

## 企业资本投资效率与会计信息质量<sup>1</sup>

金智 阳雪<sup>2</sup>

### 摘要

根据传统的受托责任观,会计信息通过缓解管理者与投资者之间的代理问题,而发挥抑制企业非效率投资的治理作用。但是,任何治理机制发挥作用,都需要满足一定的制度前提。本文认为,在政府干预严重、投资者保护不足的中国新兴市场,其制度基础使会计信息难以发挥治理作用,反而更可能使会计信息成为管理者掩盖非效率投资行为的一种工具。本文以2004至2007年中国A股上市公司为样本,发现企业资本投资效率越低,会计信息质量越低。考虑到两者之间存在的内生性问题,本文分别利用滞后项和联立方程模型的方法解决这一问题之后,所得结论基本保持一致,这说明本文的实证分析较为稳健地揭示了中国上市公司管理者利用低质量的会计信息掩盖其非效率投资的行为;并且,工具变量回归表明,这一现象在过度投资的公司中更为明显。本文既丰富了会计治理的相关文献,也为加强会计信息监管对资本市场建设的重要性提供了支持证据。

关键词:过度投资、投资不足、会计信息质量、控制权私利

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<sup>2</sup> 金智,通讯作者,西南财经大学会计学院。电子邮箱:jz@163.com。  
阳雪,广东外语外贸大学财经学院。电子邮箱:yx0900206@163.com。

## 一、引言

在新古典的分析框架下,企业当局投资净现值为正的项目,而放弃净现值为负的项目,直至投资项目的边际成本等于边际收益时停止增加投资(Biddle, Hilary, and Verdi, 2009)。所以,在新古典的完美市场中,企业投资决策仅依赖于投资项目净现值(NPV)的正负,而与其他因素无关。然而,现实世界中的市场远非新古典的完美市场,管理者与投资者之间的代理问题常常使管理者做出过度投资或投资不足的非效率投资行为,致使企业偏离最优投资水平,严重损害企业价值。传统受托责任观认为,会计信息有助于监督管理者的机会主义行为,降低企业过度投资或投资不足的非效率投资程度,从而达到缓解这种代理问题的治理作用。Biddle, Hilary, and Verdi (2009)以成熟市场为研究对象,发现高质量的会计信息能抑制企业过度投资或投资不足的行为,达到优化企业投资水平的目的。但是,任何事物都具有正反两面性,是发挥正面作用,还是负面作用,取决于事物所处环境,会计信息也不例外。会计信息在一定条件下发挥监督治理的作用,在另一种条件下却可能成为管理者掩盖其机会主义行为,侵害投资者利益的工具。在一个发达的成熟市场,政府干预少且投资者保护程度高,这些制度特征为会计信息发挥治理作用提供了必要的前提。而中国资本市场是一个处于发展初期的新兴市场,政府干预严重、投资者保护不足的制度条件将使会计信息发挥治理作用,还是成为管理者掩盖其机会主义行为的工具呢?本文将针对这一问题,结合中国特殊的制度背景,分析企业资本投资效率与会计信息质量之间的关系。

首先,在现有文献的基础上,本文通过理论分析得出会计信息发挥监督治理作用的制度条件。在Ball, Kothari, and Robin (2000)、Ball, Robin, and Wu (2003)的分析框架下,政府干预严重、投资者保护程度低决定了大股东的治理模式,导致企业解决内部人(管理者或控股股东)与外部人之间的信息不对称,是以社会关系网络和私下交流为主要渠道,从而决定了以公开披露为主的会计信息难以发挥治理作用。相反,政府干预较少、投资者保护程度高的市场环境往往决定了股东利益至上的治理模式,并直接决定了公司解决内外部信息不对称的方式以公开信息披露为主;会计信息作为投资者进行投资决策最为重要的公开信息,在如此市场环境中,就越需要会计信息发挥治理作用。因此,当一个市场具备了政府干预少、投资者保护程度高的前提条件时,会计信息才能发挥治理作用,并抑制管理者的非效率投资行为;然而,本文认为,作为一个处于转型期的新兴市场,中国现实的制度背景与成熟市场存在相当程度的差异:一方面,在转型经济体制下,政府行为对中国上市公司经营的干预严重;另一方面,作为一个处于发展初期的新兴市场,中国资本市场监管制度不健全、法律执行效率低,投资者利益保护薄弱(Allen *et al.*, 2005)。因此,本文认为中国的制度条件难以满足会计信息发挥治理作用的基本前提,从而难以发挥抑制公司非效率投资行为的监督作用。最后,本文结合中国特殊制度背景的理论分析表明,管理者有足够动机以低质量会计信息掩盖其非效率投资中的机会主义行为,从而导致非效率投资越严重,会计信息质量越低。

本文以中国上市公司2004至2007年的经验数据为样本,研究企业资本投资效率如何影响会计信息质量。结果表明,企业资本投资效率越低,会计信息质量越低;考虑到两者之间存在的内生性问题,本文分别利用滞后项和联立方程模型处理这一

问题之后，所得结论基本保持一致，这说明政府干预严重、投资保护程度低的市场环境致使中国资本市场的制度基础难以支持会计信息发挥有效的监督作用，反而更可能使会计信息成为管理者掩盖其机会主义行为的一种工具；并且，工具变量回归表明，相比投资不足的公司，这一现象在过度投资的公司中更为明显。

本文的主要贡献在于：首先，在传统的受托责任观下，现有研究将注意力主要集中在于会计信息的治理作用，而对会计信息在一定条件下也可能被管理者用来掩盖其非效率投资中的机会主义行为这一问题，并没有给予应有的重视。本文结合中国特殊制度背景，应用私人控制权理论，揭示了中国上市公司的管理者通过操纵会计信息掩盖其非效率投资行为的现象，既为加强会计信息监管对资本市场建设的重要性提供了支持证据，也有利于进一步丰富 Hung (2001)、Leuz, Nanda, and Wysocki (2003) 这类文献；其二，本文从一个与 Biddle, Hilary, and Verdi (2009) 相异的视角，考察企业资本投资效率与会计信息质量之间的关系，使我们对新兴加转型的市场中两者之间的关系有更进一步的认识，不但有利于改善会计治理作用，而且有利于企业资源配置效率的提高。并且，鉴于企业资本投资效率与会计信息质量之间所存在的内生性，本文应用滞后项、联立方程模型以及工具变量三种方法处理其内生性问题，有利于我们更加清楚地认识两者之间的关系。

本文后面部分的安排是：第二部分是文献回顾；第三部分是制度背景与理论分析；第四部分是研究设计；第五部分样本选择与描述性统计分析；第六部分是实证分析；第七部分是内生性分析；第八部分是研究结论、启示与局限性。

## 二、文献回顾

Verrecchia (2001)、Healy and Palepu (2001)、Bushman, Piotroski, and Smith (2006) 认为，会计信息质量的提高，有利于改善企业资本投资效率。但是，他们并没有证明，会计信息是以何种方式来改善企业资本投资效率，是通过降低过度投资，还是降低投资不足，抑或两者兼之？于是，Biddle, Hilary, and Verdi (2009) 在这些文献的基础上进一步研究表明，企业资本投资效率主要由逆向选择和道德风险所引起的代理问题而决定。他们的实证结果表明，会计信息质量的提高，通过降低逆向选择和减轻道德风险，从而提高企业资本投资效率，即会计信息质量越高，越能降低过度投资企业的投资水平，也越有利于提高投资不足企业的投资水平。在与 Biddle, Hilary, and Verdi (2009) 类似的理论逻辑基础上，李青原 (2009) 以中国上市公司为研究对象，应用 Richardson (2006) 计量过度投资或投资不足的方法衡量企业资本投资效率，通过实证分析指出，中国上市公司通过提高会计信息质量可降低信息不对称和代理成本，从而降低公司融资成本，进而提高企业资本投资效率；周春梅 (2009) 也以中国上市公司为样本，从会计信息治理作用的角度进行实证分析，指出高盈余质量通过降低代理成本而提高企业资本投资效率。

每一种治理机制发挥作用都需要满足一定的前提条件，会计信息监督作为一种治理机制也不例外。本文认为，政府对企业行为干预少、法律对投资者保护程度高的制度背景是会计信息发挥治理作用的必要前提。<sup>3</sup> Biddle, Hilary, and Verdi (2009) 以

<sup>3</sup> 本文在第三部分对会计信息发挥治理作用的前提条件有详细的分析。

成熟市场为研究对象，由于其所针对的市场具备政府干预少、投资者保护程度高的制度前提，所以此种情况下的会计信息能发挥治理作用。但是，在一些新兴市场，也许不能满足会计信息发挥治理作用的制度前提，因而呈现出另一种情况。Hung (2001) 指出，在应计制下的会计信息能及时地确认和配比收入与费用，从而为投资者及时地提供决策相关的信息。但是，在一个投资者保护薄弱的环境中，这种会计信息很可能成为管理者操纵盈余，掩盖其机会主义行为的工具。并且，在一个投资者保护薄弱的市场中，管理者更可能为最大化自己的利益而进行机会主义行为 (La Porta *et al.*, 1997)，从而使得会计信息更可能成为管理者掩盖其机会主义行为的工具。Leuz, Nanda, and Wysocki (2003) 指出，在一个制度环境不利于投资者利益保护的市場，自利的管理者或控股股东越有动机通过盈余管理手段，提供低质量的会计信息以掩盖其攫取私人控制权收益的机会主义行为。上述这一类研究都说明，当会计信息发挥治理作用的制度前提不满足时，会计信息不但难以发挥抑制管理者机会主义行为的治理作用，反而很可能被管理者利用，而成为掩盖其攫取私人控制权收益的工具。

总之，会计信息是发挥监督管理者机会主义行为的治理作用，还是反过来被管理者利用而成为其掩盖机会主义行为的一种工具，是一个需要根据具体环境进行实证分析的问题。中国资本市场是一个处于转型时期的新兴市场，与成熟市场存在相当程度差别，政府干预严重和投资者保护不足是其重要的制度特征 (夏立军、方轶强，2005)。从理论上而言，政府干预严重、投资者保护程度低的制度特征将使会计信息发挥治理作用的前提条件难以满足，反而很可能成为管理者掩盖其攫取私人控制权收益的工具。而且，过度投资 (Murphy, 1985; Jensen, 1986) 和投资不足 (John and Nachman, 1985; Bertrand and Mullainathan, 2003) 是管理者攫取控制权收益的两种重要途径，下文将结合中国特殊制度背景和私有控制权理论分析过度投资和投资不足这两种非效率投资行为与会计信息质量之间的关系。

### 三、制度背景与理论分析

在文献回顾中已经提出，在一定条件下，会计信息通过促进投资者对管理者的监督而降低企业代理成本，发挥会计治理作用；在另一种条件下，会计信息又可能成为管理者掩盖其攫取私有控制权收益的工具。因此，本文的分析框架为：首先，从需求与供给两个层面，结合政府干预及投资者保护理论，分析会计信息发挥治理作用所需要满足的前提条件；其次，分析中国现实的制度背景是否满足这些前提条件；然后，进一步结合中国现实的制度背景，以私人控制权收益理论，分析企业资本投资效率如何影响会计信息质量，并提出假设。

#### (一) 会计信息治理作用的制度前提

市场对投资者利益保护的度越高，外部融资的机会就越多，股权结构也就越分散 (La Porta *et al.*, 1999)，以管理者为代表的内部人与外部投资者之间的信息不对称所引起的代理问题也将越严重，从而越需要会计信息发挥治理作用，以降低两者之间信息不对称及其相应的代理成本 (Francis *et al.*, 2003)。Ball, Kothari, and Robin

(2000)、Ball, Robin, and Wu (2003)在上述“法与金融”研究的理论基础之上提出,在普通法系的国家,市场契约决定资源配置,政府对企业干预较少,法律对投资者利益保护程度高,这在很大程度上决定了股东利益至上的公司治理模式,并直接决定了公司解决内外部信息不对称的方式以公开信息披露为主。因为会计信息是市场投资者最为重要的投资决策信息,所以在这样的市场中,就越需要会计信息有效地发挥公司治理作用;但是,在大陆法系的国家,政府一方面主导资源配置,严重干预企业行为;另一方面,政府主导法律规章制度的制定,并严重影响执法。政府对企业的行为严重干预所导致的政治化经营,很大程度上决定了公司的大股东治理模式,进而直接决定了公司解决内外部信息不对称的方式是以社会关系网络和私下交流的渠道为主,而对公开披露的会计信息发挥公司治理作用的需求较低。所以,从需求层面而言,政府干预越少,法律对投资者保护程度越高,就越需要会计信息发挥治理作用,反之亦然。同时,从供给层面而言,市场对投资者利益的保护程度,决定了投资者利用会计信息发挥治理作用的效果。当市场对投资者利益保护有效时,只要投资者通过会计信息发现管理者侵害中小股东利益的行为,就能有效地通过法律手段(如集团诉讼等)或市场手段(更换管理层和控制权转移等)使管理者为攫取私利的行为付出代价,从而更有利于抑制管理者攫取私利的行为。所以,投资者利益保护越好,越有利于促进会计信息发挥治理作用。反之,如果市场对投资者利益保护不力,即使投资者通过会计信息发现管理者攫取私利的行为,由于行权成本太高,也难以发挥监督治理作用。因此,从需求与供给两方面的分析可知:在很大程度上,政府干预少、投资者保护程度高的制度特征是会计信息发挥治理作用的必要前提。

## (二) 会计信息治理的现实环境：基于中国制度背景的分析

1. 政府干预严重。在传统的计划经济体制下,政府控制国家经济资源,以行政命令决定资源配置。政府对企业行为的影响,远不止干预所能形容,甚至可以说政府能够直接控制企业行为。虽然自十一届三中全会(1978年12月)以来,中国从计划经济体制向社会主义市场经济体制转型,实行市场化改革已经有三十余年,但中央政府或地方政府对上市公司经营仍然存在严重干预,其中原因是:自上世纪70年代末期以来,财政分权改革强化了各级地方政府的预算约束,这一方面加强了地方政府提高经济效益的动机,另一方面也引发了各地方政府之间的激烈竞争;而对于各地方政府而言,上市公司就是它与其他政府竞争全国性资源的重要阵地(李增泉等,2005)。因为当地政府需要上市公司来实现发展经济、扩大就业、增加税收以及维护社会稳定等多重目标,以保障当地政府的政绩及其官员的政治前途,所以当地政府必然会对所辖地区的上市公司存在严重的干预(夏立军、方轶强,2005)。对于民营企业而言,在政府掌控主要经济资源的前提下,为了免受政府“掠夺之手”的干预,民营企业通过各种途径与政府建立关联,以期得到政府“支持之手”的保护(罗党论等,2009),这些研究说明了政府对民营企业同样存在积极或消极的干预。因此,政府干预严重是中国上市公司经营的一个重要制度特征。

2. 投资者保护薄弱。自1991年中国股票市场成立以来,如琼民源、银广夏和红光实业等重大会计欺诈事件屡禁不止,大股东对中小股东的利益侵占现象甚为

普遍，这些现象背后一个重要原因就是中国法律环境对投资者利益保护不力(夏立军、方轶强，2005)。虽然1998年颁布了《证券法》，但是该法的颁布和实施并没有从实质上改善对投资者利益的保护，其主要原因在于法律执行效率低。首先，中国上市公司很多是国有控股的上市公司，天然地与政府利益关联密切，这使得作为国务院下属部级单位的证监会难以对这些具有政府背景的上市公司实施有效处罚(刘鸿儒，2003)。而且，民营上市公司也会通过各种途径与政府建立政治关系，以在证券市场监管中寻求政治保护。从市场的角度而言，中国国有企业的经理人来自于行政任命，民营企业经理人主要是关系聘任，两者均非市场竞争的结果。经理人市场的不完善致使企业难以解雇不合格的经理人；而且，由于一股独大的现象较为严重，导致控制权市场也难以约束经理人的不当行为。此外，中国没有集体诉讼制度，证券民事赔偿制度至今仍未得到有效执行。这些因素共同导致了法律执行效率低，投资者保护严重不足。

### (三)企业资本投资效率与会计信息质量：基于中国制度背景的理论分析

Biddle, Hilary, and Verdi (2009)以成熟市场为研究对象，发现会计信息质量的提高有利于提高企业投资水平。该结论的成立与其研究对象处于政府干预少、投资者保护程度高的市场环境密切相关。然而，基于上述中国制度背景的分析可知，作为一个处于转型期的新兴市场，政府干预严重、投资者保护不足是中国上市公司必须面对的两大重要的制度特征，其共同决定了会计信息不具备发挥监督治理作用的制度基础。而且，根据Hung (2001)、Leuz, Nanda, and Wysocki (2003)等人的观点可知，在一个政府干预严重、投资者保护薄弱的市场环境中，管理者有动机通过盈余管理手段提供低质量的会计信息，掩盖其攫取私人控制权收益的行为。那么，在中国现实制度背景下，企业资本投资效率与会计信息质量究竟是何种关联？下文将结合中国现实制度背景，应用私人控制权理论，分别从过度投资和投资不足两个维度分析两者之间的关系。

Murphy (1985)和Jensen (1986)指出，通过不断地投资新项目，扩大企业规模，管理者可控制更多的资源，并从中获取更多的私人收益。所以，管理者通常具有过度投资，建立“企业帝国”的动机。这种私人收益不但能为管理者带来更高的薪酬、更高的在职消费、提高个人声誉和人力资本，而且还能更加巩固自己的地位(Shleifer and Vishny, 1989)。为了达到这一目的，管理者投资决策的主要动机不再是股东利益最大化，而是利用控制权为自己谋取最大的私人收益。在这一过程中，管理者很可能不惜接受一些净现值为负的投资项目而扩大企业规模，以更大程度攫取私人控制权收益，从而牺牲了投资者利益和降低了企业的实际绩效。

投资不足是企业投资效率低下的另一种表现形式。当企业进行新项目投资或对现有项目进行更新改造时，管理者需要承担更多责任，并且还可能学习新知识以提高自己对新增投资项目的管理能力；并且，任何投资都有风险，新增投资可能不但未能为公司带来收益，反而可能会让公司遭受巨大损失；所以，增加投资不但会影响管理者对现有生活的享受，让他们不得不付出更多的时间和精力，以应付新增投资项目带来的压力(Bertrand and Mullainathan, 2003；辛清泉等，2007)，而且还可能让管理者承担投资失败所带来的一些成本。因此，增加投资导致管理者私人

成本增加,管理者将很可能放弃一些净现值为正的投资项目,用本属于全体股东的收益为自己谋求福利,比如增加在职消费或掏空公司优质资源(John and Nachman, 1985)。

经过上述分析可知,无论是过度投资,还是投资不足,其背后往往隐藏着一些剥削中小股东利益的行为。并且,从理论上而言,几乎所有企业行为都直接或间接地影响会计信息的生成,投资行为作为一种决定企业价值的企业行为,毋庸置疑地影响会计信息的生成。过度投资和投资不足的非效率投资行为对会计报表的直接后果是:会计利润下降、资产结构失调和现金流量情况恶化。非效率投资行为越严重,对会计利润、资产结构和现金流量情况的负面影响越严重,就越需要更多或更复杂的会计操纵行为将之掩盖,从而降低了会计信息质量。其原因在于:这些不利情况的真实披露,一方面,导致投资者和债权人对企业信心的下降,资本成本增加,融资难度加剧;另一方面,严重影响管理者声誉和降低管理者的经济利益,如薪酬、奖金、在职消费及其他福利的大幅减少。所以,管理者有动机利用低质量的会计信息将之掩盖。<sup>4</sup>当然,管理者通过低质量会计信息掩盖这些行为面临着监管成本的约束。但是,作为一个处于转型期的新兴市场,中国资本市场监管制度不健全、法律执行效率低,投资者利益保护薄弱(Allen, Qian, and Qian, 2005),使得相比真实披露给管理者带来的成本而言,虚假披露的成本很低。<sup>5</sup>

同时,还存在基于信号理论的另一解释。La Porta *et al.* (1998)指出,在投资者保护薄弱的资本市场,会计信息系统很可能作为投资者保护不足的一种替代机制而存在,并使高质量的会计信息变得更为重要。因此,为了降低资本成本,管理者有动机提高会计信息质量,以此作为向市场发出的信号而与其他代理问题严重的公司区分开来。但是,根据Spence (1973)的信号理论,信号发送能否取得成功与信号发送的成本密切相关。代理问题越严重(坏事干得越多)的公司,以高质量财务报告作为发送信号的成本越高。<sup>6</sup>在此逻辑下,本文可作出推断,代理问题引致的非效率投资(投资不足或过度投资)程度越严重,以高质量会计信息作为发送信号与其他差公司(非效率投资严重)区分开来的成本越高,从而越可能会降低会计信息质量。

基于上述分析可知,作为处于转型期的社会主义市场经济体制,中国对企业行为干预严重;同时,作为处于发展初期的新兴市场,监管不严、执法不力以及

<sup>4</sup> 无论从股票市场成立的时间上,还是从规模上,中国股票市场都是一个新兴的市场。王亚平等(2009)指出,中国散户投资者一方面缺乏专业投资知识,另一方面缺乏正确的投资理念。并且,相比成熟市场,中国机构投资者规模较小,而且存在较为严重的投机行为。此外,赵宇龙、王志台(1999)和马芸、刘斌(2004)研究表明,中国股票市场存在明显的功能锁定现象。在很大程度上,上述这些因素说明了中国市场投资者的不成熟。投资者的不成熟降低了管理层提供低质量会计信息的成本,并进一步促进了管理层以低质量会计信息掩盖非效率投资的动机。

<sup>5</sup> 中国资本市场监管不严,法律执行效率低,导致虚假信息披露的成本低。尽管证监会的监管力量不断加强,但仍然无法与快速成长的国内证券市场相匹配,其监管队伍显得过于单薄。证券市场每年发生的各类违规案件可能几百甚至上千,但其每年正式立案的只有100起左右。而且,每起立案调查需要数月,办案人员可多达数十人。最后,被正式查处的仅有几十家。但是,对于一个信息披露质量一直被诟病的新兴市场而言,实际违规公司数量远不止这么多。因此,上述证据说明中国资本市场信息披露监管能力不足导致了监管不严和法律执行效率低。此外,根据上文的制度背景分析可知,由于上市公司与当地政府之间存在千丝万缕的利益关联,并且管理者与各级政府属于同一系统,他们内部存在密切的利益往来和社会关系。一旦各级政府所辖的上市公司被查出信息披露违规,上市公司与政府之间的关系将影响证券市场的执法,导致会计信息监管不力。因此,从政府监管角度而言,监管不严和执法不力导致上市公司低质量会计信息披露成本低。

<sup>6</sup> 高质量的财务报告将揭示出公司和管理层的负面信息,从而降低市场对公司及管理层的信心,使管理层付出代价,详见上段相应的分析。

投资保护薄弱。这些制度特征共同导致了会计信息难以抑制企业非效率投资中的机会主义行为，反而导致了另一种结果：企业非效率投资行为越严重，内部人（主要指管理者或控股股东）提供越低的会计信息质量掩盖其非效率投资中的机会主义行为。因此，本文提出假设：

假设：在其他条件相同的情况下，企业资本投资效率越低，会计信息质量越低。

#### 四、研究设计

本文研究设计的构想是：首先，借鉴Richardson (2006)的模型计算过度投资或投资不足，以衡量企业资本投资效率；再以修正Jones模型计算的应计质量衡量会计信息质量，并以DD模型计算应计质量，已备在回归分析中作稳健性检验；然后，以会计信息质量作为因变量，企业资本投资效率作为解释变量，并选择若干控制变量，以对企业资本投资效率如何影响会计信息质量进行多元回归分析。更为重要的是，考虑到以成熟市场为分析对象的研究指出，会计信息质量也可能会影响企业资本投资效率，也即企业资本投资效率与会计信息质量之间存在内生性，所以本文将采用三种方法解决这一内生性问题：其一，滞后项；其二，联立方程模型；其三，工具变量。

##### (一) 过度投资和投资不足的衡量

借鉴Richardson (2006) 计量企业资本投资水平的方法，我们用模型(1)估算企业投资效率，所得残差越大于0，则代表企业过度投资越严重；残差越小于0，则代表投资不足越严重。过度投资和投资不足都是非效率投资行为，所以本文以模型(1)回归残差的绝对值作为投资效率的代理变量，并按残差大于或小于0（过度投资或投资不足）对样本进行分组回归。其中， $INV_t$ 为第t年资本投资量， $GROWTH_{t-1}$ 代表企业成长机会，等于t-1年末的托宾Q值或t-1年末销售收入增长率； $LEV_{t-1}$ 、 $CASH_{t-1}$ 、 $AGE_{t-1}$ 、 $SIZE_{t-1}$ 、 $RET_{t-1}$ 、 $INV_{t-1}$ 分别为企业第t-1年末的资产负债率、现金持有量、上市年龄、公司规模、股票收益率和资本投资量。此外，模型中还加入行业变量IND和年度变量YEAR，以控制行业效应和年度效应。

$$INV_t = \alpha_0 + \alpha_1 GROWTH_{t-1} + \alpha_2 LEV_{t-1} + \alpha_3 CASH_{t-1} + \alpha_4 AGE_{t-1} + \alpha_5 SIZE_{t-1} + \alpha_6 RET_{t-1} + \alpha_7 INV_{t-1} + \sum IND + \sum YEAR + \varepsilon_t \quad (1)$$

##### (二) 会计信息质量的衡量

本文参照Dechow, Sloan, and Sweeney (1995)的方法，以修正的Jones模型计算可操纵性应计项( $DA_{it}$ )的绝对值衡量会计信息质量(IQ)，也可称为应计质量。首先，应用模型(2)分年度和控制行业进行回归，然后将估计所得的回归系数代入模型(3)，计算可操纵性应计项的绝对值( $|DA_{it}|$ )，该值越大，会计信息质量越差。其中，TA为



总应计项，等于营业利润减去经营活动现金净流量； $ASSET$ 为资产总额； $\Delta REV$ 为销售收入变动额； $\Delta REC$ 为应收账款变动额； $PPE$ 为固定资产原值。

$$\frac{TA_{i,t}}{ASSET_{i,t-1}} = \alpha_1 \frac{1}{ASSET_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{ASSET_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{ASSET_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

$$DA_{i,t} = \frac{TA_{i,t}}{ASSET_{i,t-1}} - \left( \hat{\alpha}_1 \frac{1}{ASSET_{i,t-1}} + \hat{\alpha}_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{ASSET_{i,t-1}} + \hat{\alpha}_3 \frac{PPE_{i,t}}{ASSET_{i,t-1}} \right) \quad (3)$$

同时，本文借鉴Wang (2006)的修正DD模型计算应计质量，即以模型(4)回归残差的绝对值作为会计信息质量的第二个衡量指标。其中， $ACC$ 是总应计项，等于营业利润减去经营活动现金流量，并经上期资产总额调整。 $CF_{i,t}$ 、 $CF_{i,t-1}$ 和 $CF_{i,t+1}$ 分别代表 $t$ 期、 $t-1$ 期和 $t+1$ 期的经营活动现金净流量，并经上期资产总额调整。 $DCF$ 为虚拟变量，当 $CF_{i,t} - CF_{i,t-1} < 0$ 时，等于1，否则为0； $\varepsilon_{i,t}$ 为误差项。

$$ACC_t = \alpha_0 + \alpha_1 CF_{i,t} + \alpha_2 CF_{i,t-1} + \alpha_3 CF_{i,t+1} + \alpha_4 DCF_{i,t} + \alpha_5 DCF_t * CF_{i,t+1} + \varepsilon_{i,t} \quad (4)$$

### (三) 模型设定

模型(5)是本文的回归模型之一，我们采用普通最小二乘法对模型(5)进行回归分析。其中，会计信息质量( $IQ$ )是因变量，为以修正Jones模型或DD模型计算的应计质量。 $IQ$ 值越大，会计信息质量越低；企业资本投资效率( $INVEST$ )是解释变量，其值越大，投资效率越低；其他变量为控制变量。根据上文的理论分析，预期模型(5)的 $\alpha_1$ 显著为正。

$$IQ_{i,t} = \alpha_0 + \alpha_1 INVEST_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 STATE_{i,t} + \alpha_6 CENTRAL_{i,t} + \alpha_7 BOARD_{i,t} + \alpha_8 DUAL_{i,t} + \alpha_9 GOV_{i,t} + YEAR_t + IND_j + e_{i,t} \quad (5)$$

控制变量。根据现有文献，还有一些公司基本面和公司治理指标会影响到会计信息质量，所以本文将对这些变量加以控制，具体情况如下：

1. 公司基本面指标。公司基本面指标具体包括公司规模( $SIZE$ )、财务杠杆( $LEV$ )和盈利能力( $ROA$ )。首先，公司规模预期。公司规模越大，被监督可能性越大，从而使得会计信息质量越高。但是，公司规模越大，会计盈余操纵空间越大，从而使会计信息质量越低。由于资产规模对会计信息质量存在正反两方面的影响，所以对其符号不作预期；其次，财务杠杆预期。在一个法制不健全，政府主导银行并干预企业经营的市场，债务难以发挥其监督的治理功能。相反，为了符合债务契约要求，负债比例越高的公司，越有动机进行盈余管理，从而导致会计信息质量越低(陆正飞等，2008)。因此，本文预期财务杠杆系数为正；其三，盈利能力的预期。

Lang and Lundholm (1993)指出,公司盈利能力越强,越有动机提供高质量的会计信息信息,以与其他绩效差的公司区别开来。因此,本文盈利能力系数为负。

2. 公司治理指标,具体包括产权属性(*STATE*)、股权集中度(*CENTRAL*)、董事会独立性(*BOARD*)和两职合一(*DUAL*)。首先,产权属性的预期。因为非国有企业的管理者比国有企业管理者面临更大的市场压力,所以非国有企业管理者有更大的动机进行正向盈余管理来提高公司业绩,以获得市场的信心(薄仙慧、吴联生, 2009)。因此,预期产权属性符号为正;其次,股权集中度的预期。股权集中度高,控股股东对公司的控制能力越强,操纵会计信息越容易,从而会计信息质量越低(Fan and Wong, 2002);同时,当总经理和董事长两职合一时,也使管理层更容易操纵会计信息。因此,本文预期股权集中度和两职合一系数为正;其三,董事会独立性越强,外部监督越严,从而有助于提高会计信息披露质量(Beasley, 1996)。因此,本文预期董事会独立性系数为负。此外,政府干预一方面影响企业资源配置,又会因资源依赖外部市场契约而影响会计信息质量,所以本文在上述模型中将政府干预(*GOV*)作为控制变量。

更为重要的是,根据上文的理论分析可知,企业资本投资效率可能影响会计信息质量。同时,如果以成熟市场的制度背景为分析基础,会计信息质量也可能反过来影响企业资本投资效率。因此,企业资本投资效率和会计信息质量之间存在内生性,为了进一步解决两者之间的内生性问题,本文建立联立方程模型(6)进行回归分析。联立方程模型(6)的第一个子模型为模型(5),由于上文对该模型的建立已进行了分析,此处不再赘述。根据辛清泉等(2007)的研究,除了公司基本面指标之外,自由现金流量(*FCF*)、管理费用率(*MANFEE*)和其他应收款占总资产比例(*RECTA*)都影响企业代理成本,从而影响企业资本投资效率。而且,辛清泉、郑国坚和杨德明(2007)指出企业的产权属性会影响企业资本投资效率;股权集中度影响控股股东对企业资源的控制能力,从而影响企业投资效率。而且,年度变量和行业变量也会对企业资本投资效率产生影响。因此,本文联立方程的第二个模型中加入上述变量作为控制变量。

$$\begin{cases} IQ_{it} = \alpha_0 + \alpha_1 INVEST_{it} + \alpha_2 SIZE_{it} + \alpha_3 LEV_{it} + \alpha_4 ROA_{it} + \alpha_5 STATE_{it} + \alpha_6 CENTRAL_{it} \\ \quad + \alpha_7 BOARD_{it} + \alpha_8 DUAL_{it} + \alpha_9 GOV_{it} + YEAR_t + IND_j + e_{it} \\ INVEST_{it} = \alpha_0 + \alpha_1 IQ_{it} + \alpha_2 SIZE_{it} + \alpha_3 LEV_{it} + \alpha_4 ROA_{it} + \alpha_5 STATE_{it} + \alpha_6 CENTRAL_{it} \\ \quad + \alpha_7 DUAL_{it} + \alpha_8 GOV_{it} + \alpha_9 MANFEE_{it} + \alpha_{10} FCF_{it} + \alpha_{11} RECTA_{it} + YEAR_t + IND_j + e_{it} \end{cases} \quad (6)$$

同时,本文还采用工具变量法解决企业投资效率与会计信息质量之间的内生性问题,具体为:我们以上期资本投资效率作为主要工具变量,并且为了该工具变量的有效性,我们还在第一阶段模型中进一步控制了上期自由现金流量和其他控制变量;然后,以两阶段最小二乘法对模型(7)进行工具变量回归。选取上期资本投资效率作为工具变量的具体理由为:上期投资效率( $INVEST_{i,t-1}$ )与当期投资效率( $INVEST_{i,t}$ )密切相关,但上期投资效率较少受到当期会计信息质量( $IQ$ )的影响。同时,本文在第二阶段模型中控制了大量公司基本面和公司治理结构的相关变量,从而加强了工

具变量与模型误差项的独立性。此外，模型(7)中其他控制变量的选取及设定的理由详见上文。

$$\begin{cases} INVEST_{it} = \alpha_0 + \alpha_1 INVEST_{it-1} + \alpha_2 FCF_{it-1} + \alpha_3 SIZE_{it} + \alpha_4 LEV_{it} + \alpha_5 ROA_{it} + \alpha_6 STATE_{it} \\ \quad + \alpha_7 CENTRAL_{it} + \alpha_8 BOARD_{it} + \alpha_9 DUAL_{it} + \alpha_{10} GOV_{it} + YEAR_t + IND_j + e_{it} \\ IQ_{it} = \alpha_0 + \alpha_1 INVEST_{it} + \alpha_2 SIZE_{it} + \alpha_3 LEV_{it} + \alpha_4 ROA_{it} + \alpha_5 STATE_{it} + \alpha_6 CENTRAL_{it} \\ \quad + \alpha_7 BOARD_{it} + \alpha_8 DUAL_{it} + \alpha_9 GOV_{it} + YEAR_t + IND_j + e_{it} \end{cases} \quad (7)$$

表1 变量说明表

### 1. 因变量

|           |   |
|-----------|---|
| $IQ\_1$   | 衡量会计信息质量，由本文模型(2)和模型(3)计算所得。 <sup>7</sup> 值越大，会计信息质量越差； |
| $IQ\_2$   | 衡量会计信息质量，等于本文模型(4)回归残差的绝对值，值越大，会计信息质量越差；                |
| $IQ1\_SD$ | 衡量会计信息质量， $IQ\_1$ 前瞻三期的标准差；                             |
| $IQ2\_SD$ | 衡量会计信息质量， $IQ\_2$ 前瞻三期的标准差；                             |

### 2. 解释变量

|             |   |
|-------------|---|
| $INVEST\_1$ | 衡量投资效率，等于本文模型(1)回归残差的绝对值，其中 $GROWTH_{t-1}$ 等于托宾Q值；该值越大，投资效率越差；    |
| $INVEST\_2$ | 衡量投资效率，等于本文模型(1)回归残差的绝对值，其中 $GROWTH_{t-1}$ 等于销售收入增长率；该值越大，投资效率越差； |

### 3. 控制变量

|           |   |
|-----------|---|
| $SIZE$    | 企业规模，等于企业资产总额的对数；                       |
| $LEV$     | 财务杠杆，等于企业资产负债率；                         |
| $ROA$     | 盈利能力，等于营业利润除以公司市值(营业利润/公司市值)；           |
| $STATE$   | 产权属性，当国有控股时，等于1，否则等于0；                  |
| $CENTRAL$ | 股权集中度，等于第一大股东的持股比例；                     |
| $BOARD$   | 董事会独立性，等于独立董事占董事会总人数的比例；                |
| $DUAL$    | 衡量两职合一，当董事长和总经理人为一人时，等于1，否则等于0；         |
| $GOV$     | 衡量政府干预，来自樊纲、王小鲁(2010)市场化指数中的政府干预指数。     |
| $FCF$     | 自由现金流量，其等于：净利润+利息费用+非现金支出-营运资本追加-资本性支出； |
| $MANFEE$  | 管理费用率，等于管理费用占营业收入的比例；                   |
| $RECTA$   | 等于其他应收款占总资产的比例；                         |

<sup>7</sup> 首先，应用模型(2)分年度和控制行业进行回归，再将估计所得的回归系数代入模型(3)并计算DA值，然后取DA值的绝对值，即为衡量会计信息质量的可操纵性应计项指标“ $IQ\_1$ ”。

## 五、样本选择与描述性统计分析

样本选择。本文以中国A股2004至2007年非金融类上市公司为样本，在剔除了数据缺失的样本后，总共获得3832个观测值，2004年到2007年依次为1029个、965个、921个和917个。此外，本文采用Winsorize (1%)方法对变量的极端值进行处理。本文所使用公司财务数据来自国泰安(CSMAR)数据库，公司治理数据来自色诺芬数据库。

描述性统计分析。表2报告了本文变量的描述性统计结果。本文按投资效率高将样本分为高投资效率组和低投资效率组，比较两组样本会计信息质量(IQ)的差异。结果发现，高投资效率组IQ\_1和IQ\_2均值为0.0697和0.0490，显著低于低投资效率组的0.0806和0.0608；高投资效率组IQ\_1和IQ\_2中位数为0.0469和0.0329，显著低于低投资效率组的0.0542和0.0368，所以无论是从均值角度，还是从中位数角度，都表明投资效率越低，会计信息质量越低。INVEST\_1均值为0.0823，方差为0.1046，中位数为0.0532，方差显著大于均值，说明中国上市公司之间投资效率差异很大。资产规模(SIZE)经对数化处理，均值和方差分别为21.3887和1.0413；财务杠杆(LEV)经Winsorize (1%)处理，均值和方差分别为0.5486和0.5354，说明中国上市公司资产负债率普遍较高。产权属性(STATE)中位数为1，说明中国上市公司大部分为国有控股形式；股权集中度(CENTRAL)的均值和中位数分别为0.3815和0.3572，说明中国上市公司“一股独大”的现象比较严重。

## 六、实证分析

### (一) 相关系数分析

表3报告了本文主要变量的相关系数。企业资本投资效率与会计信息质量两个指标(IQ\_1和IQ\_2)均显著正相关，说明企业资本投资效率越低，会计信息质量越低，与上文的理论预期一致。资产规模(SIZE)、财务杠杆(LEV)和盈利能力(ROA)与会计信息质量和投资效率均显著相关，说明模型中控制这些变量将有利于实证结果的可靠性。产权属性(STATE)、股权集中度(CENTRAL)与会计信息质量显著相关。而且，在后文回归分析中，各变量方差膨胀因子(VIF)均小于5，说明多重共线性问题对本文回归结果的影响不大。同时，上述变量之间的相关性是在没有控制其他因素影响下的结果，本文将在多元回归分析中控制其他影响因素，分析企业资本投资效率如何影响会计信息质量。

### (二) 多元回归分析

在多元回归分析中，本文从两个维度对样本进行分组：其一，过度投资组和投资不足组，分组的目的是为了考察哪一种非效率投资方式更可能促使公司降低会计信息质量；其二，调高盈余组和调低盈余组。非效率投资降低公司绩效，所以更可能出现调高盈余掩盖非效率投资的情况。本文分成调高盈余和调低盈余两组分别考察，是为了进一步检验中国上市公司管理层主要以哪一种方式掩盖其非效率投资行为。

表2 变量描述性统计分析

| 变量              | 观测值  | 均值        | 方差     | P25     | P50       | P75     |
|-----------------|------|-----------|--------|---------|-----------|---------|
| <i>IQ_1</i>     | 低效率组 | 0.0806    | 0.0871 | 0.0250  | 0.0542    | 0.1033  |
|                 | 高效率组 | 0.0697    | 0.0765 | 0.0225  | 0.0469    | 0.0889  |
|                 | 差异   | 0.0109*** |        |         | 0.0074*** |         |
| <i>IQ_2</i>     | 低效率组 | 0.0608    | 0.0881 | 0.0165  | 0.0368    | 0.0713  |
|                 | 高效率组 | 0.0490    | 0.0708 | 0.0139  | 0.0329    | 0.0612  |
|                 | 差异   | 0.0118*** |        |         | 0.0039*** |         |
| <i>INVEST_1</i> | 3832 | 0.0823    | 0.1046 | 0.0239  | 0.0532    | 0.0999  |
| <i>INVEST_2</i> | 3832 | 0.0828    | 0.1050 | 0.0239  | 0.0531    | 0.1004  |
| <i>SIZE</i>     | 3832 | 21.3887   | 1.0413 | 20.7211 | 21.3347   | 22.0009 |
| <i>LEV</i>      | 3832 | 0.5486    | 0.2838 | 0.3999  | 0.5354    | 0.6473  |
| <i>ROA</i>      | 3832 | 0.0160    | 0.0725 | 0.0061  | 0.0235    | 0.0469  |
| <i>STATE</i>    | 3832 | 0.6900    | 0.4626 | 0.0000  | 1.0000    | 1.0000  |
| <i>CENTRAL</i>  | 3832 | 0.3815    | 0.1602 | 0.2555  | 0.3572    | 0.5065  |
| <i>BOARD</i>    | 3832 | 0.3448    | 0.0621 | 0.3333  | 0.3333    | 0.3636  |
| <i>DUAL</i>     | 3832 | 0.2745    | 0.4463 | 0.0000  | 0.0000    | 1.0000  |
| <i>GOV</i>      | 3832 | 6.7890    | 3.3025 | 4.1700  | 6.5300    | 10.0800 |
| <i>MANFEE</i>   | 3814 | 0.1688    | 0.6044 | 0.0438  | 0.0750    | 0.1215  |
| <i>FCF</i>      | 3814 | 0.0506    | 0.1471 | 0.0077  | 0.0599    | 0.1211  |
| <i>RECTA</i>    | 3814 | 0.0691    | 0.1330 | 0.0087  | 0.0255    | 0.0667  |

表3 主要变量相关系数表

| 变量              | <i>INVEST_1</i> | <i>IQ_1</i> | <i>IQ_2</i> | <i>SIZE</i> | <i>LEV</i> | <i>ROA</i> | <i>STATE</i> | <i>CENTRAL</i> | <i>BOARD</i> | <i>DUAL</i> |
|-----------------|-----------------|-------------|-------------|-------------|------------|------------|--------------|----------------|--------------|-------------|
| <i>INVEST_1</i> | 1               |             |             |             |            |            |              |                |              |             |
| <i>IQ_1</i>     | 0.153***        | 1           |             |             |            |            |              |                |              |             |
| <i>IQ_2</i>     | 0.128***        | 0.609***    | 1           |             |            |            |              |                |              |             |
| <i>SIZE</i>     | 0.044***        | -0.098***   | -0.229***   | 1           |            |            |              |                |              |             |
| <i>LEV</i>      | 0.035**         | 0.344***    | 0.469***    | -0.152***   | 1          |            |              |                |              |             |
| <i>ROA</i>      | -0.053***       | -0.317***   | -0.495***   | 0.339***    | -0.523***  | 1          |              |                |              |             |
| <i>STATE</i>    | -0.020          | -0.081***   | -0.136***   | 0.257***    | -0.147***  | 0.127***   | 1            |                |              |             |
| <i>CENTRAL</i>  | 0.012           | -0.042***   | -0.080***   | 0.256***    | -0.151***  | 0.198***   | -0.309***    | 1              |              |             |
| <i>BOARD</i>    | 0.016           | 0.017       | -0.014      | -0.077***   | 0          | -0.022     | 0.109***     | -0.084***      | 1            |             |
| <i>DUAL</i>     | 0.010           | 0.020       | 0.019       | -0.024      | -0.001     | -0.026     | 0.011        | -0.036**       | 0.026        | 1           |

本文以修正Jones模型计算的应计质量作为因变量,企业资本投资效率(*INVEST\_1*)作为解释变量进行回归分析,所得结果报告于表4。表4回归(1)、回归(2)、回归(3)、回归(4)和回归(5)分别以过度投资且调高盈余组、过度投资且调低盈余组、投资不足且调高盈余组、投资不足且调低盈余组及全体样本进行回归分析,发现投资效率(*INVEST\_1*)系数一致为正,且仅有回归(4)不显著,其他四组回归均很显著,说明投资效率越低,会计信息质量越低。表5将解释变量换成第二个投资效率指标(*INVEST\_2*),其他条件不变,重新进行上述五组回归,所得结果与上述结论基本保持一致。

表4 企业资本投资效率(*INVEST\_1*)与会计信息质量(*IQ\_1*)—多元回归分析

| 变量                  | (1)                        | (2)                        | (3)                       | (4)                     | (5)                        |
|---------------------|----------------------------|----------------------------|---------------------------|-------------------------|----------------------------|
|                     | 过度投资及<br>调高盈余组             | 过度投资及<br>调低盈余组             | 投资不足及<br>调高盈余组            | 投资不足及<br>调低盈余组          | 全体样本组                      |
|                     | <i>IQ_1</i>                | <i>IQ_1</i>                | <i>IQ_1</i>               | <i>IQ_1</i>             | <i>IQ_1</i>                |
| INTERCEPT           | 0.258***<br>(3.10)         | 0.088<br>(1.24)            | 0.107*<br>(1.74)          | -0.091<br>(-1.57)       | 0.069*<br>(1.76)           |
| <i>INVEST_1</i>     | <b>0.154***<br/>(3.84)</b> | <b>0.088***<br/>(3.50)</b> | <b>0.116**<br/>(2.12)</b> | <b>0.033<br/>(1.11)</b> | <b>0.104***<br/>(5.43)</b> |
| <i>SIZE</i>         | -0.010***<br>(-2.76)       | -0.003<br>(-0.81)          | -0.004<br>(-1.37)         | 0.004<br>(1.64)         | -0.002<br>(-0.94)          |
| <i>LEV</i>          | 0.048**<br>(2.32)          | 0.058***<br>(4.15)         | 0.036***<br>(2.74)        | 0.082***<br>(6.18)      | 0.065***<br>(6.94)         |
| <i>ROA</i>          | 0.550***<br>(4.22)         | -0.341***<br>(-5.77)       | 0.244***<br>(4.06)        | -0.351***<br>(-9.34)    | -0.225***<br>(-7.28)       |
| <i>STATE</i>        | 0.007<br>(0.88)            | 0.004<br>(0.71)            | -0.013**<br>(-2.22)       | -0.003<br>(-0.57)       | -0.004<br>(-1.17)          |
| <i>CENTRAL</i>      | -0.039<br>(-1.61)          | 0.038**<br>(2.21)          | 0.032<br>(1.61)           | 0.029**<br>(2.16)       | 0.031***<br>(3.12)         |
| <i>BOARD</i>        | 0.007<br>(0.14)            | -0.039<br>(-0.52)          | 0.031<br>(0.88)           | 0.029<br>(0.97)         | -0.004<br>(-0.16)          |
| <i>DUAL</i>         | -0.004<br>(-0.55)          | 0.005<br>(0.87)            | 0.003<br>(0.49)           | 0.004<br>(0.82)         | 0.003<br>(0.96)            |
| <i>GOV</i>          | 0.001<br>(0.60)            | 0.001<br>(1.52)            | 0.000<br>(0.28)           | -0.000<br>(-0.15)       | 0.001<br>(1.46)            |
| 行业                  | Yes                        | Yes                        | Yes                       | Yes                     | Yes                        |
| 年度                  | Yes                        | Yes                        | Yes                       | Yes                     | Yes                        |
| adj. R <sup>2</sup> | 0.195                      | 0.219                      | 0.122                     | 0.409                   | 0.198                      |
| N                   | 619                        | 1023                       | 943                       | 1247                    | 3832                       |

注：(1)括号中报告值是T统计量；(2)\*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5,说明多重共线性对结论影响不大。

表5 企业资本投资效率(*INVEST\_2*)与会计信息质量(*IQ\_1*)—多元回归分析

| 变量                  | (1)                              | (2)                              | (3)                             | (4)                           | (5)                              |
|---------------------|----------------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|
|                     | 过度投资及<br>调高盈余组                   | 过度投资及<br>调低盈余组                   | 投资不足及<br>调高盈余组                  | 投资不足及<br>调低盈余组                | 全体样本组                            |
|                     | <i>IQ_1</i>                      | <i>IQ_1</i>                      | <i>IQ_1</i>                     | <i>IQ_1</i>                   | <i>IQ_1</i>                      |
| INTERCEPT           | 0.235***<br>(2.63)               | 0.101<br>(1.41)                  | 0.115*<br>(1.89)                | -0.107*<br>(-1.84)            | 0.068*<br>(1.73)                 |
| <i>INVEST_2</i>     | <b>0.156***</b><br><b>(3.87)</b> | <b>0.094***</b><br><b>(3.75)</b> | <b>0.133**</b><br><b>(2.45)</b> | <b>0.026</b><br><b>(0.88)</b> | <b>0.105***</b><br><b>(5.49)</b> |
| <i>SIZE</i>         | -0.010**<br>(-2.41)              | -0.004<br>(-1.16)                | -0.004<br>(-1.49)               | 0.005*<br>(1.94)              | -0.002<br>(-0.92)                |
| <i>LEV</i>          | 0.052***<br>(2.76)               | 0.058***<br>(3.57)               | 0.034**<br>(2.49)               | 0.081***<br>(6.47)            | 0.065***<br>(6.93)               |
| <i>ROA</i>          | 0.588***<br>(4.65)               | -0.325***<br>(-5.20)             | 0.231***<br>(3.78)              | -0.359***<br>(-10.02)         | -0.225***<br>(-7.30)             |
| <i>STATE</i>        | 0.005<br>(0.62)                  | 0.006<br>(1.17)                  | -0.011*<br>(-1.80)              | -0.005<br>(-1.06)             | -0.004<br>(-1.14)                |
| <i>CENTRAL</i>      | -0.039<br>(-1.60)                | 0.028<br>(1.57)                  | 0.031<br>(1.60)                 | 0.036***<br>(2.71)            | 0.031***<br>(3.14)               |
| <i>BOARD</i>        | 0.000<br>(0.00)                  | -0.034<br>(-0.45)                | 0.033<br>(0.98)                 | 0.028<br>(0.92)               | -0.004<br>(-0.16)                |
| <i>DUAL</i>         | -0.006<br>(-0.74)                | 0.005<br>(0.96)                  | 0.003<br>(0.47)                 | 0.003<br>(0.77)               | 0.003<br>(0.94)                  |
| <i>GOV</i>          | 0.000<br>(0.13)                  | 0.001<br>(1.60)                  | 0.000<br>(0.56)                 | -0.000<br>(-0.27)             | 0.001<br>(1.48)                  |
| 行业                  | Yes                              | Yes                              | Yes                             | Yes                           | Yes                              |
| 年度                  | Yes                              | Yes                              | Yes                             | Yes                           | Yes                              |
| adj. R <sup>2</sup> | 0.205                            | 0.207                            | 0.116                           | 0.415                         | 0.199                            |
| N                   | 606                              | 1000                             | 956                             | 1270                          | 3832                             |

注：(1)括号中报告值是T统计量；(2)\*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

修正 Jones 模型过于关注故意操纵行为，而忽略了非故意操纵的情况，并认为管理者难以通过操纵现金流而进行盈余管理。但是，Dechow and Dichev(2002)认为，盈余操纵可分为故意操纵和非故意操纵，并且现金流量并不一定不能被操纵。因此，他们为了解决这一问题，采用现金流对应计项目的解释力度衡量应计质量，具体计算过程见模型(4)。表6以模型(4)计算的应计质量衡量会计信息质量，对投资效率(*INVEST\_1*)进行回归分析，所得结论一致为：企业资本投资效率越低，会计信息质量越低。表7同样以模型(4)计算的应计质量衡量会计信息质量，对投资效率第二指标(*INVEST\_2*)进行回归分析，所得结论与上述结论基本保持一致。

表6 企业资本投资效率(*INVEST\_1*)与会计信息质量(*IQ\_2*)—多元回归分析

| 变量                  | (1)                             | (2)                           | (3)                              | (4)                            | (5)                              |
|---------------------|---------------------------------|-------------------------------|----------------------------------|--------------------------------|----------------------------------|
|                     | 过度投资及<br>调高盈余组                  | 过度投资及<br>调低盈余组                | 投资不足及<br>调高盈余组                   | 投资不足及<br>调低盈余组                 | 全体样本组                            |
|                     | <i>IQ_2</i>                     | <i>IQ_2</i>                   | <i>IQ_2</i>                      | <i>IQ_2</i>                    | <i>IQ_2</i>                      |
| INTERCEPT           | 0.145***<br>(2.90)              | 0.209***<br>(2.71)            | 0.102***<br>(2.90)               | 0.208**<br>(2.06)              | 0.189***<br>(4.24)               |
| <i>INVEST_1</i>     | <b>0.032**</b><br><b>(2.30)</b> | <b>0.004</b><br><b>(0.30)</b> | <b>0.087***</b><br><b>(3.22)</b> | <b>0.116*</b><br><b>(1.78)</b> | <b>0.074***</b><br><b>(3.90)</b> |
| <i>SIZE</i>         | -0.007***<br>(-2.63)            | -0.011***<br>(-2.77)          | -0.004**<br>(-2.25)              | -0.012**<br>(-2.46)            | -0.009***<br>(-3.80)             |
| <i>LEV</i>          | 0.027<br>(1.32)                 | 0.079***<br>(3.69)            | 0.005<br>(0.52)                  | 0.114***<br>(5.40)             | 0.081***<br>(6.03)               |
| <i>ROA</i>          | 0.786***<br>(8.37)              | -0.700***<br>(-6.86)          | 0.557***<br>(10.62)              | -0.643***<br>(-14.04)          | -0.361***<br>(-8.48)             |
| <i>STATE</i>        | 0.002<br>(0.52)                 | -0.001<br>(-0.17)             | -0.006*<br>(-1.93)               | -0.002<br>(-0.36)              | -0.007***<br>(-2.66)             |
| <i>CENTRAL</i>      | -0.019*<br>(-1.88)              | 0.025<br>(1.24)               | 0.011<br>(1.11)                  | 0.036***<br>(2.68)             | 0.038***<br>(3.97)               |
| <i>BOARD</i>        | 0.006<br>(0.28)                 | -0.034<br>(-0.59)             | -0.018<br>(-0.62)                | -0.015<br>(-0.43)              | -0.047*<br>(-1.84)               |
| <i>DUAL</i>         | -0.003<br>(-1.18)               | 0.003<br>(0.52)               | 0.005<br>(1.62)                  | 0.002<br>(0.48)                | 0.002<br>(0.56)                  |
| <i>GOV</i>          | 0.001<br>(1.41)                 | 0.002**<br>(2.31)             | 0.000<br>(0.70)                  | 0.002*<br>(1.90)               | 0.002***<br>(3.85)               |
| 行业                  | Yes                             | Yes                           | Yes                              | Yes                            | Yes                              |
| 年度                  | Yes                             | Yes                           | Yes                              | Yes                            | Yes                              |
| adj. R <sup>2</sup> | 0.307                           | 0.553                         | 0.286                            | 0.689                          | 0.353                            |
| N                   | 1003                            | 639                           | 1230                             | 960                            | 3832                             |

注：(1)括号中报告值是T统计量；(2)\*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

## 七、内生性分析

在政府干预严重和投资者保护不足的中国资本市场，管理者很可能通过操纵会计信息掩盖其非效率投资行为，而Biddle *et al.*, (2009)指出，提高会计信息质量可抑制管理者的非效率投资行为，也就意味着，企业投资效率影响会计信息质量，会计信息质量又反过来影响企业资本投资效率。所以，企业资本投资效率和会计信息质量之间很可能存在内生性。下面将分别采用滞后项、联立方程模型与工具变量三种方法处理两者之间的内生性问题。



表7 企业资本投资效率(*INVEST\_2*)与会计信息质量(*IQ\_2*)—多元回归分析

| 变量                  | (1)                            | (2)                           | (3)                              | (4)                           | (5)                              |
|---------------------|--------------------------------|-------------------------------|----------------------------------|-------------------------------|----------------------------------|
|                     | 过度投资及<br>调高盈余组<br><i>IQ_2</i>  | 过度投资及<br>调低盈余组<br><i>IQ_2</i> | 投资不足及<br>调高盈余组<br><i>IQ_2</i>    | 投资不足及<br>调低盈余组<br><i>IQ_2</i> | 全体样本组<br><i>IQ_2</i>             |
| INTERCEPT           | 0.157***<br>(3.13)             | 0.254***<br>(2.82)            | 0.091***<br>(2.63)               | 0.185*<br>(1.87)              | 0.188***<br>(4.24)               |
| <i>INVEST_2</i>     | <b>0.028*</b><br><b>(1.96)</b> | <b>0.006</b><br><b>(0.42)</b> | <b>0.096***</b><br><b>(3.88)</b> | <b>0.103</b><br><b>(1.60)</b> | <b>0.073***</b><br><b>(3.83)</b> |
| <i>SIZE</i>         | -0.007***<br>(-2.91)           | -0.013***<br>(-3.04)          | -0.004**<br>(-2.00)              | -0.011**<br>(-2.26)           | -0.008***<br>(-3.79)             |
| <i>LEV</i>          | 0.028<br>(1.53)                | 0.079***<br>(3.23)            | 0.003<br>(0.27)                  | 0.111***<br>(5.45)            | 0.081***<br>(6.03)               |
| <i>ROA</i>          | 0.841***<br>(8.91)             | -0.664***<br>(-6.20)          | 0.524***<br>(10.16)              | -0.663***<br>(-14.77)         | -0.361***<br>(-8.49)             |
| <i>STATE</i>        | 0.002<br>(0.56)                | -0.000<br>(-0.04)             | -0.006*<br>(-1.85)               | -0.002<br>(-0.46)             | -0.007***<br>(-2.64)             |
| <i>CENTRAL</i>      | -0.024**<br>(-2.30)            | 0.021<br>(0.97)               | 0.014<br>(1.47)                  | 0.035***<br>(2.73)            | 0.038***<br>(3.97)               |
| <i>BOARD</i>        | 0.001<br>(0.03)                | -0.031<br>(-0.53)             | -0.012<br>(-0.45)                | -0.015<br>(-0.44)             | -0.047*<br>(-1.83)               |
| <i>DUAL</i>         | -0.003<br>(-0.82)              | 0.001<br>(0.13)               | 0.004<br>(1.37)                  | 0.003<br>(0.57)               | 0.002<br>(0.55)                  |
| <i>GOV</i>          | 0.001<br>(1.55)                | 0.002**<br>(2.36)             | 0.000<br>(0.76)                  | 0.001*<br>(1.85)              | 0.002***<br>(3.85)               |
| 行业                  | Yes                            | Yes                           | Yes                              | Yes                           | Yes                              |
| 年度                  | Yes                            | Yes                           | Yes                              | Yes                           | Yes                              |
| adj. R <sup>2</sup> | 0.319                          | 0.530                         | 0.286                            | 0.692                         | 0.352                            |
| N                   | 988                            | 618                           | 1245                             | 981                           | 3832                             |

注：(1)括号中报告值是T统计量；(2)\*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

### (一)滞后项—前瞻三期应计质量的标准差

本文主要解释变量投资效率是以模型(4)回归的残差作为衡量指标，而因变量会计信息质量分别是以修正Jones模型和DD模型回归的残差作为衡量指标。如此设定的模型存在一个问题，即如果投资模型或应计模型无法正确地分离出正常投资或应计部分，那么两个模型得出的残差，即投资效率及应计质量存在着机械性的相关。<sup>8</sup>并且，某一年的投资效率问题也许并不能立刻影响当年的会计信息质量，很可能需要更长的时间才能影响到会计信息。鉴于上述问题，本文参照Biddle *et al.*(2009)的方法，以公司前瞻三期应计质量的标准差作为会计信息质量的衡量指标。同时，这种会计信息质量的衡量方式，有利于缓解内生性问题对结论的影响。

<sup>8</sup> 感谢审稿人提出的该建议：应计包括了对营运资本的净投资(如应收账款、存货的增加等等)，这些投资与长期资本投资正相关(Bushman *et al.*, 2011)；如果资本投资效率模型或应计模型未能正确地分离出正常投资或正常应计部分，那么两个模型所得的残差，即企业资本投资效率及应计质量就会存在着机械性的相关。

表8的回归(1)、回归(2)和回归(3)分别以过度投资样本、投资不足样本和全体样本为分析对象,以修正 Jones 模型计算的前瞻三期应计质量的标准差( $IQ1\_sd$ )衡量会计信息质量,对投资效率( $INVEST\_1$ )进行回归分析,发现其回归系数显著为正,说明企业资本投资效率越低,会计信息质量越低;回归(4)、回归(5)和回归(6)分别以过度投资样本、投资不足样本和全体样本为分析对象,以 DD 模型计算的前瞻三期应计质量的标准差( $IQ2\_sd$ )衡量会计信息质量,对投资效率( $INVEST\_1$ )进行回归分析,发现其回归系数仍然显著为正,也即说明企业资本投资效率越低,会计信息质量越低。表9以为投资效率第二指标( $INVEST\_2$ )作为自变量,保持其他条件不变,重复表8相应的六组回归分析,所得结果仍然一致表明:企业资本投资效率越低,会计信息质量越低,说明本文的这一结论较为可靠。

同时,由于因变量是前瞻三期的标准差,为了使各自变量在时间上与因变量一致,所以我们将主要解释变量投资效率指标( $INVEST\_1$ 和 $INVEST\_2$ )用前瞻三期的标准差,<sup>9</sup>其他控制变量用前瞻三期的均值,然后进行回归分析;表10报告了该回归结果。结果发现,所得结论与上述结果基本保持一致:企业资本投资效率越低,会计信息质量越低。

## (二)联立方程模型

本文将采用两阶段最小二乘法对联立方程模型(6)进行回归分析,以解决企业资本投资效率与会计信息质量之间存在的内生性问题。按照通行做法,我们应用 Hausman 设定误差法,检验所设定的联立方程模型(6)是否存在联立内生性问题。根据表11的检验结果可知,分别以因变量 $IQ\_1$ 和 $IQ\_2$ 及其对应的自变量 $INVEST\_1$ 或 $INVEST\_2$ 设定的联立方程模型之联立内生性检验参数均显著异于0,说明企业资本投资效率与会计信息质量之间存在内生性问题,也表明采用联立方程模型解决两者之间的内生性具有可行性。

表12报告了联立方程模型(6)实证检验的结果。表12回归(1)和回归(2)的因变量分别是以修正的 Jones 模型和 DD 模型计算的应计质量,自变量是投资效率指标( $INVEST\_1$ ),采用两阶段最小二乘法对联立方程模型(6)进行回归分析,结果发现,投资效率系数显著为正。同时,在联立方程模型的第二个方程中,会计信息质量( $IQ\_1$ 或 $IQ\_2$ )对投资效率的回归系数不再显著。这更加充分地说明了企业资本投资效率越低,会计信息质量越低;表12回归(3)和回归(4)以投资效率第二指标( $INVEST\_2$ )作为自变量,分别以修正的 Jones 模和 DD 模型计算的应计质量作为因变量,重复上述两组回归分析,所得结果与上述结果基本保持一致。因此,在考虑了企业资本投资效率与会计信息质量之间的内生性之后,上述实证结果稳健地说明了在政府干预严重、投资者保护不力的中国现实制度背景下,管理者更可能通过降低会计信息质量,掩盖其非效率投资中的机会主义行为。

<sup>9</sup> 两个投资效率指标都是模型回归的残差,其性质类似于应计质量的残差,所以如因变量一样,两个投资效率指标也以标准差代理。

表 8 企业资本投资效率(*INVEST\_I*)与会计信息质量 — 前瞻三期标准差的检验

| 变量                  | (1)                             | (2)                              | (3)                              | (4)                           | (5)                              | (6)                            |
|---------------------|---------------------------------|----------------------------------|----------------------------------|-------------------------------|----------------------------------|--------------------------------|
|                     | 过度投资组                           | 投资不足组                            | 全体样本组                            | 过度投资组                         | 投资不足组                            | 全体样本组                          |
|                     | <i>IQ1_sd</i>                   | <i>IQ1_sd</i>                    | <i>IQ1_sd</i>                    | <i>IQ2_sd</i>                 | <i>IQ2_sd</i>                    | <i>IQ2_sd</i>                  |
| INTERCEPT           | 0.223***<br>(5.21)              | 0.132***<br>(3.22)               | 0.189***<br>(5.60)               | 0.205***<br>(4.01)            | 0.127***<br>(3.32)               | 0.183***<br>(4.50)             |
| <i>INVEST_I</i>     | <b>0.029**</b><br><b>(2.18)</b> | <b>0.087***</b><br><b>(2.69)</b> | <b>0.040***</b><br><b>(2.91)</b> | <b>0.004</b><br><b>(0.41)</b> | <b>0.071***</b><br><b>(2.80)</b> | <b>0.021*</b><br><b>(1.84)</b> |
| <i>SIZE</i>         | -0.010***<br>(-4.59)            | -0.004**<br>(-2.37)              | -0.007***<br>(-4.57)             | -0.011***<br>(-3.54)          | -0.005***<br>(-2.70)             | -0.008***<br>(-3.69)           |
| <i>LEV</i>          | 0.045***<br>(3.01)              | 0.051***<br>(4.82)               | 0.045***<br>(4.41)               | 0.073***<br>(3.26)            | 0.066***<br>(5.75)               | 0.065***<br>(4.74)             |
| <i>ROA</i>          | -0.019<br>(-0.43)               | -0.030<br>(-1.23)                | -0.044*<br>(-1.68)               | -0.103<br>(-1.44)             | -0.163***<br>(-6.30)             | -0.160***<br>(-4.94)           |
| <i>STATE</i>        | -0.007*<br>(-1.65)              | -0.011***<br>(-3.28)             | -0.010***<br>(-3.40)             | -0.004<br>(-1.35)             | -0.011***<br>(-3.67)             | -0.009***<br>(-3.72)           |
| <i>CENTRAL</i>      | 0.023**<br>(2.19)               | 0.007<br>(0.70)                  | 0.017**<br>(2.02)                | 0.017*<br>(1.88)              | 0.005<br>(0.61)                  | 0.013*<br>(1.90)               |
| <i>BOARD</i>        | 0.012<br>(0.38)                 | -0.004<br>(-0.16)                | -0.000<br>(-0.00)                | 0.002<br>(0.10)               | -0.020<br>(-0.71)                | -0.015<br>(-0.70)              |
| <i>DUAL</i>         | -0.002<br>(-0.63)               | -0.001<br>(-0.24)                | -0.001<br>(-0.43)                | -0.000<br>(-0.11)             | -0.004<br>(-1.39)                | -0.002<br>(-0.89)              |
| <i>GOV</i>          | 0.001**<br>(2.18)               | -0.000<br>(-0.25)                | 0.000<br>(0.96)                  | 0.002***<br>(3.43)            | 0.001<br>(1.09)                  | 0.001***<br>(2.75)             |
| 行业                  | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                            |
| 年度                  | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                            |
| adj. R <sup>2</sup> | 0.212                           | 0.175                            | 0.184                            | 0.350                         | 0.399                            | 0.370                          |
| N                   | 1266                            | 1630                             | 2896                             | 1259                          | 1630                             | 2889                           |

注：(1)括号中报告值是T统计量；(2) \*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

### (三) 工具变量法

工具变量回归是解决内生性问题的常用方法。在模型(7)中，本文以上期资本投资效率作为主要工具变量，并且为了该工具变量的相对有效性，我们还控制上期自由现金流量和其他控制变量，然后进行工具变量回归分析。表13报告了该回归结果。结果发现，过度投资组的回归(1)和回归(3)的投资效率指标系数显著为正，而投资不足组的回归(2)和回归(4)的投资效率指标系数为正，但不显著；这说明在考虑了内生性问题之后，“企业资本投资效率越低，会计信息质量越低”的结论主要在过度投资组中显著成立，而在投资不足组中的这一关系并不显著。

表9 企业资本投资效率(*INVEST\_2*)与会计信息质量——前瞻三期标准差的检验

| 变量              | (1)                             | (2)                              | (3)                              | (4)                           | (5)                              | (6)                             |
|-----------------|---------------------------------|----------------------------------|----------------------------------|-------------------------------|----------------------------------|---------------------------------|
|                 | 过度投资组                           | 投资不足组                            | 全体样本组                            | 过度投资组                         | 投资不足组                            | 全体样本组                           |
|                 | <i>IQ1_sd</i>                   | <i>IQ1_sd</i>                    | <i>IQ1_sd</i>                    | <i>IQ2_sd</i>                 | <i>IQ2_sd</i>                    | <i>IQ2_sd</i>                   |
| INTERCEPT       | 0.225***<br>(5.01)              | 0.122***<br>(3.06)               | 0.188***<br>(5.59)               | 0.219***<br>(4.24)            | 0.117***<br>(3.06)               | 0.182***<br>(4.50)              |
| <i>INVEST_2</i> | <b>0.033**</b><br><b>(2.46)</b> | <b>0.085***</b><br><b>(2.68)</b> | <b>0.042***</b><br><b>(3.07)</b> | <b>0.012</b><br><b>(1.06)</b> | <b>0.066***</b><br><b>(2.68)</b> | <b>0.025**</b><br><b>(2.24)</b> |
| <i>SIZE</i>     | -0.010***<br>(-4.41)            | -0.004**<br>(-2.19)              | -0.007***<br>(-4.55)             | -0.011***<br>(-3.65)          | -0.005**<br>(-2.41)              | -0.008***<br>(-3.69)            |
| <i>LEV</i>      | 0.049***<br>(2.94)              | 0.046***<br>(4.59)               | 0.044***<br>(4.40)               | 0.073***<br>(3.25)            | 0.065***<br>(5.51)               | 0.065***<br>(4.75)              |
| <i>ROA</i>      | -0.009<br>(-0.20)               | -0.038<br>(-1.63)                | -0.044*<br>(-1.68)               | -0.087<br>(-1.23)             | -0.170***<br>(-6.61)             | -0.160***<br>(-4.92)            |
| <i>STATE</i>    | -0.004<br>(-1.14)               | -0.013***<br>(-3.74)             | -0.010***<br>(-3.39)             | -0.003<br>(-0.98)             | -0.012***<br>(-4.00)             | -0.009***<br>(-3.70)            |
| <i>CENTRAL</i>  | 0.019*<br>(1.75)                | 0.010<br>(1.06)                  | 0.017**<br>(2.03)                | 0.016*<br>(1.72)              | 0.006<br>(0.77)                  | 0.013*<br>(1.89)                |
| <i>BOARD</i>    | 0.001<br>(0.03)                 | 0.006<br>(0.23)                  | -0.000<br>(-0.00)                | -0.005<br>(-0.18)             | -0.013<br>(-0.53)                | -0.015<br>(-0.70)               |
| <i>DUAL</i>     | -0.003<br>(-0.90)               | -0.000<br>(-0.04)                | -0.001<br>(-0.44)                | -0.001<br>(-0.22)             | -0.003<br>(-1.26)                | -0.002<br>(-0.90)               |
| <i>GOV</i>      | 0.001**<br>(2.04)               | -0.000<br>(-0.15)                | 0.000<br>(0.97)                  | 0.002***<br>(3.25)            | 0.001<br>(1.29)                  | 0.001***<br>(2.76)              |
| 行业              | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                             |
| 年度              | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                             |
| adj. R2         | 0.227                           | 0.165                            | 0.184                            | 0.356                         | 0.395                            | 0.370                           |
| N               | 1232                            | 1664                             | 2896                             | 1227                          | 1662                             | 2889                            |

注：(1)括号中报告值是T统计量；(2)\*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3)各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

#### (四)企业资本投资效率与会计信息质量：一个补充的解释

企业资本投资效率和会计信息质量都内生于特定的市场环境。为了检验市场环境如何影响企业资本投资效率与会计信息质量之间的关系，本文先按樊纲、王小鲁(2010)的“市场中介组织的发育和法律制度环境”指数将样本分成投资者保护程度高、中和低三组；然后，对“投资者保护程度低且国有企业”组与“投资者保护程度高且非国有企业”组进行比较分析。<sup>10</sup>表14报告了这一分析的实证结果。结果发现，在“投资者保护程度低且国有企业”组中，回归(1)、回归(2)、回归(3)和回归(4)投资效率为正且几乎均十分显著，而“投资者保护程度高且非国有企业”组中回归(5)、回归(6)、回归(7)和回归(8)为正但很不显著，说明了在政府干预严重和投资者法律保护程度低的市场中，更可能呈现“企业资本投资效率越低，会计信息质量越低”的关系。

<sup>10</sup> 分组的理由：国有企业代表政府干预严重，非国有企业代表政府干预相对不严重；樊纲法律制度环境指数高代表投资者保护程度高，樊纲法律制度环境指数低代表投资者保护程度低；同时，为了突出市场环境(政府干预程度与投资者保护程度)对企业资本投资效率与会计信息质量之间关系的影响，我们选择了“投资者保护程度高且非国有企业组”和“投资者保护程度低且国有企业组”进行比较分析。

表 10 企业资本投资效率与会计信息质量 — 前瞻三期标准差的检验 (三期均值)

| 变量                    | (1)           |         | (2)           |         | (3)           |         | (4)           |         |
|-----------------------|---------------|---------|---------------|---------|---------------|---------|---------------|---------|
|                       | <i>IQ1_sd</i> |         | <i>IQ1_sd</i> |         | <i>IQ2_sd</i> |         | <i>IQ2_sd</i> |         |
| Intercept             | 0.131***      | (3.19)  | 0.130***      | (3.20)  | 0.128***      | (4.39)  | 0.128***      | (4.40)  |
| <i>INVEST_1</i> (标准差) | 0.086***      | (4.15)  |               |         | 0.040***      | (3.72)  |               |         |
| <i>INVEST_2</i> (标准差) |               |         | 0.091***      | (4.40)  |               |         | 0.042***      | (3.87)  |
| <i>SIZE</i> (均值)      | -0.005**      | (-2.49) | -0.005**      | (-2.51) | -0.006***     | (-3.76) | -0.006***     | (-3.77) |
| <i>LEV</i> (均值)       | 0.038***      | (3.18)  | 0.039***      | (3.20)  | 0.060***      | (4.06)  | 0.060***      | (4.07)  |
| <i>ROA</i> (均值)       | -0.005        | (-0.10) | -0.004        | (-0.08) | -0.171***     | (-3.22) | -0.171***     | (-3.21) |
| <i>STATE</i> (均值)     | -0.008**      | (-2.27) | -0.008**      | (-2.24) | -0.005**      | (-2.02) | -0.005**      | (-2.00) |
| <i>CENTRAL</i> (均值)   | 0.028***      | (2.77)  | 0.028***      | (2.75)  | 0.016**       | (2.31)  | 0.016**       | (2.31)  |
| <i>BOARD</i> (均值)     | -0.019        | (-0.52) | -0.019        | (-0.53) | -0.003        | (-0.17) | -0.003        | (-0.17) |
| <i>DUAL</i> (均值)      | 0.002         | (0.56)  | 0.002         | (0.56)  | -0.002        | (-1.08) | -0.002        | (-1.09) |
| <i>GOV</i> (均值)       | 0.001         | (1.12)  | 0.001         | (1.15)  | 0.001***      | (3.42)  | 0.001***      | (3.43)  |
| 行业                    | Yes           |         | Yes           |         | Yes           |         | Yes           |         |
| 年度                    | Yes           |         | Yes           |         | Yes           |         | Yes           |         |
| adj. R <sup>2</sup>   | 0.174         |         | 0.176         |         | 0.433         |         | 0.433         |         |
| N                     | 2212          |         | 2212          |         | 2205          |         | 2205          |         |

注：(1) 括号中报告值是T统计量；(2) \*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3) 各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

表 11 联立方程模型联立内生性的 Hausman 检验

| 联立方程模型             | 自变量( <i>INVEST_1</i> ) |       |       | 自变量( <i>INVEST_2</i> ) |       |       |
|--------------------|------------------------|-------|-------|------------------------|-------|-------|
|                    | 内生性                    |       |       | 内生性                    |       |       |
|                    | 检验参数                   | 方差    | T值    | 检验参数                   | 方差    | T值    |
| 因变量( <i>IQ_1</i> ) | -0.949***              | 0.213 | -4.45 | -0.941***              | 0.208 | -4.53 |
| 因变量( <i>IQ_2</i> ) | -1.971***              | 0.405 | -4.87 | -1.897***              | 0.381 | -4.98 |

## 八、研究结论、启示与局限性

根据受托责任观，会计信息通过降低信息不对称而发挥治理作用。但是，会计信息发挥治理作用需要满足一定的前提条件。在政府干预少、投资者保护程度高的市场，会计信息通过发挥治理作用，而抑制企业非效率投资中的机会主义行为；对于一个处于发展初期的新兴资本市场而言，政府干预严重、投资者保护薄弱不但导致会计信息难以发挥治理作用，而且很可能致使管理者以低质量会计信息掩盖其非效率投资中的机会主义行为。在这一逻辑框架下，本文以2004至2007年中国上市公司为分析对象，研究表明，企业资本投资效率越低，会计信息质量越低。而且，考虑到会计信息质量与企业资本投资效率之间的内生性问题，本文分别应用滞后项和联立方程模型的方法处理这一内生性问题，并经过一系列稳健性检验之后，结果仍然表明：企业资本投资效率越低，会计信息质量越低。这说明本文实证结果稳健地

表 12 企业资本投资效率与会计信息质量 — 联立方程模型的检验

| 变量              | (1)             |         | (2)             |         | (3)             |         | (4)             |         |
|-----------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|
| Main (1)        | <i>IQ_1</i>     |         | <i>IQ_2</i>     |         | <i>IQ_1</i>     |         | <i>IQ_2</i>     |         |
| INTERCEPT       | 0.068           | (1.42)  | 0.000           | (0.00)  | 0.057           | (1.20)  | 0.000           | (0.00)  |
| <i>INVEST_1</i> | 1.045***        | (5.50)  | 2.025***        | (6.17)  |                 |         |                 |         |
| <i>INVEST_2</i> |                 |         |                 |         | 1.039***        | (5.58)  | 1.951***        | (6.24)  |
| <i>SIZE</i>     | -0.005**        | (-2.41) | -0.016***       | (-4.10) | -0.005**        | (-2.26) | -0.015***       | (-4.00) |
| <i>LEV</i>      | 0.061***        | (7.37)  | 0.072***        | (5.02)  | 0.059***        | (7.16)  | 0.069***        | (4.95)  |
| <i>ROA</i>      | -0.112***       | (-2.75) | -0.130*         | (-1.85) | -0.117***       | (-2.95) | -0.148**        | (-2.22) |
| <i>STATE</i>    | 0.007           | (1.34)  | 0.015*          | (1.67)  | 0.007           | (1.47)  | 0.015*          | (1.79)  |
| <i>CENTRAL</i>  | 0.011           | (0.78)  | -0.005          | (-0.22) | 0.013           | (0.93)  | -0.000          | (-0.01) |
| <i>BOARD</i>    | -0.006          | (-0.18) | -0.050          | (-0.90) | -0.004          | (-0.14) | -0.047          | (-0.87) |
| <i>DUAL</i>     | 0.001           | (0.31)  | -0.002          | (-0.26) | 0.001           | (0.22)  | -0.003          | (-0.35) |
| <i>GOV</i>      | 0.002**         | (2.57)  | 0.004***        | (3.44)  | 0.002***        | (2.66)  | 0.004***        | (3.58)  |
| 行业              | Yes             |         | Yes             |         | Yes             |         | Yes             |         |
| 年度              | Yes             |         | Yes             |         | Yes             |         | Yes             |         |
| (2)             | <i>INVEST_1</i> |         | <i>INVEST_1</i> |         | <i>INVEST_2</i> |         | <i>INVEST_2</i> |         |
| INTERCEPT       | 0.000           | (0.00)  | -0.016          | (-0.29) | 0.000           | (0.00)  | 0.000           | (0.00)  |
| <i>IQ_1</i>     | 0.158           | (0.04)  |                 |         | 0.363           | (0.09)  |                 |         |
| <i>IQ_2</i>     |                 |         | 0.022           | (0.04)  |                 |         | 0.051           | (0.10)  |
| <i>SIZE</i>     | 0.006           | (1.38)  | 0.006**         | (2.39)  | 0.005           | (1.22)  | 0.006**         | (2.31)  |
| <i>LEV</i>      | -0.018          | (-0.09) | -0.013          | (-0.52) | -0.027          | (-0.13) | -0.014          | (-0.53) |
| <i>ROA</i>      | -0.017          | (-0.03) | -0.031          | (-0.28) | 0.020           | (0.03)  | -0.017          | (-0.16) |
| <i>STATE</i>    | -0.009          | (-0.67) | -0.010**        | (-2.14) | -0.009          | (-0.65) | -0.010**        | (-2.26) |
| <i>CENTRAL</i>  | 0.014           | (0.11)  | 0.018           | (0.88)  | 0.006           | (0.05)  | 0.015           | (0.73)  |
| <i>DUAL</i>     | 0.001           | (0.09)  | 0.002           | (0.47)  | 0.001           | (0.07)  | 0.002           | (0.55)  |
| <i>GOV</i>      | -0.001          | (-0.49) | -0.001          | (-1.07) | -0.001          | (-0.55) | -0.001          | (-1.18) |
| <i>MANFEE</i>   | 0.011           | (0.21)  | 0.017           | (0.90)  | 0.008           | (0.15)  | 0.016           | (0.88)  |
| <i>FCF</i>      | -0.032          | (-0.19) | -0.016          | (-0.92) | -0.025          | (-0.15) | -0.016          | (-0.91) |
| <i>RECTA</i>    | 0.034           | (0.17)  | 0.044           | (0.88)  | 0.026           | (0.13)  | 0.043           | (0.85)  |
| 行业              | Yes             |         | Yes             |         | Yes             |         | Yes             |         |
| 年度              | Yes             |         | Yes             |         | Yes             |         | Yes             |         |
| R <sup>2</sup>  | 0.088           |         | 0.073           |         | 0.074           |         | 0.077           |         |
| N               | 3814            |         | 3814            |         | 3814            |         | 3814            |         |

注：(1) 括号中报告值是 T 统计量；(2) \*、\*\* 和 \*\*\* 分别表示 10%、5% 和 1% 显著性水平。

表 13 企业资本投资效率与会计信息质量 — 工具变量回归

| 变量              | (1)       |         | (2)       |         | (3)       |         | (4)       |         |
|-----------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
|                 | IQ_1      |         | IQ_1      |         | IQ_1      |         | IQ_1      |         |
| INTERCEPT       | 0.202***  | (3.26)  | -0.011    | (-0.21) | 0.195***  | (3.52)  | -0.024    | (-0.45) |
| <i>INVEST_1</i> | 0.396**   | (2.46)  | 0.055     | (0.41)  |           |         |           |         |
| <i>INVEST_2</i> |           |         |           |         | 0.329**   | (2.23)  | 0.094     | (0.68)  |
| <i>SIZE</i>     | -0.009*** | (-2.92) | 0.001     | (0.28)  | -0.009*** | (-2.96) | 0.001     | (0.54)  |
| <i>LEV</i>      | 0.058***  | (6.35)  | 0.070***  | (9.21)  | 0.058***  | (6.49)  | 0.070***  | (9.35)  |
| <i>ROA</i>      | -0.197*** | (-4.17) | -0.259*** | (-6.86) | -0.160*** | (-3.42) | -0.261*** | (-6.94) |
| <i>STATE</i>    | 0.007     | (1.23)  | -0.010**  | (-2.46) | 0.007     | (1.23)  | -0.010**  | (-2.37) |
| <i>CENTRAL</i>  | 0.012     | (0.75)  | 0.049***  | (4.22)  | 0.006     | (0.41)  | 0.052***  | (4.59)  |
| <i>BOARD</i>    | 0.002     | (0.04)  | 0.022     | (0.81)  | -0.008    | (-0.22) | 0.024     | (0.90)  |
| <i>DUAL</i>     | -0.002    | (-0.41) | 0.005     | (1.33)  | -0.001    | (-0.20) | 0.004     | (1.24)  |
| <i>GOV</i>      | 0.002**   | (2.56)  | 0.000     | (0.59)  | 0.002**   | (2.25)  | 0.000     | (0.82)  |
| 行业              | Yes       |         | Yes       |         | Yes       |         | Yes       |         |
| 年度              | Yes       |         | Yes       |         | Yes       |         | Yes       |         |
| F值              | 7.84      |         | 21.36     |         | 7.83      |         | 22.44     |         |
| R <sup>2</sup>  | 0.01      |         | 0.25      |         | 0.08      |         | 0.25      |         |
| N               | 1496      |         | 1958      |         | 1463      |         | 1991      |         |

注：(1) 括号中报告值是T统计量；(2) \*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3) 本表应用Stata软件进行上述工具变量回归(Ivreg)。

验证了本文的理论预期：整体而言，在政府干预严重、投资者保护程度低的中国新兴市场，管理者攫取私人控制权收益和虚假披露会计信息的成本低，致使会计信息难以通过发挥治理作用而抑制管理者在非效率投资中的机会主义行为，反而成为他们掩盖非效率投资中机会主义行为的一种工具，从而导致企业资本投资效率越低，会计信息质量越低。同时，本文在工具变量回归中发现，这一关系在主要存在于过度投资的公司，在投资不足的公司中不明显。

研究结论的启示：其一，政策启示。政府“有形之手”应加强投资者利益保护制度的建设，以严刑峻法严惩各种侵占中小投资者利益的行为；考虑到监管资源的稀缺性和局限性，监管者在制度规范上应给予投资者更多权利，并不断壮大机构投资者力量，以提高投资者的自我保护能力；其二，理论启示。会计问题作为公司治理问题的一个重要分支，同样内生于特定的制度环境。以成熟市场为对象的现有研究理论和经验证据，都与其自身制度背景密切相关，在制度背景相异的市场很可能不成立。因此，本文的研究结论与Biddle, Hilary, and Verdi (2009)的差异再一次说明，对于中国这样具有特殊制度背景的国家，应结合其特殊的制度环境研究本土会计问题，以更深入地理解问题的本质。

表 14 企业资本投资效率与会计信息质量 — 市场环境的影响

| 变量                  | 投资者保护程度低且国有企业组       |                      |                      |                      | 投资者保护程度高且非国有企业组      |                      |                      |                      |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                     | (1)<br><i>IQ_1</i>   | (2)<br><i>IQ_1</i>   | (3)<br><i>IQ_2</i>   | (4)<br><i>IQ_2</i>   | (5)<br><i>IQ_1</i>   | (6)<br><i>IQ_1</i>   | (7)<br><i>IQ_2</i>   | (8)<br><i>IQ_2</i>   |
| INTERCEPT           | -0.039<br>(-0.47)    | -0.039<br>(-0.48)    | 0.084<br>(1.38)      | 0.083<br>(1.37)      | 0.347***<br>(3.52)   | 0.345***<br>(3.50)   | 0.555***<br>(3.99)   | 0.553***<br>(3.96)   |
| <i>INVEST_1</i>     | 0.126***<br>(2.97)   |                      | 0.041*<br>(1.75)     |                      | 0.025<br>(0.68)      |                      | 0.062<br>(1.25)      |                      |
| <i>INVEST_2</i>     |                      | 0.123***<br>(2.90)   |                      | 0.038<br>(1.62)      |                      | 0.027<br>(0.76)      |                      | 0.056<br>(1.15)      |
| <i>SIZE</i>         | 0.002<br>(0.66)      | 0.002<br>(0.67)      | -0.002<br>(-0.85)    | -0.002<br>(-0.83)    | -0.016***<br>(-4.01) | -0.016***<br>(-4.00) | -0.025***<br>(-4.33) | -0.025***<br>(-4.30) |
| <i>LEV</i>          | 0.028**<br>(2.44)    | 0.027**<br>(2.38)    | 0.031***<br>(2.79)   | 0.031***<br>(2.78)   | 0.097***<br>(4.88)   | 0.097***<br>(4.88)   | 0.124***<br>(5.27)   | 0.124***<br>(5.28)   |
| <i>ROA</i>          | -0.202***<br>(-4.16) | -0.203***<br>(-4.16) | -0.310***<br>(-5.43) | -0.310***<br>(-5.44) | -0.283***<br>(-3.31) | -0.283***<br>(-3.32) | -0.646***<br>(-3.75) | -0.647***<br>(-3.76) |
| <i>CENTRAL</i>      | 0.053***<br>(2.71)   | 0.053***<br>(2.71)   | 0.041**<br>(2.47)    | 0.042**<br>(2.47)    | -0.026<br>(-0.86)    | -0.026<br>(-0.86)    | -0.003<br>(-0.08)    | -0.003<br>(-0.08)    |
| <i>BOARD</i>        | -0.002<br>(-0.06)    | -0.002<br>(-0.06)    | -0.080<br>(-1.53)    | -0.080<br>(-1.53)    | 0.028<br>(0.47)      | 0.028<br>(0.47)      | -0.133**<br>(-2.01)  | -0.134**<br>(-2.02)  |
| <i>DUAL</i>         | -0.007<br>(-1.25)    | -0.007<br>(-1.25)    | -0.001<br>(-0.27)    | -0.001<br>(-0.27)    | 0.006<br>(0.69)      | 0.006<br>(0.70)      | 0.004<br>(0.32)      | 0.004<br>(0.33)      |
| <i>GOV</i>          | -0.001<br>(-1.04)    | -0.001<br>(-1.01)    | -0.003**<br>(-2.32)  | -0.003**<br>(-2.31)  | 0.001<br>(0.34)      | 0.001<br>(0.34)      | 0.001<br>(0.21)      | 0.001<br>(0.22)      |
| 行业                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  |
| 年度                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  | Yes                  |
| adj. R <sup>2</sup> | 0.124                | 0.123                | 0.285                | 0.284                | 0.386                | 0.386                | 0.519                | 0.518                |
| N                   | 916                  | 916                  | 916                  | 916                  | 429                  | 429                  | 429                  | 429                  |

注：(1) 括号中报告值是T统计量；(2) \*、\*\*和\*\*\*分别表示10%、5%和1%显著性水平；(3) 各模型及其各变量方差膨胀因子(VIF)都小于5，说明多重共线性对结论影响不大。

本研究的局限性：其一，内生性问题。如何解决企业资本投资效率与会计信息质量之间的内生性问题是本文面临的挑战。虽然我们已尝试应用滞后项、联立方程模型和工具变量三种方法解决这一问题，并得到了预期的结果，但在工具变量的选取方面也许仍然存在一定的局限性。<sup>11</sup>对于这一点，有待后续研究做进一步的努力；其二，虽然本文结合中国特殊的制度背景，从理论上分析了公司的非效率投资程度如何影响了会计信息质量，并且在实证上也从多个角度、应用多种方法展开了具体的分析，但由于内生性问题的解决仍然存在一定的不足。所以，本文结论只能说明

<sup>11</sup> 虽然我们可以推断滞后一期的公司资本投资效率(工具变量)与当期公司资本投资效率密切相关，但是我们难以说明其与模型残差无关。



在中国这样的新兴市场，政府干预严重，投资者保护不足，企业资本投资效率与会计信息质量之间的关系，更可能或主要呈现出“企业资本投资效率越低，会计信息质量越低”的关系，即管理者通过提供低质量的会计信息掩盖其非效率投资的机会主义行为，而不是否定“高质量的会计信息有助于通过降低管理者的道德风险，而提高公司资本投资效率”；当然，更不是试图否定会计信息在中国资本市场的作用，<sup>12</sup>而是旨在说明，市场环境的完善对提高会计信息质量和资源配置效率的重要意义。

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<sup>12</sup> 会计信息的功能可分为降低事前的逆向选择(信号作用)和事后的道德风险(监督作用)两大功能(Scott, 2006)，以目前中国资本市场的制度环境，会计信息也许主要发挥信号作用。

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## Capital Investment Efficiency and Accounting Information Quality<sup>1</sup>

Zhi Jin and Xue Yang<sup>2</sup>

### Abstract

According to the perspective of traditional trusteeship, accounting information can restrain inefficient capital investment activities by mitigating the agency problems. However, a governance mechanism must be based on certain institutional premises for this to take effect. The authors believe that in Chinese listed companies, in which there is severe government intervention and weak shareholder protection, managers can hide inefficient capital investment activities by manipulating accounting information. Using a sample of Chinese listed companies from 2004 to 2007, this study finds that the lower the capital investment efficiency, the worse the quality of accounting information. Moreover, this study employs the simultaneous equations model method, the instrument variable, and the lagged item to process the endogeneity problem, and finds the same results. This study enriches the literature on accounting governance and reveals that managers cover up their inefficient opportunistic capital investment behaviour by manipulating accounting information and that the phenomenon primarily exists in overinvestment firms. It has some important implications, including the need to strengthen the accounting regulation system and improve the education of investors in the Chinese capital market.

**Keywords:** Overinvestment, Underinvestment, Accounting Information Quality, Private Benefits of Control

**CLC codes:** F230, F275

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<sup>2</sup> Zhi Jin, corresponding author, School of Accountancy, Southwestern University of Finance and Economics, Email: 09001-jz@163.com. Xue Yang, School of Finance, Guangdong University of Foreign Studies, Email: yx0900206@163.com.

## I Introduction

According to the neo-classical framework, managers (1) invest in projects of positive net present value but give up investing in projects of negative net present value and (2) stop investing in a project when its marginal benefit equals the marginal cost of the firm's investment (Biddle, Hilary, and Verdi, 2009). Therefore, in a perfect market, a firm's investment decisions only depend on the sign of net present value and are not related to other factors. However, markets in the real world are far from perfect; the agency problems between managers and investors often lead to over-or under-investment by managers, and so the value of firms is impaired when their investments deviate from the optimum level. According to the perspective of traditional trusteeship, accounting information can monitor managers' opportunistic behaviour to mitigate the agency problems and to reduce the level of inefficient investment, be this in the form of overinvestment or underinvestment. Biddle, Hilary, and Verdi (2009) show that accounting information can reduce the level of firms' over-or under-investment in developed capital markets so as to optimise their investment level. However, whether the positive or the negative effect prevails depends on the circumstances, and there is no exception to this rule when accounting information is concerned. Accounting information plays the governance role in some situations, but in other situations, it may also help managers to cover up their misconduct in invading shareholders' interests. In a developed capital market, the government protects shareholders' interests well and seldom intervenes in the operations of firms, providing the basic premise for accounting information to play the governance role. However, the question is whether in the Chinese emerging capital market where government intervention is severe and investor protection is weak, accounting information will play a governance role or just be a tool for covering up the opportunistic behavior of management. Based on the given institutional background, this paper answers the question by investigating the relation between the efficiency of capital investment and the quality of accounting information.

First, on the basis of the existing literature, this paper analyses the institutional premise for accounting information to play a governance role. According to the analytical framework of Ball, Kothari, and Robin (2000) and Ball, Robin, and Wu (2003), severe government intervention and weak shareholder protection jointly contribute to the "stakeholder" model, in which the ways to lessen the information asymmetry between insiders and outsiders are through social connections and private communications, and so there is a lower demand for high quality public financial reporting. On the contrary, low government intervention and strong shareholder protection jointly contribute to the "shareholder" model, in which the way to lessen the information asymmetry between insiders and outsiders is through public disclosure, and so there is a strong demand for accounting information to play the governance role. Therefore, low government intervention and strong shareholder protection are collectively the institutional premise for accounting information to play the governance role in inhibiting inefficient investment

activities. However, we believe that the institutions in China's emerging capital market are very different from those in a developed market. On the one hand, there is severe government intervention in the operations of firms in China's transitional economy; on the other hand, as an emerging market, the regulatory system, the efficiency of law enforcement, and shareholder protection are weak in China (Allen *et al.*, 2005). Therefore, we consider that the Chinese institutional background makes it hard to meet the premise for accounting information to play the governance role, and so it is difficult to use accounting information to reduce inefficient investments. Finally, based on the special Chinese institutional background, our theoretical analysis shows that managers have enough incentives to provide accounting information of lower quality to cover up their opportunistic behaviour in their inefficient investment activities; in other words, the more inefficient the capital investment, the lower the quality of accounting information.

Using a sample of Chinese public companies from 2004 to 2007, this study investigates how capital investment efficiency affects the quality of accounting information. The results show that the lower the capital investment efficiency, the worse the quality of accounting information. Given the endogeneity problem between capital investment efficiency and accounting information quality, this study employs the lagged item and simultaneous equation model to deal with this endogeneity problem and finds the same results, which imply that it is difficult for accounting information to play the governance role within an institutional environment of severe government intervention and weak shareholder protection; rather, it is used as a tool for covering up managers' opportunistic behaviour. Moreover, the result of the instrument variable regression is more significant in overinvestment firms than in underinvestment firms.

The major contributions of this study are as follows. First, as the traditional trusteeship perspective prevails, existing researchers mainly focus on the governance role of accounting information but do not give due attention to the question of how managers hide their opportunistic behaviour in their inefficient investments activities by providing low-quality accounting information. Given the Chinese institutional background and according to the private control theory, this paper investigates how managers in Chinese listed firms hide inefficient investments by manipulating accounting information, providing support for the importance of strengthening accounting regulation in the capital market, and in so doing, makes an important theoretical contribution to the literature, such as those made by Hung (2001) and Leuz, Nanda, and Wysocki (2003). Second, this paper investigates the relation between firms' capital investment efficiency and the quality of accounting information from a new angle that is different from Biddle, Hilary, and Verdi (2009), thus helping to further our understanding of the relation between them. This betterment can improve not only the accounting governance of firms but also the efficiency of resource allocation. Moreover, considering the endogeneity problem between capital investment efficiency and accounting information quality, this study employs the lagged item, simultaneous equation model, and the instrument variable to

deal with this problem, which makes the empirical results more robust.

The remainder of the paper is organised as follows: Section II discusses the existing literature related to the subject of this paper; Section III describes the analysis of the institutional background and related theory; Section IV presents the research method and empirical models; Section V provides the sample selection and analyses of the descriptive statistics of the variables; Section VI presents the main empirical tests and results; Section VII provides additional analyses; and Section VIII concludes the paper.

## II Review of Related Literature

Verrecchia (2001), Healy, and Palepu (2001), and Bushman, Piotroski, and Smith (2006) argue that higher quality accounting information should increase firms' capital investment efficiency, but they do not show how accounting information improves firms' capital investment efficiency either by reducing overinvestment, improving underinvestment, or both. Based on these studies, Biddle, Hilary, and Verdi (2009) propose that firms' capital investment efficiency is mainly determined by the agency problem (including adverse selection and moral hazards), and their empirical results find that higher quality accounting information can better reduce overinvestment or underinvestment by mitigating the adverse selection and moral hazard problems. Following the theoretical basis of Biddle, Hilary, and Verdi (2009), Li (2009) finds that higher quality accounting information can better reduce the information asymmetry, thus lowering the financing cost, by which the capital investment efficiency in Chinese listed companies can be increased. Zhou (2009) also finds a similar result in Chinese listed companies.

Each governance mechanism must be based on the necessary premise in order to take effect, and accounting information is no exception to this rule. This paper considers that rare government intervention and strong shareholder protection are jointly the premise for accounting information taking a governance role.<sup>3</sup> According to Biddle, Hilary, and Verdi (2009), accounting information can play the governance role in a developed capital market that satisfies the basic premise. But it is difficult for accounting information to play the governance role in an emerging capital market, and thus a different result is found because the premise cannot be satisfied. Hung (2001) proposes that accrual accounting provides better matching between revenues and expenses than cash accounting and therefore produces more value-relevant accounting information. However, it is very likely that in a capital market with weak shareholder protection, accounting information is manipulated by managers to maximise self-interest and thus has become a tool to cover up management's opportunistic behaviour. Leuz, Nanda, and Wysocki (2003) also present the same argument. Therefore, the above research concludes

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<sup>3</sup> This precondition is detailed in Section III.

that when the basic premise cannot be satisfied, not only is it difficult for accounting information to play a governance role, but also it is more likely to become a tool for management to cover up their opportunistic behaviour.

In sum, depending on the particular situation, accounting information either plays a governance role or is just a tool for covering up management's opportunistic behaviour. As an emerging capital market in a transitional economy, the Chinese capital market has certain institutional features that are very different from those in a developed capital market, namely severe government intervention and weak shareholder protection (Xia and Fang, 2005). In theory, with these institutional features, it is hard to satisfy the premise for accounting information to play a governance role; rather, these features probably lead to accounting information becoming a tool used by management to grab benefits of control rights through opportunistic behaviour. Furthermore, overinvestment (Murphy, 1985; Jensen, 1986) and underinvestment (John and Nachman, 1985; Bertrand and Mullainathan, 2003) are the two main ways used by managers to invade shareholders' interests. Given the special institutional background of the Chinese capital market, this paper investigates the relation between the efficiency of capital investment and the quality of accounting information based on the theory about the private yield of control rights.

### **III System Background and Theoretical Analysis**

As mentioned in the literature review, on the one hand, accounting information can play a governance role by reducing the agency cost through strengthening the monitoring function of shareholders, but on the other hand, it can become a tool of management in their pursuit of their private benefit of control by covering up their opportunistic behaviour. Therefore, the analytical framework of this paper is as follows: First, from the two perspectives of demand and supply, we analyse the premise for accounting information to play a governance role; second, we analyse whether the given Chinese institutional environment satisfies the premise; and lastly, based on the special institutional environment of the Chinese capital market, we investigate the relation between the efficiency of capital investment and the quality of accounting information according to the theory about the private yield of control rights.

#### **1. The institutional premise of accounting governance**

Financial markets with stronger shareholder protection can create more external financing opportunities and more diversified ownership. In such capital markets, the agency problems caused by the information asymmetry between managers and outsider investors should be more severe, and so in order to reduce the information asymmetry and agency cost, there is a greater need for accounting information to play a governance role (Francis *et al.*, 2003). Based on the theory of law and finance, Ball, Kothari, and Robin (2000) and Ball, Robin, and Wu (2003) propose that the market-oriented distribution of



resources, low government intervention, and strong shareholder protection in common law countries jointly contribute to the “shareholder” model and directly cause information asymmetry to be more efficiently resolved through public disclosure. In such capital markets, accounting information is the most important information for investors and so it is more necessary for accounting information to play a governance role. However, in code law countries, the distribution of resources is planning oriented and the government intervenes severely in the operations of firms. In addition, in capital markets, the government enacts and enforces the rules. Politicisation leads to a “stakeholder” model of corporate governance in which information asymmetry is more likely to be resolved by “insider” communications with stakeholders or social connections, and so there is a lower demand for public accounting information. Therefore, on the demand side, in a capital market with less government intervention and stronger shareholder protection, the need for accounting information to play a governance role is higher, and vice versa. On the supply side, in a capital market with effective shareholder protection, shareholders can punish managers, through lawsuits or the stock market, for their misconduct in invading the interests of minority shareholders as long as they can discover the managers’ opportunistic behaviour; whereas in a capital market with weak shareholder protection, even though shareholders discover managers’ misconduct in invading the interests of minority shareholders through the accounting information, it is hard for them to punish managers due to the high litigation costs, and thus it is difficult for accounting information to play a governance role. Therefore, the analysis based on the demand and supply sides suggests that, together, less government intervention and strong shareholder protection form the basic institutional premise for accounting information to play a governance role.

## **2. The institutional condition for accounting governance: An analysis based on the Chinese institutional environment**

(1) Severe government intervention. During the planned economy period, the Chinese government controlled and allocated economic resources through administrative orders. The government did not simply intervene in the operations of domestic firms, it more or less directly controlled them. Marketisation reform in China has been running for more than 30 years, ever since the Third Plenary Session of the 11th Central Committee of the Communist Party of China in 1978, turning the Chinese economy from a planning-oriented economy into a market-oriented economy. However, central or local government intervention still has a severe impact on the operations of firms. The reasons for this are as follows. Since 1978, fiscal decentralisation reform, which reinforces the budget constraints on different levels of governments, has strengthened the motivation of governments at all levels to improve their economic efficiency and stimulated competition among different regional governments. For local governments, listed companies are an important tool for coping with this competition (Li *et al.*, 2005). Local governments need

listed companies to develop the local economies, increase employment and tax revenue, and maintain social stability. These objectives can improve the political achievements and the prospects of local governments and their officials (Xia and Fang, 2005). As for private enterprises, they must establish political connections with local governments through all possible channels in a government-oriented economy (Luo *et al.*, 2009), which suggests that severe government intervention also occurs in private enterprises. Thus, severe government intervention is an important institutional feature in China.

(2) Weak shareholder protection. Since the establishment of the stock market in China in 1991, there have been a number of accounting irregularity cases, such as the cases of Hainan Minyuan Modern Agricultural Development, Guangxia (Yinchuan) Industry, and Chengdu Hongguang Industrial. Cases of controlling shareholders infringing the interests of minority shareholders are often found in the Chinese stock markets. An important reason for this phenomenon is that shareholder protection from the Chinese legal system is weak (Xia and Fang, 2005). The government of China promulgated the *Securities Law* in 1998, but this law has not improved shareholder protection due to its inefficient implementation. First, most listed state-owned enterprises (SOEs) inherently have political connections with the government. The China Securities Regulatory Commission (CSRC) is directly subordinate to the State Council. Both SOEs and the CSRC are subordinate to governmental bodies, and so it is hard for the CSRC to fairly penalise listed SOEs (Liu, 2003). Second, private companies acquire political connections with the government through all possible channels so as to get political protection. From the perspective of the manager market, the managers of SOEs are appointed by higher administrative authorities and the managers of private companies owe their appointment to their social connections, such as family ties and friends; neither type of appointment is the result of market competition. The ineffective managerial labour market makes dismissing incompetent managers unfeasible. There is only one dominant shareholder in most of China's listed companies, and so it is hard to restrain the misconduct of managers through the market for corporate control. In addition, there is no provision for class action in China, and civil compensation is still not effectively implemented. The above factors jointly contribute to the weak shareholder protection in the Chinese capital market.

### **3. Capital investment efficiency and the quality of accounting information: An analysis based on the system in China**

Using a sample from a developed capital market, Biddle, Hilary, and Verdi (2009) show that improving the quality of accounting information can enhance capital investment efficiency. They can reach this conclusion mainly because the object of their investigation operates under a system of low government intervention and strong shareholder protection. However, as previously stated in the analysis of institutional background, the Chinese capital market operates under a system of severe government

intervention and weak shareholder protection, and so the premise for accounting information to play an effective role in the operations of firms cannot be satisfied. Moreover, according to Hung (2001) and Leuz, Nanda, and Wysocki (2003), in such a system, managers have more incentive to manipulate accounting data to hide their opportunistic behaviour of invading the interests of minority shareholders. How then does capital investment efficiency affect the quality of accounting information in the capital market of China? Given the institutional features of China, this paper will analyse the nature of the relationship between capital investment efficiency and accounting information quality from the two perspectives of overinvestment and underinvestment using the private control theory.

Murphy (1985) and Jensen (1986) propose that managers can control more resources and acquire more private benefits by expanding the enterprise scale, and so they usually have more incentive to establish an enterprise empire through overinvestment. The private benefits of managers include not only more payments, more perquisite consumption, better reputation, and human capital but also the further enhancement of their status within their companies (Shleifer and Vishny, 1989). To this end, managers seeking to maximise their personal welfare tend to make investments that are not in the best interests of shareholders (Jensen and Meckling, 1976; Biddle *et al.*, 2009). They invest in projects of negative net present value in order to grab more private interests of control rights, and this impairs firm value and investors' benefits.

Another form of inefficient investment is underinvestment. Managers need to take on more responsibility and even learn relevant knowledge to improve their own managerial ability when they invest in new projects or update existing projects. Moreover, all types of investment involve risk; a new investment project may result in a firm suffering a loss. New investments may reduce the happiness of managers' lives and may even lead to managers having to bear the cost of the failure of investments (Bertrand and Mullainathan, 2003; Xin, 2007). Therefore, new investments increase managers' private costs, and so they will give up some projects of positive net present value and maximise their own private interests by means of perquisite consumption and tunnelling at the expense of the shareholders' interests (John and Nachman, 1985).

Based on the above analysis, over-or under-investment is very likely to imply that managers are invading the interests of shareholders. In theory, all economic activities of firms will be directly or indirectly reflected in their accounting information. As a vital determinant of firm value, investment undoubtedly affects the generation of accounting information. Over-or under-investment contributes to a decrease in earnings, imbalance of asset structure, and cash flow deterioration in the financial reports. The more inefficient the investment, the worse the situation, and so managers provide worse manipulated accounting data to cover up their misconduct, thus lowering the quality of accounting information. The reasons for the above situation are as follows. First, if the financial reports actually disclose the awful situation of a firm, investors and creditors will lose

confidence in the firm and this will increase the firm's financing costs. Second, this will impair the reputation and economic interests of managers, such as remuneration, bonus, perquisite consumption, and other aspects of their welfare. Therefore, managers have sufficient incentives to manipulate accounting data to effect a cover-up.<sup>4</sup> Of course, managers have to bear the costs and risks of manipulating accounting data, but they almost ignore these costs and risks because in a transitional emerging market, the legal system is inefficient and shareholder protection is weak.<sup>5</sup>

Another explanation for the above situation is based on the signal theory. According to La Porta *et al.* (1998), in a capital market with weak shareholder protection, the accounting system, rather than the weak institutional system, protects shareholders' interests, and this makes higher quality accounting information more important to shareholders. Therefore, managers have enough incentive to send signals to the market by improving the accounting information in order to distinguish their firms from bad firms with severe agency problems and to lower their firms' cost of capital. According to Spence's (1973) argument, the success of signal sending is related to the cost of sending the signal. The more severe the agency problems are in a firm, the higher its cost of signal sending through high-quality financial reporting.<sup>6</sup> Therefore, based on the above analysis, we believe that the more severe the inefficient investment caused by agency problems is, managers are faced with the higher cost of signal sending through high-quality financial reporting to differentiate their firms from worse companies, and thus are more likely to lower the quality of accounting information.

In the transition to the socialist market economic system, the governments of China have severely intervened in the operations of firms. In such an emerging capital market, regulation, law enforcement, and investment protection are weak. Together, these institutional features make it difficult for accounting information to act as a restraint on managers' misconduct in the form of inefficient investments; they even cause a

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<sup>4</sup> Whether judged by their development since they were founded or rated by the present market scale, Chinese stock markets are still at an emerging stage. Wang *et al.* (2009) point out that private investors in the Chinese stock markets are lacking in professional stock investment skills and do not know the right investment philosophy. In addition, compared to institutional investors in developed markets, the scale of institutional investors in the Chinese capital market is still small and their speculative behaviour is severe. Zhao and Wang (1999) and Ma and Liu (2004) state that there are some obvious functional fixation phenomena in Chinese stock markets. To a great extent, the above reasons indicate that the majority of Chinese investors are immature. The immaturity of investors reduces the managers' cost of providing low-quality accounting information and gives managers' more incentive to provide low-quality accounting information to cover up their inefficient investments.

<sup>5</sup> Lax regulation and the low efficiency of law enforcement jointly result in the low cost of providing false accounting information. Although the CSRC is increasingly strengthening its supervision teams, it still cannot catch up with the growth of the capital market. There are thousands of cases of illegalities every year, but only dozens of cases are punished, and so the scarcity of regulatory resources contributes to lax regulation and the low efficiency of law enforcement. In addition, from the above analysis of the system background, the political connections between listed firms and local governments have a bad influence on law enforcement, which lowers the efficiency of accounting regulation. Therefore, the above reasons make the cost of providing lower quality accounting information very low.

<sup>6</sup> Higher quality financial reports are more likely to reveal negative information about firms and managers, thus making the market lose confidence in both the firms and the managers, and the managers have to pay the cost.

higher degree of inefficient investment in these firms. Managers disclose lower quality accounting information to cover up their misconduct. Therefore, this paper proposes the following hypothesis:

**Hypothesis: *Ceteris paribus*, the lower the capital investment, the worse the quality of accounting information.**

## IV Research Design

The research design is as follows. First, we use over-or under-investment, estimated using Richardson's (2006) model, as a proxy for capital investment efficiency. Second, we use accrual quality estimated by the modified model of Jones (1995) as a proxy for accounting information quality and accrual quality estimated by the Dechow and Dichev (2002) model as the alternative proxy for accounting information quality in the robustness test. Finally, we construct a regression model in which the dependent variable is accounting information quality and the main independent variable is capital investment efficiency; some of the control variables are also selected into the regression model. Then, we use this model to investigate the relation between capital investment efficiency and accounting information quality. In consideration of the influence of endogeneity, we separately employ the lagged item, simultaneous equation model, and the instrumental variable to deal with this influence.

### 1. The measure of overinvestment or underinvestment

Referring to the method of estimating capital investment efficiency in Richardson (2006), we use Model (1) to estimate capital investment efficiency. A higher positive estimated residual means that overinvestment is more severe; a lower negative estimated residual means that underinvestment is more severe. Both overinvestment and underinvestment are forms of inefficient investment, and so we use the absolute value of the estimated residual of Model (1) as a proxy for investment efficiency. We divide the sample into the overinvestment group and the underinvestment group. In Model (1),  $GROWTH_{t-1}$  is the growth rate of sales or Tobin's Q in year  $t-1$ ;  $LEV_{t-1}$  is debt-to-total assets ratio at the end of year  $t-1$ ;  $CASH_{t-1}$  is the sum of monetary capital and trading financial assets or short term investments in year  $t-1$ ;  $AGE_{t-1}$  is the logarithm of the number of years the firm has been listed on the stock exchange as of the start of the year;  $SIZE_{t-1}$  is the natural logarithm of total assets in year  $t-1$ ;  $RET_{t-1}$  is the cumulative market-adjusted return of the firm from May at year  $t-2$  to the end of April at next year  $t-1$ ; and  $INV_t$  or  $INV_{t-1}$  is capital investment expenditure in year  $t$  or  $t-1$ . The year indicator is a vector of indicator variables to capture annual fixed effects, and the industry indicator is a vector of indicator variables to capture industry fixed effects.

$$INV_t = a_0 + a_1GROWTH_{t-1} + a_2LEV_{t-1} + a_3CASH_{t-1} + a_4AGE_{t-1} + a_5SIZE_{t-1} + a_6RET_{t-1} + a_7INV_{t-1} + \sum IND + \sum YEAR + \varepsilon_t \quad (1)$$

## 2. The measure of accounting information quality

Referring to the method of estimating discretionary accruals in Dechow, Sloan, and Sweeney (1995), we jointly use Models (2) and (3) to estimate discretionary accruals. We use the absolute accruals estimated by the modified Jones model as a proxy for accounting information quality. First, we regress Model (2) to estimate the coefficients of its variables with industry fixed effects in per sample year, and then we put the coefficients into Model (3) and compute the absolute value of the model residual to act as the discretionary accruals. A higher absolute value ( $|DA_{i,t}|$ ) means that the accounting information quality is worse.  $TA$  means the difference between the operating income and cash flow from operating activities;  $ASSET$  equals the total assets of the company at the end of the previous period;  $\Delta REV$  means the difference between the sales from the company's major operating activities of the current period and those of the previous period;  $\Delta REC$  equals the difference between the accounts receivable of the company at the end of the current period and those at the end of the previous period; and  $PPE$  means the value of the fixed assets, such as property, plant, and equipment of the company, at the end of the current period.

$$\frac{TA_{i,t}}{ASSET_{i,t-1}} = \alpha_1 \frac{1}{ASSET_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{ASSET_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{ASSET_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

$$DA_{i,t} = \frac{TA_{i,t}}{ASSET_{i,t-1}} - (\hat{\alpha}_1 \frac{1}{ASSET_{i,t-1}} + \hat{\alpha}_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{ASSET_{i,t-1}} + \hat{\alpha}_3 \frac{PPE_{i,t}}{ASSET_{i,t-1}}) \quad (3)$$

Furthermore, we adopt the Dechow and Dichev (2002) model modified by Wang (2006) to estimate abnormal accruals in Model (4). The absolute value of the residuals ( $IQ\_2$ ) from Model (4) is the proxy for accounting information quality.

$$ACC_t = \alpha_0 + \alpha_1 CF_{i,t} + \alpha_2 CF_{i,t-1} + \alpha_3 CF_{i,t+1} + \alpha_4 DCF_{i,t} + \alpha_5 DCF_t * CF_{i,t+1} + \varepsilon_{i,t} \quad (4)$$

where:

$ACC_t$  = total accruals at  $t$ , scaled by average total assets at  $t$  (total accruals are earnings before extraordinary items minus operating cash flows);

$CF_t$  = operating cash flows at  $t$ , scaled by average total assets at  $t$ ;

$CF_{t-1}$  = operating cash flows at  $t-1$ , scaled by average total assets at  $t$ ;

$CF_{t+1}$  = operating cash flows at  $t+1$ , scaled by average total assets at  $t$ ;

$DCF_t = 1$  if the change in cash flows at  $t$  is less than zero ( $CF_t - CF_{t-1} < 0$ ), and 0 otherwise;

$\varepsilon_t$  = error term.

### 3. The empirical model

We regress Model (5) using the ordinary least squares (OLS) method, in which the dependent variable is accounting information quality ( $IQ$ ): the larger the  $IQ$ , the worse the accounting information quality. The main independent variable is capital investment efficiency ( $INVEST$ ): the larger the  $INVEST$ , the worse the capital investment efficiency. Meanwhile, some control variables are selected into the regression model, and so we expect  $\alpha_1$  is significantly positive.

$$IQ_{i,t} = \alpha_0 + \alpha_1 INVEST_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 STATE_{i,t} + \alpha_6 CENTRAL_{i,t} + \alpha_7 BOARD_{i,t} + \alpha_8 DUAL_{i,t} + \alpha_9 GOV_{i,t} + YEAR_t + IND_j + e_{i,t} \quad (5)$$

Control variables. According to the extant literature, firm characteristics and corporate governance could affect the quality of accounting information, and so we control for the determinants in the regression model. These determinants are as follows:

(1) Firm characteristics. These include firm scale ( $SIZE$ ), financial leverage ( $LEV$ ), and firm profitability ( $ROA$ ). First, a larger firm is more likely to be supervised, and so the quality of the firm's accounting information should be higher. But the larger the scale of the firm is, the easier it is to manipulate accounting information, and so the quality of the firm's accounting information is lower. Therefore, we do not make any expectation on the sign of the firm scale variable. Second, in a government-oriented banking system, the government intervenes in the operations of firms, and thus it is difficult for debt contracts to play a governance role. In contrast, higher firm financial leverage leads to more incentives for managers to manipulate accounting information or to lower the quality of accounting information in order to meet the requirements of debt contracts (Lu *et al.*, 2008). Therefore, we expect the sign of firm financial leverage to be positive. Third, Lang and Lundholm (1993) believe that higher firm profitability leads to more incentives for managers to improve accounting information quality so as to distinguish their firms from firms with poor performance. Therefore, we expect the sign of firm profitability to be negative.

(2) Corporate governance variables. These include the attribute of ownership ( $STATE$ ), the concentration of ownership structure ( $CENTRAL$ ), independence of the board ( $BOARD$ ), and CEO duality ( $DUAL$ ). First, the managers of non-state-owned enterprises come under more pressure from the market than the managers of state-owned enterprises, and so the former have more incentive to increase performance through earnings management in order to improve the market's expectations for their firms (Bo and Wu, 2009). Therefore, we expect the sign of the attribute of ownership to be positive. Second, if the power of controlling shareholders is stronger, managers are more likely to disclose lower quality accounting information (Fan and Wong, 2002). Meanwhile, CEO duality makes it easier for managers to manipulate accounting information. Therefore, we expect that the signs of the concentration of ownership structure and CEO duality are

both positive. Third, the more independent a board is, the more serious the supervision, and so we expect that the sign of the independence of board is negative. In addition, the Chinese government intervenes in the resource allocation of firms, and this also affects the quality of accounting information because resources are dependent on contracts in the external market; therefore, we control for government intervention in the regression model.

Furthermore, based on the above analysis, capital investment efficiency affects the quality of accounting information, but accounting information quality affects capital investment efficiency in return, and so an endogeneity problem exists between them. We deal with this endogeneity problem in Model (6), which is a simultaneous equations model. According to Xin *et al.* (2007), free cash flow (*FCF*), the rate of administrative expenses (*MANFEE*), and the proportion of other accounts receivable in total assets (*RECTA*) all affect capital investment efficiency. Xin, Zheng, and Yang (2007) show that the attribute of ownership and the concentration of ownership structure affect capital investment efficiency. Therefore, we control for the above variables in the second equation of Model (6). In addition, we also control for the year dummy variables and industry dummy variables in the two equations.

$$\begin{cases} IQ_{i,t} = \alpha_0 + \alpha_1 INVEST_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 STATE_{i,t} + \alpha_6 CENTRAL_{i,t} \\ \quad + \alpha_7 BOARD_{i,t} + \alpha_8 DUAL_{i,t} + \alpha_9 GOV_{i,t} + YEAR_t + IND_j + e_{i,t} \\ INVEST_{i,t} = \alpha_0 + \alpha_1 IQ_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 STATE_{i,t} \\ \quad + \alpha_6 CENTRAL_{i,t} + \alpha_7 DUAL_{i,t} + \alpha_8 GOV_{i,t} + \alpha_9 MANFEE_{i,t} \\ \quad + \alpha_{10} FCF_{i,t} + \alpha_{11} RECTA_{i,t} + YEAR_t + IND_j + e_{i,t} \end{cases} \quad (6)$$

At the same time, we use an instrument variable to resolve the endogeneity problem between capital investment efficiency and accounting information quality. We use the previous capital investment efficiency as the instrument variable and control for the previous free cash flow and other variables in the first stage of Model (7). Then, we regress Model (7) using the two-stage least squares method. We use previous capital investment efficiency as the instrument variable because it is related to current capital investment efficiency but is almost unrelated to accounting information quality. Moreover, we control for many firm characteristics variables and corporate governance variables to increase the independence between the instrument variable and the error term of the first equation. The reasons for selecting the other variables are detailed in the analyses above.

$$\begin{cases} INVEST_{i,t} = \alpha_0 + \alpha_1 INVEST_{i,t-1} + \alpha_2 FCF_{i,t-1} + \alpha_3 SIZE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 ROA_{i,t} \\ \quad + \alpha_6 STATE_{i,t} + \alpha_7 CENTRAL_{i,t} + \alpha_8 BOARD_{i,t} + \alpha_9 DUAL_{i,t} \\ \quad + \alpha_{10} GOV_{i,t} + YEAR_t + IND_j + e_{i,t} \\ IQ_{i,t} = \alpha_0 + \alpha_1 INVEST_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 STATE_{i,t} \\ \quad + \alpha_6 CENTRAL_{i,t} + \alpha_7 BOARD_{i,t} + \alpha_8 DUAL_{i,t} + \alpha_9 GOV_{i,t} + YEAR_t + IND_j + e_{i,t} \end{cases} \quad (7)$$



**Table 1** Variable Definitions

| <b>1. Dependent variables</b>   |   |
|---------------------------------|---|
| <i>IQ_1</i>                     | = accounting information quality. We regress Model (2) to estimate the coefficients of its variables with industry fixed effects per year; then, we put the coefficients into Model (3) and compute the absolute value of the Model (2) residual to proxy for accounting information quality. A larger absolute value means that the accounting information quality is worse. |
| <i>IQ_2</i>                     | = accounting information quality. The absolute value of the residual from Model (4) is the proxy for accounting information quality. The larger the absolute value, the worse the accounting information quality.   |
| <i>IQ1_SD</i>                   | = the standard deviation of firm-level residuals from <i>IQ_1</i> during the year <i>t</i> to year <i>t+2</i> .   |
| <i>IQ2_SD</i>                   | = the standard deviation of firm-level residuals from <i>IQ_2</i> during the year <i>t</i> to year <i>t+2</i> .   |
| <b>2. Explanatory variables</b> |   |
| <i>INVEST_1</i>                 | = the absolute value of the residual of Model (1), in which $GROWTH_{t-1}$ is the Tobin's Q. A larger absolute value means that the capital investment efficiency is worse.   |
| <i>INVEST_2</i>                 | = the absolute value of the residual of Model (1), in which $GROWTH_{t-1}$ is the sales growth rate. A larger absolute value means that the capital investment efficiency is worse.   |
| <b>3. Control variables</b>     |   |
| <i>SIZE</i>                     | = the logarithm of total assets (renminbi);   |
| <i>LEV</i>                      | = the ratio of liabilities to total assets;   |
| <i>ROA</i>                      | = the ratio of operating profit to a firm's market value;   |
| <i>STATE</i>                    | = 1 if the ultimate largest shareholder is state-owned, and 0 otherwise;  |
| <i>CENTRAL</i>                  | = shareholding proportion of the largest shareholder;   |
| <i>BOARD</i>                    | = the number of independent directors/the total number of directors on the board;   |
| <i>DUAL</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 0 otherwise;  |
| <i>GOV</i>                      | = government intervention index taken from the marketisation index of Fan and Wang (2009);  |
| <i>FCF</i>                      | = the ratio of the firm's operating cash flow minus depreciation, amortisation, and expected newly increased investment to average total assets;  |
| <i>MANFEE</i>                   | = the ratio of management fees to sales revenue;  |
| <i>RECTA</i>                    | = the ratio of other accounts receivable to total assets.   |

## V Sample Selection and Descriptive Statistics

We select Chinese A-share listed companies between 2004 and 2007 as the sample. Then, we exclude the financial industry and delete the observations with incomplete data. Finally, we obtain 3,832 firm-year observations. In addition, we winsorise the major variables at the 0.5 per cent and 99.5 per cent levels. All of the financial data of firms is obtained from the China Stock Market and Accounting Research (CSMAR) database and the data about corporate governance from the China Center for Economic Research (CCER) database.

Table 2 reports the descriptive statistics for the variables in this paper. We divide the observations into two groups and compare the differences between them. The results show that in the high capital investment efficiency group, the mean values of  $IQ\_1$  and  $IQ\_2$  are 0.0697 and 0.0490, respectively, which are significantly less than the corresponding mean values (0.0806 and 0.0608) of  $IQ\_1$  and  $IQ\_2$  in the low capital investment efficiency group. In the high capital investment efficiency group, the median values of  $IQ\_1$  and  $IQ\_2$  are 0.0469 and 0.0329, respectively, which are significantly less than the corresponding mean values (0.0542 and 0.0368) of  $IQ\_1$  and  $IQ\_2$  in the low capital investment efficiency group. Therefore, from both the mean value and median aspects, the results show that the lower the capital investment efficiency, the worse the quality of accounting information. The mean, variance, and median of  $INVEST\_1$  are 0.0823, 0.1046, and 0.0532, respectively, and the variance is significantly larger than the mean, which suggests that the difference in capital investment efficiency is quite significant in Chinese listed companies. The mean and variance values of logarithmic total assets are 21.3887 and 1.0413, respectively. The mean and median of  $LEV$  are 0.5468 and 0.5354, respectively, which suggests that the asset-liability ratio is generally high in Chinese listed companies. The median value of  $STATE$  is 1, which suggests that most companies are state owned. The mean and median of  $CENTRAL$  are 0.3815 and 0.3572, respectively, suggesting that it is common for Chinese listed companies to be controlled by one shareholder only.

## VI Empirical results and analysis

### 1. Correlation Coefficient Analysis

Table 3 lists the correlation coefficients between the variables.  $INVEST\_1$  is positively related to  $IQ\_1$  and  $IQ\_2$ , which suggests that the lower capital investment efficiency is, the worse the quality of accounting information quality. This is consistent with the theoretical expectation.  $SIZE$ ,  $LEV$ , and  $ROA$  are significantly related to  $IQ\_1$  or  $IQ\_2$ , which suggests that controlling for the variables in the regression model increase the reliability of the empirical results.  $STATE$  and  $CENTRAL$  are related to  $IQ\_1$  or  $IQ\_2$ . In addition, in the regression analysis below, we find that the variance inflation factor of each variable is less than 5, which suggests that multicollinearity has little impact

on the regression results. At the same time, the correlation coefficient analysis does not control for the other determinants, and so we control for the other determinants in the multiple regression analysis in order to investigate how capital investment efficiency affects accounting information quality.

**Table 2** Descriptive Statistics of Variables

| Variable        | Observations | Mean      | SD     | P25     | P50       | P75     |
|-----------------|--------------|-----------|--------|---------|-----------|---------|
| <i>IQ_1</i>     | Low Group    | 0.0806    | 0.0871 | 0.0250  | 0.0542    | 0.1033  |
|                 | High Group   | 0.0697    | 0.0765 | 0.0225  | 0.0469    | 0.0889  |
|                 | Diff         | 0.0109*** |        |         | 0.0074*** |         |
| <i>IQ_2</i>     | Low Group    | 0.0608    | 0.0881 | 0.0165  | 0.0368    | 0.0713  |
|                 | High Group   | 0.0490    | 0.0708 | 0.0139  | 0.0329    | 0.0612  |
|                 | Diff         | 0.0118*** |        |         | 0.0039*** |         |
| <i>INVEST_1</i> | 3832         | 0.0823    | 0.1046 | 0.0239  | 0.0532    | 0.0999  |
| <i>INVEST_2</i> | 3832         | 0.0828    | 0.1050 | 0.0239  | 0.0531    | 0.1004  |
| <i>SIZE</i>     | 3832         | 21.3887   | 1.0413 | 20.7211 | 21.3347   | 22.0009 |
| <i>LEV</i>      | 3832         | 0.5486    | 0.2838 | 0.3999  | 0.5354    | 0.6473  |
| <i>ROA</i>      | 3832         | 0.0160    | 0.0725 | 0.0061  | 0.0235    | 0.0469  |
| <i>STATE</i>    | 3832         | 0.6900    | 0.4626 | 0.0000  | 1.0000    | 1.0000  |
| <i>CENTRAL</i>  | 3832         | 0.3815    | 0.1602 | 0.2555  | 0.3572    | 0.5065  |
| <i>BOARD</i>    | 3832         | 0.3448    | 0.0621 | 0.3333  | 0.3333    | 0.3636  |
| <i>DUAL</i>     | 3832         | 0.2745    | 0.4463 | 0.0000  | 0.0000    | 1.0000  |
| <i>GOV</i>      | 3832         | 6.7890    | 3.3025 | 4.1700  | 6.5300    | 10.0800 |
| <i>MANFEE</i>   | 3814         | 0.1688    | 0.6044 | 0.0438  | 0.0750    | 0.1215  |
| <i>FCF</i>      | 3814         | 0.0506    | 0.1471 | 0.0077  | 0.0599    | 0.1211  |
| <i>RECTA</i>    | 3814         | 0.0691    | 0.1330 | 0.0087  | 0.0255    | 0.0667  |

**Table 3** Correlation Coefficient Analysis

| Variable        | <i>INVEST_1</i> | <i>IQ_1</i> | <i>IQ_2</i> | <i>SIZE</i> | <i>LEV</i> | <i>ROA</i> | <i>STATE</i> | <i>CENTRAL</i> | <i>BOARD</i> | <i>DUAL</i> |
|-----------------|-----------------|-------------|-------------|-------------|------------|------------|--------------|----------------|--------------|-------------|
| <i>INVEST_1</i> | 1               |             |             |             |            |            |              |                |              |             |
| <i>IQ_1</i>     | 0.153***        | 1           |             |             |            |            |              |                |              |             |
| <i>IQ_2</i>     | 0.128***        | 0.609***    | 1           |             |            |            |              |                |              |             |
| <i>SIZE</i>     | 0.044***        | -0.098***   | -0.229***   | 1           |            |            |              |                |              |             |
| <i>LEV</i>      | 0.035**         | 0.344***    | 0.469***    | -0.152***   | 1          |            |              |                |              |             |
| <i>ROA</i>      | -0.053***       | -0.317***   | -0.495***   | 0.339***    | -0.523***  | 1          |              |                |              |             |
| <i>STATE</i>    | -0.020          | -0.081***   | -0.136***   | 0.257***    | -0.147***  | 0.127***   | 1            |                |              |             |
| <i>CENTRAL</i>  | 0.012           | -0.042***   | -0.080***   | 0.256***    | -0.151***  | 0.198***   | -0.309***    | 1              |              |             |
| <i>BOARD</i>    | 0.016           | 0.017       | -0.014      | -0.077***   | 0          | -0.022     | 0.109***     | -0.084***      | 1            |             |
| <i>DUAL</i>     | 0.010           | 0.020       | 0.019       | -0.024      | -0.001     | -0.026     | 0.011        | -0.036**       | 0.026        | 1           |

Note:\*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels, respectively.

## 2. Multiple regression analysis

In the multiple regression analysis, we divide the sample along two dimensions. First, we divide it into an overinvestment group and an underinvestment group: The aim of this division is to investigate which kind of inefficient investment is more likely to lower accounting information quality. Second, we divide each of these groups into a positive earnings management group and a negative earnings management group: Because inefficient investment reduces firm performance, positive earnings management is more likely to be used to cover up inefficient investment; in this paper, the two groups are further divided to investigate which way (positive earnings management or negative earnings management) is more likely to be used to cover up inefficient investment by management.

Table 4 lists the regression results for Model (5) with *INVEST\_1* as the dependent variable and *IQ\_1* as the main independent variable in the different groups. The results show that in the five different groups, capital investment efficiency is positively related with accounting information quality. The division of the groups is detailed in Table 4. Table 5 lists the regression results for Model (5) with *INVEST\_2* as the dependent variable, and the results are generally consistent with the results in Table 4.

The modified Jones model focuses on intentional earnings management and neglects unintentional earnings management, and it believes that managers find it difficult to manipulate earnings by cash flow. However, Dechow and Dichev (2002) believe that earnings manipulation can be divided into intentional manipulation and unintentional manipulation and that it may be possible to manipulate cash flow. Therefore, they employ the explanatory extent of cash flow in accruals to measure accrual quality, and their detailed computation is included in Model (4). In Table 6, the dependent variable is the accounting information quality measured by the accrual quality computed in Model (4) and the main independent variable is capital investment efficiency. As shown by the regression results of the five different groups, the lower capital investment efficiency is, the worse the quality of accounting information is. The division of groups is detailed in Table 6. Table 7 lists the regression results for Model (5) with *INVEST\_2* as the dependent variable; the results are generally consistent with the results in Table 6.

## VII Endogenous Analysis

As there is severe government intervention and weak shareholder protection in the Chinese capital market, managers are more likely to cover up inefficient investment by manipulating accounting information. However, Biddle *et al.* (2009) show that higher quality accounting information can improve capital investment efficiency. In other words, there is an endogeneity problem between capital investment efficiency and accounting information quality. Below, we deal with this endogeneity problem using the following methods: the lagged item, the simultaneous equations model, and the instrumental variable.

**Table 4** Capital investment efficiency (*INVEST\_1*) and accounting information quality (*IQ\_1*): Multiple regression analysis

| Variable            | (1)   | (2)   | (3)  | (4)  | (5)                           |
|---------------------|---|---|--|--|-------------------------------|
|                     | Overinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_1</i> | Overinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_1</i> | Underinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_1</i> | Underinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_1</i> | Overall sample<br><i>IQ_1</i> |
| INTERCEPT           | 0.258***<br>(3.10)  | 0.088<br>(1.24)   | 0.107*<br>(1.74)   | -0.091<br>(-1.57)  | 0.069*<br>(1.76)              |
| <i>INVEST_1</i>     | <b>0.154***<br/>(3.84)</b>  | <b>0.088***<br/>(3.50)</b>  | <b>0.116**<br/>(2.12)</b>  | <b>0.033<br/>(1.11)</b>  | <b>0.104***<br/>(5.43)</b>    |
| <i>SIZE</i>         | -0.010***<br>(-2.76)  | -0.003<br>(-0.81)   | -0.004<br>(-1.37)  | 0.004<br>(1.64)  | -0.002<br>(-0.94)             |
| <i>LEV</i>          | 0.048**<br>(2.32)   | 0.058***<br>(4.15)  | 0.036***<br>(2.74)   | 0.082***<br>(6.18)   | 0.065***<br>(6.94)            |
| <i>ROA</i>          | 0.550***<br>(4.22)  | -0.341***<br>(-5.77)  | 0.244***<br>(4.06)   | -0.351***<br>(-9.34)   | -0.225***<br>(-7.28)          |
| <i>STATE</i>        | 0.007<br>(0.88)   | 0.004<br>(0.71)   | -0.013**<br>(-2.22)  | -0.003<br>(-0.57)  | -0.004<br>(-1.17)             |
| <i>CENTRAL</i>      | -0.039<br>(-1.61)   | 0.038**<br>(2.21)   | 0.032<br>(1.61)  | 0.029**<br>(2.16)  | 0.031***<br>(3.12)            |
| <i>BOARD</i>        | 0.007<br>(0.14)   | -0.039<br>(-0.52)   | 0.031<br>(0.88)  | 0.029<br>(0.97)  | -0.004<br>(-0.16)             |
| <i>DUAL</i>         | -0.004<br>(-0.55)   | 0.005<br>(0.87)   | 0.003<br>(0.49)  | 0.004<br>(0.82)  | 0.003<br>(0.96)               |
| <i>GOV</i>          | 0.001<br>(0.60)   | 0.001<br>(1.52)   | 0.000<br>(0.28)  | -0.000<br>(-0.15)  | 0.001<br>(1.46)               |
| <i>IND</i>          | Yes   | Yes   | Yes  | Yes  | Yes                           |
| <i>YEAR</i>         | Yes   | Yes   | Yes  | Yes  | Yes                           |
| adj. R <sup>2</sup> | 0.195   | 0.219   | 0.122  | 0.409  | 0.198                         |
| N                   | 619   | 1023  | 943  | 1247   | 3832                          |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

**Table 5** Capital investment efficiency (*INVEST\_2*) and accounting information quality (*IQ\_1*): Multiple regression analysis

| Variable            | (1)   | (2)   | (3)  | (4)  | (5)                              |
|---------------------|---|---|--|--|----------------------------------|
|                     | Overinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_1</i> | Overinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_1</i> | Underinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_1</i> | Underinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_1</i> | Overall sample<br><i>IQ_1</i>    |
| INTERCEPT           | 0.235***<br>(2.63)  | 0.101<br>(1.41)   | 0.115*<br>(1.89)   | -0.107*<br>(-1.84)   | 0.068*<br>(1.73)                 |
| <i>INVEST_2</i>     | <b>0.156***</b><br><b>(3.87)</b>                                      | <b>0.094***</b><br><b>(3.75)</b>                                      | <b>0.133**</b><br><b>(2.45)</b>  | <b>0.026</b><br><b>(0.88)</b>  | <b>0.105***</b><br><b>(5.49)</b> |
| <i>SIZE</i>         | -0.010**<br>(-2.41)   | -0.004<br>(-1.16)   | -0.004<br>(-1.49)  | 0.005*<br>(1.94)   | -0.002<br>(-0.92)                |
| <i>LEV</i>          | 0.052***<br>(2.76)  | 0.058***<br>(3.57)  | 0.034**<br>(2.49)  | 0.081***<br>(6.47)   | 0.065***<br>(6.93)               |
| <i>ROA</i>          | 0.588***<br>(4.65)  | -0.325***<br>(-5.20)  | 0.231***<br>(3.78)   | -0.359***<br>(-10.02)  | -0.225***<br>(-7.30)             |
| <i>STATE</i>        | 0.005<br>(0.62)   | 0.006<br>(1.17)   | -0.011*<br>(-1.80)   | -0.005<br>(-1.06)  | -0.004<br>(-1.14)                |
| <i>CENTRAL</i>      | -0.039<br>(-1.60)   | 0.028<br>(1.57)   | 0.031<br>(1.60)  | 0.036***<br>(2.71)   | 0.031***<br>(3.14)               |
| <i>BOARD</i>        | 0.000<br>(0.00)   | -0.034<br>(-0.45)   | 0.033<br>(0.98)  | 0.028<br>(0.92)  | -0.004<br>(-0.16)                |
| <i>DUAL</i>         | -0.006<br>(-0.74)   | 0.005<br>(0.96)   | 0.003<br>(0.47)  | 0.003<br>(0.77)  | 0.003<br>(0.94)                  |
| <i>GOV</i>          | 0.000<br>(0.13)   | 0.001<br>(1.60)   | 0.000<br>(0.56)  | -0.000<br>(-0.27)  | 0.001<br>(1.48)                  |
| <i>IND</i>          | Yes   | Yes   | Yes  | Yes  | Yes                              |
| <i>YEAR</i>         | Yes   | Yes   | Yes  | Yes  | Yes                              |
| adj. R <sup>2</sup> | 0.205   | 0.207   | 0.116  | 0.415  | 0.199                            |
| N                   | 606   | 1000  | 956  | 1270   | 3832                             |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

**Table 6** Capital investment efficiency (*INVEST\_I*) and accounting information quality (*IQ\_2*): Multiple regression analysis

| Variable            | (1)   | (2)   | (3)  | (4)  | (5)                           |
|---------------------|---|---|--|--|-------------------------------|
|                     | Overinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_2</i> | Overinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_2</i> | Underinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_2</i> | Underinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_2</i> | Overall sample<br><i>IQ_2</i> |
| INTERCEPT           | 0.145***<br>(2.90)  | 0.209***<br>(2.71)  | 0.102***<br>(2.90)   | 0.208**<br>(2.06)  | 0.189***<br>(4.24)            |
| <i>INVEST_I</i>     | <b>0.032**<br/>(2.30)</b>   | <b>0.004<br/>(0.30)</b>   | <b>0.087***<br/>(3.22)</b>   | <b>0.116*<br/>(1.78)</b>   | <b>0.074***<br/>(3.90)</b>    |
| <i>SIZE</i>         | -0.007***<br>(-2.63)  | -0.011***<br>(-2.77)  | -0.004**<br>(-2.25)  | -0.012**<br>(-2.46)  | -0.009***<br>(-3.80)          |
| <i>LEV</i>          | 0.027<br>(1.32)   | 0.079***<br>(3.69)  | 0.005<br>(0.52)  | 0.114***<br>(5.40)   | 0.081***<br>(6.03)            |
| <i>ROA</i>          | 0.786***<br>(8.37)  | -0.700***<br>(-6.86)  | 0.557***<br>(10.62)  | -0.643***<br>(-14.04)  | -0.361***<br>(-8.48)          |
| <i>STATE</i>        | 0.002<br>(0.52)   | -0.001<br>(-0.17)   | -0.006*<br>(-1.93)   | -0.002<br>(-0.36)  | -0.007***<br>(-2.66)          |
| <i>CENTRAL</i>      | -0.019*<br>(-1.88)  | 0.025<br>(1.24)   | 0.011<br>(1.11)  | 0.036***<br>(2.68)   | 0.038***<br>(3.97)            |
| <i>BOARD</i>        | 0.006<br>(0.28)   | -0.034<br>(-0.59)   | -0.018<br>(-0.62)  | -0.015<br>(-0.43)  | -0.047*<br>(-1.84)            |
| <i>DUAL</i>         | -0.003<br>(-1.18)   | 0.003<br>(0.52)   | 0.005<br>(1.62)  | 0.002<br>(0.48)  | 0.002<br>(0.56)               |
| <i>GOV</i>          | 0.001<br>(1.41)   | 0.002**<br>(2.31)   | 0.000<br>(0.70)  | 0.002*<br>(1.90)   | 0.002***<br>(3.85)            |
| <i>IND</i>          | Yes   | Yes   | Yes  | Yes  | Yes                           |
| <i>YEAR</i>         | Yes   | Yes   | Yes  | Yes  | Yes                           |
| adj. R <sup>2</sup> | 0.307   | 0.553   | 0.286  | 0.689  | 0.353                         |
| N                   | 1003  | 639   | 1230   | 960  | 3832                          |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

**Table 7** Capital investment efficiency (*INVEST\_2*) and accounting information quality (*IQ\_2*): Multiple regression analysis

| Variable            | (1)   | (2)   | (3)  | (4)  | (5)                              |
|---------------------|---|---|--|--|----------------------------------|
|                     | Overinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_2</i> | Overinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_2</i> | Underinvestment<br>& Positive<br>earnings<br>management<br><i>IQ_2</i> | Underinvestment<br>& Negative<br>earnings<br>management<br><i>IQ_2</i> | Overall sample<br><i>IQ_2</i>    |
| INTERCEPT           | 0.157***<br>(3.13)  | 0.254***<br>(2.82)  | 0.091***<br>(2.63)   | 0.185*<br>(1.87)   | 0.188***<br>(4.24)               |
| <i>INVEST_2</i>     | <b>0.028*</b><br><b>(1.96)</b>  | <b>0.006</b><br><b>(0.42)</b>   | <b>0.096***</b><br><b>(3.88)</b>                                       | <b>0.103</b><br><b>(1.60)</b>  | <b>0.073***</b><br><b>(3.83)</b> |
| <i>SIZE</i>         | -0.007***<br>(-2.91)  | -0.013***<br>(-3.04)  | -0.004**<br>(-2.00)  | -0.011**<br>(-2.26)  | -0.008***<br>(-3.79)             |
| <i>LEV</i>          | 0.028<br>(1.53)   | 0.079***<br>(3.23)  | 0.003<br>(0.27)  | 0.111***<br>(5.45)   | 0.081***<br>(6.03)               |
| <i>ROA</i>          | 0.841***<br>(8.91)  | -0.664***<br>(-6.20)  | 0.524***<br>(10.16)  | -0.663***<br>(-14.77)  | -0.361***<br>(-8.49)             |
| <i>STATE</i>        | 0.002<br>(0.56)   | -0.000<br>(-0.04)   | -0.006*<br>(-1.85)   | -0.002<br>(-0.46)  | -0.007***<br>(-2.64)             |
| <i>CENTRAL</i>      | -0.024**<br>(-2.30)   | 0.021<br>(0.97)   | 0.014<br>(1.47)  | 0.035***<br>(2.73)   | 0.038***<br>(3.97)               |
| <i>BOARD</i>        | 0.001<br>(0.03)   | -0.031<br>(-0.53)   | -0.012<br>(-0.45)  | -0.015<br>(-0.44)  | -0.047*<br>(-1.83)               |
| <i>DUAL</i>         | -0.003<br>(-0.82)   | 0.001<br>(0.13)   | 0.004<br>(1.37)  | 0.003<br>(0.57)  | 0.002<br>(0.55)                  |
| <i>GOV</i>          | 0.001<br>(1.55)   | 0.002**<br>(2.36)   | 0.000<br>(0.76)  | 0.001*<br>(1.85)   | 0.002***<br>(3.85)               |
| <i>IND</i>          | Yes   | Yes   | Yes  | Yes  | Yes                              |
| <i>YEAR</i>         | Yes   | Yes   | Yes  | Yes  | Yes                              |
| adj. R <sup>2</sup> | 0.319   | 0.530   | 0.286  | 0.692  | 0.352                            |
| N                   | 988   | 618   | 1245   | 981  | 3832                             |

Note:(1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.



## 1. The lagged item method – the standard deviation of accrual quality for the next three years

The capital investment efficiency of the main independent variable is measured by the regression residual of Model (4). The accounting information quality of the dependent variable is measured by the residual of the modified Jones model or the Dechow and Dichev model. There is an econometric problem in such a defined model: When Model (4) and the two accrual models cannot adequately separate the normal investment or normal accruals, then there is a mechanical relation between the residuals (the measures of capital investment efficiency and accounting information quality).<sup>7</sup> In addition, the capital investment efficiency in year  $t$  may not affect the accounting information quality in year  $t$ , but it may affect accounting information quality over a longer period. Therefore, following the measure used in Biddle *et al.* (2009), we use the standard deviation of firm-level residuals from Model (2) or Model (4) for the next three years as the measure of accounting information quality; this can mitigate the endogeneity problem.

In Table 8, the first three columns are the regression results of the overinvestment group, the underinvestment group, and the overall sample group, respectively. The dependent variable in each of the three columns is *IQ1\_sd*, measured by the standard deviation of the accrual quality of the modified Jones model for the next three years. The regression results consistently indicate that the coefficients of *INVEST\_1* are positive, which suggests that lower capital investment efficiency contributes to worse accounting information quality. Regarding the other three columns in Table 8, the last three groups use *IQ2\_sd* as the dependent variable to regress on accounting information quality; the regression results are generally consistent with those of the first three groups in Table 8.

In Table 9, we employ *INVEST\_2* as the independent variable and, keeping other conditions unchanged, repeat the regressions of the corresponding six groups in Table 8, the results of which consistently suggest that lower capital investment efficiency contributes to worse accounting information quality.

In addition, when the dependent variable is the standard deviation of the accruals for the next three years, in order to match the dependent variable to the independent variables in terms of time, we use the standard deviation of capital investment efficiency and the mean of the other independent variables for the next three years in the regressions. Table 10 reports the regression results for the next three years.<sup>8</sup> The results remain consistent with the above result: the lower the capital investment efficiency, the worse the quality of accounting information.

<sup>7</sup> We thank the anonymous referees for this valuable suggestion.

<sup>8</sup> Both of the two investment efficiency variables are the residuals of the model regressions, and their characteristics are similar to those of the residual of the accrual model, and so we use the standard deviations of the two investment efficiency variables.

**Table 8** Capital investment efficiency (*INVEST\_I*) and accounting information quality: Standard deviation for the next three years

| Variable            | (1)                             | (2)                              | (3)                              | (4)                           | (5)                              | (6)                            |
|---------------------|---------------------------------|----------------------------------|----------------------------------|-------------------------------|----------------------------------|--------------------------------|
|                     | Overinvestment                  | Underinvestment                  | Overall sample                   | Overinvestment                | Underinvestment                  | Overall sample                 |
|                     | <i>IQ1_sd</i>                   | <i>IQ1_sd</i>                    | <i>IQ1_sd</i>                    | <i>IQ2_sd</i>                 | <i>IQ2_sd</i>                    | <i>IQ2_sd</i>                  |
| INTERCEPT           | 0.223***<br>(5.21)              | 0.132***<br>(3.22)               | 0.189***<br>(5.60)               | 0.205***<br>(4.01)            | 0.127***<br>(3.32)               | 0.183***<br>(4.50)             |
| <i>INVEST_I</i>     | <b>0.029**</b><br><b>(2.18)</b> | <b>0.087***</b><br><b>(2.69)</b> | <b>0.040***</b><br><b>(2.91)</b> | <b>0.004</b><br><b>(0.41)</b> | <b>0.071***</b><br><b>(2.80)</b> | <b>0.021*</b><br><b>(1.84)</b> |
| <i>SIZE</i>         | -0.010***<br>(-4.59)            | -0.004**<br>(-2.37)              | -0.007***<br>(-4.57)             | -0.011***<br>(-3.54)          | -0.005***<br>(-2.70)             | -0.008***<br>(-3.69)           |
| <i>LEV</i>          | 0.045***<br>(3.01)              | 0.051***<br>(4.82)               | 0.045***<br>(4.41)               | 0.073***<br>(3.26)            | 0.066***<br>(5.75)               | 0.065***<br>(4.74)             |
| <i>ROA</i>          | -0.019<br>(-0.43)               | -0.030<br>(-1.23)                | -0.044*<br>(-1.68)               | -0.103<br>(-1.44)             | -0.163***<br>(-6.30)             | -0.160***<br>(-4.94)           |
| <i>STATE</i>        | -0.007*<br>(-1.65)              | -0.011***<br>(-3.28)             | -0.010***<br>(-3.40)             | -0.004<br>(-1.35)             | -0.011***<br>(-3.67)             | -0.009***<br>(-3.72)           |
| <i>CENTRAL</i>      | 0.023**<br>(2.19)               | 0.007<br>(0.70)                  | 0.017**<br>(2.02)                | 0.017*<br>(1.88)              | 0.005<br>(0.61)                  | 0.013*<br>(1.90)               |
| <i>BOARD</i>        | 0.012<br>(0.38)                 | -0.004<br>(-0.16)                | -0.000<br>(-0.00)                | 0.002<br>(0.10)               | -0.020<br>(-0.71)                | -0.015<br>(-0.70)              |
| <i>DUAL</i>         | -0.002<br>(-0.63)               | -0.001<br>(-0.24)                | -0.001<br>(-0.43)                | -0.000<br>(-0.11)             | -0.004<br>(-1.39)                | -0.002<br>(-0.89)              |
| <i>GOV</i>          | 0.001**<br>(2.18)               | -0.000<br>(-0.25)                | 0.000<br>(0.96)                  | 0.002***<br>(3.43)            | 0.001<br>(1.09)                  | 0.001***<br>(2.75)             |
| <i>IND</i>          | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                            |
| <i>YEAR</i>         | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                            |
| adj. R <sup>2</sup> | 0.212                           | 0.175                            | 0.184                            | 0.350                         | 0.399                            | 0.370                          |
| N                   | 1266                            | 1630                             | 2896                             | 1259                          | 1630                             | 2889                           |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

**Table 9** Capital investment efficiency (*INVEST\_2*) and accounting information quality: Standard deviation for the next three years

| Variable            | (1)                             | (2)                              | (3)                              | (4)                           | (5)                              | (6)                             |
|---------------------|---------------------------------|----------------------------------|----------------------------------|-------------------------------|----------------------------------|---------------------------------|
|                     | Overinvestment                  | Underinvestment                  | Overall sample                   | Overinvestment                | Underinvestment                  | Overall sample                  |
|                     | <i>IQ1_sd</i>                   | <i>IQ1_sd</i>                    | <i>IQ1_sd</i>                    | <i>IQ2_sd</i>                 | <i>IQ2_sd</i>                    | <i>IQ2_sd</i>                   |
| INTERCEPT           | 0.225***<br>(5.01)              | 0.127***<br>(3.06)               | 0.188***<br>(5.59)               | 0.219***<br>(4.24)            | 0.117***<br>(3.06)               | 0.182***<br>(4.50)              |
| <i>INVEST_2</i>     | <b>0.033**</b><br><b>(2.46)</b> | <b>0.085***</b><br><b>(2.68)</b> | <b>0.042***</b><br><b>(3.07)</b> | <b>0.012</b><br><b>(1.06)</b> | <b>0.066***</b><br><b>(2.68)</b> | <b>0.025**</b><br><b>(2.24)</b> |
| <i>SIZE</i>         | -0.010***<br>(-4.41)            | -0.004**<br>(-2.19)              | -0.007***<br>(-4.55)             | -0.011***<br>(-3.65)          | -0.005**<br>(-2.41)              | -0.008***<br>(-3.69)            |
| <i>LEV</i>          | 0.049***<br>(2.94)              | 0.046***<br>(4.59)               | 0.044***<br>(4.40)               | 0.073***<br>(3.25)            | 0.065***<br>(5.51)               | 0.065***<br>(4.75)              |
| <i>ROA</i>          | -0.009<br>(-0.20)               | -0.038<br>(-1.63)                | -0.044*<br>(-1.68)               | -0.087<br>(-1.23)             | -0.170***<br>(-6.61)             | -0.160***<br>(-4.92)            |
| <i>STATE</i>        | -0.004<br>(-1.14)               | -0.013***<br>(-3.74)             | -0.010***<br>(-3.39)             | -0.003<br>(-0.98)             | -0.012***<br>(-4.00)             | -0.009***<br>(-3.70)            |
| <i>CENTRAL</i>      | 0.019*<br>(1.75)                | 0.010<br>(1.06)                  | 0.017**<br>(2.03)                | 0.016*<br>(1.72)              | 0.006<br>(0.77)                  | 0.013*<br>(1.89)                |
| <i>BOARD</i>        | 0.001<br>(0.03)                 | 0.006<br>(0.23)                  | -0.000<br>(-0.00)                | -0.005<br>(-0.18)             | -0.013<br>(-0.53)                | -0.015<br>(-0.70)               |
| <i>DUAL</i>         | -0.003<br>(-0.90)               | -0.000<br>(-0.04)                | -0.001<br>(-0.44)                | -0.001<br>(-0.22)             | -0.003<br>(-1.26)                | -0.002<br>(-0.90)               |
| <i>GOV</i>          | 0.001**<br>(2.04)               | -0.000<br>(-0.15)                | 0.000<br>(0.97)                  | 0.002***<br>(3.25)            | 0.001<br>(1.29)                  | 0.001***<br>(2.76)              |
| <i>IND</i>          | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                             |
| <i>YEAR</i>         | Yes                             | Yes                              | Yes                              | Yes                           | Yes                              | Yes                             |
| adj. R <sup>2</sup> | 0.227                           | 0.165                            | 0.184                            | 0.356                         | 0.395                            | 0.370                           |
| N                   | 1232                            | 1664                             | 2896                             | 1227                          | 1662                             | 2889                            |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

**Table 10** Capital investment efficiency (*INVEST\_1* or *INVEST\_2*) and accounting information quality: Standard deviation for the next three years (mean)

| Variable                       | (1)           |         | (2)           |         | (3)           |         | (4)           |         |
|--------------------------------|---------------|---------|---------------|---------|---------------|---------|---------------|---------|
|                                | <i>IQ1_sd</i> |         | <i>IQ1_sd</i> |         | <i>IQ2_sd</i> |         | <i>IQ2_sd</i> |         |
| Intercept                      | 0.131***      | (3.19)  | 0.130***      | (3.20)  | 0.128***      | (4.39)  | 0.128***      | (4.40)  |
| <i>INVEST_1</i><br>(Deviation) | 0.086***      | (4.15)  |               |         | 0.040***      | (3.72)  |               |         |
| <i>INVEST_2</i><br>(Deviation) |               |         | 0.091***      | (4.40)  |               |         | 0.042***      | (3.87)  |
| <i>SIZE</i> (Mean)             | -0.005**      | (-2.49) | -0.005**      | (-2.51) | -0.006***     | (-3.76) | -0.006***     | (-3.77) |
| <i>LEV</i> (Mean)              | 0.038***      | (3.18)  | 0.039***      | (3.20)  | 0.060***      | (4.06)  | 0.060***      | (4.07)  |
| <i>ROA</i> (Mean)              | -0.005        | (-0.10) | -0.004        | (-0.08) | -0.171***     | (-3.22) | -0.171***     | (-3.21) |
| <i>STATE</i> (Mean)            | -0.008**      | (-2.27) | -0.008**      | (-2.24) | -0.005**      | (-2.02) | -0.005**      | (-2.00) |
| <i>CENTRAL</i><br>(Mean)       | 0.028***      | (2.77)  | 0.028***      | (2.75)  | 0.016**       | (2.31)  | 0.016**       | (2.31)  |
| <i>BOARD</i> (Mean)            | -0.019        | (-0.52) | -0.019        | (-0.53) | -0.003        | (-0.17) | -0.003        | (-0.17) |
| <i>DUAL</i> (Mean)             | 0.002         | (0.56)  | 0.002         | (0.56)  | -0.002        | (-1.08) | -0.002        | (-1.09) |
| <i>GOV</i> (Mean)              | 0.001         | (1.12)  | 0.001         | (1.15)  | 0.001***      | (3.42)  | 0.001***      | (3.43)  |
| <i>IND</i>                     | Yes           |         | Yes           |         | Yes           |         | Yes           |         |
| <i>YEAR</i>                    | Yes           |         | Yes           |         | Yes           |         | Yes           |         |
| adj. R <sup>2</sup>            | 0.174         |         | 0.176         |         | 0.433         |         | 0.433         |         |
| N                              | 2212          |         | 2212          |         | 2205          |         | 2205          |         |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.

## 2. Simultaneous equation model

We regress the simultaneous equation model using the two-stage least squares method to resolve the endogeneity problem between capital investment efficiency and accounting information quality. First, in general, we test the endogeneity of Model (6) using the Hausman setting error method. Table 11 reports the test results. The test parameters detailed in Table 11 are significantly different from zero, which suggests that there is evident endogeneity between capital investment efficiency and accounting information quality, and so we use the simultaneous equations model method to resolve the endogeneity problem.

**Table 11** Test using the Hausman setting error method.

| Simultaneous<br>equation model     | Independent variable ( <i>INVEST_1</i> ) |          |         | Independent variable ( <i>INVEST_2</i> ) |          |         |
|------------------------------------|--|----------|---------|--|----------|---------|
|                                    | Endogenous<br>test<br>parameters         | Variance | T-value | Endogenous<br>test<br>parameters         | Variance | T-value |
| Dependent variable ( <i>IQ_1</i> ) | -0.949***                                | 0.213    | -4.45   | -0.941***                                | 0.208    | -4.53   |
| Dependent variable ( <i>IQ_2</i> ) | -1.971***                                | 0.405    | -4.87   | -1.897***                                | 0.381    | -4.98   |

Note: (1) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively.

Table 12 reports the regression results of the simultaneous equations Model (6). The dependent variables in the first and second columns are *IQ\_1* (measured by the modified Jones model) and *IQ\_2* (measured by the Dechow and Dichev model), respectively, and the main independent variable is *INVEST\_1* (capital investment efficiency). We regress the simultaneous equations Model (6) using the two-stage least squares method. The results show that the coefficients of *INVEST\_1* are significantly positive, but the coefficients of *IQ\_1* and *IQ\_2* in the second equation of Model (6) are not significantly different from zero. Keeping all conditions unchanged, we employ *INVEST\_2* in place of *INVEST\_1* in the third and fourth columns and then repeat the first and second regressions; the results remain generally consistent. Therefore, after considering the endogeneity problem, the above results robustly suggest that in the Chinese capital market with severe government intervention and weak shareholder protection, managers are more likely to cover up their misconduct in their inefficient investment activities by manipulating accounting information.

### 3. The instrumental variable method

The instrumental variable method is the usual method used to resolve endogeneity. In Model (7), we use the capital investment efficiency (*INVEST\_1* or *INVEST\_2*) of the prior period as an instrument variable. Further, we control for the free cash flow of the prior period and other variables to make the regression results more valid. The regression results of Model (7) reported in Table 13 show that the coefficients of capital investment efficiency (*INVEST\_1* or *INVEST\_2*) are significantly positive in the overinvestment group but not significantly positive in the underinvestment group, which suggests that the conclusion that “lower capital investment efficiency leads to worse accounting information quality” is mainly found in the overinvestment group but is not significant in the underinvestment group.

**Table 12** Capital investment efficiency and accounting information quality: Simultaneous equation model

| Variable        | (1)             |               | (2)             |               | (3)             |               | (4)             |               |
|-----------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|
| Main (1)        | <i>IQ_1</i>     |               | <i>IQ_2</i>     |               | <i>IQ_1</i>     |               | <i>IQ_2</i>     |               |
| INTERCEPT       | 0.068           | (1.42)        | 0.000           | (0.00)        | 0.057           | (1.20)        | 0.000           | (0.00)        |
| <i>INVEST_1</i> | <b>1.045***</b> | <b>(5.50)</b> | <b>2.025***</b> | <b>(6.17)</b> |                 |               |                 |               |
| <i>INVEST_2</i> |                 |               |                 |               | <b>1.039***</b> | <b>(5.58)</b> | <b>1.951***</b> | <b>(6.24)</b> |
| <i>SIZE</i>     | -0.005**        | (-2.41)       | -0.016***       | (-4.10)       | -0.005**        | (-2.26)       | -0.015***       | (-4.00)       |
| <i>LEV</i>      | 0.061***        | (7.37)        | 0.072***        | (5.02)        | 0.059***        | (7.16)        | 0.069***        | (4.95)        |
| <i>ROA</i>      | -0.112***       | (-2.75)       | -0.130*         | (-1.85)       | -0.117***       | (-2.95)       | -0.148**        | (-2.22)       |
| <i>STATE</i>    | 0.007           | (1.34)        | 0.015*          | (1.67)        | 0.007           | (1.47)        | 0.015*          | (1.79)        |
| <i>CENTRAL</i>  | 0.011           | (0.78)        | -0.005          | (-0.22)       | 0.013           | (0.93)        | -0.000          | (-0.01)       |
| <i>BOARD</i>    | -0.006          | (-0.18)       | -0.050          | (-0.90)       | -0.004          | (-0.14)       | -0.047          | (-0.87)       |
| <i>DUAL</i>     | 0.001           | (0.31)        | -0.002          | (-0.26)       | 0.001           | (0.22)        | -0.003          | (-0.35)       |
| <i>GOV</i>      | 0.002**         | (2.57)        | 0.004***        | (3.44)        | 0.002***        | (2.66)        | 0.004***        | (3.58)        |
| <i>IND</i>      | Yes             |               | Yes             |               | Yes             |               | Yes             |               |
| Year            | Yes             |               | Yes             |               | Yes             |               | Yes             |               |
| <b>(2)</b>      | <i>INVEST_1</i> |               | <i>INVEST_1</i> |               | <i>INVEST_2</i> |               | <i>INVEST_2</i> |               |
| INTERCEPT       | 0.000           | (0.00)        | -0.016          | (-0.29)       | 0.000           | (0.00)        | 0.000           | (0.00)        |
| <i>IQ_1</i>     | <b>0.158</b>    | <b>(0.04)</b> |                 |               | <b>0.363</b>    | <b>(0.09)</b> |                 |               |
| <i>IQ_2</i>     |                 |               | <b>0.022</b>    | <b>(0.04)</b> |                 |               | <b>0.051</b>    | <b>(0.10)</b> |
| <i>SIZE</i>     | 0.006           | (1.38)        | 0.006**         | (2.39)        | 0.005           | (1.22)        | 0.006**         | (2.31)        |
| <i>LEV</i>      | -0.018          | (-0.09)       | -0.013          | (-0.52)       | -0.027          | (-0.13)       | -0.014          | (-0.53)       |
| <i>ROA</i>      | -0.017          | (-0.03)       | -0.031          | (-0.28)       | 0.020           | (0.03)        | -0.017          | (-0.16)       |
| <i>STATE</i>    | -0.009          | (-0.67)       | -0.010**        | (-2.14)       | -0.009          | (-0.65)       | -0.010**        | (-2.26)       |
| <i>CENTRAL</i>  | 0.014           | (0.11)        | 0.018           | (0.88)        | 0.006           | (0.05)        | 0.015           | (0.73)        |
| <i>DUAL</i>     | 0.001           | (0.09)        | 0.002           | (0.47)        | 0.001           | (0.07)        | 0.002           | (0.55)        |
| <i>GOV</i>      | -0.001          | (-0.49)       | -0.001          | (-1.07)       | -0.001          | (-0.55)       | -0.001          | (-1.18)       |
| <i>MANFEE</i>   | 0.011           | (0.21)        | 0.017           | (0.90)        | 0.008           | (0.15)        | 0.016           | (0.88)        |
| <i>FCF</i>      | -0.032          | (-0.19)       | -0.016          | (-0.92)       | -0.025          | (-0.15)       | -0.016          | (-0.91)       |
| <i>RECTA</i>    | 0.034           | (0.17)        | 0.044           | (0.88)        | 0.026           | (0.13)        | 0.043           | (0.85)        |
| <i>IND</i>      | Yes             |               | Yes             |               | Yes             |               | Yes             |               |
| <i>YEAR</i>     | Yes             |               | Yes             |               | Yes             |               | Yes             |               |
| R <sup>2</sup>  | 0.088           |               | 0.073           |               | 0.074           |               | 0.077           |               |
| N               | 3814            |               | 3814            |               | 3814            |               | 3814            |               |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively.

**Table 13** Capital investment efficiency and accounting information quality: Method of instrumental variable

| Variable        | (1)            |               | (2)          |               | (3)            |               | (4)          |               |
|-----------------|----------------|---------------|--------------|---------------|----------------|---------------|--------------|---------------|
|                 | <i>IQ_1</i>    |               | <i>IQ_1</i>  |               | <i>IQ_1</i>    |               | <i>IQ_1</i>  |               |
| INTERCEPT       | 0.202***       | (3.26)        | -0.011       | (-0.21)       | 0.195***       | (3.52)        | -0.024       | (-0.45)       |
| <i>INVEST_1</i> | <b>0.396**</b> | <b>(2.46)</b> | <b>0.055</b> | <b>(0.41)</b> |                |               |              |               |
| <i>INVEST_2</i> |                |               |              |               | <b>0.329**</b> | <b>(2.23)</b> | <b>0.094</b> | <b>(0.68)</b> |
| <i>SIZE</i>     | -0.009***      | (-2.92)       | 0.001        | (0.28)        | -0.009***      | (-2.96)       | 0.001        | (0.54)        |
| <i>LEV</i>      | 0.058***       | (6.35)        | 0.070***     | (9.21)        | 0.058***       | (6.49)        | 0.070***     | (9.35)        |
| <i>ROA</i>      | -0.197***      | (-4.17)       | -0.259***    | (-6.86)       | -0.160***      | (-3.42)       | -0.261***    | (-6.94)       |
| <i>STATE</i>    | 0.007          | (1.23)        | -0.010**     | (-2.46)       | 0.007          | (1.23)        | -0.010**     | (-2.37)       |
| <i>CENTRAL</i>  | 0.012          | (0.75)        | 0.049***     | (4.22)        | 0.006          | (0.41)        | 0.052***     | (4.59)        |
| <i>BOARD</i>    | 0.002          | (0.04)        | 0.022        | (0.81)        | -0.008         | (-0.22)       | 0.024        | (0.90)        |
| <i>DUAL</i>     | -0.002         | (-0.41)       | 0.005        | (1.33)        | -0.001         | (-0.20)       | 0.004        | (1.24)        |
| <i>GOV</i>      | 0.002**        | (2.56)        | 0.000        | (0.59)        | 0.002**        | (2.25)        | 0.000        | (0.82)        |
| <i>IND</i>      | Yes            |               | Yes          |               | Yes            |               | Yes          |               |
| <i>YEAR</i>     | Yes            |               | Yes          |               | Yes            |               | Yes          |               |
| F-value         | 7.84           |               | 21.36        |               | 7.83           |               | 22.44        |               |
| R <sup>2</sup>  | 0.01           |               | 0.25         |               | 0.08           |               | 0.25         |               |
| N               | 1496           |               | 1958         |               | 1463           |               | 1991         |               |

Note:(1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The order of the instrumental variable regression is “Ivreg” in STATA software.

#### 4. Capital investment efficiency and accounting information quality: An additional explanation

Capital investment efficiency and accounting information quality are both derived from the given market environment. To investigate the effect of market environment on the relation between capital investment efficiency and accounting information quality, we first divide the sample into three groups – strong shareholder protection, median shareholder protection, and weak shareholder protection – according to the index in Fan (2009). Then, we regress the two groups: “strong shareholder protection and non-state-owned enterprises” and “weak shareholder protection and state-owned enterprises”.<sup>9</sup> The empirical results listed in Table 14 show that the coefficients of the first four columns are basically significantly positive but the coefficients of the other four columns are insignificantly positive, which suggests that in a market environment with severe government intervention and weak shareholder protection, the result that lower capital investment efficiency leads to worse accounting information quality is more likely to be found.

<sup>9</sup> The reasons for the groupings are as follows. The state-owned companies represent severe government intervention and the private companies represent weak government intervention; a high law protection index represents a high degree of shareholder protection, and vice versa. In order to show how the market environment affects the relation between firms’ capital investment efficiency and accounting information quality, we conduct a comparative analysis of two groups: “strong shareholder protection and non-state-owned enterprises” and “weak shareholder protection and state-owned enterprises”.

**Table 14** Capital investment efficiency and accounting information quality: Role of market environment

| Variable            | Weak shareholder protection<br>and state-owned enterprises |                      |                      |                      | Strong shareholder protection<br>and non-state-owned enterprises |                      |                      |                      |
|---------------------|--|----------------------|----------------------|----------------------|--|----------------------|----------------------|----------------------|
|                     | (1)  | (2)                  | (3)                  | (4)                  | (5)  | (6)                  | (7)                  | (8)                  |
|                     | <i>IQ_1</i>  | <i>IQ_1</i>          | <i>IQ_2</i>          | <i>IQ_2</i>          | <i>IQ_1</i>  | <i>IQ_1</i>          | <i>IQ_2</i>          | <i>IQ_2</i>          |
| INTERCEPT           | -0.039<br>(-0.47)  | -0.039<br>(-0.48)    | 0.084<br>(1.38)      | 0.083<br>(1.37)      | 0.347***<br>(3.52)   | 0.345***<br>(3.50)   | 0.555***<br>(3.99)   | 0.553***<br>(3.96)   |
| <i>INVEST_1</i>     | 0.126***<br>(2.97)   |                      | 0.041*<br>(1.75)     |                      | 0.025<br>(0.68)  |                      | 0.062<br>(1.25)      |                      |
| <i>INVEST_2</i>     |  | 0.123***<br>(2.90)   |                      | 0.038<br>(1.62)      |  | 0.027<br>(0.76)      |                      | 0.056<br>(1.15)      |
| <i>SIZE</i>         | 0.002<br>(0.66)  | 0.002<br>(0.67)      | -0.002<br>(-0.85)    | -0.002<br>(-0.83)    | -0.016***<br>(-4.01)   | -0.016***<br>(-4.00) | -0.025***<br>(-4.33) | -0.025***<br>(-4.30) |
| <i>LEV</i>          | 0.028**<br>(2.44)  | 0.027**<br>(2.38)    | 0.031***<br>(2.79)   | 0.031***<br>(2.78)   | 0.097***<br>(4.88)   | 0.097***<br>(4.88)   | 0.124***<br>(5.27)   | 0.124***<br>(5.28)   |
| <i>ROA</i>          | -0.202***<br>(-4.16)                                       | -0.203***<br>(-4.16) | -0.310***<br>(-5.43) | -0.310***<br>(-5.44) | -0.283***<br>(-3.31)   | -0.283***<br>(-3.32) | -0.646***<br>(-3.75) | -0.647***<br>(-3.76) |
| <i>CENTRAL</i>      | 0.053***<br>(2.71)   | 0.053***<br>(2.71)   | 0.041**<br>(2.47)    | 0.042**<br>(2.47)    | -0.026<br>(-0.86)  | -0.026<br>(-0.86)    | -0.003<br>(-0.08)    | -0.003<br>(-0.08)    |
| <i>BOARD</i>        | -0.002<br>(-0.06)  | -0.002<br>(-0.06)    | -0.080<br>(-1.53)    | -0.080<br>(-1.53)    | 0.028<br>(0.47)  | 0.028<br>(0.47)      | -0.133**<br>(-2.01)  | -0.134**<br>(-2.02)  |
| <i>DUAL</i>         | -0.007<br>(-1.25)  | -0.007<br>(-1.25)    | -0.001<br>(-0.27)    | -0.001<br>(-0.27)    | 0.006<br>(0.69)  | 0.006<br>(0.70)      | 0.004<br>(0.32)      | 0.004<br>(0.33)      |
| <i>GOV</i>          | -0.001<br>(-1.04)  | -0.001<br>(-1.01)    | -0.003**<br>(-2.32)  | -0.003**<br>(-2.31)  | 0.001<br>(0.34)  | 0.001<br>(0.34)      | 0.001<br>(0.21)      | 0.001<br>(0.22)      |
| <i>IND</i>          | Yes  | Yes                  | Yes                  | Yes                  | Yes  | Yes                  | Yes                  | Yes                  |
| <i>YEAR</i>         | Yes  | Yes                  | Yes                  | Yes                  | Yes  | Yes                  | Yes                  | Yes                  |
| adj. R <sup>2</sup> | 0.124  | 0.123                | 0.285                | 0.284                | 0.386  | 0.386                | 0.519                | 0.518                |
| N                   | 916  | 916                  | 916                  | 916                  | 429  | 429                  | 429                  | 429                  |

Note: (1) Numbers in brackets are T-statistics; (2) \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels for the two-tailed test, respectively; (3) The variance inflation factor of each variable in the regression is less than 5, which has barely any effect on the regression results.



## VIII Research Conclusions, Implications, and Limitations

According to the perspective of traditional trusteeship, accounting information performs a governance function by reducing information asymmetry. However, certain assumptions are required beforehand. Only in a market with less government intervention and strong investor protection will the governance of accounting information act to inhibit opportunistic behaviour in the form of inefficient investments. As for in emerging capital markets, severe government intervention and weak investor protection will lessen the governance effect of accounting information and increase the possibility of concealing opportunistic behaviour in the form of inefficient investments by providing lower quality accounting information. Based on this logic frame, this paper finds that in Chinese listed firms between 2004 and 2007, the lower the capital investment efficiency, the worse the quality of accounting information. Also, considering the endogeneity between accounting information quality and capital investment efficiency, this study employs the lagged item and simultaneous equation model to deal with the endogeneity problem and applies a series of robustness tests. It then finds a consistent result: lower capital investment efficiency leads to worse accounting information quality. This indicates that the empirical results robustly prove the theoretical hypothesis: On the whole, in an emerging market with severe government intervention and weak shareholder protection like China, the cost of managers snatching private benefits of control and disclosing false accounting information is low, which makes it hard for accounting information to have the governance effect of inhibiting managers' misconduct in the form of inefficient investment and allows accounting information to become a tool for managers to conceal their opportunistic behaviour in their inefficient investment activities. Thus, the lower a firm's investment efficiency, the worse the quality of its accounting information. The instrumental variable regression indicates that the above result is more obvious in the overinvestment group but is not significant in the underinvestment group.

The research's conclusions provide some revelations. From the perspective of government policy, the tangible hand of government should reinforce the institutional building of shareholder protection and seriously punish managers' malfeasances in invading shareholders' interests by means of strict laws. Considering the scarcity and limitations of the regulatory resources, the regulators should give investors more rights and strengthen the market of institutional investors so as to enhance investors' self-protection ability.

As an important aspect of corporate governance, accounting problems originate from the given institutional environment. The extant related research in developed capital markets finds conclusions that are based only on their own institutional background; different conclusions may be reached under different institutional backgrounds. Therefore, the conclusions of this paper are different from those in Biddle, Hilary, and Verdi (2009), suggesting that we should study local accounting issues on basis of the given institutional background so that we can gain a deep understanding of the essence of the issues.

This study has its limitations. An important challenge for this study is to resolve the endogeneity problem between capital investment efficiency and accounting information quality. Although we have tried to employ the lagged item, instrument variable regression, and simultaneous equation model to address the endogeneity problem and have found the expected results, there are still some limitations to the study which suggest directions for future research.<sup>10</sup>

Although this study has theoretically analysed how a firm's inefficient investments affect the quality of accounting information based on the special Chinese system background and has also conducted a specific empirical test with some different dimensions and using various methods, there are still some deficiencies in relation to solving the endogeneity problem. Therefore, the conclusion of this study mainly shows that in China's emerging market with severe government intervention and weak shareholder protection, the more inefficient a firm's capital investment is, the worse its accounting information quality is. In other words, managers cover up their opportunistic behaviour in their inefficient investment activities by providing accounting information of inferior quality, although the conclusion does not deny that higher quality accounting information can better improve capital investment efficiency by reducing management's moral hazards. Of course, the conclusion does not deny accounting information's function in Chinese capital markets,<sup>11</sup> but it aims to illustrate that improving the market environment is very important to the improvement of accounting information quality and the efficiency of resource allocation.

## References

Please refer to pp. 77-79.

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<sup>10</sup> Although we may infer that lagged capital investment efficiency (instrumental variable) and current capital investment efficiency are closely related, we cannot show that there is no relation with the model residual.

<sup>11</sup> The functions of accounting information can be divided into reducing adverse selection beforehand (signalling effect) and moral hazard afterwards (monitoring effect) (Scott, 2006). In view of the current institutional environment in Chinese capital markets, accounting information mainly provides the signalling effect.