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# 事务所规模、盈余管理与信息不对称[1]

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## 摘要

本文以 2001 至 2009 年上市公司 8,788 个年度观察值为研究样本，研究了不同规模事务所审计的公司的可操控应计额的信息含量差异。本文的研究发现，可操控应计额与知情交易概率、买卖价差成正相关，可操控应计额越高，知情交易概率越高，买卖价差越大，信息不对称程度越高。更为重要的是，文章的研究结果还发现，“十大”和“非十大”审计的公司的可操控应计额与知情交易概率、买卖价差关系的显著性不同，由“十大”审计的公司的可操控应计额与知情交易概率和买卖价差的正相关关系显著更弱。这表明“十大”更好地抑制了机会主义盈余管理，其审计的公司的可操控应计额的信息含量更高，信息不对称程度更低。这一研究结论有助于理解基于传递价值相关信息和基于机会主义两类不同目的的操控应计额的盈余管理行为。

关键词：事务所规模、盈余管理、可操控应计额质量、信息不对称
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## 一、 引言

会计权责发生制导致的应计额可以划分为不可操控应计额和可操控应计额，可操控应计额是管理层利用会计处理方法的多样性及职业判断的自由度在编制财务报告时所选择报告的应计额（Jones, 1991; Gul, Chen, and Tsui, 2003），管理层操控应计额可能出于两种目的：一是向市场和投资者传递与公司价值相关的信息，即形成价值相关性的可操控应计额（Healy and Palepu, 1993）；二是为了管理盈余，达到管理层报酬最大化或满足监管需要的机会主义目的的盈余操控，即形成机会主义可操控应计额（Christie and Zimmerman, 1994）。无论是哪种可操控应计额，都使盈余的不确定性增加，但机会主义的可操控应计额，是为了纯粹管理盈余导致的结果，与公司未来价值无关，不确定性程度更大，降低了信息披露质量。

外部审计是公司治理的重要一环，是解决信息不对称和代理问题的重要机制（Jensen and Meckling, 1976）。审计师对财务报告进行审计后，一方面通过审计调整纠正公司存在的不当盈余报告行为，以保证信息披露质量；另一方面对于不按照要求进行审计调整的公司，通过出具非标准意见向投资者揭示信息披露存在的问题，从而保护投资者利益。不同规模的事务所的谨慎性和独立性不同，大量的研究发现，大型事务所谨慎性和独立性更高，通过其审计的财务报表的盈余质量更高（Becker *et al.*, 1998; Francis *et al.*, 1999; Francis and Krishnan, 1999; Hsieh and Tsai, 2004）。

但过去的文献在研究事务所规模与盈余质量关系时，主要集中于分析不同规模的事务所对盈余管理程度的影响，尤其是对可操控应计额数量上的探究（Becker *et al.*, 1998; Francis *et al.*, 1999; Kim, Chung, and Firth, 2003），这些文献并没有注意到可操控应计额也存在性质上的差异，即使相同金额的可操控应计额，体现的不确定性程度和信息含量也不同。本文在上述文献的基础上，进一步探究不同规模事务所审计的可操控应计额的信息含量差异，利用在 2001 年至 2009 年上海和深圳两个交易所上市的 8,788 个 A 股样本观察值的研究结果发现，可操控应计额与知情交易概率、买卖价差显著正相关，可操控应计额导致的信息不透明，引发了知情交易概率上升和买卖价差的扩大，而大型事务所的审计降低了可操控应计额与知情交易概率和买卖价差的正相关关系，表明大型事务所审计的可操控应计额不确定性更低，更多地传递了价值相关性信息，促使知情交易概率下降，买卖价差缩小，投资者利益得到更好保护。

本文的研究可能在以下方面拓展了现有文献，一是关于事务所规模与盈余管理的文献，不停留在简单分析事务所规模对可操控应计额数量的影响，而是基于信息不对称视角，分析了不同规模事务所审计的可操控应计额的信息含量差异，这为研究可操控应计额质量提供了参考；二是把知情交易概率、买卖价差等信息质量指标引入审计质量检验领域，过去主要采用异常报酬或 IPO 折价衡量审计产品的信息含量（Teoh and Wong, 1993; Jang and Lin, 1993; Krishnan, 2003），而本文引入知情交易概率、买卖价差作为检验审计产品的信息含量，提供了新的研究视角。而且此项研究与中国证券市场作为新兴市场的特点相符。在中国证券市场中，盈余管理更加严

重（Aharony *et al.*, 2000; Chen and Yuan, 2004），各类以私有信息为基础的内幕交易层出不穷（傅勇和谭松涛，2008；薛爽和蒋义宏，2008； 晏艳阳和赵大玮，2006；祝红梅，2003）。证监会在 2007 年出台了《内幕交易行为认定指引》和《操纵市场行为认定指引》之后，从 2008 年至 2009 年 3 月，根据 2007 出台的两个指引的相关规定，证监会就向公安机关移送内幕交易案 8 起，操纵市场案 2 起。可见，信息不对称严重影响了市场效率，损害投资者利益。管理层利用盈余管理模糊信息透明度与外部投资者希望借助盈余披露传递价值相关信息的需求同时并存，而审计师为了解脱审计责任，也存在抑制模糊信息透明度的机会主义盈余管理和允许传递价值相关信息盈余管理的可能。三是对解释现有研究发现的分歧具有帮助。尽管大部分文献发现四大审计的公司可操控应计额更低，但也有部分文献的发现不同。Piot and Janin（2007）研究了法国资本市场的情况，发现无论是采用绝对值的可操控应计额还是不取绝对值的可操控应计额，五大与非五大审计的公司都没有显著差异，这说明在法国“五大”与“非五大”对盈余管理的抑制效应没有差异。刘峰和周福源（2007）的研究也发现，国际“四大”与“非四大”审计的公司，其可操控应计额并不存在显著差异。出现不一致的研究结论，现有的解释是认为，法国、中国的法律风险与美国、澳大利亚等国不同，前者的法律风险低于后者，而法律风险对审计师的行为产生重大影响。当处于一个低法律风险的审计环境下时，大型事务所的“深口袋”诉讼风险不再存在（Piot and Janin, 2007），审计失败导致的损失下降，尤其是当审计需求市场无效时，低法律风险必然导致低审计质量，大型事务所会根据其面临的执业风险调整审计质量（刘峰和许菲，2002），从而导致大型事务所与小型事务所对待盈余管理的谨慎性没有差异。但也存在另外一种可能性，上述研究仅仅发现的是大型事务所与小型事务所审计的公司的可操控应计额数量上没有显著差异，但也可能在信息含量上存在显著差异。如果大型事务所与小型事务所审计的公司的可操控应计额传递的信息不同，那么大型事务所所体现出来的审计质量仍然异于小型事务所。本文的发现有助于解释上述研究结果差异。

## 二、 文献回顾

### （一）事务所规模与盈余管理

大型事务所基于两个方面的原因可能提供更高审计质量。一是以 DeAngelo（1981）等人为代表的学者认为，由于准租的存在，大型事务所一旦审计失败，对声誉有重大影响，不仅要为审计失败承担诉讼赔偿责任，而且还要承担因声誉损失导致的现有客户或潜在客户流失的损失，大型事务所因审计失败所造成的损失比小事务所更大，因此大型事务所有更大的激励维持审计独立性和谨慎性。二是 Craswell, Francis, and Taylor（1995）、Hogan and Jeter（1999）等人为代表的学者认为，大规模品牌事务所更可能投资于专业化建设，审计团队分工越精细，专业经验积累速度

越快，更有利于审计人员专业能力的提升，在分配审计任务时更有可能选择经验丰富和熟悉被审计单位行业的审计师进行审计，提高了审计师的专业胜任能力。大量经验证据支持了这一推论，发现大型事务所对盈余管理更加敏感。Becker *et al.*（1998）、Francis *et al.*（1999）、Kim, Chung, and Firth（2003）、Hsieh and Tsai（2004）和 Zhou and Elder（2004）比较了不同规模事务所审计的公司的盈余管理情况，发现五大或六大审计的公司的可操控应计额显著更低。针对中国资本市场的研究中，李仙和聂丽洁（2006）、漆江娜等（2004）发现经大型事务所审计的公司，盈余管理程度也更低。吴水澎和李奇凤（2006）的研究结果也表明“四大”与国内“十大”、国内“十大”与国内“非十大”在抑制公司盈余管理程度上具有显著差异。

### （二）盈余管理与信息不对称

盈余信息质量与信息不对称紧密相关。早期的文献中，Welker（1995）研究了信息披露质量与买卖价差的关系，他的研究发现信息披露政策与买卖价差成负相关，信息披露评级排序在最低三分之一公司的买卖价差比信息披露评级排序在最高三分之一的公司大约高了 50%。Leuz and Verrechia（2000）研究了德国公司采用 IAS 和 GAAP 后的经济后果，他们的研究表明，采用高质量国际会计准则后，公司的买卖价差下降，股票交易量上升。Affleck-Graves, Callahan, and Chipalkatti（2002）的研究还现，盈余预测能力好的公司买卖价差低于盈余预测能力低的公司。Heflin, Shaw, and Wild（2005）的研究发现与此类似，他们的研究结果表明财务分析师对公司的信息披露评级与有效价差和市场深度成负相关。Brown and Hillegeist（2007）以 AIMR 得分作为信息披露质量指标，研究了信息披露质量对 *PIN* 的影响，他们的研究发现年度报告披露质量与 *PIN* 显著负相关，高质量信息披露吸引了更多的非知情交易者，导致知情交易概率（the probability of informed trading，*PIN*）下降。尽管上述文献没有直接分析盈余管理与信息不对称的关系，但也充分说明了盈余信息质量对信息不对称的重要影响。而 Richardson（2000）、Ascioglu *et al.*（2012）和 Bhattacharya *et al.*（2012）等直接分析了应计额与信息不对称的关系。Richardson（2000）的研究发现，无论是采用时间序列的修正琼斯模型还是横截面的修正琼斯模型，都一致发现可操控应计额与买卖价差呈显著正相关。Jayaraman（2008）以盈余波动与现金波动的差异作为应计额质量的替代变量，以买卖价差和 *PIN* 作为知情交易的替代变量，研究应计额质量与信息不对称的关系，他的研究发现，当盈余比现金流更加平滑时，知情交易更多，同样，当盈余比现金流更加波动时，也更容易发生知情交易。Ascioglu *et al.*（2012）采用了 DD 模型、管理层规避亏损、真实盈余管理和异常应计费用等多个指标来度量盈余管理，分析其与市场流动性的关系，发现盈余管理越高，市场流动性越差，知情交易概率更高。Bhattacharya, Desai, and Venkataraman（2012）以 Francis *et al.*（2005）采用的修正 DD 模型计算的残差标准差作为应计额质量，分析了其与信息不对称的关系，发现应计额质量越差，信息越不对称。同时，他们还将应计额分解为“先天”（innate）的应计额和可操控的应计

额，进一步探究这二者对信息不对称的影响。Bhattacharya *et al.*（2012）也考察了盈余质量与信息不对称的关系，他们发现应计额质量与买卖价差和 *PIN* 显著相关，买卖价差和 *PIN* 随着应计额质量的提高而下降，并且应计额质量直接对权益成本产生影响，随着应计额质量的下降，信息风险的增加，权益资本成本增加。

### （三）研究假设

公司管理层进行盈余管理可以划分为两类动机（Gul, Chen, and Tsui, 2003），一是出于谋求不正当利益的机会主义动机（Christie and Zimmernan, 1994），二是传递公司未来经营业绩的价值相关性信息（Healy and Palepu, 1993; Francis, Maydew, and Sparks, 1999）。也就是说盈余管理可以划分为机会主义盈余管理和决策有用性盈余管理两种。Healy and Wahlen（1999）认为公司可能基于管理层收购、股票发行、股权激励、内部人交易、满足薪酬契约和债务契约的要求，或者是规避政府行业监管和反托拉斯监管的需要进行机会主义盈余管理。但同时，公司也存在一种以传递价值相关性信息为目的的决策有用性盈余管理。Subramanyam（1996）、Hunt, Moyer, and Shevlin（2000）、Tucker and Zarowin（2006）等人的研究发现公司会通过盈余管理来传递价值相关性信息。Subramanyam（1996）发现可操控应计额与股票回报率之间存在正相关关系，Hunt, Moyer, and Shevlin（2000）发现公司的利润平滑增强了盈余与股票价格之间的关系。Tucker and Zarowin（2006）也发现收入增加的利润平滑能够反映未来盈余和现金流量的信息。Gul, Leung, and Srinidhi（2003）的研究也发现高投资者机会公司的可操控应计额提高了盈余的价值相关性。

这两类不同的盈余管理的错报风险不同，机会主义盈余管理操控的应计额无法与未来的盈余和现金流相联系，不确定性程度更高，存在更大的错报风险，而传递价值相关性信息的决策有用性盈余管理所操控的应计额，反映了企业未来的盈余和现金流的可实现性，传递了有用信息，错报风险更低（陈小林和林昕，2011）。如果大型事务所具有更高的专业胜任能力，那么比小型事务所更能辨认两类不同的盈余管理，同时如果大型事务所也具有更高的独立性和谨慎性，也将更有动机抑制公司的机会主义盈余管理，而更允许企业进行决策有用性盈余管理。

那么国内大型事务所是否具备这些条件？可以说，国内的大型事务所不仅更受政府监管部门关注，而且在一些经济活动领域发挥特殊作用，具有提高审计质量的压力和声誉机制。把国内事务所做大做强，一直是监管部门的愿望，曾多次推动事务所合并浪潮。2000 年财政部发布了《会计师事务所扩大规模若干问题的指导意见》和《会计师事务所合并审批管理暂行办法》等文件，推动事务所上规模、上水平。2007 年中注协印发了《中国注册会计师协会关于推动会计师事务所做大做强的意见》的通知，要求实现会计师事务所做大做强、走向国际的目标。2009 年国务院办公厅转发了财政部《关于加快发展我国注册会计师行业若干意见的通知》，该《通知》指出，大力支持会计师事务所改革创新，鼓励优化组合、兼并重组、强强联合，促进行业走跨越式发展道路。2011 年中注协又颁布了《中国注册会计师行业发展规

划（2011-2015 年）》，推动大型事务所做强做大，成为行业发展的龙头骨干力量，引导中小事务所做精做专，着力培育 10 家左右执业网络、服务能力、收入规模和市场影响具有国际水准的大型事务所，除国际合作所之外，至少有 3 家以上事务所迈入世界前 20 强之列。这些政策措施倾注了政府对大型事务所的扶持，同时也加强了对大型事务所的监管，实质上行政监管部门也是把大型事务所作为审计行业高质量审计的宣传窗口，并依赖大型事务所来推动整个行业的审计质量，一些大型事务所的注册会计师也成功当选为人大代表或政协委员。政府监管部门的关心以及社会赋予的巨大荣誉都将给大型事务所以无形压力，从而有助于约束其强化质量控制，提高审计质量。此外，涉及国有大型企业或中央企业审计任务的事务所，国资委往往对其有特定要求。如承担中央企业财务决算审计的参审会计师事务所，原则上应进入全国会计师事务所综合评价排名前 100 位，[3] 国资委统一委托会计师事务所对企业年度财务决算审计工作，审计企业资产总额在 1000 亿元以上的，要求主审会计师事务所注册会计师人数不得少于 100 名。[4] 这些规定也有助于引导事务所做大做强，提高声誉。而且不少经验研究的文献也的确发现了国内大型事务所的审计质量高于中小事务所（李仙和聂丽洁，2006；吴水澎和李奇凤，2006）。因此，我们有理由推测，国内大型事务所相对中小事务所而言更具专业胜任能力和独立性、谨慎性。

这样，国内大型事务所不仅在盈余管理的量上起到抑制作用，而且即使是相同数量的盈余管理，经国内大型事务所审计的公司，由于更可能是决策有用性盈余管理，从而所体现的盈余信息质量也会更高。而盈余信息质量与信息不对称密切相关，因大型事务所审计的公司的可操控应计额更可能是传递价值相关信息的决策有用性盈余管理，那么该应计额的信息含量更高，所对应的信息不对称程度更低。因此，本文想检验的假设是：经由大型事务所审计的公司的可操控应计额的信息含量更高，信息不对称程度更低。

## 三、 实证分析结果

### （一）研究设计

#### 1. 研究模型

为了测试大型事务所审计的盈余管理的信息含量是否不同，本文采用股票的知情交易概率 *PIN* 和根据 Glosten and Harris（1988）、Glosten（1987）计算的买卖价差 *IASpread* 和 *PRSpread* 三个指标作为衡量信息不对称的变量，以修正 Jones（1991）计算的可操控应计额度量盈余管理。知情交易概率体现了股票交易中以私有信息为基础进行股票交易的概率，知情交易概率越高，说明私有信息交易越严重，公司的

[3] 见《关于会计师事务所承担中央企业财务决算审计有关问题的通知》。
[4] 见《国资委统一委托会计师事务所试行办法》。

信息透明度越差。可操控应计额的存在，增加了信息的不透明性和不确定性，理论上，可操控应计额与知情交易概率成正相关，可操控应计额越高，知情交易概率越高（Kim, Li, and Li, 2012）。同理，买卖价差也会随着可操控应计额的增加而增加。如果大型事务所审计的可操控应计额或其中的大部分是用于传递价值相关信息，那么可操控应计额的不确定性会减少，信息的不确定性减少，透明度增加，从而知情交易概率和买卖价差应下降。也就是说，由大型事务所审计的公司的可操控应计额与 *PIN*、*IASpread* 和 *PRSpread* 的正相关关系更弱，即大型事务所与可操控应计额的交互项与 *PIN*、*IASpread* 和 *PRSpread* 应成负相关关系。所建立的检验模型如下：

$$\begin{aligned} INFOASY = {} & \alpha + \beta_1 BIG10 + \beta_2 ABSDA + \beta_3 BIG10 * ABSDA \\ & + \beta_4 LSIZE + \beta_5 LAGE + \beta_6 STD + \beta_7 TOBINQ \\ & + \beta_8 TURN + \beta_9 ROA + \beta_{10} INST + \beta_{11} PRIV \\ & + \beta_{12} YR07 + \sum \beta_{13-i} IND_i + \varepsilon \end{aligned} \quad (1)$$

（1）因变量

*INFOASY* 是因变量，为信息不对称指标，代表了公司信息披露透明度情况，共包括三个指标 *PIN*、*IASpread* 和 *PRSpread*。

（2）待检验变量

*BIG10* 代表事务所的规模。如果是国内“十大”，*BIG10* 等于 1，其他等于 0。*BIG10* 的划分采用了中注协每年公布的百强事务所名单，[5] 百强事务所中前十的国内事务所定义为 *BIG10*（去除国际四大的排名），其他则为 *Non_BIG10*。根据研究预期，大型事务所的审计质量更高，那么其审计的公司的知情交易概率更低，预期 *BIG10* 的系数显著为负。

*ABSDA* 为当期可操控应计额 *DA* 的绝对值。*DA* 是采用截面修正 Jones 模型计算而得。可操控应计额模糊了公司的信息披露，使透明度下降，将导致知情交易概率上升，因此，预期 *ABSDA* 的系数显著为正。

*BIG10***ABSDA* 是大型事务所与可操控应计额绝对值的交互项，是本文的主要测试变量。如果大型事务所审计的可操控应计额的信息含量与其他事务所不同，高于

[5] 在样区间，2006 年之前中注协的排序原则是借鉴国际通行做法，以上年业务收入作为会计师事务所排名的主要依据，业务收入最高的排在第一位，按递减原则。2006 年中注协颁布了《会计师事务所综合评价办法（试行）》，开始对事务所采用综合评价，包括：总收入、注册会计师人数、培训完成率、行业领军人才后备人选人数、处罚和惩戒情况等五项指标。综合评价得分 = 总收入得分＋注册会计师人数得分＋培训完成率得分＋领军人才人数得分－事务所和注册会计师的处罚、惩戒应减分值。尽管排名的方法发生了变化，但从排名的结果看，仍然是业务收入为主导，在样本区间内只有 2007 年有 1 家事务所的业务收入在国内前十但综合排名在前十二，除此外，其他国内综合排名前十事务所的业务收入也均在前十。由于事务所百强排名是以上年度数据为基准，因此本文采用了下年度中注协公布的事务所排名次序，同时中注协的事务所百强排名自 2003 年开始公布（即披露了 2002 年事务所的实际排名情况），而文中的样本是从 2001 年开始，考虑到业务收入排名比较稳定，故文中 2001 年前十大采用了 2002 年的排名结果。同时我们也曾删除了 2001 年样本进行分析，研究结果不受影响。

其他类型事务所，则其审计的可操控应计额信息含量相对较高，将导致信息不对称程度下降，该交互项的系数预期显著为负。

（3）控制变量

除上述变量外，模型中其他变量均为控制变量，控制变量的选择根据 Aslan *et al.*（2011）、Kim, Li, and Li（2012）进行。*LSIZE* 为股东权益市值的自然对数。*LAGE* 为上市年限的自然对数。*STD* 是公司当年日报酬率的标准差。*TOBINQ* 为公司的 Tobin's Q 值。*TURN*，是公司当年的股票周转率，等于股票交易量除以流通股股数。*ROA* 为公司当年总资产报酬率。*INST* 是公司当年年末机构投资者持股比例。*PRIV* 为企业性质的虚拟变量，如果公司属于民营企业等于 1，其他等于 0。*YR07* 是年度虚拟变量，我国在 2007 年开始实施现行会计准则体系，这可能对信息透明度产生影响，故设置虚拟变量予以控制。*IND* 是公司行业的虚拟变量，用于控制行业差异的影响，本文采用证监会公布的代码分类，对制造业采用二级代码分类，其他行业采用一级代码分类。此外，为了避免异常值的影响，按照 Aslan *et al.*（2011）的做法，我们对非自然对数连续变量进行了前后 1%的 Winsorize 处理。

2. *PIN*、*IASpread* 和 *PRSpread* 的计算

知情交易概率 *PIN* 是由 Easley *et al.*（1996）提出，反映了市场交易中基于私有信息交易的比例，后来得当广泛运用（Easley *et al.*, 2002; Jayaraman, 2008; Karin, 2010; Kim *et al.*, 2012; Vega, 2006），成为衡量信息不对称的重要指标，但 Mohanram and Rajgopal（2009）也对该指标能否很好反映信息不对称风险提出了怀疑，他们的研究发现，*PIN* 中与信息不对称无关的流动性效应解释了 PIN 与截面预期回报的关系。本文按照 Easley *et al.*（2008）的方法计算。*PIN* 一般是按照下面的步骤进行参数估计，首先确定单位时间的似然函数：

$$
\begin{aligned}
L(\theta \mid B,S) = {} & (1-\alpha)e^{-\varepsilon_b}\frac{\varepsilon_b^{\,B}}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^{\,S}}{S!} \\
& + \alpha\delta e^{-\varepsilon_b}\frac{\varepsilon_b^{\,B}}{B!}e^{-(\mu+\varepsilon_s)}\frac{(\mu+\varepsilon_s)^{S}}{S!} \\
& + \alpha(1-\delta)e^{-(\mu+\varepsilon_b)}\frac{(\mu+\varepsilon_b)^{B}}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^{\,S}}{S!}
\end{aligned}
$$

其中，$B$ 和 $S$ 分别表示单位时间内的买单和卖单数量，其余的 5 个参数均为待定变量，即 $\theta = (\alpha, \mu, \delta, \varepsilon_b, \varepsilon_s)$ 需要利用极大似然法进行估计。这里，$\alpha$ 是信息事件发生概率，$\delta$ 是坏消息的概率，$\mu$ 表示知情者提交订单的到达率，$\varepsilon_b$ 表示非知情者提交买单到达率，$\varepsilon_s$ 表示非知情者提交卖单到达率。在推断订单买卖方向的时候，采用 Lee and Ready（1991）的方法进行确定。在假设每个交易日的消息互相独立的情况下，可以给出一段时期内（设为 I）的似然函数，如下：

$$L(\theta \mid M)=\prod_{i=1}^{I} L(\theta \mid B_i, S_i)$$

对两边取对数，在不改变单调性的情况下，可以表达为求和的形式，在此基础上，根据优化程序计算出 $(\alpha, \mu, \delta, \varepsilon_b, \varepsilon_s)$。然后求得 *PIN* 为：

$$PIN=\frac{\alpha\mu}{\alpha\mu+\varepsilon_b+\varepsilon_s}$$

买卖价差（Bid-ask spreads）是市场微观结构文献中衡量股票市场流动性风险的重要指标，反映了信息不对称程度。Glosten and Harris（1988）、Stoll（1989）等都发现买卖价差的主要组成部分是信息不对称，Chung *et al.*（1995）、Huang and Stoll（1997）、Gregoriou *et al.*（2005）和 Gong（2007）也认为买卖价差反映了信息不对称，因此，文中也采用该指标来衡量信息不对称。本文采用了两种方法来计算买卖价差，其中 *IASpread* 是按照 Glosten and Harris（1988）计算的买卖价差，具体而言，是基于股票交易的买卖价差分解出其中的信息不对称成分，采用如下回归方程：

$$\begin{aligned}\Delta PRICE_{i,s}=&C_0\Delta TRADE_{i,s}+C_1\Delta TRADE_{i,s}\times TRADESIZE_{i,s}\\&+Z_0 TRADE_{i,s}+Z_1 TRADE_{i,s}\times TRADESIZE_{i,s}+\varepsilon\end{aligned}\qquad(2)$$

其中，对于公司 *i* 在每个交易时间上，Δ*PRICE* 表示价格变动除以上一次的交易价格，*TRADESIZE* 表示成交量（股数），*TRADE* 为指示变量，如果交易由买方发起则取值为 1，若为卖方发起则取值为 -1。对于每一轮交易，非信息不对称成分（*NIASpread*）可由 $2(C_0+C_1 TRADESIZE)$ 计算得到，而信息不对称成分 *IASpread* 可由 $2(Z_0+Z_1 TRADESIZE)$ 计算得到。在最终计算 *IASpread* 时使用平均交易规模（*AVGTRADESIZE*），即公司 *i* 在当天所有成交量的平均值。对于年度变量，我们进一步将公司在该年度所有的日度 *IAspread* 进行平均。

而 *PRSpread* 是采用了 Glosten（1987）的方法计算的买卖价差，具体计算公式如下：

$$PRSprd=\frac{P_a-P_b}{\frac{1}{2}(P_a+P_b)}$$

其中，$P_a$ 和 $P_b$ 分别表示询问报价（Ask quotes，卖价）和投标报价（Bid quotes，买价）。我们同样首先计算公司 *i* 在每一天基于所有成交量加权的均值。然后，进一步对每一个年度将所有日度 *PRSpread* 进行平均。

### 3. 可操控应计额的计算

对于可操控应计额（discretionary accruals，*DA*），通过采用截面修正 Jones 模型计算而得。其计算过程如下：

首先，计算不可操控应计额（nondiscretionary accruals，*NDA*），不可操控应计额的计算方程如下：

$$NDA_i = \alpha_1(1/A_{i-1}) + \alpha_2[(\Delta REV_i - \Delta REC_i)/A_{i-1}] + \alpha_3(PPE_i/A_{i-1}) + \varepsilon$$

其中：$NDA_i$ 是经过上期期末资产总额调整后的不可操控应计额，$\Delta REV_i$ 是本期主营业务收入和上期主营业务收入的差额，$\Delta REC_i$ 是本期应收账款与上期应收账款的差额，$PPE_i$ 是本期固定资产价值，$A_{i\text{-}1}$ 是上期期末资产总额。方程中的系数 $\alpha_1$、$\alpha_2$、$\alpha_3$ 是通过下面方程估计出来的 $\beta_1$、$\beta_2$ 和 $\beta_3$。

$$TA_i/A_{i-1} = \beta_1(1/A_{i-1}) + \beta_2(\Delta REV_i/A_{i-1}) + \beta_3(PPE_i/A_{i-1})$$

其中：$TA_i$ 为总应计额（total accruals，*TA*），我们采用了包括线下项目的总应计额，其他变量的含义与前相同。我们估计系数时的样本包括当年除金融保险业外的全部样本，并分年度按行业估计系数。

在估计出不可操控应计额后，通过下述公式计算可操控应计额：

$$DA_i = TA_i/A_{i-1} - NDA_i$$

式中：$DA_i$ 便是经过上期期末资产总额调整后的可操控应计额。用 $DA_i$ 的绝对值代入检验模型分析。

## （二）实证结果

### 1. 样本和描述性统计

本文研究数据主要来自 CSMAR 和 WIND 数据库。样本是从 2001 年至 2009 年的 A 股上市公司，同时对样本进行了筛选，删除了被审计师出具非标准意见的公司、金融保险类公司、同时发行 A 股和 B 股或 H 股的公司、四大审计的公司和研究变量数据缺失的公司。[6] 通过上述筛选最终得到研究样本 8,788 个年度观察值。表 1 列示了相关变量的描述性统计量。*PIN* 的均值为 0.126，最小值为 0.014，最大值为 0.295，小于张宗新（2008）计算的 0.178，这可能是因为张宗新计算的都是特殊样本公司，但与 Chan, Menkveld, and Yang（2008）的 0.13 相近。*IASpread* 和 *PRSpread* 的均值分别为 0.064 和 0.049。*BIG10* 的均值为 0.274，说明国内十大审计的上市公司在本文的样本中占了 27.4%。可操控应计额的绝对值 *ABSDA* 的均值为 0.101，说明上市公司可操控应计额约上年资产总额的 10.1%，远比 Aslan *et al.*（2011）计算的美国市场的 5.6%高。控制变量还表明我国上市公司股票周转率为 4.975，总资产报酬率 *ROA* 为 5.2%，机构投资者持股为 14.9%，民营上市公司占了样本公司的 30.2%。

[6] 本文删除国际四大审计的样本，主要是基于：（1）集中考察国内大所和国内小所的审计差异；（2）刘峰和周福源（2007）、陈小林、王玉涛和陈运森（2013）等发现国际四大在中国的表现异于其他国家。

**表 1　描述性统计**

| 变量 | Q1 | Mean | Median | Q3 | Std | Min | Max |
|---|---|---|---|---|---|---|---|
| *PIN* | 0.079 | 0.126 | 0.131 | 0.167 | 0.063 | 0.014 | 0.295 |
| *IASpread* | 0.029 | 0.064 | 0.057 | 0.088 | 0.042 | 0.010 | 0.212 |
| *PRSpread* | 0.016 | 0.049 | 0.023 | 0.046 | 0.071 | 0.011 | 0.560 |
| *BIG10* | 0.000 | 0.274 | 0.000 | 1.000 | 0.446 | 0.000 | 1.000 |
| *ABSDA* | 0.028 | 0.101 | 0.063 | 0.119 | 0.185 | 0.000 | 7.658 |
| *LSIZE* | 9.079 | 9.361 | 9.317 | 9.591 | 0.405 | 8.201 | 11.337 |
| *LAGE* | 0.699 | 0.840 | 0.903 | 1.041 | 0.251 | 0.000 | 1.301 |
| *STD* | 0.022 | 0.031 | 0.029 | 0.037 | 0.023 | 0.002 | 0.980 |
| *TOBINQ* | 1.325 | 2.230 | 1.796 | 2.623 | 1.416 | 0.901 | 10.978 |
| *TURN* | 1.949 | 4.975 | 3.693 | 6.945 | 3.932 | 0.037 | 31.030 |
| *ROA* | 0.029 | 0.052 | 0.050 | 0.079 | 0.062 | -0.469 | 0.249 |
| *INST* | 0.001 | 0.149 | 0.049 | 0.233 | 0.201 | 0.000 | 0.985 |
| *PRIV* | 0.000 | 0.302 | 0.000 | 1.000 | 0.459 | 0.000 | 1.000 |
| *YR07* | 0.000 | 0.387 | 0.000 | 1.000 | 0.487 | 0.000 | 1.000 |

表 2 列示了因变量与待检验变量的 Pearson 相关系数分析结果。从表 2 可以看出，*PIN* 与 *BIG10*、*BIG10*ABSDA* 相关系数分别是 -0.209 和 -0.077，显著性水平均在 1%以上，与 *ABSDA* 的相关系数为 -0.016，与预期符号相反，但系数检验不显著。*IASpread* 与 *BIG10*、*BIG10*ABSDA* 相关系数分别为 -0.173 和 -0.063，显著性水平均在 1%以上，与 *ABSDA* 的相关系数为 0.005，但相关性不显著。*PRSpread* 与 *BIG10*、*ABSDA* 的相关系数分别为 -0.065、0.052，且显著性在 1%水平以上，但 *PRSpread* 与 *BIG10*ABSDA* 相关系数不显著。上述相关系数的统计结果初步表明，经十大审计的公司的信息不对称程度更低，可操控应计额增加了信息不对称程度，十大审计的公司的可操控应计额的不确定性更低，十大的审计降低了可操控应计额带来的知情交易概率上升，为投资者提供了更好的保护。但相关系数分析仅仅是考虑了单个变量之间的相关系数，并没有控制其他因素的影响，因此这仅仅是初步证据，更可靠的分析还需要在控制其他变量因素的基础进行回归分析。

2. 多元回归分析结果

表 3 至表 5 列示了分别采用 *PIN*、*IASpread* 和 *PRSpread* 为信息不对称变量时的回归结果，进行回归分析时，先分别纳入 *BIG10*、*ABSDA*，然后再将交互项纳入，以便更清晰的分析各个变量与信息不对称的关系。表 3 首先列示的是 *PIN* 作为因变量的回归结果，模型（1）的结果表明，*BIG10* 的系数为 -0.004，在 1%水平上显著。模型（2）中 *ABSDA* 的系数为 0.010，在 1%水平上显著。模型（3）把 *BIG10* 和 *ABSDA* 都同时纳入模型进行回归，发现二者的系数也均在 1%水平上显著。模型（4）同时

**表 2 相关系数分析**

| | *PIN* | *PRSpread* | *IASpread* | *BIG10* | *ABSDA* | *BIG10*ABSDA* |
|---|---|---|---|---|---|---|
| *PIN* | 1.000 | | | | | |
| *PRSpread* | 0.305 | 1.000 | | | | |
| | (0.000)*** | | | | | |
| *IASpread* | 0.512 | 0.266 | 1.000 | | | |
| | (0.000)*** | (0.000)*** | | | | |
| *BIG10* | -0.209 | -0.065 | -0.173 | 1.000 | | |
| | (0.000)*** | (0.000)*** | (0.000)*** | | | |
| *ABSDA* | -0.016 | 0.052 | 0.005 | 0.014 | 1.000 | |
| | (0.148) | (0.000)*** | (0.617) | (0.197) | | |
| *BIG10*ABSDA* | -0.077 | -0.007 | -0.063 | 0.327 | 0.694 | 1.000 |
| | (0.000)*** | (0.490) | (0.000)*** | (0.000)*** | (0.000)*** | |

纳入了 *BIG10* 和 *ABSDA* 的交互项，此时的回归结果表明，*BIG10* 的系数为 -0.003，*ABSDA* 的系数为 0.015，*BIG10* 与 *ABSDA* 交互项的系数为 -0.009，三者的回归系数均在 1%水平上显著。这些回归结果说明，经由 *BIG10* 审计的公司知情交易概率更低，可操控应计额增加了信息的不确定性，随着可操控应计额的增加，知情交易概率增加，但交互项的系数显著为负，又表明经十大审计的公司的可操控应计额的信息透明度更高，吸引了更少的知情交易者。此外，表 3 控制变量的回归结果还表明，*LSIZE*、*LAGE*、*TURN*、*INST*、*PRIV* 的系数显著为负，说明公司规模越大、公司上市年限越长、股票交易周转率越高、机构投资者持股比率越高和民营企业发生以私有信息为基础的知情交易概率更低，信息透明度更好。而 *TOBINQ* 和 *ROA* 的系数显著为正，说明 Tobin's Q 值大，总资产收益率高的公司吸引了更多的知情交易者，知情交易概率更高。同时 *YRO7* 的系数显著为负，说明 2007 年我国实施现行会计准则、审计准则后，信息披露透明度得到提高，知情交易概率显著下降。

表 4 列示的是 *IASpread* 作为信息不对称变量时的回归结果。*BIG10* 的模型（1）、模型（3）和模型（4）中的回归系数分别为 -0.005、-0.005 和 -0.004，显著性水平均在 1%以上。*ABSDA* 在模型（2）、（3）和（4）的回归系数分别是 0.006、0.006 和 0.011，也在 1%水平以上显著，而 *BIG10* 和 *ABSDA* 的交互项在模型（4）中的系数为 -0.009，在 5%水平上显著。表 4 的这些回归结果也与本文的预期假设一致，经十大审计的公司的可操控应计额相对非十大来说，更可能是传递价值相关性信息的盈余管理，信息不对称程度下降，导致买卖价差缩小。此外，控制变量中除 *ROA* 的系数变得不显著外，其他控制变量的回归结果与表 3 相同。

表 5 列示的是 *PRSpread* 作为信息不对称变量的回归结果。表 5 的回归结果表

表 3　*PIN* 的回归分析结果

| 变量 | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | 0.400*** | 31.93 | 0.405*** | 32.32 | 0.402*** | 32.08 | 0.401*** | 32.06 |
| *BIG10* | -0.004*** | -4.36 | | | -0.004*** | -4.34 | -0.003*** | -3.01 |
| *ABSDA* | | | 0.010*** | 4.37 | 0.010*** | 4.35 | 0.015*** | 4.48 |
| *BIG10*ABSDA* | | | | | | | -0.009** | -2.06 |
| *LSIZE* | -0.024*** | -17.58 | -0.024*** | -18.05 | -0.024*** | -17.74 | -0.024*** | -17.74 |
| *LAGE* | -0.022*** | -11.96 | -0.022*** | -11.96 | -0.022*** | -12.05 | -0.022*** | -12.07 |
| *STD* | -0.007 | -0.35 | -0.018 | -0.91 | -0.018 | -0.93 | -0.023 | -1.15 |
| *TOBINQ* | 0.006*** | 17.69 | 0.006*** | 17.77 | 0.006*** | 17.57 | 0.006*** | 17.47 |
| *TURN* | -0.005*** | -32.85 | -0.005*** | -32.86 | -0.005*** | -32.72 | -0.005*** | -32.75 |
| *ROA* | 0.039*** | 5.16 | 0.038*** | 5.04 | 0.038*** | 5.05 | 0.038*** | 5.03 |
| *INST* | -0.030*** | -10.86 | -0.031*** | -11.19 | -0.030*** | -10.89 | -0.030*** | -10.95 |
| *PRIV* | -0.002** | -2.49 | -0.002** | -2.56 | -0.003*** | -2.66 | -0.003*** | -2.68 |
| *YR07* | -0.057*** | -41.08 | -0.058*** | -41.64 | -0.057*** | -41.12 | -0.057*** | -41.01 |
| 行业 | 控制 | | 控制 | | 控制 | | 控制 | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj R-squared | 0.619 | | 0.619 | | 0.620 | | 0.620 | |

表 4　*IASpread* 的回归分析结果

| 变量 | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | 0.262*** | 23.28 | 0.266*** | 23.67 | 0.263*** | 23.38 | 0.262*** | 23.36 |
| *BIG10* | -0.005*** | -5.71 | | | -0.005*** | -5.70 | -0.004*** | -4.21 |
| *ABSDA* | | | 0.006*** | 3.16 | 0.006*** | 3.14 | 0.011*** | 3.70 |
| *BIG10*ABSDA* | | | | | | | -0.009** | -2.13 |
| *LSIZE* | -0.020*** | -16.82 | -0.021*** | -17.30 | -0.021*** | -16.93 | -0.021*** | -16.92 |
| *LAGE* | -0.009*** | -5.31 | -0.009*** | -5.25 | -0.009*** | -5.37 | -0.009*** | -5.38 |
| *STD* | -0.015 | -0.83 | -0.022 | -1.22 | -0.022 | -1.25 | -0.026 | -1.47 |
| *TOBINQ* | 0.009*** | 29.49 | 0.009*** | 29.63 | 0.009*** | 29.40 | 0.009*** | 29.28 |
| *TURN* | -0.001*** | -10.01 | -0.001*** | -10.09 | -0.001*** | -9.91 | -0.001*** | -9.93 |
| *ROA* | -0.003 | -0.40 | -0.003 | -0.49 | -0.003 | -0.49 | -0.003 | -0.50 |
| *INST* | -0.025*** | -9.98 | -0.026*** | -10.38 | -0.025*** | -10.00 | -0.025*** | -10.06 |
| *PRIV* | -0.004*** | -4.66 | -0.004*** | -4.65 | -0.004*** | -4.78 | -0.004*** | -4.80 |
| *YR07* | -0.022*** | -17.63 | -0.023*** | -18.19 | -0.022*** | -17.64 | -0.022*** | -17.54 |
| 行业 | 控制 | | 控制 | | 控制 | | 控制 | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj R-squared | 0.304 | | 0.302 | | 0.305 | | 0.305 | |

表 5　*PRSpread* 的回归结果

| 变量 | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | -0.007 | -0.34 | -0.003 | -0.15 | -0.004 | -0.20 | -0.005 | -0.23 |
| *BIG10* | -0.001 | -0.88 | | | -0.001 | -0.86 | 0.001 | 0.61 |
| *ABSDA* | | | 0.018*** | 5.06 | 0.018*** | 5.05 | 0.031*** | 5.78 |
| *BIG10*ABSDA* | | | | | | | -0.023*** | -3.18 |
| *LSIZE* | 0.010*** | 4.67 | 0.010*** | 4.45 | 0.010*** | 4.49 | 0.010*** | 4.50 |
| *LAGE* | -0.053*** | -18.47 | -0.054*** | -18.57 | -0.054*** | -18.58 | -0.054*** | -18.61 |
| *STD* | -0.015 | -0.47 | -0.036 | -1.14 | -0.036 | -1.14 | -0.046 | -1.47 |
| *TOBINQ* | 0.018*** | 33.61 | 0.018*** | 33.57 | 0.018*** | 33.50 | 0.018*** | 33.34 |
| *TURN* | -0.005*** | -20.30 | -0.005*** | -20.19 | -0.005*** | -20.15 | -0.005*** | -20.20 |
| *ROA* | -0.013 | -1.04 | -0.014 | -1.18 | -0.014 | -1.18 | -0.015 | -1.21 |
| *INST* | -0.051*** | -11.75 | -0.052*** | -11.87 | -0.051*** | -11.79 | -0.052*** | -11.88 |
| *PRIV* | -0.011*** | -6.79 | -0.011*** | -6.97 | -0.011*** | -6.99 | -0.011*** | -7.01 |
| *YR07* | -0.006*** | -2.53 | -0.006*** | -2.63 | -0.006*** | -2.54 | -0.005** | -2.41 |
| 行业 | 控制 | | 控制 | | 控制 | | 控制 | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj R-squared | 0.247 | | 0.252 | | 0.252 | | 0.253 | |

明，*BIG10* 的系数不显著，而 *ABSDA* 的系数在模型（2）、（3）和（4）中分别为 0.018、0.018 和 0.031，且均在 1%水平上显著，*BIG10* 和 *ABSDA* 交互项的系数在模型（4）的系数为 -0.025，也在 1%水平上显著。这表明，尽管 *BIG10* 的系数不显著，但 *BIG10* 和 *ABSDA* 对 *PRSpread* 的交互项效应是显著存在，十大审计的公司的可操控应计额与 *PRSpread* 的正相关关系更弱。此回归结果依然表明预期假设成立，十大审计的公司的可操控应计额引起的信息不对称程度更低。

总之，表 3 至表 5 的回归结果证实，事务所规模与信息不对称显著负相关，事务所规模越大，其所审计的公司的信息不对称程度就越低，大型事务所提供了更好的信息质量。可操控应计额绝对值与信息不对称显著正相关，可操控应计额越高，信息不对称程度越高，可操控应计额的存在，增加了信息的不透明度。“十大”审计的公司的可操控应计额与信息不对称的正相关关系相对“非十大”审计的公司更低，说明“十大”审计的公司的可操控应计额更具有透明度，不确定程度更低，“十大”比“非十大”提供了更高的审计质量，更好地保护了投资者利益。

### 3. 稳健性检验

（1）考虑内生性的检验结果

表 3 至表 5 的回归中并没有考虑事务所潜在的自选择问题，Ireland and Lennox（2002）、Chaney *et al.*（2004）等人在研究中考虑了自选择问题，因此，我们参考 Ireland and Lennox（2002）、Chaney *et al.*（2004）等的做法，在回归分析中进一步考虑内生性问题。第一阶段构建审计师选择的 Probit 模型的变量，参考了 Ireland and Lennox（2002）、Chaney *et al.*（2004）等的做法，分别是公司规模 *LSIZE*、总资产报酬率 *ROA*、流动资产占总资产的比重 *CURR*、流动比率 *QUIK*、资产负债率 *LEV*、总资产周转率 *ATURN*、当年是否亏损 *LOSS*、审计行业专长 *SPE* 和公司所处的行业 *IND*。此外，考虑到公司治理可能影响到审计师选择，如公司治理好的公司选择十大的可能性更大，因此我们又进一步增加了两个公司治理变量：独立董事比例（*INDP*）和董事长与总经理两职合一（*DUAL*）。所建立的第一阶段 Probit 模型如下式（3）所示：

$$\begin{aligned} BIG10 = {} & \alpha + \beta_1 LSIZE + \beta_2 ROA + \beta_3 CURR + \beta_4 QUIK \\ & + \beta_5 LEV + \beta_6 ATURN + \beta_7 LOSS + \beta_8 SPE \\ & + \beta_9 INDP + \beta_{10} DUAL + \sum \beta_{11-i} IND_i + \varepsilon \end{aligned} \tag{3}$$

因第一阶段 Probit 回归中部分变量的观测值缺失，故两阶段回归中的样本数为 8,646，两阶段回归的详细结果列示于表 6。表 6 的结果显示，因变量为 *PIN* 时，*BIG10* 的系数为 -0.014，*ABSDA* 的系数为 0.015，*BIG10* 与 *ABSDA* 交互项的系数为 -0.010，三个系数均显著。因变量为 *IASpread* 时，*BIG10* 的系数为 -0.011，在 1%水平上显著，*ABSDA* 的系数为 0.012，在 1%水平上显著，*BIG10* 与 *ABSDA* 的交互项的系数为 -0.009，在 5%水平上显著。当因变量为 *PRSpread* 时，*BIG10* 的系数为 -0.052，

*ABSDA* 的系数为 0.033，*BIG10*ABSDA* 的系数为 -0.024，系数检验均在 1%水平上显著。可见，在考虑了内生性问题后，无论采用哪个指标作为信息不对称的衡量指标，*BIG10* 和 *ABSDA* 的系数均显著为负，仍然与预期假设相符。同时，控制变量的回归结果也与表 3 没有实质性差异。

当然，采用两阶段回归时，研究结果对第二阶段模型采用的排除约束（exclusion restrictions）比较敏感（Lennox, Francis, and Wang, 2012），因此我们参考 Bushee, Matsumoto, and Miller（2003）的做法对第二阶段的控制变量进行敏感性测试，在第二阶段回归中分别纳入第一阶段回归时被排除的变量组合，但实验变量的回归结果没有实质性变化，同时 *BIG10* 与 *ABSDA* 交互项系数的方差膨胀因子为 2.448，因此多重共线性也不至于影响回归结果。

**表 6　两阶段回归结果**

| 变量 | *PIN* | | *IASpread* | | *PRSpread* | |
|---|---|---|---|---|---|---|
| | Coef. | z-Stat | Coef. | z-Stat | Coef. | z-Stat |
| *CONS* | 0.387*** | 29.12 | 0.255*** | 21.33 | -0.068*** | -3.22 |
| *BIG10* | -0.014*** | -4.58 | -0.011*** | -3.96 | -0.052*** | -17.60 |
| *ABSDA* | 0.015*** | 4.56 | 0.012*** | 3.82 | 0.033*** | 6.06 |
| *BIG10*ABSDA* | -0.010** | -2.13 | -0.009** | -2.18 | -0.024*** | -3.30 |
| *LSIZE* | -0.022*** | -15.39 | -0.020*** | -15.06 | 0.017*** | 7.40 |
| *LAGE* | -0.022*** | -11.76 | -0.008*** | -4.98 | -0.050*** | -17.16 |
| *STD* | -0.022 | -1.10 | -0.027 | -1.52 | -0.047 | -1.53 |
| *TOBINQ* | 0.006*** | 17.20 | 0.009*** | 29.08 | 0.018*** | 32.97 |
| *TURN* | -0.005*** | -32.22 | -0.001*** | -9.94 | -0.004*** | -19.15 |
| *ROA* | 0.037*** | 4.81 | -0.003 | -0.38 | -0.018 | -1.37 |
| *INST* | -0.029*** | -10.44 | -0.025*** | -10.00 | -0.045*** | -10.19 |
| *PRIV* | -0.003** | -2.59 | -0.004*** | -4.65 | -0.009*** | -6.13 |
| *YR07* | -0.057*** | -40.62 | -0.022*** | -17.10 | -0.004 | -1.61 |
| 行业 | 控制 | | 控制 | | 控制 | |
| LAMBDA | 0.007 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald P>chi2 | 13921.81 | | 3758.98 | | 3315.19 | |

（2）分组检验结果

由描述性统计分析可知，由十大审计的公司仅占总样本的 27.4%，非十大审计的公司占了总样本的 72.6%，两组样本存在较大的差异，为避免计量问题，又进一步将交互项检验改为分组检验，测试十大和非十大两组的 *ABSDA* 的系数是否存在显著差异，十大的 *ABSDA* 的系数是否显著低于非十大。分组回归结果列示于表 7，Panel A 是因变量为 *PIN* 的回归结果，在 BIG10 组中，*ABSDA* 的系数为 0.006，显著性水平为 5%，在 *Non_BIG10* 组，*ABSDA* 的回归系数为 0.015，显著性水平为 1%，可以看出前者的系数和显著性水平都低于后者，为了比较两个系数是否在统计上存在显著差异，对其采用 Chow 检验，检验结果表明，卡方值为 3.41，显著性水平为 10%。可见采用 *PIN* 作为信息不对称的度量变量时，十大审计的公司的可操控应计额与信息不对称的正相关关系弱于非十大审计的公司。Panel B 是采用 *IASpread* 作为因变量时的回归结果。此时，*BIG10* 组中 *ABSDA* 的系数为 0.003，系数检验不显著，而在 *Non_BIG10* 组，*ABSDA* 的系数为 0.011，系数检验在 1%水平上显著，Chow 检验表明，卡方值为 4.41，两个系数在 5%水平上存在显著差异，*BIG10* 组中的 *ABSDA* 的系数 0.003 显著比 *Non_BIG10* 组中 *ABSDA* 的系数 0.011 低 0.008。Panel C 列示的是因变量为 *PRSpread* 时的回归结果，*BIG10* 组中 *ABSDA* 的系数为 0.008，在 10%水平上显著，*Non_BIG10* 组中，*ABSDA* 的系数为 0.030，在 1%水平上显著，两个系数是否相等的 Chow 检验的卡方值为 3.74，表明两个系数在 10%水平上存在显著差异，*BIG10* 组的 *ABSDA* 的系数比 *Non_BIG10* 组的 *ABSDA* 的系数低了 0.022。Panel B 和 Panel C 的结果都一致表明，十大审计的公司的可操控应计额与买卖价差的正相关关系弱于非十大审计的公司。总之，表 7 的回归结果表明，十大审计的公司的可操控应计额与引起的信息不对称程度更低，更可能是传递价值相关信息的盈余管理，符合前文提出的预期假设。

（3）盈余管理的其他替代变量

此外，我们按照 Ascioglu *et al.*（2012）的做法采用了其他两个盈余管理的替代变量。首先是采用 Dechow and Dichev（2002）模型计算的营运资本应计额质量作为盈余管理替代变量。Dechow and Dichev（2002）估计模型如下：

$$\Delta WC_t / A_t = b_0 + b_1 CFO_{t-1} / A_t + b_2 CFO_t / A_t + b_3 CFO_{t+1} / A_t + \varepsilon_t \qquad (4)$$

$\Delta WC$ 代表营运资本的变化，$CFO_{t\text{-}1}$、$CFO_t$ 和 $CFO_{t+1}$ 分别代表滞后一期、当期和下一期的经营活动现金流量，$A_t$ 为当年资产总额。具体估计时采用分行业进行估计，把回归得到的残差绝对值 *ACER* 作为盈余管理指标。

表 8 的 Panel A 列示的是采用 Dechow and Dichev（2002）模型计算的盈余管理的回归结果，并考虑了内生性问题。当因变量为 *PIN* 时，*BIG10* 的系数为 -0.014，显著性水平为 1%，*ACER* 的系数为 0.005，显著性水平为 5%，*BIG10* 和 *ACER* 的交

**表 7　分组回归结果**

| 变量 | *BIG10* | | *Non_BIG10* | |
|---|---|---|---|---|
| | Coef. | t-Stat | Coef. | t-Stat |
| Panel A：因变量为 *PIN* | | | | |
| *CONS* | 0.422*** | 19.39 | 0.393*** | 25.60 |
| *ABSDA* | 0.006** | 2.00 | 0.015*** | 4.26 |
| *LSIZE* | -0.025*** | -10.98 | -0.023*** | -14.08 |
| *LAGE* | -0.029*** | -8.93 | -0.019*** | -8.57 |
| *STD* | -0.003 | -0.10 | -0.044 | -1.51 |
| *TOBINQ* | 0.004*** | 6.17 | 0.007*** | 16.46 |
| *TURN* | -0.004*** | -17.64 | -0.005*** | -27.65 |
| *ROA* | 0.050*** | 3.42 | 0.035*** | 3.95 |
| *INST* | -0.036*** | -7.80 | -0.026*** | -7.72 |
| *PRIV* | -0.006*** | -3.23 | -0.002 | -1.39 |
| *YR07* | -0.058*** | -24.22 | -0.056*** | -32.88 |
| 行业 | 控制 | | 控制 | |
| N | 2409 | | 6379 | |
| Adj.R2 | 0.663 | | 0.581 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | $\chi^2(1)$ =3.41 Prob > $\chi^2$ = 0.065 | | | |
| Panel B：因变量为 *IASpread* | | | | |
| *CONS* | 0.196*** | 10.07 | 0.294*** | 21.41 |
| *ABSDA* | 0.003 | 1.08 | 0.011*** | 3.57 |
| *LSIZE* | -0.012*** | -6.05 | -0.024*** | -16.42 |
| *LAGE* | -0.011*** | -3.84 | -0.008*** | -4.27 |
| *STD* | -0.008 | -0.34 | -0.046* | -1.78 |
| *TOBINQ* | 0.007*** | 12.67 | 0.010*** | 26.75 |
| *TURN* | -0.001*** | -6.05 | -0.001*** | -7.46 |
| *ROA* | 0.003 | 0.24 | -0.002 | -0.27 |
| *INST* | -0.026*** | -6.32 | -0.025*** | -8.15 |
| *PRIV* | -0.006*** | -3.68 | -0.004*** | -3.74 |
| *YR07* | -0.028*** | -13.06 | -0.019*** | -12.51 |
| 行业 | 控制 | | 控制 | |
| N | 2409 | | 6379 | |
| Adj.R2 | 0.340 | | 0.271 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | $\chi^2(1)$ =4.41 Prob > $\chi^2$ (1)=0.036 | | | |

| Panel C：因变量为 *PRSpread* | | | | |
|---|---|---|---|---|
| *CONS* | -0.042 | -1.32 | 0.017 | 0.69 |
| *ABSDA* | 0.008* | 1.87 | 0.030*** | 5.37 |
| *LSIZE* | 0.013*** | 4.02 | 0.007*** | 2.65 |
| *LAGE* | -0.047*** | -9.84 | -0.057*** | -15.99 |
| *STD* | -0.004 | -0.09 | -0.083* | -1.77 |
| *TOBINQ* | 0.010*** | 11.20 | 0.021*** | 31.96 |
| *TURN* | -0.004*** | -10.88 | -0.005*** | -16.27 |
| *ROA* | 0.010 | 0.46 | -0.014 | -0.96 |
| *INST* | -0.036*** | -5.44 | -0.059*** | -10.58 |
| *PRIV* | -0.010*** | -3.71 | -0.011*** | -5.76 |
| *YR07* | -0.006* | -1.72 | -0.005* | -1.93 |
| 行业 | 控制 | | 控制 | |
| N | 2409 | | 6379 | |
| Adj.R2 | 0.201 | | 0.268 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | $\chi^2(1)=3.74$ Prob > $\chi^2(1)=0.053$ | | | |

互项系数为 -0.003，系数符号与预期相同，但系数检验不显著。当因变量为 *IASpread* 时，*BIG10* 的系数为 -0.012，且系数检验在 1%水平显著，而 *ACER* 及 *ACER* 与 *BIG10* 的交互项系数均不显著。当因变量为 *PRSpread* 时，*BIG10* 的系数为 -0.050，在 1%水平上显著，*ACER* 的系数为 0.025，在 1%水平上显著，而且 *BIG10* 与 *ACER* 交互项的系数为 -0.026，也在 1%水平显著。这表明，经由十大审计的公司的营运资本应计额与买卖价差的正相关关系更弱，与预期假设相符。

然后根据 Ascioglu *et al.*（2012）、Roychowdhury（2006）等的做法，把 Dechow *et al.*（1998）提出的异常现金流估计模型估计出的异常现金流的绝对值 *AACFO* 作为盈余管理的替代变量。估计模型如下：

$$CFO_t / A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \lambda_1(S_t / A_{t-1}) + \lambda_2(\Delta S_t / A_{t-1}) + \varepsilon_t \quad (5)$$

$CFO_t$ 为当期经营活动现金流量，$S_t$ 为当期营业收入，$\Delta S_t$ 为营业收入的变化，$A_{t-1}$ 为滞后一期的资产总额。经过上述模型回归得到的预测误差就是异常现金流，根据 Ascioglu *et al.*（2012）和 Roychowdhury（2006）认为，异常现金流的绝对值 *AACFO* 是一个很好的盈余管理替代变量。根据逻辑推理，*AACFO* 将引起信息不对称，*BIG10* 与 *AACFO* 的交互项应显著为正。表 8 的 Panel B 列示了 *AACFO* 作为盈余管理指标的回归结果，并考虑了事务所选择的内生性问题。Panel B 的回归结果显示，*PIN* 为因变量时，*BIG10* 的系数为 -0.014，显著性水平为 1%，*AACFO* 的系数为 0.014，显著性水平也为 1%，*BIG10* 和 *AACFO* 的交互项的系数为 -0.009，但系

表 8　盈余管理其他计量模型回归结果

| 变量 | *PIN* | | *IASpread* | | *PRSpread* | |
|---|---|---|---|---|---|---|
| | Coef. | z | Coef. | z | Coef. | z |
| Panel A：Dechow and Dichev（2002）模型 | | | | | | |
| *CONS* | 0.384*** | 28.79 | 0.254*** | 21.13 | -0.079*** | -3.72 |
| *BIG10* | -0.014** | -4.6 | -0.012*** | -4.14 | -0.050*** | -16.36 |
| *ACER* | 0.005** | 2.03 | 0.002 | 0.76 | 0.025*** | 5.99 |
| *BIG10*ACER* | -0.003 | -0.73 | 0.000 | -0.14 | -0.026*** | -4.12 |
| *LSIZE* | -0.022*** | -15.12 | -0.019*** | -14.88 | 0.018*** | 7.83 |
| *LAGE* | -0.021*** | -11.67 | -0.008*** | -4.9 | -0.050*** | -17.11 |
| *STD* | -0.010 | -0.51 | -0.017 | -0.95 | -0.034 | -1.1 |
| *TOBINQ* | 0.006*** | 17.07 | 0.009*** | 29 | 0.017*** | 32.41 |
| *TURN* | -0.005*** | -32.2 | -0.001*** | -9.98 | -0.004*** | -19.14 |
| *ROA* | 0.037*** | 4.84 | -0.002 | -0.32 | -0.018 | -1.42 |
| *INST* | -0.029*** | -10.39 | -0.025*** | -9.93 | -0.045*** | -10.21 |
| *PRIV* | -0.002** | -2.47 | -0.004*** | -4.53 | -0.009*** | -6.02 |
| *YR07* | -0.057*** | -40.64 | -0.022*** | -17.17 | -0.004 | -1.59 |
| 行业 | 控制 | | 控制 | | 控制 | |
| LAMBDA | 0.006 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald chi2 | 13873.47 | | 3737.65 | | 3303.45 | |

表 8　盈余管理其他计量模型回归结果（续）

| 变量 | *PIN* | | *IASpread* | | *PRSpread* | |
|---|---|---|---|---|---|---|
| | Coef. | z | Coef. | z | Coef. | z |
| Panel B：Dechow *et al.*（1998）模型 | | | | | | |
| *CONS* | 0.388*** | 29.1 | 0.255*** | 21.32 | -0.068*** | -3.19 |
| *BIG10* | -0.014*** | -4.55 | -0.011*** | -3.88 | -0.053*** | -17.77 |
| *AACFO* | 0.014*** | 3.67 | 0.012*** | 3.46 | 0.028*** | 4.58 |
| *BIG10*AACFO* | -0.009 | -1.62 | -0.011** | -2.12 | -0.018** | -2.02 |
| *LSIZE* | -0.022*** | -15.37 | -0.020*** | -15.04 | 0.017*** | 7.4 |
| *LAGE* | -0.021*** | -11.74 | -0.008*** | -4.97 | -0.050*** | -17.13 |
| *STD* | -0.017 | -0.86 | -0.024 | -1.38 | -0.037 | -1.2 |
| *TOBINQ* | 0.006*** | 17.32 | 0.009*** | 29.19 | 0.018*** | 33.15 |
| *TURN* | -0.005*** | -32.23 | -0.001*** | -9.97 | -0.004*** | -19.17 |
| *ROA* | 0.034*** | 4.39 | -0.005 | -0.73 | -0.024* | -1.82 |
| *INST* | -0.029*** | -10.44 | -0.025*** | -10.01 | -0.045*** | -10.17 |
| *PRIV* | -0.002** | -2.5 | -0.004*** | -4.58 | -0.009*** | -6.01 |
| *YR077* | -0.057*** | -40.62 | -0.022*** | -17.1 | -0.004* | -1.66 |
| 行业 | 控制 | | 控制 | | 控制 | |
| LAMBDA | 0.006 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald chi2 | 13898.97 | | 3754.19 | | 3291.88 | |

数检验不显著。当因变量为 *IASpread* 时，*BIG10* 的系数为 -0.011，显著性水平为 1%，*AACFO* 的系数为 0.012，显著性水平为 1%，*BIG10* 和 *AACFO* 交互项的系数为 -0.011，显著性水平为 5%。当因变量为 *PRSpread* 时，*BIG10* 的系数为 -0.053，在 1%水平显著，*AACFO* 的系数为 0.028，也在 1%水平显著，*BIG10* 和 *AACFO* 交互项的系数为 -0.018，系数检验也在 5%水平上显著。综合表 8 的回归结果可知，采用异常营运资本应计额和异常现金流作为盈余管理替代变量时，仍然发现，经十大审计的公司的盈余管理引起的买卖价差更小，这表明在盈余管理数额相同时，十大审计的公司的信息不对称程度更低，十大发挥了比非十大更好的审计治理作用，更有利于保护投资者利益。

## 四、 研究结论

基于信息不对称视角，本文提供的经验证据支持了大型事务所能够提供高审计质量的证据，发现十大事务所审计的公司的可操控应计额质量更高，信息不对称程度更低。在研究设计上采用了知情交易概率 *PIN* 和买卖价差 *IASpread*、*PRspread* 等三个变量测度信息不对称程度，以修正 Jones（1991）模型计算的可操控应计额作为盈余管理的测度变量，把国内事务所划分为十大和非十大，探索不同规模事务所审计的可操控应计额的信息含量是否存在差异。实证结果发现，十大审计的公司的可操控应计额与信息不对称的正相关关系更弱，也就是说十大的审计弱化了可操控应计额与信息不对称的正相关关系。这表明十大比非十大事务所审计的财务报告中的可操控应计额更可能是传递价值相关性信息的应计额，信息含量更高。随后我们又进一步考虑事务所选择的内生性，按事务所规模进行分组检验，将盈余管理的衡量指标替换为 Dechow and Dichev（2002）模型和 Dechow *et al.*（1998）模型估算的异常营运资本应计额和异常经营活动现金流的绝对值，但实证结果仍然发现，十大事务所的审计弱化了公司盈余管理与知情交易概率 *PIN* 或买卖价差 *IASpread* 和 *PRSpread* 的正相关关系，与本文提出的研究假设一致。

本文的研究思路为今后类似研究提供了参考，在利用可操控应计额进行相关研究时，不仅要考虑可操控应计额的数量，还要区分可操控应计额的性质。也在一定程度上解释了为什么在一些低法律风险国家未能发现大型事务所与小型事务所审计的可操控应计额存在差异的原因，很可能在低法律风险国家，大型事务所虽然放宽了审计重要性水平，所允许的可操控应计额更高，但主要允许的是价值相关性的应计额管理。但值得注意的是，本文主要集中于从信息不对称角度讨论不同规模事务所审计的可操控应计额的质量差异，未来的研究可以从更广泛的视角开展研究。

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# Audit Firm Size, Earnings Management, and Information Asymmetry[1]

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## Abstract

Using a sample of 8,788 observations from Chinese listed firms from 2001 to 2009, we investigate the difference in the information content of discretionary accruals between those audited by Top 10 and non-Top 10 accounting firms. We find that discretionary accruals are positively related to the probability of informed trading (*PIN*) and bid-ask spreads; the larger the discretionary accruals, the higher will be *PIN*, the level of information asymmetry, and bid-ask spreads. Furthermore, we argue that the significance level of the correlation between discretionary accruals and *PIN*/bid-ask spreads differs between companies audited by Top 10 and by other firms. The positive relationship between discretionary accruals and *PIN*/bid-ask spreads is significantly weaker in companies audited by the Top 10. This indicates that the Top 10 firms are better at restraining opportunistic earnings management, and also that the information content of their clients' discretionary accruals is higher and their information asymmetry lower. Our study contributes to a better understanding of the two types of earnings management through manipulating discretionary accruals; one is based on delivering value-related information and the other arises from opportunism.

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## I. Introduction

Accrual-based accounting leads to the division of total accruals into nondiscretionary and discretionary components. The latter are the proportion of accruals that management chooses to report, taking advantage of the diversity of accounting treatments available and the freedom to exercise professional judgment (Jones, 1991; Gul *et al.*, 2003). Management may decide to manipulate accruals for two purposes. The first is to deliver value-related information to the market and investors, or in other words, to produce value-related discretionary accruals (Healy and Palepu, 1993). The second is to manage earnings to maximise management compensation or meet regulatory requirements, a process referred to as opportunistic discretionary accruals (Christie and Zimmerman, 1994). Either type of discretionary accruals increases the uncertainty of earnings, but opportunistic discretionary accruals are generated solely by earnings management and are irrelevant to the company's future value. This leads to higher uncertainty and lower information disclosure quality.

External auditing is an important corporate governance tool and plays a significant role in reducing agency costs as well as information asymmetry (Jensen and Meckling, 1976). In an audit of financial reports, the auditor will rectify the reporting of unjustified earnings through audit adjustment so as to guarantee the quality of information disclosure. However, the auditor will issue a qualified audit opinion if the company refuses to make the requested adjustments, so as to make problems of information disclosure clear to investors so they can protect their interests. Audit firms of different sizes usually demonstrate different levels of prudence and independence, with many researchers having shown that larger firms show more of both and tend to produce financial report audits which have higher earnings quality (Becker *et al.*, 1998; Francis *et al.*, 1999; Francis and Krishnan, 1999; Hsieh and Tsai, 2004).

However, when it comes to the study of the relationship between the scale of audit firms and earnings quality, the literature focuses mainly on analysing how firm size affects the level of earnings management, particularly in terms of the amount of discretionary accruals (Becker *et al.*, 1998; Francis *et al.*, 1999; Kim, Chung, and Firth, 2003). Such work ignores the diverse nature of discretionary accruals. Even if the same amount of them is being performed, the level of uncertainty which results, and the content of the information, may be different. Based on this literature, this study further

investigates differences in the information content of discretionary accruals between companies audited by firms of different sizes. We use a sample of 8,788 observations of Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges from 2001 to 2009, and show that discretionary accruals are significantly and positively related to the probability of informed trading (*PIN*) and bid-ask spreads. This is because the lack of transparency caused by discretionary accruals triggers the expansion of *PIN* and bid-ask spreads. However, audits conducted by large firms dampen the positive relationship between discretionary accruals and *PIN*/bid-ask spreads, indicating that discretionary accruals audited by such organisations have a lower level of uncertainty and deliver more value-related information. This reduces the *PIN* decline and bid-ask spreads, providing better protection for investors.

This study aims to contribute to the development of the existing literature in three ways. Firstly, unlike previous studies, it not only analyses the effect of the scale of audit firms on discretionary accruals, but also investigates the difference in information content between discretionary accruals audited by firms of different sizes from the perspective of information asymmetry. Secondly, it incorporates information quality indicators such as *PIN* and bid-ask spreads into the field of audit quality testing. While the existing literature mainly uses abnormal returns or the discounted pricing of initial public offerings (IPOs) to measure the information content of audit products (Teoh and Wong, 1993; Jang and Lin, 1993; Krishnan, 2003), this study introduces *PIN* and bid-ask spreads to offer a new perspective. Moreover, as an emerging market, the Chinese securities market has characteristics that are relevant to the aims of this study. Its earnings management is more rigorous (Aharony *et al.*, 2000; Chen and Yuan, 2004), as represented by various types of insider trading based on private information (Fu and Tan, 2008; Xue and Jiang, 2008; Yan and Zhao, 2006; Zhu, 2003). After promulgating the *Guidance on Identifying Insider Trading* and the *Guidance on Identifying Market Manipulation* in 2007, the China Securities Regulatory Commission (CSRC) referred eight cases of insider trading and two of market manipulation to public security organisations from 2008 to March 2009. It is thus apparent that information asymmetry will greatly affect information efficiency and harm investors' interests. Earnings management, which is used to obscure information, and investors' need to obtain value-related information through earnings disclosure, exist alongside one another. In addition, auditors tend to restrain opportunistic earnings management that reduces information transparency, and to allow earnings management that delivers value-related information, so as to avoid taking responsibility.

Thirdly, this study helps to explain a divergence in the existing literature. Although several studies have discovered a lower level of discretionary accruals in companies

audited by the Big Four firms, others have not. Piot and Janin (2007) analyse the French capital market and find no significant differences in discretionary accruals between companies audited by the Big Five and non-Big Five firms, whether or not the absolute value of discretionary accruals is used. This suggests that firm scale has no restraining effect on earnings management in France. Liu and Zhou (2007) also find no significant differences in discretionary accruals between companies audited by the international Big Four and non-Big Four firms. The currently favoured explanation for these inconsistent conclusions is that the legal risks in France and mainland China are lower than those found in the US and Australia, influencing auditors' behaviour. In an audit environment with low legal risk, large audit firms no longer face the risk of "deep pocket" litigation (Piot and Janin, 2007), and the losses caused by audit failure therefore decline. In particular, low legal risk inevitably results in low audit quality when a firm faces market inefficiency in response to auditing need, and large audit firms will adjust quality according to their own assessment of professional risk (Liu and Xu, 2002). Consequently, there are no differences between large and small audit firms in terms of the amount of prudence applied to earnings management. However, the literature referred to above shows only that there are no significant differences in the *amount* of discretionary accruals between companies audited by large and small audit firms. It may still be the case that there significant differences in their information content. If so, there would still be a distinction between the audit quality of large and small audit firms. This study helps to explain this difference.

## II. Literature Review and Research Hypothesis

### 2.1 Scale of Accounting Firms and Earnings Management

Large accounting firms tend to deliver better audit quality for the following reasons. As described by DeAngelo *et al.* (1981), they must deal with the significant reputational consequences of an audit failure, due to the presence of quasi-rent. The authors suggest that large audit firms have to bear the costs not only of litigation and compensation but also the loss of current or potential clients as a result of such reputational damage. Since large firms have much more to lose than small firms in the event of audit failure, they have a stronger motivation to maintain independence and prudence. The other reason is put forward by Craswell, Francis, and Taylor (1995) and Hogan and Jeter (1999), who argue that large, brand leader audit firms are more likely to invest in business specialisation and have a more elaborated division of audit teams, allowing their staff to accumulate professional experience and enhance their professional abilities more rapidly.

In addition, such firms are more likely to hire and deploy experienced auditors who are familiar with the industries in which their clients operate, thereby increasing the competence of the team. There is abundant empirical evidence to support this proposition and show that large audit firms are more sensitive to earnings management. Beck *et al.* (1998), Francis *et al.* (1999), Kim, Chung, and Firth (2003), Hsieh and Tsai (2004), and Zhou and Elder (2004) all compare earnings management between companies audited by different-sized firms, and find a significantly lower level of discretionary accruals in companies audited by the Big Five or Six. In terms of the Chinese capital market, Li and Nie (2006) and Qi *et al.* (2004) find that companies audited by large firms demonstrate a lower level of earnings management. Wu and Li (2006) also show that there is a significant difference in the restraining levels of earnings management between companies audited by the Big Four and those audited by the Chinese Top Ten firms, as well as between the latter group and those audited by other companies.

## 2.2 Earnings Management and Information Asymmetry

There are close connections between earnings management and information asymmetry. In the early literature, Welker (1995) shows that bid-ask spreads are inversely related to disclosure policy. Relative bid-ask spreads for firms with disclosure rankings in the bottom third of the empirical distribution are approximately 50 per cent higher than for firms ranked in the top third. According to Leuz and Verrechia (2000), the bid-ask spreads of German companies switching from the German to the international reporting regime (the International Accounting Standards or the Generally Accepted Accounting Principles of the US) decline while trading volume increases. Moreover, firms with relatively less predictable earnings have consistently higher total bid-ask spreads than firms whose earnings are more predictable (Affleck-Graves, Callahan, and Chipalkatti, 2002). Similarly, the results of Hefin, Shaw, and Wild (2005) show a robust inverse relationship between disclosure ratings and depth-adjusted effective spreads across all trade sizes. Using the disclosure scores given by the Association for Investment Management and Research (AIMR) as a proxy for disclosure quality, Brown and Hillegeist (2007) show that disclosure quality (assessed by reference to annual financial reports) is notably and negatively associated with *PIN*. High disclosure quality attracts more uninformed traders, triggering a decline in *PIN*. Although these studies do not directly analyse the relationship between earnings management and information asymmetry, they still offer a detailed description of how the disclosure quality of earnings influences the latter. On the other hand, Richardson (2000), Ascioglu *et al.* (2012), and Bhattacharya *et al.* (2012) look directly at the association between discretionary accruals and information asymmetry. According to Richardson (2000), there is a consistent and

significantly positive association between discretionary accruals and bid-ask spreads, whether the time-series or cross-sectional modified Jones model is adopted. Using the difference between earnings volatility and cash flows volatility as a proxy for accruals quality, and bid-ask spreads and *PIN* as a proxy for informed trading, Jayaraman (2008) examines the relationship between accruals quality and information asymmetry and finds that *PIN* is higher when earnings are smoother than cash flows and when earnings are more volatile than cash flows. Ascioglu *et al.* (2012) adopt the Dechow and Dichew (2002) (DD) model, using the tendency of managers to avoid reporting losses, real earnings management, and the level of abnormal discretionary expenses to measure earnings management and analyse its relationship to market liquidity. They show that firms which exhibit a higher level of earnings management are associated with lower market liquidity and higher *PIN*. Using the standard deviation of residuals from the modified DD model (Francis *et al.*, 2005) as a proxy for accruals quality, Bhattacharya, Desai, and Venkataraman (2012) find that the lower this is, the higher the level of information asymmetry. Furthermore, they decompose accruals into "innate" and discretionary types, so as to further investigate the effect of these two components on information asymmetry. Bhattacharya *et al.* (2012) also examine the relationship between earnings quality and information asymmetry, and find that declining bid-ask spreads/*PIN* are associated with increasing accruals quality. Moreover, this also has a direct influence on the cost of equity capital. If it decreases, the information risk as well as the cost of equity capital would increase.

## 2.3 Research Hypothesis

The motivation to carry out earnings management can be divided into two types (Gul, Chen, and Tsui, 2003). One is opportunistic, where illegitimate interests are being pursued (Christie and Zimmernan, 1994); the other is the delivery of value-related information about companies' future operating results (Healy and Palepu, 1993; Francis, Maydew, and Sparks, 1999). In other words, earnings management can be divided into the opportunistic and decision useful. Healy and Wahlen (1999) argue that companies may manage their earnings for a potential management buy-out; a stock issue; the payment of stock-based compensation; insider trading; to meet the requirements of remuneration and debt contracts; or to evade government, industrial, and/or antitrust supervision. At the same time, decision-usefulness earnings management may be used to deliver value-related information, according to the studies of Subramanyam (1996), Hunt, Moyer, and Shevlin (2000), and Tucker and Zarowin (2006). There is a positive relationship between discretionary accruals and shares return (Subramanyam, 1996), and income smoothing by companies enhances the contemporaneous price-earnings

relationship (Hunt, Moyer, and Shevlin, 2000). Moreover, Tucker and Zarowin (2006) find that income smoothing reveals information about firms' future earnings and cash flows. According to Gul, Leung, and Srinidhi (2003), the discretionary accruals of companies with a high-investment opportunity set (IOS) increase the value relevance of their earnings.

The risks of misstatement are different for the two types of earnings management defined above. Since discretionary accruals manipulated by opportunistic earnings management have no connections with future earnings and cash flows, they are associated with a higher level of uncertainty and misstatement risk. However, discretionary accruals manipulated by decision-usefulness earnings management reflect the realisability of companies' future earnings and cash flows and deliver useful information, so the misstatement risk is lower (Chen and Lin, 2011). If larger audit firms have a higher level of professional competence, they will find it easier to distinguish between the two types of earnings management. Meanwhile, if such firms also have a higher level of independence and prudence, they will have greater motivation to restrain opportunistic and allow decision-usefulness earnings management.

Do Chinese large audit firms meet these requirements? In fact, not only do they attract more attention from government regulators, but they also play a special role in certain economic activities and bear the responsibility of improving audit quality and reputation. Regulatory authorities have always expected Chinese audit firms to become bigger and stronger, and they have promoted consolidation on many occasions. In 2000, the Ministry of Finance promulgated *Instructions on Some Issues of Expansion of Accounting Firms* and *Interim Provisions for Approval Administration of Accounting Firms Consolidation* for the purpose of enhancing the size and quality of domestic audit firms. In 2007, the Chinese Institute of Certified Public Accountants (CICPA) published its opinions on how Chinese audit firms could become bigger, stronger, and more internationalised. In 2009, the General Office of the State Council put forward the *Notification of Opinions on Accelerating the Improvement of Chinese Certified Public Accountants Industry* as issued by the Ministry of Finance. This measure strove to support the reformation and innovation of Chinese audit firms and encourage optimisation, mergers, restructuring, and alliances so as to enhance the development of the audit industry. In 2011, CICPA announced the 2011-2015 development plan for the Chinese certified public accountancy industry with the aim of encouraging large firms to become even bigger and stronger so that they would become leading powers, and to guide small- and medium-sized firms to become specialised and enhance quality. The Institute plans to develop about 10 large audit firms such that their practitioners' networks, service capability, income size, and market influence will reach international standards,

with at least three firms (excluding international cooperation accounting firms) entering the ranks of the global Top 20. These policies and measurements reflect the support from, and enhanced regulation of, large firms by the Chinese government, given that such firms are effectively the platform for disseminating and promoting high audit quality by the regulatory authorities in mainland China. Many certified public accountants in large firms have been elected to be members of the National People's Congress (NPC) or Chinese People's Political Consultative Conference (CPPCC). All this attention from the regulatory authorities and the public exerts an invisible pressure on large audit firms that helps to intensify quality control and promote audit quality. Additionally, audit firms involved with large state-owned or centrally administered enterprises normally have to meet the special requirements of the State-owned Assets Supervision and Administration Commission (SASAC). For example, in principle, audit firms undertaking the final financial audit of central enterprises should rank among the Top 100 of Chinese audit firms as sorted by comprehensive assessment,[3] and audit firms delegated by the SASAC to do the final financial audit on companies whose total assets exceed RMB100 billion should have no fewer than 100 certified public accountants on staff.[4] These requirements contribute to enhancing the reputation of audit firms and making them bigger and stronger. Furthermore, a large volume of empirical research shows that the audit quality of large Chinese audit firms is higher than that of small- and medium-sized firms (Li and Nie, 2006; Wu and Li, 2006). Therefore, we have reason to infer that large Chinese audit firms will display more professional competence, independence, and prudence than small- and medium-sized companies.

As a result of the measures described above, large Chinese audit firms play a role in restraining the amount of earnings management, but even if this is the same, companies audited by large firms are more likely to conduct decision-usefulness earnings management and demonstrate higher quality in earnings. Since earnings quality is closely associated with information asymmetry, discretionary accruals in companies audited by large audit firms are more likely to be used for decision-usefulness earnings management, which delivers value-related information and has more content as well as less asymmetry. Hence, this study tests the hypothesis that discretionary accruals in firms audited by large firms have a higher level of information content and a lower level of information asymmetry.

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[3] See the *Notification of Issues on Audit Firms Undertaking Final Financial Audit of Central Enterprises* as promulgated by the Chinese Ministry of Finance.

[4] See the *Interim Measures for Unification of Audit Firms Delegated by SASAC* as promulgated by SASAC.

# III. Empirical Analysis and Findings

## 3.1 Research Design

### 3.1.1. Research models

In order to test whether earnings management in companies audited by large firms contains more information, this paper employs three variables to measure information asymmetry; *PIN*, *IASpread,* and *PRSpread* according to Glosten and Harris (1988) and Glosten (1987). These variables are used to modify the calculations of discretionary accruals (Jones, 1991) in measuring earnings management. *PIN* reflects the probability of stock trading based on private information. The higher it is, the more prevalent such trading and the lower the information transparency. As discretionary accruals intensify information nontransparency and uncertainty, in theory there will be a positive relationship between discretionary accruals and *PIN*, with a higher level of the former leading to a higher *PIN* (Kim, Li, and Li, 2012). Similarly, the bid-ask spread goes up along with the increase in discretionary accruals. If all, or at least most, of the discretionary accruals audited by large firms are used to deliver value-related information, their uncertainty would decrease, leading to less uncertainty and more information transparency. In turn, this would result in a reduction in *PIN* and bid-ask spreads. In other words, discretionary accruals of companies audited by large firms have a weaker positive relationship with *PIN*, *IASpread*, and *PRSpread*, while the interaction term between large audit firms and discretionary accruals will be negatively related to *PIN*, *IASpread*, and *PRSpread*. The testing model can be specified as follows:

$$\begin{aligned} INFOASY = {} & \alpha + \beta_1 BIG10 + \beta_2 ABSDA + \beta_3 BIG10 * ABSDA \\ & + \beta_4 LSIZE + \beta_5 LAGE + \beta_6 STD + \beta_7 TOBINQ \\ & + \beta_8 TURN + \beta_9 ROA + \beta_{10} INST + \beta_{11} PRIV \\ & + \beta_{12} YR07 + \sum \beta_{13-i} IND_i + \varepsilon \end{aligned} \tag{1}$$

(1) Dependent variables

*INFOASY* is the dependent variable indicating information asymmetry. It is used to represent the level of information disclosure transparency of firms and includes three indicators; *PIN*, *IASpread*, and *PRSpread*.

(2) Tested variables

*BIG10* indicates the scale of the accounting firm. If it belongs to the Chinese Top 10 firms, *BIG10* equals 1, and 0 otherwise. The division of the Top 10 is in accordance with

the list of Top 100 audit firms published by the CICPA every year,[5] the Top 10 of which are defined as *BIG10* (excluding the international Big Four) and the others as *Non_BIG10*. According to our expectations, the audit quality of large firms is higher, leading to a lower *PIN* for the companies they audit and a significantly negative coefficient for *BIG10*.

*ABSDA* is the absolute value of current discretionary accruals (*DA*), which is derived from the modified cross-sectional Jones model. As such accruals obscure companies' information disclosure transparency, causing a rise in *PIN*, the expected coefficient of *ABSDA* is significantly positive.

*BIG10*ABSDA*, the interaction term between large audit firms and discretionary accruals, is the principal variable tested in this study. If the information content of discretionary accruals audited by large firms is higher than that involving other audit firms, causing a decline in information asymmetry, the expected coefficient of the interaction term will be significantly negative.

(3) Control variables

Except for the above, all the other variables in our model are control variables chosen according to Aslan *et al.* (2011) and Kim, Li, and Li (2012). *LSIZE* is the natural logarithm of the market value of shareholders' equity. *LAGE* is the natural logarithm of the number of listed years. *STD* is the standard deviation of a company's daily rate of return in the current year. *TOBINQ* is a company's Tobin's Q ratio. *TURN* is a company's stock turnover rate in the current year, equivalent to the trading volume divided by the number of outstanding shares. *ROA* is a company's rate of return on total assets in the current year. *INST* is the shareholding ratio of institutional investors in a company at the end of the current year. *PRIV* is a dummy variable for company nature, which equals 1 if the company is a private enterprise, and 0 otherwise. *YR07* is a dummy variable for the year, set to control for the possible effects on information transparency of the adoption of

[5] Before 2006, the CICPA used internationally-accepted practice to sort audit firms; that is, ranking previous-year operating income. The top firm was the one with the highest operating income. In 2006, the CICPA began to evaluate audit firms more comprehensively, using five indicators; total revenue, number of CPAs, percentage of training accomplishments, number of back-ups for industry leaders, and penalty and punishment regimes. The comprehensive assessment score was arrived at as follows: total revenue scores + number of CPA scores + percentage of training accomplishment scores + number of back-ups for industry leaders scores – conditions of penalty and punishment on audit firms and CPA scores. Although the sorting rules have changed, the ranking results still show that operating income plays a leading role. In our sample, there is only one audit firm whose operating income ranks within the Chinese Top 10 but has a comprehensive rank of 12. All other audit firms rated as in the Top 10 also have operating income which ranks within this group. Since the Top 100 audit firms are ranked on the basis of data from the previous year, this study adopts the following year's ranking published by CICPA. In addition, the Top 100 ranking by CICPA started in 2003 (ranking audit firms in 2002), while the sample in this study starts from 2001. We choose to use the 2002 ranking to represent 2001 given that operating income ranking is relatively stable. Meanwhile, if we delete the samples from 2001, the research results are unaffected.

the Chinese new accounting principle system in 2007. *IND* is a dummy variable for industry, which is applied to control for the effect of industry difference. This paper employs the code classification of the CSRC, using a two-level code classification for the manufacturing industry and one-level code classification for other sectors. In addition, to avoid the influence of abnormal values, we winsorise the unnatural logarithm continuous variables at the upper and lower 1 per cent tails, according to Aslan *et al.* (2011).

### 3.1.2 Calculation of *PIN*, *IASpread*, and *PRSpread*

*PIN* was first proposed by Easley *et al.* (1996) and reflects the proportion of market transactions based on private information. It has since been widely used (Easley *et al.*, 2002; Jayaraman, 2008; Karin, 2010; Kim *et al.*, 2012; Vega, 2006) and is considered an important indicator for measuring information asymmetry. However, Mohanram and Raigopal (2009) cast doubt on whether *PIN* is a good reflection of information asymmetry. They find that the liquidity effect of the part of *PIN* that is unrelated to information asymmetry explains its relationship to cross-sectional expected return. The calculations in this paper are performed in accordance with Easley *et al.* (2008). We obtain parameter estimates of *PIN* according to the following steps, which start with determining the likelihood function per unit time:

$$
\begin{aligned}
L(\theta \mid B,S) = {} & (1-\alpha)e^{-\varepsilon_b}\frac{\varepsilon_b^{\,B}}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^{\,S}}{S!} \\
& + \alpha\delta e^{-\varepsilon_b}\frac{\varepsilon_b^{\,B}}{B!}e^{-(\mu+\varepsilon_s)}\frac{(\mu+\varepsilon_s)^{S}}{S!} \\
& + \alpha(1-\delta)e^{-(\mu+\varepsilon_b)}\frac{(\mu+\varepsilon_b)^{B}}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^{\,S}}{S!}
\end{aligned}
$$

In this function, $B$ and $S$ denote the number of bids and asks per unit of time, respectively. The five parameters in $\theta = (\alpha, \mu, \delta, \varepsilon_b, \varepsilon_s)$ are all undetermined variables which should be estimated by the maximum likelihood method. $\alpha$ denotes the probability of the occurrence of information events; $\delta$ the probability of a bad news event; $\mu$ the effective reach of orders by informed traders; and $\varepsilon_b$ the effective reach of orders by uninformed traders. We use the method of Lee and Ready (1991) to determine the directions of orders. Supposing each day's information is mutually independent, the likelihood function for a certain period (I) is as follows:

$$
L(\theta \mid M) = \prod_{i=1}^{I} L(\theta \mid B_i, S_i)
$$

Taking the logarithm in both sides, the function can be expressed in the form of

summation without changing the monotonicity. On this basis, we calculate ($\alpha$, $\mu$, $\delta$, $\varepsilon_b$, $\varepsilon_s$) through an optimiser and get *PIN*:

$$PIN = \frac{\alpha\mu}{\alpha\mu + \varepsilon_b + \varepsilon_s}$$

In the literature on market microstructure, the bid-ask spread is an important indicator for measuring liquidity risk in stock markets, since it reflects the level of information asymmetry. Glosten and Harris (1988) and Stoll (1989) find that the chief component of bid-ask spreads is information asymmetry, and Chung *et al.* (1995), Huang and Stoll (1997), Gregoriou *et al.* (2005), and Gong (2007) all believe that bid-ask spreads reflect information asymmetry. Thus we also choose bid-ask spreads to measure information asymmetry. Bid-ask spreads are calculated in two ways: *IASpread* and *PRSpread*. *IASpread* is calculated according to Glosten and Harris (1988). To be specific, we extract the proportion of information asymmetry from the bid-ask spreads of stock trading using the following regression function:

$$\begin{aligned}\Delta PRICE_{i,s} = {} & C_0 \Delta TRADE_{i,s} + C_1 \Delta TRADE_{i,s} \times TRADESIZE_{i,s} \\ & + Z_0 TRADE_{i,s} + Z_1 TRADE_{i,s} \times TRADESIZE_{i,s} + \varepsilon\end{aligned} \tag{2}$$

In every trading hour of company *i*, $\Delta PRICE$ denotes the change in prices divided by the last trading price; *TRADESIZE* the trading volume (number of shares), and *TRADE* is the indicator variable that takes the value of +1 for a trade initiated by the buyer and -1 for a trade initiated by the seller. In each round of trades, the noninformation asymmetry proportion (NIASpread) is calculated by $2(C_0 + C_1 TRADESIZE)$ while the information asymmetry proportion (*IASpread*) is $2(Z_0 + Z_1 TRADESIZE)$. In the final calculation of *IASpread*, we use average trading size (*AVGTRADESIZE*), which is the average value of all trading volume during the current day. Furthermore, we take the average value of all daily *IASpread* of company *i* in the current year to get the yearly *IASpread*.

*PRSpread* is calculated according to Glosten (1987) using the following function:

$$PRSprd = \frac{P_a - P_b}{\frac{1}{2}(P_a + P_b)}$$

$P_a$ and $P_b$ represent ask quotes and bid quotes, respectively. Similarly, we calculate the weighted average of the spreads of company *i* on the basis of each day's trading volume, then take the average value of all daily PRSpreads in the current year.

### 3.1.3 Calculation of discretionary accruals

The modified cross-sectional Jones model is used to calculate discretionary accruals (*DA*) using the following procedures.

Firstly, we calculate nondiscretionary accruals (*NDA*) using the function below:

$$NDA_i = \alpha_1(1/A_{i-1}) + \alpha_2[(\Delta REV_i - \Delta REC_i)/A_{i-1}] + \alpha_3(PPE_i/A_{i-1}) + \varepsilon$$

$NDA_i$ denotes nondiscretionary accruals after adjusting for total assets at the end of the last year; $\Delta REV_i$ the difference in core business revenues between the current and previous periods; $\Delta REC_i$ the difference in accounts receivable between the current and previous periods; $PPE_i$ the current value of property, plant, and equipment; and $A_{i-1}$ total assets at the end of the last period. The coefficients $\alpha_1$, $\alpha_2$, and $\alpha_3$ are calculated through the following function, denoted by $\beta_1$, $\beta_2$, and $\beta_3$, respectively:

$$TA_i/A_{i-1} = \beta_1(1/A_{i-1}) + \beta_2(\Delta REV_i/A_{i-1}) + \beta_3(PPE_i/A_{i-1})$$

$TA_i$ in this function represents the total accruals at time *t*, including below-line items, while the meanings of other variables are the same as given above. The samples we use to estimate coefficients consist of the total samples except those from the finance and insurance industries, which are classified by industry and year for the estimation of coefficients.

After estimating nondiscretionary accruals, discretionary accruals are calculated through the following function:

$$DA_i = TA_i/A_{i-1} - NDA_i$$

$DA_i$ denotes the discretionary accruals after adjusting the total assets at the end of the last period. The absolute value of $DA_i$ is processed into our testing model.

## 3.2 Empirical Results

### 3.2.1 Sample and descriptive statistics

The data for this study mainly come from the CSMAR and WIND databases. We use a sample of A-share listed companies from 2001 to 2009, filtered to remove the following companies; those for which qualified audit opinions have been issued, those from the finance and insurance industry, those issuing A and B shares simultaneously, those audited by the Big Four firms, and those lacking data for the test variables.[6] We obtain a final sample of 8,788 annual observations. Table 1 displays the descriptive statistics of

[6] This study excludes sample companies audited by the international Big Four firms mainly because (1) it concentrates on investigating the differences between large and small Chinese firms; and (2) Liu and Zhou (2007) and Chen, Wang, and Chen (2013) find that the behaviour of international Big Four firms is different in mainland China than in other countries.

relevant variables. *PIN* has a mean of 0.126, a minimum value of 0.014, and a maximum value of 0.295, all of which are lower than 0.178 as calculated by Zhang (2008) but close to 0.13 as calculated by Chan, Menkveld, and Yang (2008). This is probably because Zhang's samples are all special firms. The means of *IASpread* and *PRSpread* are 0.064 and 0.049, respectively. The mean of *BIG10* is 0.274, indicating that firms audited by the Chinese Top 10 firms account for 27.4 per cent of the whole sample in this study. The mean of the absolute value of discretionary accruals (*ABSDA*) is 0.101, indicating that the discretionary accruals of listed firms account for 10.1 per cent of total assets in the last year. This is much higher than the 5.6 per cent calculated by Aslan *et al.* (2011) for the US market. Moreover, as shown by the control variables, the stock turnover rate of Chinese listed companies is 4.975; total return on assets (*ROA*) is 5.2 per cent; the shareholding proportion of institutional investors is 14.9 per cent, and private companies account for 30.2 per cent of our sample firms.

**Table 1 Descriptive Statistics**

| Variable | Q1 | Mean | Median | Q3 | Std | Min | Max |
|---|---|---|---|---|---|---|---|
| *PIN* | 0.079 | 0.126 | 0.131 | 0.167 | 0.063 | 0.014 | 0.295 |
| *IASpread* | 0.029 | 0.064 | 0.057 | 0.088 | 0.042 | 0.010 | 0.212 |
| *PRSpread* | 0.016 | 0.049 | 0.023 | 0.046 | 0.071 | 0.011 | 0.560 |
| *BIG10* | 0.000 | 0.274 | 0.000 | 1.000 | 0.446 | 0.000 | 1.000 |
| *ABSDA* | 0.028 | 0.101 | 0.063 | 0.119 | 0.185 | 0.000 | 7.658 |
| *LSIZE* | 9.079 | 9.361 | 9.317 | 9.591 | 0.405 | 8.201 | 11.337 |
| *LAGE* | 0.699 | 0.840 | 0.903 | 1.041 | 0.251 | 0.000 | 1.301 |
| *STD* | 0.022 | 0.031 | 0.029 | 0.037 | 0.023 | 0.002 | 0.980 |
| *TOBINQ* | 1.325 | 2.230 | 1.796 | 2.623 | 1.416 | 0.901 | 10.978 |
| *TURN* | 1.949 | 4.975 | 3.693 | 6.945 | 3.932 | 0.037 | 31.030 |
| *ROA* | 0.029 | 0.052 | 0.050 | 0.079 | 0.062 | -0.469 | 0.249 |
| *INST* | 0.001 | 0.149 | 0.049 | 0.233 | 0.201 | 0.000 | 0.985 |
| *PRIV* | 0.000 | 0.302 | 0.000 | 1.000 | 0.459 | 0.000 | 1.000 |
| *YR07* | 0.000 | 0.387 | 0.000 | 1.000 | 0.487 | 0.000 | 1.000 |

Table 2 reports the correlation coefficients between the dependent and tested variables. The correlation coefficients between *PIN* and *BIG10* as well as *BIG10*ABSDA* are -0.209 and -0.077, respectively, with a significance level above 1 per cent. *PIN* is negatively associated with *ABSDA*, which is contrary to our expectations, but the correlation coefficient is not significant ($\rho$ = -0.016). The correlation coefficients between *IASpread* and *BIG10* as well as *BIG10*ABSDA* are -0.173 and -0.063, respectively, with

a significance level at above 1 per cent, while *IASpread* is nonsignificantly associated with *ABSDA* ($\rho = 0.005$). The correlation coefficients between *PRSpread* and *BIG10* as well as *ABSDA* are 0.065 and 0.052, respectively, with a level of significance above 1 per cent, while *PRSpread* is nonsignificantly associated with *BIG10*ABSDA*. These results primarily show that companies audited by the Big Four firms have a lower level of information asymmetry due to the reduced uncertainty of discretionary accruals, and having a Big Four audit decreases the probability of informed trading caused by discretionary accruals and provides better investor protection. However, this analysis only covers the correlation coefficients between two single variables, without controlling for the effects of other factors. Therefore, we need to perform a more reliable regression analysis based on controlling for these factors as well.

**Table 2 Correlation Coefficient Analysis**

| | *PIN* | *PRSpread* | *IASpread* | *BIG10* | *ABSDA* | *BIG10*ABSDA* |
|---|---|---|---|---|---|---|
| *PIN* | 1.000 | | | | | |
| *PRSpread* | 0.305 | 1.000 | | | | |
| | (0.000)*** | | | | | |
| *IASpread* | 0.512 | 0.266 | 1.000 | | | |
| | (0.000)*** | (0.000)*** | | | | |
| *BIG10* | -0.209 | -0.065 | -0.173 | 1.000 | | |
| | (0.000)*** | (0.000)*** | (0.000)*** | | | |
| *ABSDA* | -0.016 | 0.052 | 0.005 | 0.014 | 1.000 | |
| | (0.148) | (0.000)*** | (0.617) | (0.197) | | |
| *BIG10*ABSDA* | -0.077 | -0.007 | -0.063 | 0.327 | 0.694 | 1.000 |
| | (0.000)*** | (0.490) | (0.000)*** | (0.000)*** | (0.000)*** | |

### 3.2.2 Results of the multiple regression analysis

Tables 3 to 5 present the results of using *PIN*, *IASpread*, and *PRSpread* separately as the variables for information asymmetry in our regression. We firstly introduced *BIG10* and *ABSDA*, respectively, then the interaction items, leading to a clearer analysis of the relationship between these variables and information asymmetry. The results of the regression adopting *PIN* as the dependent variable are shown in Table 3. Model (1) indicates that the coefficient of *BIG10* is -0.005 at a significance level of 1 per cent, while Model (2) indicates that the coefficient of *ABSDA* is 0.010 at a significance level of 1 per cent. After bringing both *BIG10* and *ABSDA* into the regression, Model (3) shows that

their coefficients are both significant at the 1 per cent level. Model (4) brings in the interaction item between *BIG10* and *ABSDA*, showing that the coefficients of *BIG10*, *ABSDA* and their interaction item are -0.003, 0.015, and -0.009, respectively, at a significance level of 1 per cent. All these regressions indicate there is a lower probability of informed trading in companies audited by the Top 10 firms. As the increase in discretionary accruals aggregates with information asymmetry, the probability of informed trading goes up; nevertheless, the significantly negative coefficient of the interaction term indicates that there are fewer informed traders in companies audited by the Top 10 firms due to the higher information transparency of discretionary accruals.

Moreover, the regression results of the control variables in Table 3 also show significantly negative coefficients for *LSIZE*, *LAGE*, *TURN*, *INST*, and *PRIV*, indicating that companies with a larger size, a longer listing history, a higher turnover rate of stock trading, and a higher shareholding ratio of institutional investors have a lower *PIN* based on private information in private enterprises, and a higher level of information transparency. The significantly positive coefficients of *TOBINQ* and *ROA* demonstrate that companies with a big Tobin's Q ratio and a high return on assets attract more informed traders and have a higher *PIN*. The coefficient of *YRO7* is significantly negative, indicating that information disclosure transparency has improved and *PIN* has greatly decreased since the adoption of the Chinese new accounting and auditing standard in 2007.

Table 4 displays regression results using *IASpread* as the variable representing information asymmetry. The regression coefficients of *BIG10* in Models (1), (3), and (4) are -0.005, -0.005 and -0.004, respectively (at a significance level of 1 per cent). The coefficients of *ABSDA* in Models (2), (3), and (4) are 0.006, 0.006, and 0.011, respectively (at a significance level of 1 per cent). The coefficient of the interaction item between *BIG10* and *ABSDA* in Model (4) is -0.009 at a significance level of 5 per cent. These results are consistent with our hypothesis that compared with *Non_BIG10*, the discretionary accruals of *BIG10* firms are more likely to deliver value-related information, leading to a lower level of information asymmetry and a smaller bid-ask spread. In addition, except *ROA* which has a significant coefficient, the regression results of other control variables are in accordance with Table 3.

Using *PRSpread* as the variable for information asymmetry, Table 5 shows regression results in which the coefficient of *BIG10* is insignificant, the coefficients of *ABSDA* in Models (1), (2), and (3) are 0.018, 0.018 and 0.031, respectively (at a significance level of 1 per cent), and the coefficient of interaction item between *BIG10* and *ABSDA* in Model (4) is -0.025 (at a significance level of 1 per cent). This indicates that even with an insignificant coefficient of *BIG10*, there is a significant interaction item

**Table 3 Regression Results of *PIN***

| Variable | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | 0.400*** | 31.93 | 0.405*** | 32.32 | 0.402*** | 32.08 | 0.401*** | 32.06 |
| *BIG10* | -0.004*** | -4.36 | | | -0.004*** | -4.34 | -0.003*** | -3.01 |
| *ABSDA* | | | 0.010*** | 4.37 | 0.010*** | 4.35 | 0.015*** | 4.48 |
| *BIG10*ABSDA* | | | | | | | -0.009** | -2.06 |
| *LSIZE* | -0.024*** | -17.58 | -0.024*** | -18.05 | -0.024*** | -17.74 | -0.024*** | -17.74 |
| *LAGE* | -0.022*** | -11.96 | -0.022*** | -11.96 | -0.022*** | -12.05 | -0.022*** | -12.07 |
| *STD* | -0.007 | -0.35 | -0.018 | -0.91 | -0.018 | -0.93 | -0.023 | -1.15 |
| *TOBINQ* | 0.006*** | 17.69 | 0.006*** | 17.77 | 0.006*** | 17.57 | 0.006*** | 17.47 |
| *TURN* | -0.005*** | -32.85 | -0.005*** | -32.86 | -0.005*** | -32.72 | -0.005*** | -32.75 |
| *ROA* | 0.039*** | 5.16 | 0.038*** | 5.04 | 0.038*** | 5.05 | 0.038*** | 5.03 |
| *INST* | -0.030*** | -10.86 | -0.031*** | -11.19 | -0.030*** | -10.89 | -0.030*** | -10.95 |
| *PRIV* | -0.002** | -2.49 | -0.002** | -2.56 | -0.003*** | -2.66 | -0.003*** | -2.68 |
| *YR07* | -0.057*** | -41.08 | -0.058*** | -41.64 | -0.057*** | -41.12 | -0.057*** | -41.01 |
| *INDUSTRY* | Controlled | | Controlled | | Controlled | | Controlled | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj. R-squared | 0.619 | | 0.619 | | 0.620 | | 0.620 | |

**Table 4 Regression Results of *IASpread***

| Variable | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | 0.262*** | 23.28 | 0.266*** | 23.67 | 0.263*** | 23.38 | 0.262*** | 23.36 |
| *BIG10* | -0.005*** | -5.71 | | | -0.005*** | -5.70 | -0.004*** | -4.21 |
| *ABSDA* | | | 0.006*** | 3.16 | 0.006*** | 3.14 | 0.011*** | 3.70 |
| *BIG10*ABSDA* | | | | | | | -0.009** | -2.13 |
| *LSIZE* | -0.020*** | -16.82 | -0.021*** | -17.30 | -0.021*** | -16.93 | -0.021*** | -16.92 |
| *LAGE* | -0.009*** | -5.31 | -0.009*** | -5.25 | -0.009*** | -5.37 | -0.009*** | -5.38 |
| *STD* | -0.015 | -0.83 | -0.022 | -1.22 | -0.022 | -1.25 | -0.026 | -1.47 |
| *TOBINQ* | 0.009*** | 29.49 | 0.009*** | 29.63 | 0.009*** | 29.40 | 0.009*** | 29.28 |
| *TURN* | -0.001*** | -10.01 | -0.001*** | -10.09 | -0.001*** | -9.91 | -0.001*** | -9.93 |
| *ROA* | -0.003 | -0.40 | -0.003 | -0.49 | -0.003 | -0.49 | -0.003 | -0.50 |
| *INST* | -0.025*** | -9.98 | -0.026*** | -10.38 | -0.025*** | -10.00 | -0.025*** | -10.06 |
| *PRIV* | -0.004*** | -4.66 | -0.004*** | -4.65 | -0.004*** | -4.78 | -0.004*** | -4.80 |
| *YR07* | -0.022*** | -17.63 | -0.023*** | -18.19 | -0.022*** | -17.64 | -0.022*** | -17.54 |
| *INDUSTRY* | Controlled | | Controlled | | Controlled | | Controlled | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj. R-squared | 0.304 | | 0.302 | | 0.305 | | 0.305 | |

**Table 5 Regression Results of *PRSpread***

| Variable | Model (1) | | Model (2) | | Model (3) | | Model (4) | |
|---|---|---|---|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. | Coef. | t-Stat. |
| *CONS* | -0.007 | -0.34 | -0.003 | -0.15 | -0.004 | -0.20 | -0.005 | -0.23 |
| *BIG10* | -0.001 | -0.88 | | | -0.001 | -0.86 | 0.001 | 0.61 |
| *ABSDA* | | | 0.018*** | 5.06 | 0.018*** | 5.05 | 0.031*** | 5.78 |
| *BIG10*ABSDA* | | | | | | | -0.023*** | -3.18 |
| *LSIZE* | 0.010*** | 4.67 | 0.010*** | 4.45 | 0.010*** | 4.49 | 0.010*** | 4.50 |
| *LAGE* | -0.053*** | -18.47 | -0.054*** | -18.57 | -0.054*** | -18.58 | -0.054*** | -18.61 |
| *STD* | -0.015 | -0.47 | -0.036 | -1.14 | -0.036 | -1.14 | -0.046 | -1.47 |
| *TOBINQ* | 0.018*** | 33.61 | 0.018*** | 33.57 | 0.018*** | 33.50 | 0.018*** | 33.34 |
| *TURN* | -0.005*** | -20.30 | -0.005*** | -20.19 | -0.005*** | -20.15 | -0.005*** | -20.20 |
| *ROA* | -0.013 | -1.04 | -0.014 | -1.18 | -0.014 | -1.18 | -0.015 | -1.21 |
| *INST* | -0.051*** | -11.75 | -0.052*** | -11.87 | -0.051*** | -11.79 | -0.052*** | -11.88 |
| *PRIV* | -0.011*** | -6.79 | -0.011*** | -6.97 | -0.011*** | -6.99 | -0.011*** | -7.01 |
| *YR07* | -0.006*** | -2.53 | -0.006*** | -2.63 | -0.006*** | -2.54 | -0.005** | -2.41 |
| *INDUSTRY* | Controlled | | Controlled | | Controlled | | Controlled | |
| N | 8788 | | 8788 | | 8788 | | 8788 | |
| Adj. R-squared | 0.247 | | 0.252 | | 0.252 | | 0.253 | |

effect of *BIG10* and *ABSDA* on *PRSpread*, and the discretionary accruals of companies audited by *BIG10* have a weaker positive relationship with *PRSpread*. This result still supports our hypothesis that there will be a lower level of information asymmetry in discretionary accruals of firms audited by *BIG10* firms.

In conclusion, the regression results in Tables 3 to 5 demonstrate that the scale of audit firms is significantly and negatively associated with information asymmetry. The bigger the firm, the lower the level of information asymmetry in the companies they audit, due to the better quality of information they provide. The absolute value of discretionary accruals is significantly and positively associated with information asymmetry. The higher the level of discretionary accruals, the higher will also be the level of information asymmetry since the existence of discretionary accruals dampens information transparency. The positive correlation between discretionary accruals and information in companies audited by *BIG10* firms is lower than that of companies audited by *Non_BIG10* firms. This means that the discretionary accruals of companies audited by *BIG10* have a higher level of transparency as well as a lower level of uncertainty. *BIG10* firms provide higher audit quality than *Non_BIG10* and give better investor protection.

### 3.2.3 Robustness testing

(1) Test results after controlling for endogeneity

The regressions in Tables 3 to 5 do not take into account the potential self-selection of audit firms. Using the work of Ireland and Lennox (2002) and Chaney *et al.* (2004) as a reference, we carry out a further analysis to consider endogeneity in our regression. Firstly, we construct the probit audit selection model by replicating the approach of previous studies (Ireland and Lennox, 2002; Chaney *et al.*, 2004), employing *LSIZE* (company size), *ROA* (return on assets), *CURR* (weight of current assets in total assets), *QUIK* (quick ratio), *LEV* (leverage), *ATURN* (asset turnover ratio), *LOSS* (whether a deficit is incurred in the current year), *SPE* (audit industry expertise), and *IND* (industry) as the variables. To account for the effect of corporate governance (for instance, a company with better corporate governance is more likely to choose a *BIG10* firm), we include two more variables: *INDP* (percentage of independent directors) and *DUAL* (dual role of president and general manager). The first-stage probit model is shown in the following formula (3):

$$\begin{aligned} BIG10 = {} & \alpha + \beta_1 LSIZE + \beta_2 ROA + \beta_3 CURR + \beta_4 QUIK \\ & + \beta_5 LEV + \beta_6 ATURN + \beta_7 LOSS + \beta_8 SPE \\ & + \beta_9 INDP + \beta_{10} DUAL + \sum \beta_{11-i} IND_i + \varepsilon \end{aligned} \tag{3}$$

Due to missing observations for some variables in the first-stage probit model, there are 8,646 samples in the two-stage regressions, whose detailed results are shown in Table 6. As can be seen, when choosing *IASpread* as the dependent variable, the coefficients of *BIG10* and *ABSDA* are -0.011 and 0.012, respectively (at a significance level of 1 per cent), and the coefficient of the interaction item between *BIG10* and *ABSDA* is -0.009 (at a significance level of 5 per cent). When choosing *PRSpread* as the dependent variable, the coefficients of *BIG10*, *ABSDA*, and the interaction item between *BIG10* and *ABSDA* are -0.052, 0.033, and -0.024, respectively (at a significance level of 1 per cent). Thus, after controlling for endogeneity, regardless of what variable is chosen to be the indicator of information asymmetry, the coefficients of *BIG10* and *ABSDA* are significantly negative. This is consistent with our hypothesis. Meanwhile, we find no material difference between the regression results in Tables 6 and 3.

In the two-stage regression, our results are clearly quite sensitive to the exclusion restrictions used in the second-stage model (Lennox, Francis, and Wang, 2012). Accordingly, we also perform a sensitivity test on the control variables in the second stage, replicating the work of Bushee, Matsumote, and Miller (2003) and employing the group of variables excluded in stage 1. No substantial changes are found in the regression results. At the same time, the variance inflation factor of the interaction item between *BIG10* and *ABSDA* is 2.448, indicating that multicollinearity does not affect the regression results.

(2) Group test results

According to the descriptive statistical analysis, firms audited by *BIG10* account for only 27.4 per cent of the total sample, while firms audited by *Non_BIG10* take up 72.6 per cent. Due to the large discrepancy, we alter the interactive test to a group test to measure whether there are significant differences in the coefficient of *ABSDA* between Group *BIG10* and Group *Non_BIG10*, and whether the coefficient of *ABSDA* in Group *BIG10* is significantly lower than that in Group *Non_BIG10*. The group test results are reported in Table 7. Panel A shows the regression results using *PIN* as the dependent variable, in which the coefficients of *ABSDA* in Group *BIG10* and Group *Non_BIG10* are 0.006 (at a significance level of 5 per cent) and 0.015 (at a significance level of 1 per cent), respectively. Both the coefficient and the significance level of the former are lower than the latter. In order to examine whether there are statistically significant differences between these two coefficients, we conduct the Chow test and obtain a 3.41 chi-square value at a 10 per cent significance level. Thus when employing *PIN* as the variable for information asymmetry, the positive correlation between discretionary accruals and information asymmetry of Group *BIG10* is lower than that for Group *Non_BIG10*.

**Table 6 Two-Stage Regression Results**

| Variable | *PIN* | | *IASpread* | | *PRSpread* | |
|---|---|---|---|---|---|---|
| | Coef. | z-Stat | Coef. | z-Stat | Coef. | z-Stat |
| *CONS* | 0.387*** | 29.12 | 0.255*** | 21.33 | -0.068*** | -3.22 |
| *BIG10* | -0.014*** | -4.58 | -0.011*** | -3.96 | -0.052*** | -17.60 |
| *ABSDA* | 0.015*** | 4.56 | 0.012*** | 3.82 | 0.033*** | 6.06 |
| *BIG10*ABSDA* | -0.010** | -2.13 | -0.009** | -2.18 | -0.024*** | -3.30 |
| *LSIZE* | -0.022*** | -15.39 | -0.020*** | -15.06 | 0.017*** | 7.40 |
| *LAGE* | -0.022*** | -11.76 | -0.008*** | -4.98 | -0.050*** | -17.16 |
| *STD* | -0.022 | -1.10 | -0.027 | -1.52 | -0.047 | -1.53 |
| *TOBINQ* | 0.006*** | 17.20 | 0.009*** | 29.08 | 0.018*** | 32.97 |
| *TURN* | -0.005*** | -32.22 | -0.001*** | -9.94 | -0.004*** | -19.15 |
| *ROA* | 0.037*** | 4.81 | -0.003 | -0.38 | -0.018 | -1.37 |
| *INST* | -0.029*** | -10.44 | -0.025*** | -10.00 | -0.045*** | -10.19 |
| *PRIV* | -0.003** | -2.59 | -0.004*** | -4.65 | -0.009*** | -6.13 |
| *YR07* | -0.057*** | -40.62 | -0.022*** | -17.10 | -0.004 | -1.61 |
| Industry | Controlled | | Controlled | | Controlled | |
| LAMBDA | 0.007 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald P>chi2 | 13921.81 | | 3758.98 | | 3315.19 | |

Panel B reports the regression results when using *IASpread* as the dependent variable. This time, *ABSDA* of Group *BIG10* has an insignificant coefficient of 0.003, while *ABSDA* of *Non_BIG10* has a coefficient of 0.011 (at a significance level of 1 per cent). The Chow test here gives a chi-square value of 4.41 at a significance level of 5 per cent, which means that the coefficient of *ABSDA* of Group *BIG10* (0.003) is significantly lower than that of Group *Non_BIG10* (0.011). Panel C reports the regression results using *PRSpread* as the dependent variable, in which the coefficients of ABSDA of Group *BIG10* and Group *Non_BIG10* are 0.008 (at a significance level of 10 per cent) and 0.030 (at a significance level of 1 per cent), respectively. The Chow test gives a chi-square value of 3.74, indicating a significant difference between the two coefficients at a significance level of 10 per cent. The coefficient of *ABSDA* of Group *BIG10* is 0.022 lower than that of Group *Non_BIG10*. The results presented in Panels B and C consistently show that the positive correlation between discretionary accruals and bid-ask spread in companies audited by *BIG10* is lower than that for companies audited by *Non_BIG10* firms. In a word, the regression results in Table 7 indicate that companies audited by *BIG10* firms have a lower level of discretionary accruals and information

asymmetry, and their earnings management is more likely to deliver value-related information. This is in accordance with our hypothesis.

**Table 7 Regression Results of Group Test**

| Variable | *BIG10* | | *Non_BIG10* | |
|---|---|---|---|---|
| | Coef. | t-Stat. | Coef. | t-Stat. |
| Panel A: Dependent variable is *PIN* | | | | |
| *CONS* | 0.422*** | 19.39 | 0.393*** | 25.60 |
| *ABSDA* | 0.006** | 2.00 | 0.015*** | 4.26 |
| *LSIZE* | -0.025*** | -10.98 | -0.023*** | -14.08 |
| *LAGE* | -0.029*** | -8.93 | -0.019*** | -8.57 |
| *STD* | -0.003 | -0.10 | -0.044 | -1.51 |
| *TOBINQ* | 0.004*** | 6.17 | 0.007*** | 16.46 |
| *TURN* | -0.004*** | -17.64 | -0.005*** | -27.65 |
| *ROA* | 0.050*** | 3.42 | 0.035*** | 3.95 |
| *INST* | -0.036*** | -7.80 | -0.026*** | -7.72 |
| *PRIV* | -0.006*** | -3.23 | -0.002 | -1.39 |
| *YR07* | -0.058*** | -24.22 | -0.056*** | -32.88 |
| Industry | Controlled | | Controlled | |
| N | 2409 | | 6379 | |
| Adj. R-squared | 0.663 | | 0.581 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | $\chi^2(1) = 3.41$, Prob > $\chi^2 = 0.065$ | | | |
| Panel B: Dependent variable is *IASpread* | | | | |
| *CONS* | 0.196*** | 10.07 | 0.294*** | 21.41 |
| *ABSDA* | 0.003 | 1.08 | 0.011*** | 3.57 |
| *LSIZE* | -0.012*** | -6.05 | -0.024*** | -16.42 |
| *LAGE* | -0.011*** | -3.84 | -0.008*** | -4.27 |
| *STD* | -0.008 | -0.34 | -0.046* | -1.78 |
| *TOBINQ* | 0.007*** | 12.67 | 0.010*** | 26.75 |
| *TURN* | -0.001*** | -6.05 | -0.001*** | -7.46 |
| *ROA* | 0.003 | 0.24 | -0.002 | -0.27 |
| *INST* | -0.026*** | -6.32 | -0.025*** | -8.15 |
| *PRIV* | -0.006*** | -3.68 | -0.004*** | -3.74 |
| *YR07* | -0.028*** | -13.06 | -0.019*** | -12.51 |
| Industry | Controlled | | Controlled | |
| N | 2409 | | 6379 | |
| Adj. R-squared | 0.340 | | 0.271 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | $\chi^2(1) = 4.41$, Prob > $\chi^2(1) = 0.036$ | | | |

| | | | | |
|---|---|---|---|---|
| Panel C: Dependent variable is *PRSpread* | | | | |
| *CONS* | -0.042 | -1.32 | 0.017 | 0.69 |
| *ABSDA* | 0.008* | 1.87 | 0.030*** | 5.37 |
| *LSIZE* | 0.013*** | 4.02 | 0.007*** | 2.65 |
| *LAGE* | -0.047*** | -9.84 | -0.057*** | -15.99 |
| *STD* | -0.004 | -0.09 | -0.083* | -1.77 |
| *TOBINQ* | 0.010*** | 11.20 | 0.021*** | 31.96 |
| *TURN* | -0.004*** | -10.88 | -0.005*** | -16.27 |
| *ROA* | 0.010 | 0.46 | -0.014 | -0.96 |
| *INST* | -0.036*** | -5.44 | -0.059*** | -10.58 |
| *PRIV* | -0.010*** | -3.71 | -0.011*** | -5.76 |
| *YR07* | -0.006* | -1.72 | -0.005* | -1.93 |
| Industry | Controlled | | Controlled | |
| N | 2409 | | 6379 | |
| Adj. R-squared | 0.201 | | 0.268 | |
| $H_0$: $\beta_1^{big} = \beta_1^{nonbig}$ | | $\chi^2(1) = 3.74$<br>Prob > $\chi^2(1) = 0.053$ | | |

(3) Other proxy variables of earnings management

In addition, we employ two other proxy variables for earnings management according to Ascioglu *et al.* (2012). One of these is the quality of working capital accruals, drawn from the DD model (Dechow and Dichew, 2002), which can be specified as follows:

$$\Delta WC_t / A_t = b_0 + b_1 CFO_{t-1} / A_t + b_2 CFO_t / A_t + b_3 CFO_{t+1} / A_t + \varepsilon_t \quad (4)$$

$\Delta WC$ represents change in working capital, while $CFO_{t\text{-}1}$, $CFO_t$, and $CFO_{t+1}$ represent cash flows from operations accrued at $t$-1, current cash flows from operations, and cash flows from operations deferred to $t$+1, respectively. $A_t$ stands for current total assets. An industry-specific regression is then conducted, from which *ACER* (absolute value of residuals) is used as an alternative measure of earnings management.

Panel A of Table 8 reports the regression results of earnings management using the DD model and accounting for endogeneity. When the dependent variable is *PIN*, the coefficient of *BIG10* is -0.014 (at a significance level of 1 per cent), the coefficient of *ACER* is 0.005 (at a significance level of 5 per cent), and the coefficient of the interaction item between *BIG10* and *ACER* is -0.003, whose sign is in accordance with our expectations but is nonsignificant. When the dependent variable is *IASpread*, the

coefficient of *BIG10* is -0.012 (at a significance level of 1 per cent), and the coefficients of *ACER* and the interaction term between *ACER* and *BIG10* are both statistically nonsignificant. When the dependent variable is *PRSpread*, the coefficient of *BIG10* is -0.050 (at a significance level of 1 per cent), the coefficient of *ACER* is 0.025 (at a significance level of 1 per cent), and the coefficient of the interaction item between *BIG10* and *ACER* is -0.026 (at a significance level of 1 per cent). This indicates that there is a weaker correlation between the working capital accruals of firms audited by *BIG10* and their bid-ask spreads, consistent with our hypothesis.

The other proxy variable for earnings management is *AACFO* (absolute value of abnormal cash flows) as evaluated by the model of Dechow *et al.* (1998) by Ascioglu *et al.* (2012) and Roychowdhury (2006). The evaluation model is:

$$CFO_t / A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \lambda_1(S_t / A_{t-1}) + \lambda_2(\Delta S_t / A_{t-1}) + \varepsilon_t \quad (5)$$

$CFO_t$ is the current cash flows from operations; $S_t$ is the current operating revenue; $\Delta S_t$ is the change in operating revenue, and $A_{t-1}$ is total asset for time $t$-1. The estimation error calculated from this model is *AACFO*, which is a good proxy for earnings management (Ascioglu *et al.*, 2012; Roychowdhury, 2006). Logically, since *AACFO* leads to information asymmetry, it should have a significantly positive relationship with *BIG10*.

Panel B of Table 8 reports the regression results of earnings management employing *AACFO* as the proxy variable and accounting for the endogeneity of accounting firm selection. When the dependent variable is *PIN*, the coefficient of *BIG10* is -0.014 (at a significance level of 1 per cent), the coefficient of *AACFO* is 0.014 (at a significance level of 1 per cent), and the coefficient of the interaction item between *BIG10* and *AACFO* is -0.009, which is statistically nonsignificant. When the dependent variable is *IASpread*, the coefficients of *BIG10* and *AACFO* are -0.011 and 0.012 (at a significance level of 1 per cent), respectively. The coefficient of the interaction item between *BIG10* and *AACFO* is -0.011 (at a significance level of 5 per cent). When the dependent variable is *PRSpread*, the coefficients of *BIG10* and *AACFO* are -0.053 and -0.018 (at a significance level of 1 per cent), respectively. The coefficient of the interaction item between *BIG10* and *AACFO* is -0.018 (at a 5 per cent significance level). In summary, when using *ACER* (absolute value of residuals) and *AACFO* (absolute value of abnormal cash flows) as proxies for earnings management, the regression results shown in Table 8 still suggest that the earnings management of companies audited by *BIG10* leads to smaller bid-ask spreads, indicating a lower level of information asymmetry given the same amounts of earnings management. This means that *BIG10* firms play a better role in audit governance than *Non_BIG10* and provide better investor protection.

**Table 8 Regression Results of Other Statistical Models of Earnings Management**

| Variable | *PIN* | | *IASpread* | | *PRSpread* | |
|---|---|---|---|---|---|---|
| | Coef. | z | Coef. | z | Coef. | z |
| Panel A: Dechow and Dichev (2002) Model | | | | | | |
| *CONS* | 0.384*** | 28.79 | 0.254*** | 21.13 | -0.079*** | -3.72 |
| *BIG10* | -0.014** | -4.6 | -0.012*** | -4.14 | -0.050*** | -16.36 |
| *ACER* | 0.005** | 2.03 | 0.002 | 0.76 | 0.025*** | 5.99 |
| *BIG10*ACER* | -0.003 | -0.73 | 0.000 | -0.14 | -0.026*** | -4.12 |
| *LSIZE* | -0.022*** | -15.12 | -0.019*** | -14.88 | 0.018*** | 7.83 |
| *LAGE* | -0.021*** | -11.67 | -0.008*** | -4.9 | -0.050*** | -17.11 |
| *STD* | -0.010 | -0.51 | -0.017 | -0.95 | -0.034 | -1.1 |
| *TOBINQ* | 0.006*** | 17.07 | 0.009*** | 29 | 0.017*** | 32.41 |
| *TURN* | -0.005*** | -32.2 | -0.001*** | -9.98 | -0.004*** | -19.14 |
| *ROA* | 0.037*** | 4.84 | -0.002 | -0.32 | -0.018 | -1.42 |
| *INST* | -0.029*** | -10.39 | -0.025*** | -9.93 | -0.045*** | -10.21 |
| *PRIV* | -0.002** | -2.47 | -0.004*** | -4.53 | -0.009*** | -6.02 |
| *YR07* | -0.057*** | -40.64 | -0.022*** | -17.17 | -0.004 | -1.59 |
| Industry | Controlled | | Controlled | | Controlled | |
| LAMBDA | 0.006 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald chi2 | 13873.47 | | 3737.65 | | 3303.45 | |
| Panel B: Dechow *et al.* (1998) Model | | | | | | |
| *CONS* | 0.388*** | 29.1 | 0.255*** | 21.32 | -0.068*** | -3.19 |
| *BIG10* | -0.014*** | -4.55 | -0.011*** | -3.88 | -0.053*** | -17.77 |
| *AACFO* | 0.014*** | 3.67 | 0.012*** | 3.46 | 0.028*** | 4.58 |
| *BIG10*AACFO* | -0.009 | -1.62 | -0.011** | -2.12 | -0.018** | -2.02 |
| *LSIZE* | -0.022*** | -15.37 | -0.020*** | -15.04 | 0.017*** | 7.4 |
| *LAGE* | -0.021*** | -11.74 | -0.008*** | -4.97 | -0.050*** | -17.13 |
| *STD* | -0.017 | -0.86 | -0.024 | -1.38 | -0.037 | -1.2 |
| *TOBINQ* | 0.006*** | 17.32 | 0.009*** | 29.19 | 0.018*** | 33.15 |
| *TURN* | -0.005*** | -32.23 | -0.001*** | -9.97 | -0.004*** | -19.17 |
| *ROA* | 0.034*** | 4.39 | -0.005 | -0.73 | -0.024* | -1.82 |
| *INST* | -0.029*** | -10.44 | -0.025*** | -10.01 | -0.045*** | -10.17 |
| *PRIV* | -0.002** | -2.5 | -0.004*** | -4.58 | -0.009*** | -6.01 |
| *YR077* | -0.057*** | -40.62 | -0.022*** | -17.1 | -0.004* | -1.66 |
| Industry | Controlled | | Controlled | | Controlled | |
| LAMBDA | 0.006 | | 0.005 | | 0.034 | |
| N | 8646 | | 8646 | | 8646 | |
| Wald chi2 | 13898.97 | | 3754.19 | | 3291.88 | |

## IV. Conclusion

From information asymmetry perspective, the empirical evidence presented in this paper supports the conclusion that large audit firms provide higher audit quality, and companies audited by *BIG10* have higher discretionary accruals quality and a lower level of information asymmetry. Our research identifies three variables for measuring the level of information asymmetry; *PIN*, *IASpread*, and *PRSpread*. We also adopt discretionary accruals, calculated according to the modified Jones model (1991), as the measurement variable for earnings management, and investigate whether there are differences in discretionary accruals between companies audited by firms of different sizes by grouping Chinese audit firms into *BIG10* and *Non_BIG10*.

The empirical results show that there is a weaker positive relationship between the discretionary accruals of companies audited by *BIG10* firms and their information asymmetry. In other words, audit scrutiny by *BIG10* weakens this positive relationship, implying that the discretionary accruals in the financial reports of companies audited by *BIG10* firms are more likely to deliver value-related information and to be more informative than those of companies using *Non_BIG10* auditors. Furthermore, we take the endogeneity of audit firm selection into account by conducting group tests according to firm size, and substitute the measurement variables of earnings management for abnormal working capital accruals (Dechow and Dichew, 2002) and the absolute value of abnormal cash flows (Dechow *et al.,* 1998). The results continue to support our hypothesis by disclosing a weaker positive relationship between earnings management and *PIN*/bid-ask spreads (*IASpread* and *PRSpread*) of companies audited by *BIG10* firms.

Our study provides useful insights for similar research using discretionary accruals to account not only for quantity but also the quality of such management approaches. To some extent we also explain why in countries with low litigation risk, there are still no differences in discretionary accruals between companies audited by large and small audit firms. It is quite possible that in such countries, although large audit firms lose some level of materiality and permit higher discretionary accruals, these accruals will be mostly value-related. It is noteworthy that this paper focuses on discussing the quality discrepancy of discretionary accruals among audit firms of various sizes from the perspective of information asymmetry. Future research could be conducted from a broader perspective.

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