indication that a direct relation does not exist between a firm's investment size and its risk; only excessive investment will increase the probability of a firm falling into a financial crisis. Additionally, the indexes disclosed in Columns B and C concerning internal control have positive correlations with *Z_Dum*, showing that regardless of whether a firm is over-investing, reducing information asymmetry in internal control will have a positive impact on its financial risk condition.

Table 4 Regression Results for the Capital Investment Model

Variables	Expected sign	<i>Growth</i> = Growth Ratio		<i>Growth</i> = Tobin's Q	
		Coefficient	T-stat.	Coefficient	T-stat.
Constant	?	-0.140	-5.45***	-0.226	-7.06***
<i>Growth</i> _{<i>t-1</i>}	+	0.014	5.45***		
<i>Q</i> _{<i>t-1</i>}	+			0.012	4.33***
<i>Level</i> _{<i>t-1</i>}	-	-0.037	-5.77***	-0.031	-4.47***
<i>Cash</i> _{<i>t-1</i>}	+	0.071	5.87***	0.064	5.08***
<i>Age</i> _{<i>t-1</i>}	-	-0.030	-13.92***	-0.031	-14.19***
<i>Size</i> _{<i>t-1</i>}	+	0.010	7.89***	0.013	8.94***
<i>Ret</i> _{<i>t-1</i>}	+	0.013	5.46***	0.011	4.44***
<i>Inv</i> _{<i>t-1</i>}	+	0.024	2.10**	0.033	2.87***
Industry		Control		Control	
Year		Control		Control	
Observations		10185		9187	
Adjusted R-squared		0.139		0.125	

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test. T-statistics are corrected for heteroscedasticity, and we adjust the coefficients' standard errors for the effects of non-independence by clustering on each company (Rogers, 1993; Petersen, 2009).

Table 5 Descriptive Statistics of Main Variables

Panel A: Mean, Median, Standard Deviation, and Quantile (Total Sample)					
	Mean	Median	Standard deviation	5% quantile	95% quantile
<i>Ic_Dis_Score</i>	14.88	13	8.69	3	32
<i>Ic_Dis_Dum</i>	0.47	0	0.5	0	1
<i>Over_Inv</i>	0.08	0.05	0.09	0	0.31
<i>Z_Dum</i>	0.08	0	0.51	-1	1

Panel B: Correlation Coefficient Matrix (Total Sample)					
	<i>Ic_Dis_Score</i>	<i>Ic_Dis_Dum</i>	<i>Residue</i>	<i>Z_Dum</i>	
<i>Ic_Dis_Score</i>	1.00				
<i>Ic_Dis_Dum</i>	0.82***	1.00			
<i>Residue</i>	0.02	0.01	1.00		
<i>Z_Dum</i>	0.14***	0.12***	-0.001	1.00	

Panel C: Correlation Coefficient Matrix (Sample of Over-investment)					
	<i>Ic_Dis_Score</i>	<i>Ic_Dis_Dum</i>	<i>Over_Inv</i>	<i>Z_Dum</i>	
<i>Ic_Dis_Score</i>	1.00				
<i>Ic_Dis_Dum</i>	0.82***	1.00			
<i>Over_Inv</i>	-0.05**	-0.05**	1.00		
<i>Z_Dum</i>	0.13***	0.13***	-0.10***	1.00	

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5.2. Internal Control Disclosure and Over-investment: Regression Results

Table 6 shows the effect of internal control disclosure on over-investment. The coefficients of *Ic_Dis_Dum*, *Ic_Dis_Score*, and *Certif*, which are the three indexes of internal control disclosure, are all significantly negative, showing that more disclosure of internal control information reduces the information asymmetry relating to internal control governance and makes it harder for a firm to invest inefficiently. This is strong evidence for the hypothesis that internal control disclosure effectively reduces the agency problem generated or exacerbated by information asymmetry, thereby suppressing a firm's over-investment. Moreover, the variable of *Certif*, which measures whether a firm has disclosed the internal control authentication report, is negatively correlated with over-investment. We conclude that voluntary disclosure of the internal control authentication report could also be a governance mechanism to improve investment efficiency and suppress a firm's over-investment.

We see from the regression results of the control variables that a higher free cash flow (*FCF*) leads to higher over-investment, which is consistent with the theoretical analysis of Jensen (1986) and empirical evidence of Richardson (2006). Meanwhile, a higher management expense ratio (*Adm*) also leads to more over-investment, while fund appropriation by the largest shareholder (*Orecta*) is negatively correlated with over-investment, which is probably because the largest shareholder holding funds will cause the listed company to be short of cash, thereby reducing the firm's capital investment. In addition, the shareholding ratio of senior executives (*Stkpro*), compensation of senior executives (*Compensation*), and board of directors (*Boardsize*) are all negatively correlated with over-investment, showing that these corporate governance factors suppress over-investment to some degree.

5.3. Internal Control Disclosure, Over-investment, and Financial Crisis: Regression Results

Table 7 shows the results of the financial risk equation regressed by the ordered-logit model, reflecting how internal control disclosure and over-investment affect a firm's financial crisis. We see from Equations (1) to (6) that all values of *Over_Inv* are significantly and negatively correlated with a firm's financial risk, indicating that over-investment worsens a firm's financial condition, causing it to easily fall into a financial crisis. The regression coefficients of the three internal control disclosure indexes (*Ic_Dis_Dum*, *Ic_Dis_Score*, and *Certif*) in Equations (1), (2), and (3) are all significantly positive, making it clear that reducing information asymmetry helps lower a firm's financial risk. The regression coefficients of the interaction terms (*Ic_Dis_Score*Over_Inv*, *Ic_Dis_Dum*Over_Inv*, and *Certif*Over_Inv*) between the variables of the internal control disclosure indexes and over-investment in Equations (4), (5), and (6) are all significantly positive, indicating that with a reduction in information asymmetry, the variable of *Over_Inv* will have a lesser effect on *Z-Dum*; in other words, internal control disclosure helps reduce the negative impact of over-investment and lowers the likelihood of a firm falling into a financial crisis.

5.4. Sensitivity Analysis

5.4.1 Self-Selection Problem

Since internal control disclosure is voluntary, firms may reduce or increase the level of this disclosure when they weigh other factors, leading to a situation where higher levels of information disclosure do not lead to more measures on internal control, thus causing a potential self-selection bias in the sample. Therefore, we use two econometrical ways to control for this self-selection problem. First, we choose the two-step method of Heckman (1979). Following the equation of Dolye *et al.* (2007) on the determinants of internal control disclosure, we estimate the probability of whether a firm's internal control disclosure is high or low through a probit regression. From the first probit estimation, we identify the probability of a firm's internal control disclosure, and then calculate the inverse Mill's ratio (Heckman, 1979; Leuz and Verrecchia, 2000). Finally, we conduct regression analysis on the corresponding over-investment and financial risk equations, again based on the control for the inverse Mill's ratio. The results (see Tables 8 and 9) still support our research conclusion above.

Table 6 Internal Control and Over-investment: Tobit Regression Results

Variables	Model (2a)		Model (2b)		Model (2c)	
	Coefficient	Robust Z-stat.	Coefficient	Robust Z-stat.	Coefficient	Robust Z-stat.
Constant	0.029	3.59***	0.026	3.49***	0.024	3.06***
<i>Ic_Dis_Score</i>	-0.000	-3.15***				
<i>Ic_Dis_Dum</i>			-0.004	-2.61***		
<i>Certif</i>					-0.010	-5.70***
<i>FCF</i>	0.069	8.77***	0.068	8.72***	0.068	8.71***
<i>Adm</i>	0.040	6.49***	0.041	6.59***	0.040	6.68***
<i>Orecta</i>	-0.065	-4.80***	-0.066	-4.89***	-0.063	-4.75***
<i>Inv</i>	0.985	134.34***	0.985	133.96***	0.986	137.58***
<i>Stkpro</i>	-3.282	-3.94***	-3.356	-4.04***	-3.631	-4.42***
<i>Ctrlr</i>	0.003	1.73*	0.003	1.69*	0.003	1.93*
<i>Direpro</i>	-0.029	-1.75*	-0.028	-1.71*	-0.027	-1.67*
<i>Compensation</i>	-0.000	-6.68***	-0.000	-6.73***	-0.000	-6.66***
<i>Boardsize</i>	-0.002	-5.14***	-0.002	-5.08***	-0.002	-4.97***
<i>Director_Manager</i>	0.000	0.09	0.000	0.10	0.000	0.09
						0.08
Industry	Control		Control		Control	
Year	Control		Control		Control	
Observations	2499		2499		2499	
Pseudo R-squared	14.87		14.85		14.93	

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test. We use Intreg to do a regression to obtain the Z values corrected by robust standard deviation. We also adjust the coefficients' standard errors for the effects of non-independence by clustering on each company (Rogers, 1993; Petersen, 2009).

Second, we adopt the propensity score matching method named by Lalonde (1986), which Morsfield and Tan (2006) and Doyle *et al.* (2007) also apply. The principle of this method is to control for the self-selection problem by creating a low information-disclosure sample that has the same expected probability as the high information-disclosure sample. According to the expected probability estimated in stage 1 and the propensity score, we create a matching sample to control for self-selection. We consider those sample companies with a value of *Ic_Dis_Dum* equal to 1 and those with a value of *Certif* equal to 1 to be the high information-disclosure group, and create a homologous low information-disclosure sample group. We then do a regression analysis on the obtained matching sample, and the results (see Tables 8 and 9) support our research conclusion above as well.

Table 7 Ordered-logit Regression Results of the Financial Risk Equation

Variables	Model (3a)			Model (3b)		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Over_Inv</i>	-6.139*** (-6.40)	-6.083*** (-6.30)	-6.050*** (-6.30)	-7.985*** (-6.20)	-7.195*** (-6.49)	-6.498*** (-6.78)
<i>Ic_Dis_Score</i>	0.029*** (2.73)					
<i>Ic_Dis_Dum</i>		0.450** (2.46)				
<i>Certif</i>			0.456** (2.10)			
<i>Ic_Dis_Score*Over_Inv</i>				0.136** (2.18)		
<i>Ic_Dis_Dum*Over_Inv</i>					2.645** (2.12)	
<i>Certif*Over_Inv</i>						3.584** (1.98)
<i>Growth</i>	0.036 (0.18)	0.023 (0.11)	0.025 (0.12)	0.035 (0.17)	0.031 (0.15)	0.027 (0.13)
<i>Level</i>	-3.788*** (-5.40)	-3.764*** (-5.39)	-3.698*** (-5.25)	-3.746*** (-5.35)	-3.743*** (-5.35)	-3.745*** (-5.34)
<i>Size</i>	0.379*** (3.45)	0.370*** (3.35)	0.374*** (3.40)	0.387*** (3.51)	0.379*** (3.44)	0.380*** (3.44)
<i>Roa</i>	20.292*** (9.99)	20.349*** (9.95)	20.373*** (10.01)	20.276*** (10.08)	20.325*** (10.04)	20.321*** (10.06)
<i>Stkpro</i>	56.394 (0.69)	59.313 (0.74)	86.714 (1.08)	83.517 (1.04)	79.109 (0.98)	87.686 (1.09)
<i>Ctrlr</i>	0.316 (1.44)	0.323 (1.48)	0.308 (1.40)	0.331 (1.52)	0.338 (1.55)	0.313 (1.42)
<i>Compensation</i>	0.000** (2.49)	0.000** (2.55)	0.000** (2.57)	0.000*** (2.63)	0.000*** (2.63)	0.000*** (2.68)
<i>Boardsize</i>	-0.003 (-0.07)	-0.004 (-0.07)	-0.008 (-0.15)	-0.006 (-0.13)	-0.006 (-0.11)	-0.008 (-0.15)
<i>Director_Manager</i>	-0.532* (-1.88)	-0.537* (-1.91)	-0.541* (-1.91)	-0.553* (-1.96)	-0.553** (-1.96)	-0.571** (-2.02)
Industry	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Observations	1114	1114	1114	1114	1114	1114
Pseudo R-squared	0.321	0.320	0.319	0.318	0.319	0.318

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test. Z-statistics are presented in parentheses below the coefficients and are corrected for heteroscedasticity. We adjust the coefficients' standard errors for the effects of non-independence by clustering on each company (Rogers, 1993; Petersen, 2009).

5.4.2. Endogenous Problem

Apart from the above sensitivity test, we also try to explore the endogeneity issue. Previous literature lacks discussion on the potential endogenous problem between information disclosure and a firm's investment. We consider that a firm's information disclosure, investment efficiency, and financial risk might interact, leading to a correlation between the residue we get by regression from a single equation with explanatory variables, which would result in biased estimated coefficients. Thus, we refer to Jiang *et al.* (2009) and Ye *et al.* (2007) and use the 3SLS regression to control for this possible bias (detailed explanations on how 3SLS solves the endogeneity issue can be found in Maddala [1983]). First, following Doyle *et al.* (2007) on the study of internal control disclosure determinants, we develop the equation for internal control disclosure; we then add the homologous endogenous variables based on the previous equation for over-investment and financial risk to obtain the simultaneous equations (specific variables can be found in Table 7). Afterwards, we run the 3SLS regression; Table 10 shows specific regression results.

As seen from Table 10, for the internal control disclosure equation, the coefficient of *Z_Dum* is significantly positive, making it clear that better financial risk conditions lead to more disclosure of internal control information. Although the coefficient of over-investment (*Over_Inv*) is negative, it is not significant, meaning that a firm's investment efficiency does not have a direct effect on internal control disclosure. As for the over-investment equation, the coefficient of *Ic_Dis_Score* is significantly negative, meaning that increasing internal control transparency will help suppress over-investment. As for the risk equation, the coefficient of *Over_Inv* is significantly negative, while that of *Ic_Dis_Score* is significantly positive, indicating that over-investment will cause a firm to fall into a financial crisis, while internal control disclosure will help reduce a firm's financial risk. The above results all support our research conclusions above.

In addition, when we use the interaction term (*Ic_Dis_Score*Over_Inv*) to replace the internal control disclosure index in the risk equation, we find that the sign of the term's coefficient is still significantly positive. This means that internal control disclosure can reduce a firm's financial risk caused by over-investment. In the simultaneous equations, we also use the other two internal control disclosure indexes (*Ic_Dis_Dum* and *Certif*) to replace *Ic_Dis_Score*, and find that the signs of the interaction terms that combine the previous two indexes with *Over_Inv* are still significantly positive. These results are all supportive of the previous hypothesis that increasing internal control disclosure will help reduce a firm's financial risk caused by over-investment.

Table 8 Internal Control Disclosure and Over-investment after Controlling for Self-Selection

Methods	Inverse Mill's Ratio		Propensity Score Matching	
	<i>Over_Inv</i>	<i>Over_Inv</i>	<i>Over_Inv</i>	<i>Over_Inv</i>
Constant	-0.083*** (-6.70)	-0.164*** (-21.67)	0.018** (2.45)	0.008 (0.65)
<i>Ic_Dis_Dum</i>	-0.003** (-2.16)		-0.003** (-2.20)	
<i>Certif</i>		-0.002* (-1.93)		-0.005** (-2.24)
<i>FCF</i>	0.059*** (8.74)	0.036*** (7.25)	0.059*** (9.05)	0.066*** (5.42)
<i>Adm</i>	0.024*** (4.35)	-0.009** (-2.27)	0.050*** (8.74)	-0.000 (-0.01)
<i>Orecta</i>	-0.046*** (-4.24)	0.004 (0.51)	-0.074*** (-6.22)	-0.060** (-2.51)
<i>Inv</i>	0.984*** (146.98)	1.017*** (196.26)	0.986*** (138.45)	0.992*** (85.44)
<i>Stkpro</i>	9.644*** (7.23)	-2.993*** (-6.68)	-2.709*** (-5.92)	-3.301*** (-3.18)
<i>Ctrlr</i>	0.007*** (4.82)	0.016*** (14.88)	0.005*** (3.23)	0.007*** (2.72)
<i>Direpro</i>	0.009 (0.63)	0.051*** (4.69)	-0.008 (-0.54)	-0.008 (-0.33)
<i>Compensation</i>	0.000*** (5.30)	0.000*** (8.20)	-0.000*** (-9.40)	-0.000** (-2.07)
<i>Boardsize</i>	-0.003*** (-7.55)	-0.000 (-0.40)	-0.002*** (-6.09)	-0.002*** (-3.97)
<i>Director_Manager</i>	-0.008*** (-4.16)	-0.002 (-1.16)	0.001 (0.53)	-0.003 (-0.76)
<i>Mills</i>	0.010*** (10.92)	0.074*** (35.97)		
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control
Observations	2499	2499	2370	798
Pseudo R-squared	15.19	17.75	21.56	17.04

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test. T-statistics are presented in parentheses below the coefficients. We also try to obtain robust standard deviation and Z-statistics of the truncated regression model using Intreg regression; the results are similar to those in this table using the Tobit regression.

Table 9 Regression Results of Financial Risk Equation Using the Ordered-logit Model after Controlling for Self-Selection

Methods	Inverse Mill's Ratio			Propensity Score Matching				
	Z_Dum	Z_Dum	Z_Dum	Z_Dum	Z_Dum	Z_Dum		
<i>Over_Inv</i>	-5.950*** (-6.15) 0.440** (2.41)	-7.027*** (-6.31)	-6.057*** (-6.26)	-6.400*** (-6.60)	-6.266*** (-5.37) 0.520*** (2.60)	-7.718*** (-5.99)	-5.826* (-1.95)	-8.857*** (-2.47)
<i>Ic_Dis_Dum</i>		2.556** (2.05)				2.950** (2.23)		
<i>Ic_Dis_Dum*Over_Inv</i>			0.373* (1.72)				0.942*** (2.71)	
<i>Certif</i>				2.730 (1.51)				6.439* (1.86)
<i>Certif*Over_Inv</i>				-0.173 (-0.82)				-0.574 (-1.16)
<i>Growth</i>	0.300 (1.10)	0.309 (1.13)	-0.176 (-0.84)	-0.151 (-0.64)		-0.115 (-0.49)	-0.605 (-1.23)	
<i>Level</i>	-3.308*** (-4.44) 0.079	-3.287*** (-4.40) 0.088	-2.433*** (-3.15) 0.129	-2.468*** (-3.20) 0.134	-3.262*** (-4.17) 0.413***	-3.242*** (-4.10) 0.410***	-0.424 (-0.29) 0.087	-0.291 (-0.20) 0.072
<i>Size</i>	19.939*** (9.81)	19.916*** (9.89)	19.978*** (9.78)	19.924*** (9.82)	22.272*** (9.53)	22.121*** (9.56)	30.584*** (6.29)	30.442*** (6.42)
<i>Roa</i>	-514.366 (-1.17)	-494.580 (-1.13)	73.943 (0.86)	74.551 (0.87)	148.115*** (2.63)	156.230*** (2.73)	-128.258 (-0.69)	-149.349 (-0.75)
<i>Stkpro</i>	0.224 (0.97)	0.239 (1.03)	0.034 (0.14)	0.039 (0.16)	0.083 (0.38)	0.100 (0.46)	-0.420 (-1.01)	-0.382 (-0.92)
<i>Cirtir</i>	-0.000 (-0.44)	-0.000 (-0.41)	0.000 (1.34)	0.000 (1.41)	0.000*** (2.72)	0.000*** (2.77)	0.000*** (1.97)	0.000* (1.71)
<i>Compensation</i>	0.050 (0.76)	0.048 (0.73)	-0.034 (-0.65)	-0.034 (-0.65)	-0.005 (-0.10)	0.002 (0.04)	0.092 (0.97)	0.082 (0.87)
<i>Boardsize</i>	-0.205 (-0.56)	-0.221 (-0.60)	-0.516* (-1.85)	-0.539* (-1.94)	-0.733** (-2.37)	-0.766** (-2.49)	-0.376 (-0.65)	-0.451 (-0.78)
<i>Director_Manager</i>	-4.403 (-1.45)	-4.402 (-1.46)	-1.830*** (-3.45)	-1.834*** (-3.46)				
<i>Mills</i>	Control	Control	Control	Control	Control	Control	Control	Control
Industry or Year	1114	1114	1114	1114	1068	1068	364	364
Observations	0.323	0.321	0.328	0.327	0.339	0.336	0.382	0.372
Pseudo R-squared								

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test. Z-statistics are presented in parentheses below the coefficients and are corrected for heteroscedasticity. We adjust the coefficients' standard errors for the effects of non-independence by clustering on each company (Rogers, 1993; Petersen, 2009).

Table 10 Regression Results of Simultaneous Equations

Variables	Internal Control Disclosure Equation		Over-investment Equation		Risk Equation	
	Coefficient	Z-stat.	Coefficient	Z-stat.	Coefficient	Z-stat.
Constant	17.3504	7.19***	0.2247	4.34***	-1.1202	-3.14***
<i>Over_Inv</i>	-1.3350	-0.54			-0.5406	-2.76***
<i>Ic_Dis_Score</i>			-0.0095	-4.61***	0.0429	2.87***
<i>Z_Dum</i>	3.6983	4.33***	0.0221	1.71*		
<i>Ctrlr</i>	0.8397	1.67*	0.0094	1.21	0.0084	0.21
<i>Compensation</i>	0.0000	0.97	0.0000	0.19	0.0000	1.51
<i>Boardsize</i>	-0.1970	-1.59	-0.0028	-1.47	0.0017	0.18
<i>Director_Manager</i>	-0.3875	-0.58	-0.0060	-0.59	-0.0617	-1.21
<i>Stkpro</i>	812.7038	3.51***	7.0147	1.66*	-36.0695	-1.44
<i>Age</i>	-2.5091	-10.59***				
<i>Losses</i>	-0.2048	-1.16				
<i>Acquisition</i>	-0.1305	-0.76				
<i>Direpro</i>	-8.0383	-2.19**	-0.0935	-1.48		
<i>Growth</i>	-0.2585	-2.24**			0.0269	0.84
<i>Level</i>					-0.4654	-6.65***
<i>Size</i>	0.5028	7.71***			0.0257	1.66*
<i>Roa</i>					2.2540	7.57***
<i>FCF</i>			0.0317	5.27***		
<i>Inv</i>			0.9351	26.29***		
<i>Adm</i>			0.0244	2.88***		
<i>Orecta</i>			-0.0089	-0.95		
Industry	Control		Control		Control	
Year	Control		Control		Control	
Observations	1114		1114		1114	
Chi2	672.6***		672.6***		279.2***	
Adjusted R-squared	0.27		0.37		0.004	

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, two-tailed test.

Ic_Dis_Score, *Over_Inv*, and *Z_Dum* represent dependent variables of the internal control equation, over-investment equation, and financial risk equation, respectively.

5.4.3. Difference between the Information of Internal Control Disclosure and General Financial Disclosure

Does the information of internal control disclosure consist of incremental information compared with the information of general financial disclosure? If no, then the research conclusion of this paper may not be the result of internal control disclosure. To answer this question, we add a test to study the correlation between the information of internal control and financial reporting. First, we adopt two ways to estimate the quality of earnings information: (1) With reference to Caramanis and Lennox (2008), Kothari *et al.* (2005), and Xia (2003), we run regressions with the Jones (1991) model by year and industry, and then use the absolute value of estimated residue (discretionary accruals) as a proxy variable to measure a firm's quality of earnings information (*DA*). (2) With reference to Dechow and Dichev (2002), Ball and Shivakumar (2006), and Wang (2006), we use the absolute value of estimated residue obtained through the modified DD model to measure the quality of earnings information (*DA*).

Afterwards, we compare the relations between the quality of earnings information (*DA*) and the variables of internal control disclosure. We then run regressions on the corresponding over-investment equation and financial risk equation while controlling for the variable *DA*. We find that both *DA* estimated by the two methods have a negative correlation with the variables of internal control disclosure; that is, better internal control disclosure leads to a higher quality of earnings information and makes it harder for firms to manipulate earnings. But after we control for the variable of accounting earnings information, the research conclusions mentioned above do not change substantively. This means that internal control information does differ from general financial information in that the former incorporates the whole process of corporate operations, including decision, execution, and supervision, and is difficult to capture from the information of earnings quality.

In addition, we also use the Tobit and ordered-logit stepwise regression methods to study whether the variables of internal control disclosure significantly increase the model's explanatory power after adding the control variable of *DA*. We find that after we control for *DA*, each internal control disclosure variable makes a significant marginal contribution, and the model's explanatory power gains a lot after adding these variables. The results thus show to some extent that internal control disclosure has additional information that cannot be captured by the disclosure of general financial information.

5.4.4. Industry Factor of Over-investment

The principle of Richardson's (2006) model is to predict expected normal value through Model (1), but since the decision mechanisms of investment vary greatly among different industries – for example, the high-tech industry versus traditional manufacturing – if we just use the dummy variable to control for industry, the expected error may be substantial. Therefore, we adopt Richardson's model to run a regression analysis on every

industry and obtain the degree of over-investment (*Over_Inv*) for the firm. We then use the variable *Over_Inv* to run the regression again based on the previous equations of over-investment and financial risk, and find that the research conclusions do not change substantively.

5.4.5. Effect of Macro Factors

Again using Richardson's (2006) model, we first obtain the predicted average value and take the residue as the value of over-investment, which is a relative index of average value and which has not been controlled for the effects of macro factors. If there is a year when listed companies are involved in widespread over-investment, the predicted value of this index may be high, and we may thereby underestimate the over-investment, thus biasing the results. Therefore, it is necessary to control for the effect of macro factors on corporate investments. So, with reference to the method of Altamuro and Beatty (2010) on controlling macro factors, we control for the risk-free market rate of interest and the annual rate of market return as in Richardson's (2006) regression model. Specifically, we use the risk-free market benchmark rate of interest and the A-share annual rate of market return with cash dividends reinvested as the substitute variables for the macro factors, and include them in the corresponding equations of over-investment and financial risk to run the regression. The results show that the over-investment activities of listed companies do have correlations with the macro factors; the phenomenon of over-investment becomes more serious when the composite annual rate of market return is high, and the risk-free market rate of interest is negatively correlated with over-investment. But after controlling for these macro factors, our research conclusions do not change substantively.

5.4.6. Other Ways to Measure Over-investment

Once again using Richardson's (2006) model, we first obtain the predicted average value and take the residue as the value of over-investment, which is a relative index. This way of measuring over-investment often makes the deviation from the mean value much higher when the current actual level of investment is high, which probably causes us to overrate the degree of over-investment for companies whose current actual level of investment is high. To further study the reliability of the research conclusions, we adopt two different ways to measure over-investment and again observe the relation between internal control disclosure and over-investment.

First, we observe the relation between internal control disclosure and the sensitivity of investment cash flows. Vogt (1994) judges whether a firm is over-investing by adding the interaction term between Tobin's Q and free cash flow in the investment model. A negative coefficient for the interaction term means that with the reduction in investment opportunities, a firm's investment expenses increase with the growing cash flow; that is, the sensitivity of investment cash flow increases with the decrease in investment opportunities. This probably tells us that managers have abused cash flows and invested

the firm's cash flow in non-profit maximised projects or even those with a negative net present value, thus causing the firm to over-invest.

According to Jensen (1986) and Vogt (1994), when a firm has sufficient cash flow, the phenomenon of over-investment becomes more serious; therefore, we put emphasis on the group of companies having high cash flows. We group companies according to the median of free cash flow (*FCF*), and classify those companies whose *FCF* result is higher than the median as the high cash-flow group. The firm's sensitivity to investment cash flow is studied with reference to Vogt's (1994) model. We find that the coefficient of $Q*FCF$ is significantly negative, meaning that the sensitivity of investment cash flow increases with the decrease in investment opportunities. This tells us that even if the firm lacks investment opportunities, its investment expenses continue to increase with the increase in cash flow, implying that over-investment activities are occurring within the firm.

Furthermore, we discover that the coefficients of the three-dimensional interaction terms between *Ic_Dis_Dum*, *Ic_Dis_Score*, and *Certif* and $Q*FCF$ are all positive, among which the coefficients of the two interaction terms between *Ic_Dis_Score* and *Certif* and $Q*FCF$ are significant. This shows to some extent that with the increase in internal control disclosure, the over-investment level of companies having adequate cash flow decreases, which is consistent with the hypothesis that internal control disclosure helps suppress a firm's over-investment. As Jensen (1986) and Vogt (1994) point out, the phenomenon of over-investment may be prominent in companies having adequate cash flows; we do not find over-investment as measured by the sensitivity of over-investment cash flows for those companies in the low cash-flow group. In general, these results do not change our research conclusions mentioned above.

Second, following Biddle *et al.* (2009), we measure a firm's expected investment through the following model, in which $Investment_{i,t+1}$ is the total investment and $SalesGrowth_{i,t}$ is sales growth:

$$Investment_{i,t+1} = \beta_0 + \beta_1 * SalesGrowth_{i,t} + \varepsilon_{i,t+1}$$

Biddle *et al.* (2009) run a regression with this model by year and industry (eliminating samples whose number of observations is fewer than 20 within the industry), and then sort the residues in ascending order from the lowest value to the highest; these are then divided into four groups, of which the middle two groups are classified as the normal investment group ($Inv_Dum = 2$), the fourth group as the over-investment group ($Inv_Dum = 3$), and the first group as the under-investment group ($Inv_Dum = 1$). After controlling for a series of relevant variables, they take *Inv_Dum* as the dependent variable and run the multinomial-logit regression. With reference to their method of measuring over-investment and under-investment and the setting of the multinomial-logit model, we run the multinomial-logit multiple regression. The results show that compared with the normal investment group, the coefficients of *Ic_Dis_Dum* and *Ic_Dis_Score*

are significantly negative for the groups of under-investment and over-investment (the coefficient of *Certif* is not significant, for it reflects only a small part of the internal control disclosure variable *Ic_Dis_Score* and does not affect our research conclusions). This shows that when keeping the other variables unchanged, if a firm increases its internal control disclosure, the probability of falling into the under-investment or the over-investment groups significantly decreases; in other words, the better a firm's internal control disclosure, the less likely the firm will be included in the abnormal investment groups. This also supports our hypothesis that internal control disclosure helps suppress a firm's over-investment.

5.4.7. Other Ways to Measure Financial Risk

We also try other measures to test a firm's financial risk. First, we refer to Andrade and Kaplan (1998), who define a financial crisis as when a firm lacks sufficient profit before interest and tax to pay for its interest expenses. Specific steps are set as follows. When a firm is ST or PT, we consider it to be financially distressed, and $Zdd = -1$; when a firm is not ST or PT, but its profit before interest and tax is not enough to pay the interest (financial expenses), we consider it to be facing financial distress, and $Zdd = 0$; otherwise, we consider a firm to be financially sound, and $Zdd = 1$.

Second, we refer to Dahiya *et al.* (2003) on the definition of financial crisis and define it as when a firm does not have sufficient cash flow to repay due debts. Specific steps are set as follows. When a firm is ST or PT, we consider it to be financially distressed, and $Zdd = -1$; when a firm is not ST or PT, but its net value of cash flow from operational activities is not enough to pay interest (financial expenses), we consider it to be facing financial distress, and $Zdd = 0$; otherwise, we consider a firm to be financially sound, and $Zdd = 1$.

We separately adopt the above two methods to measure a firm's financial risk and run the regression analysis again. On the whole, the regression results still support our research conclusions.

5.4.8. Measurement of Internal Control Disclosure

Since the key data used in this paper are taken from Shenzhen Dibo Technology, information about a company's processing methods, procedures, and results are not publicly available. So to further test the conclusions, we try to collect data and build an index database for internal control disclosure by ourselves. Of the five elements of internal control, control activities represent the specific way to implement internal control and are closely correlated with whether a firm is over-investing. Therefore, we emphasise this element of internal control to build the control activity disclosure index. Table 11 gives specific descriptions about the index. We divide control activity disclosure into 13 factors and respectively judge whether a firm has made disclosure about the factor. If a firm discloses information about a particular factor, it scores 1 point, and otherwise

0. We then add up the scores to obtain the firm's control activity disclosure index. Since the workload of data collection is quite large, we choose only listed companies in the manufacturing industry as our test sample. There are 1,437 observations for listed companies in the manufacturing industry between 2007 and 2008. Using the same research models and methods, we run a regression analysis with our self-built data of internal control disclosure, and the results do not change substantively.

In addition, to better understand the similarities and differences between the two different indexes, we compare the internal control disclosure index we build and the one built by Shenzhen Dibo Technology and find that both indexes are highly correlated, in that the related coefficient reaches 0.8776 and is significant at the 1 per cent level. This means that the index built by Shenzhen Dibo Technology is credible to a certain extent.

5.4.9. Effect of Lagged Internal Control Disclosure on Current Investment

We further study how internal control disclosure in the previous period affects a firm's current over-investment. The result shows that generally lagged internal control disclosure does not significantly affect a firm's current over-investment. The reason might be that from the perspective of information economics, information about internal control disclosure can be quickly absorbed by the market and does not take a long lagged time to play its role in reducing information asymmetry.

In addition, we also test the relation between lagged over-investment and current financial risk. We find that the over-investment coefficient for the lagged period is not significant in the financial risk equation, meaning that over-investment in the lagged period is not directly related to financial risk in the current period, but lagged financial risk does affect current financial risk. Therefore, lagged over-investment might affect a firm's current financial situation by affecting lagged financial risk.

5.4.10. Other Tests

We calculate the measurement of over-investment mentioned above through Model (1) by using the growth rate (*Growth*) as the index for a firm's growth opportunities. We also try to calculate the amount of over-investment using Tobin's Q to measure a firm's growth opportunities. The results make no substantive changes in our research conclusions. Some scholars (such as Yang and Hu, 2007) use the difference between operational cash flow and expected capital investment to represent free cash flow (*FCF*), taking into account the importance of free cash flow in the capital investment decision. We adopt the same method to measure *FCF* and run the regression analysis again; the research conclusions do not change substantively.

Table 11 Self-Built Index: Factors Relating to Control Activities of Internal Control

Disclosure of Control Activities	
1	Disclose relevant situations of incompatible duties separation
2	Disclose relevant requirements for authorisation
3	Adopt the system of group examination and approval or joint endorsement for major business and issues
4	Disclose the control system for important business activities
5	Establish an early warning mechanism for significant risk
6	Establish a contingent mechanism for emergencies
7	Perform analyses on operational situations regularly, discover existing problems, find out the reason, and provide remedies in time.
8	Establish and implement a performance appraisal system
9	Establish a system for routine property management and regular inventory checks
10	No contact or disposal of property by unauthorised personnel (considered nil if there is no disclosure about this factor)
11	Implement a comprehensive budget management system
12	Managers at all levels do not commit ultra vires acts (considered nil if there is no disclosure about this factor)
13	Disclose the establishment of accounting organs and the qualifications of the accounting person-in-charge

In addition, we adopt the data between 2000 and 2008 when estimating capital investment. In this period firms experienced the non-tradable share reform, which started during the first half of 2005. Considering the probable effect of institutional transition on the investment mode of listed companies, we also adopt the data between 2005 and 2008 during which the non-tradable share reform started, and our research conclusions have no substantive changes. Finally, we winsorise the main continuous variables used in this paper by the upper and lower 1 per cent, and our results are robust as well.

According to the above sensitivity analysis, we hold that our research conclusions are comparatively robust.

VI. Research Conclusions

Unlike the extant literature discussing the effect of information disclosure on firm investment efficiency, this paper studies firm investment efficiency from the perspective of internal control disclosure. It examines the relationships between internal control disclosure, over-investment, and financial crisis. Paying more attention to financial risk created by non-efficient investment, we study not only the ways that internal control disclosure affects a firm's over-investment, but also the financial risk that may be

caused by over-investment and the role internal control disclosure plays in controlling risk. The results show first that raising the level of internal control disclosure helps to reduce information asymmetry in internal control governance and to mitigate the agency problem generated or exacerbated by asymmetry, thereby effectively suppressing the over-investment behaviour of enterprises. Second, over-investment tends to cause firms to fall into a financial crisis, and the more seriously a firm over-invests, the more likely it will fall into crisis. And third, internal control disclosure helps to reduce the negative impact of over-investment and to lower the likelihood that a firm will fall into crisis.

This paper studies over-investment from the perspective of internal control disclosure for the first time by examining the relationships between internal control disclosure, over-investment, and financial crisis. The study enriches the existing literature on information disclosure affecting investment efficiency, confirms the importance of internal control disclosure, and shows that the regulatory authority's decision to require firms to strengthen such disclosure is helpful in protecting investors' benefits. The paper also provides a useful perspective for practitioners and regulatory agencies in developing policies with regard to internal control and investor protection.

References

Please refer to pp. 102-106.