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上市公司IPO募集资金投向、使用效率及其对股权再融资成本的影响[1]

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摘要

本文分别按照IPO募集资金是否投资于主营业务、是否投向招股说明书的承诺项目和资金是否闲置进行分类来研究资金的运用对资金使用效率和后续再融资（指 IPO 后首次配股）成本的影响。我们用上市公司 IPO 当年和之后 3 年的会计业绩来衡量资金的使用效率，用市场对配股公告的反应、配股的发行费用率和配股折价幅度来衡量再融资成本。研究发现，IPO募集资金用于主营业务的发展、按照计划投向承诺项目、资金被充分运用所产生的效率要分别高于资金用于非主营业务（多元化）、改变资金投向和资金闲置的情况。而且，资金使用效率对后续再融资成本将产生影响，使用效率高的公司后续融资成本低，表现在市场负面反应较小，发行费率较低和配股折价幅度较小等方面。本文的研究结果对证券监管部门、投资银行和上市公司都具有启示作用。

关键词：募集资金使用效率、再融资、发行费用率、配股折价

一、引言

上市公司如何使用在股票市场上募集到的资金？资金用途如何影响其使用效率？市场参与者能否对此做出有效判别并依此做出决策从而影响公司的再融资成本？本文研究的目的是为回答这些问题提供实证的数据支持。

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股票市场实现资源配置的过程实际上是众多企业进行筹资和投资的一个不断循环的过程。企业有资金需求时可以选择在资本市场上进行权益融资，如上市时的首次发行（initial public offerings 简称 IPO）以及上市后的配股或增发（seasoned equity offerings 简称 SEO）。按照中国证监会的要求，公司在 IPO 和 SEO 时，应在招股说明书或配股说明书中对募集资金投向进行可行性分析。通常，这些可行性分析会得到相似的结论："拟投资项目具有较高的投资回报率、较短的回收期和较低的风险"。投资者依据可行性分析报告所提供的信息、股票发行价格及当时市场价格，做出投资决策。如果有足够的投资者愿意购买拟发行的股票，上市公司就能按计划筹集到资金。公司筹资的目的是投资。投资是企业在市场竞争中持续发展、为股东创造价值的关键而又具有风险的活动。但在实务中，我们却看到越来越多的资金投向和所产生的经济效益与公司上市或配股增发时可行性分析中承诺的资金投向以及高收益、低风险的预期大相径庭。有些公司上市后宣称主业经营风险高，变更募集资金投向；有些公司则以资本运作名义将募集资金投入到新的业务领域，特别是与公司当前业务关联度低的业务领域；还有些公司的募集资金被用来偿还债务、补充流动资金甚至被大股东占用。现有研究结果（如张为国、翟春燕，2004；李海键，2003 等）表明，公司上市和增发新股后，净资产收益率等财务指标整体上呈逐年下降的趋势，上市公司募集资金使用效率低下。

从理论上来说，如果市场是有效的[4]，而且上市公司和投资者之间的博弈是多期的，即上市公司需要不断地进行股权融资，则市场会对上市公司的投资行为产生有效约束。这是因为：一方面，公司如果预期到未来还需要继续在资本市场上进行融资，就会对投资行为进行自我约束，否则再融资可能失败。另一方面，投资者在考虑是否进行配股或参与增发时，前次募集资金的使用效率是公有的信息，如果前次募集资金被滥用或效率低于预期，投资者对再融资会要求一个比较高的补偿即较大的折价，从上市公司角度来说就是增加了再融资的成本。资金使用效率低的公司如果进行再融资对投资者来说是一个坏消息，市场应该有更为负面反应[5]。承销商方面，在包销的方式下，承销商承担发行失败的风险。所以承销商在帮助公司进行定价和收取承销费用的时候，同样会考虑公司前次募集资金的使用效率。

本文实证研究结果表明，IPO 募集资金投入到主营业务产生的效率要高于投入到其他行业。变更资金用途或资金闲置会降低资金使用效率。资金使用

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4 国内现有实证研究支持我国资本市场弱式有效假说。

5 国内国外的实证研究都表明，公司再融资公告时都有负面的反应，最被广泛接受的解释是公司管理层和投资者之间的信息不对称，即管理层在认为股价被高估时发行股票。这里我们认为假定其他条件相同，前次募集资金使用效率较低公司相对于募集资金使用效率较高公司，市场的负面反应更大。

效率将影响后续再融资成本，IPO 资金使用效率低的公司再融资时会有较高的发行费率、较大的折价和相对更差的市场反应。

本文的其他部分安排如下：第二部分是文献综述，回顾了现有文献对相关问题的研究成果；第三部分在进行理论分析的基础上提出本文的四个假说；第四部分是有关样本的说明与变量释义；第五部分是实证检验结果；最后，在第六部分总结本文的研究结果并阐释其经济含义。

二、文献综述

(一) 关于资金投向和使用效率的研究

国外对募集资金使用问题的研究，主要集中在如何防止公司经理人的过度投资行为和对自由现金流的滥用（Harris 和 Raviv, 1990; Stulz, 1990; Jensen, 1986）等方面，对于上市公司募集资金使用效率的研究很少。Pierre（2000）研究了法国市场上配股资金使用和公司长期业绩之间的关系。他发现如果配股资金用于新投资项目（包括对内和对外的新项目投资），公司业绩都有一个显著的下降，但为了改善财务结构而进行配股的公司业绩没有明显下降。

国内学者对募集资金投向的研究主要有两个方向，一是募集资金投向变更的原因；二是募集资金使用方式对业绩的影响。

关于募集资金投向的变更原因，刘勤、陆满平等（2002）以 2000 年募集资金的公司为样本研究发现能将募集资金投向所承诺项目的上市公司不到五成，募集资金到位后按原计划进度实际投入资金的公司则更少。朱武祥（2002）从投资审批体制不适应实际需要等多个方面分析了上市公司变更资金投向的原因。张为国、翟春燕（2004）研究表明，一些公司大股东（或母公司）通过变更募集资金投向进行关联交易从而达到套现目的；公司的融资规模与变更募集资金投向呈显著的正相关关系；公司融资后的时间越短，越容易变更募集资金投向。刘少波等（2004）研究发现IPO公司募集资金的变更面和变更程度比配股公司和增发公司更突出，募集资金大量闲置。上市公司资产规模与资金投向变更呈显著负相关，他认为约束缺失是导致上市公司变更募资投向的主要原因。

关于募集资金与业绩的关系，张为国、翟春燕（2004）发现中国上市公司变更募集资金投向以后确实存在着较显著的业绩下滑现象，他们认为代理成本越高，投资效益越差。徐沛（2004）研究表明大部分上市公司经营增长率与股权融资关系不大，所投资的项目并不能对大多数企业的经营增长产生贡献。刘少波等（2004）发现IPO公司变更募资投向对上市公司的短期业绩有较明显的影响。李海健（2003）从会计业绩和股票回报率业绩两个方面研究了配股资金使用的不同行为对公司业绩的影响。他发现配股资金用于改善财务结构的公

司会计业绩要差于投资特定项目公司，但是股票回报率业绩前者却稍好于后者；关联交易对公司业绩没有产生明显影响；投资项目变更、进度变更对公司业绩有明显的负面影响。

(2) 关于股权融资成本的研究

国外有关股权融资成本的研究主要集中在两个方面，一是发行费用的研究，二是新股发行定价相对于融资公告前一日市场价格的折价的研究。

发行费用方面，Altinkilic 和 Hansen (2000) 研究发现承销商服务的费用具有规模经济的特征。即发行规模越大，承销商索取的服务费用越低。Butler，Grullon and Weston (2002) 认为股票发行费用是新股发行成本的重要组成部分，他们考察了市场流动性对公司股票发行费用的影响，发现公司股票流动性越强，股票发行的费用越低。

在新股折价方面，Bowen, Chen and Cheng (2004) 研究认为增发新股的折价是新股发行成本的重要组成部分，并分析了分析师的跟踪对配股折价的影响。Kim 和 Shin (2001) 研究发现承销商的声誉与新股发行折价负相关。Gerard and Nanda (1993) 发现发行新股数量相对于已发行在外的股份的配售比例越高，发行折价越高。相对于国外研究而言，国内对于新股发行成本的研究几乎处于真空地带。

综上分析，目前国内外探讨 IPO 募集资金使用效率与股权再融资成本关系的研究相当匮乏，本文希望在这一方面做一些有益探索。

三、假说发展

本文的目的是研究 IPO 募集资金投向、使用效率与再融资成本之间的关系。我们将研究分成两个紧密相关的问题，一是研究资金投向是否会影响使用效率，二是投资者是否会以前次募集资金的使用效率对企业未来投资项目的回报率做出预期。显然，第二个问题的研究是以第一个问题为基础的。

本文用 IPO 后公司的会计业绩衡量募集资金的使用效率。由于募集资金一般用于长期投资，所以我们计算了募集资金当年及以后 3 年的会计业绩。

首先，我们关注募集资金是否用于主营业务的发展。国内外的研究表明，多元化经营会对企业价值产生负面影响。如 Lang and Stulz (1994)，Berger and Ofek (1995) 都发现与专业化相比，多元化战略使公司价值发生明显的折价。Comment and Jarrell (1995)，John and Ofek (1995) 则发现公司收缩战线，转向更为专业化的战略有利于提升股东财富。Gillan, Kensinger and Martin (2000) 分析了 Sears, Roebuck & Co. 的多元化战略失败后又重新回归专业化经营的案例，发现多元化给公司业绩带来负面影响，尽管后来公司又剥离了合并的金融业务，但公司股东仍然由于失去了发展的有利时机而遭受了

巨大损失（opportunity loss）。国内的研究也有相似的结果。如冯根福、吴林江，（2001）发现兼并收购并不能给公司带来长期业绩回报。薛爽（2004）发现上市公司涉及的行业越多，业绩越差。我国上市公司募集资金后，很多淡化了主业，将资金投向一些完全陌生、与主业相关性极小的行业[6]。也有些公司将募集资金用于偿还债务或补充公司流动资金，这虽然可以减少公司的财务费用，缓解公司的财务困境，改善财务结构，但并不能提升公司未来的长期盈利能力。因此，可以预期，将募集资金投入主营业务的公司业绩要好于未投资于主营业务的公司。

其次，募集资金投向发生变更也可能影响资金使用效率。一方面，如果募集资金投向变更的原因是由于客观条件的影响，例如市场环境发生变化、合作方出现了问题、国家政策发生变化等，则是否变更对业绩应该没有显著影响或有正面影响。另一方面，如果公司根本没有切实可行的投资项目，而招股说明书中的可行投资项目只是为了能够上市圈钱而编造的，则变更也属于必然。变更后资金仍可能被滥用，对公司业绩产生负面影响。因此，资金投向变更对资金使用效率的影响应该取决于以正反上两个方面。但现有的研究倾向于支持后者。

最后，许多公司将IPO募集资金用于委托理财、购买国债、被关联方占用或者存于银行，资金的这种闲置状态实质上是公司没有找到值得投资项目的表现。用于委托理财、被大股东占用或闲置在银行的资金可能被内部控制人转移，也为内部人的在职消费提供了自由现金流。这无疑会损害企业价值，影响公司的长期绩效。

所以，根据现有的研究结果和以上分析，我们提出如下假设：

假设1A：IPO募集资金投入主业[7]公司的未来长期业绩好于未投入主业的公司。

1B：IPO募集资金投向未发生明显变更[8]公司的未来长期业绩好于资金投向发生明显变更公司。

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[6] 近年来，我国上市公司热衷于所谓的“概念”，投资于一些热门行业如网络、生物工程等，盲目投资于这些行业经营风险巨大，且容易产生泡沫。随着泡沫的破灭，投资将受到重创。如2001年网络泡沫的破灭。

[7] 本文中将投入主业的募集资金占募集资金总额比例超过70%的情形定义为IPO募集资金投入主业。由于资料缘故，我们这里设定募集资金实际使用情况的观察期限是截止到IPO后第3年年末。事实上，大多数公司募集资金的投资年度基本就是4年（包括IPO当年）。下面假设1B、1C也类似。

[8] 根据2001年11月15日中国证监会公布的《关于进一步加强股份有限公司公开募集资金管理的通知》（征求意见稿）中的要求：募集资金项目的实施情况与公司在招股说明书等法律文件中的承诺相比，如果发生放弃或增加募集资金项目变化、募集资金单个项目投资金额变化超过20%、证监会或交易所认定的其

1C：IPO 募集资金未闲置[9] 公司的未来长期业绩好于资金闲置的公司。

IPO 公司不注重主业发展而过分乐观地进行多元化、变更募集资金投向或将募集的资金闲置直接影响到企业的长期发展，可能致使企业未来经营业绩下滑。投资项目被变更或本应投入实业的资金被闲置甚至挪用，这些行为违背了招股说明书或上市公告书中的承诺，而且在 IPO 时投资者对此无法预知。对于这些公司，投资者的信任度会降低。上市公司宣告配股时，投资者会根据前次募集资金使用效率对后续配股行为进行评价。据此提出本文的假设 2：

假设2A：与IPO募集资金投入主业的公司相比，未投入主业的公司在发布配股公告时，市场会做出相对更差的反应。

2B：与IPO募集资金投向未发生明显变更的公司相比，发生明显变更的公司在发布配股公告时，市场会反应更差。

2C：与IPO募集资金未闲置的公司相比，资金闲置公司在发布配股公告时，市场反应更差。

目前我国上市公司配股发行时，流通股配股由承销商包销，即如果投资者放弃配股，承销商就需要认购这些股份，这保证了大股东向小股东的配股融资目标完全能够实现；大股东的配股采用代销方式，大股东可以作出参加配股、放弃配股或者转让配股的决策。换言之，承销商为上市公司配股承销股票，主要面对的认购对象是中小投资者。因此，承销商为上市公司配股承销股票会根据公司股票被认购的难易程度而索取服务费用。根据上述分析，上市公司 IPO 募集资金的使用效率是影响投资者决策和投资行为的重要因素，而投资者的决策和投资行为又是影响上市公司配股能否成功的关键要素，承销商在为包销行为定价即确定承销费用时应该考虑前次募集资金使用效率，据此，我们提出假设 3：

他情况的，将视作改变募集资金用途。为了尽可能剔除由于客观环境因素的变化导致的资金投向变更，本文中定义募集资金变更超过招股说明书中的募集资金额的 50% 的为募集资金发生明显变更，下文以 IPO 募集资金是否发生明显变更分类进行研究。

[9] 由于募集资金投资有个时间过程，所以本文将募集资金闲置定义为上市公司 IPO 后第 3 年年末仍存在将募集资金用于委托理财、被关联方占用、购买国债、存放银行等任何一种情况。有些公司在IPO后投资过程中，出现部分资金闲置，暂时用于短期投资等，但随即在当年或次年就收回该部分资金继续用于投资项目。本文中的资金闲置不包括这种情况。

假设 3A：IPO 募集资金投入主业公司的配股发行费用率[10] 低于 IPO 募集资金未投入主业的公司。

3B：IPO 募集资金投向未发生明显变更公司的配股发行费用率低于 IPO 募集资金投向发生明显变更的公司。

3C：IPO 募集资金未闲置公司的配股发行费用率低于 IPO 募集资金闲置的公司。

承销商在承销过程中，一方面可以通过调整发行费用来反映其承销股票的风险，另一方面可以通过影响配股价格来控制风险。通常情况下，配股价格是承销商和上市公司协商的结果。在包销的方式下，承销商在建议配股价格时，会考虑投资者对公司前次募集资金使用效率和再融资行为的评价。在代销的情况下，上市公司为了把股票按计划配售除去，同样会考虑投资者对公司前次募集资金使用效率和再融资行为的评价。因此有假设 4：

假设 4A：IPO 募集资金投入主业公司的配股折价程度[11] 低于 IPO 募集资金未投入主业的公司。

4B：IPO 募集资金投向未发生明显变更公司的配股折价程度低于 IPO 募集资金投向发生明显变更的公司。

4C：IPO 募集资金未闲置公司的配股折价程度低于 IPO 募集资金闲置的公司。

四、样本与变量设计

（一）样本

本文检验 IPO 当年和之后 3 年公司业绩所用样本是从 1996 年到 2000 年在上海和深圳证券交易所进行首次发行的全部 685 家 A 股上市公司。在 685 家公司中，有 403 家在 1997 到 2001 年进行了 IPO 后的首次配股，去掉数据缺失的 89 家公司，剩余的 314 家公司是研究募集资金使用效率与再融资成本关系时所用样本。

本文所用的财务数据和股票价格数据、市场报酬率数据均来自《巨灵证券信息系统数据库》和《中国股票市场研究数据库》（CSMAR）。

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[10] 本文定义发行费用率定义为配股发行费用占配股募集资金总收入（未扣除发行费用部分）的比率

[11] 配股折价 =（配股公告前 1 日的收盘价 – 配股价格）/ 配股公告前 1 日的收盘价

（二）变量设计

1．募集资金使用效率

在考察资金使用方式对使用效率的影响时，我们按照募集资金是否投入主业、投向是否发生明显变更以及资金是否闲置分别进行分组检验。

本文将分别采用 IPO 当年及其后 3 年的未经行业中位数调整的和经行业中位数调整后的会计业绩指标作为投资效率的替代变量，它们包括：

（1）净资产收益率（*ROE* 和 *AROE* 分别为未经调整和经行业调整后的净资产收益率）。目前证监会审核配股资格、增发新股资格等都是以其作为硬性约束指标。尽管企业为了"达标"会对该指标进行操纵，但是企业无法连续对其进行操纵，因此，本文仍然将 *ROE* 作为衡量业绩的指标之一。

（2）利息和税收前总资产收益率（*ROA* 和 *AROA* 分别为未经调整和经行业调整后的总资产收益率）。息税前总资产收益率可以控制各个公司因不同的资本结构和不同的税收政策对利润产生的影响。

（3）企业的核心（主营）业务形成的息税前总资产收益率（*CROA* 和 *ACROA* 分别为未经调整和经行业调整后的核心业务总资产收益率，核心业务收益率是用主营业务利润除以总资产）。*CROA* 指标可以在一定程度上避免 *ROA* 指标被公司通过非核心业务（即线下项目）进行操纵的缺陷。

2．再融资成本

（1）配股公告日超额收益率（*AR*）

计算事件日股票的超额收益（AR_i），这里我们采用 Spiess and Affleck-Graves（1995）的方法[12]，该指标定义为：

$$AR_i = R_{it} - R_{mt}$$

R_{it} 为个股考虑现金红利的日报酬率，R_{mt} 为考虑现金红利的日市场报酬率。我们计算了配股宣告日前后各 10 日的累积超额报酬率（CAR_i）。CAR_i 定义为：

$$CAR_i = \left[\prod_{t=t1}^{t=t2}(1+AR_{it})\right]-1$$

[12] 此研究表明，采用此方法和 *CAPM* 方法以及市场回归计算的方法的结果是一致的。薛爽（2001）用中国资本市场数据对三种方法进行比较，结果发现三种方法具有高度相关性。

（2）发行费用率（*SEOFEE*）。发行费用[13]占配股募集资金总额的比例，为连续性变量。

（3）配股折价（*DISC*）。

公司会在配股说明书中公布配股价格，配股折价定义为配股价格和配股公告前一日的收盘价之差额与配股公告前一日收盘价的比值，即配股折价为：

$$DISC=(P_t-P_s)/Pt$$

*DISC*为配股折价，P_t为配股前一天的收盘价格，P_s为配股价格。*DISC*越大，说明企业的配股折价幅度越大。

3．其他控制变量

（1）主承销商的声誉（*REP*）。主承销商排名在前 10 名的为 1，否则为 0。声誉好的投资银行可以增加配股公司声誉，所以为公司承销股票时，可能会索取较高的价格。另外，声誉好的投资银行也可以以其声誉获得一个好的发行价格（Kim and Shin, 2001），即其他条件相同时，可以以较小的折价率将股票推销出去。

（2）配售比例（*ISRT*）。Gerard and Nanda（1993）发现配售比例与发行折价率正相关，因此我们在模型中控制这一变量。该变量为配售股份数量与配股前已发行在外的股份数之比。

（3）募集资金规模（*LNPRO*）。规模控制变量，为上市公司配股后实际取得资金额的自然对数。

（4）非流通股认购比例（*NONTR*），即实际认购数 / 应认购数。原红旗（2004）研究表明中国资本市场对大股东的高认购行为做出正面反应。

（5）自由现金流（*FCFD*）。上市公司配股前的自由现金流。如果上市公司配股前自由现金流越小，说明公司投资项目确实需要资金，而如果自由现金流越大，说明公司配股圈钱的动机较大，市场更可能做出负面反应。

（6）配股上一年的负债比率（*LEV*）。配股行为会改变公司的负债率。由于负债率的降低使得财富由股东向债权人转移的效应会影响投资者对股票价值的预期。

（7）市净率（*MBT*）。为股票的市场价格与每股净资产之比。根据 Gaver and Gaver（1993）的研究，*MBT* 可以衡量企业未来的增长潜力或投资机会。

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[13] 根据证监会 1996 年 6 月 17 日《证券经营机构股票承销业务管理办法》，其中，第二十二条规定，证券包销的佣金应在募集资金总额的 1.5–3%。在实务操作中，券商一般采用一揽子协议收费的方式，将上市前的辅导费、保荐费和发行费合在一起收取。其中，发行费占 85%甚至更多。本研究中使用的承销费是以上费用的合计数。

该比率越大，表示投资者越看好公司未来的成长机会，市场会给予较高的定价。在我国证券市场上，只有一部分股票是流通股，其他的均为非流通的国家股和法人股，因此，本文在使用市净率时，考虑了流通股和非流通股的差别。采取的市价为配股上年年末最后一个交易日的价格，以年末公布的每股净资产作为帐面净值。计算公式为：

市净率 =（市场价格 * 可流通股份数 + 每股净资产 * 非流通股份数）/ 股东权益合计

(8) 公司在 IPO 时主营业务成熟程度。变更资金用途可能是因为公司本身的经营活动不够稳定[14]。我们分别用两个变量来度量公司的成熟度，即到 IPO 当年为止公司已存续时间（AGE_i）和上市方式（$MODE_i$）。如果到 IPO 时，公司已存续时间越长，业务应越趋成熟，投资计划变更可能性越小。从公司上市方式来看，有剥离上市、捆绑上市和整体上市[15]。剥离上市是从母公司分离出部分较好的业务上市。捆绑上市是将几个原来彼此独立的公司合在一起上市。整体上市是指集团公司整体上市。剥离上市与整体上市的企业连续性较好，业务也相对单一、稳定。捆绑上市公司因为是几个企业临时拼凑在一起的，企业之间的协调和管理都不稳定，更有可能频繁地变更投资计划。

(9) 年度变量（$YEAR_i$）。证券市场走势以及政策的变化会影响发行的难易程度，进而影响上市公司筹集资金的成本。因此我们用年度哑元变量来控制市场走势和政策变化的影响。下标 i 表示年度。

(10) 行业变量（IND_i）。我们按照上市公司行业非类标准将所有样本分为 13 个行业。

五、实证结果

（一）募集资金使用效率（假设 1）

分别按照募集资金是否投入主业、投向是否发生明显变更及是否闲置进行分组，检验资金投向对募集资金使用效率的影响。

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[14] 感谢审稿人的宝贵建议。

[15] 这几种上市方式与不同时期的政策背景有关。在“控制规模，划分额度”的政策下，企业受最大发行量的限制，更多的选择剥离上市。在“控制规模，限报家数”的政策下，地方政府为了能使更多的企业达到融资目的，往往将多个企业捆绑上市。在全部685家样本中，剥离上市、整体上市和捆绑上市的样本数分别为 448 、 122 和 155 。在回归的 314 家样本中，三种上市方式的公司数分别为 212 、 58 和 44 。

按照上述 3 个因素分组的样本在各年度的分布见表 1：

表 1 上市公司 IPO 募集资金投向

年度	当年	是否投入主业		投向是否明显变更		是否闲置	
	IPO 数	是	否	是	否	是	否
1996	171	110	61	14	157	43	128
1997	185	114	71	17	168	60	125
1998	101	60	41	9	92	18	83
1999	92	51	41	15	77	37	55
2000	136	59	77	16	120	77	59
合计	685	394	291	71	614	235	450
在全部样本中所占比例	100%	57.52%	42.48%	10.36%	89.64%	34.31%	65.69%

上市公司募集资金投向的分类是观察IPO当年、IPO后第一年、第二年、第三年资金累计使用结果划分得到的。其中，是否投入主业是按照实际投入到主营业务的资金占募集资金总额的比例是否超过70%进行划分的；投向是否发生明显变更是按照变更金额是否超过募集资金额的 50% 划分的；资金是否闲置是按照 IPO 后第三年年末资金是否还有闲置划分的。

表 1 中上市公司募集资金使用的分类是观察 IPO 当年、IPO 后第一年、第二年、第三年资金累计使用结果划分得到的。其中，是否投入主业是按照实际投入主营业务的资金占募集资金总额的比例是否超过 70% 进行划分的；投向变更是按照变更金额是否超过募集资金额的 50% 划分的；资金是否闲置是按照 IPO 三年后资金是否还有闲置划分的。685 个 IPO 样本中，在 IPO 当年及以后 3 年中将 IPO 募集资金投入主业的公司数为 394 家，占 57.52%。IPO 募集资金投向发生明显变更的样本数为 71 家，占全部样本的 10.36%。到IPO后的第三年年末，资金仍有闲置的公司数为235家，占样本的 34.31%。

IPO 募集资金使用的情况是否影响到投资效率呢？表 2 统计了上述各子样本组在 IPO 当年及以后 3 年的会计业绩，包括净资产收益率 *ROE* 与经过行业中值调整的净资产收益率 *AROE*（PANEL-A），总资产收益率 *ROA* 与经过行业中值调整的总资产收益率 *AROA*（PANEL-B），以及核心业务总资产收益率 *CROA* 与经过行业中值调整的核心业务总资产收益率 *ACROA*（PANEL-C）。从表2我们看到无论是用哪个指标，也无论是用原始业绩指标还是用经过行业调整的业绩指标，都显示出与假设 1 相一致的结果，即 IPO 资金用于主营业务发展的公司业绩要好于未用于主营业务发展的公司业

表 2　IPO 募集资金投向与长期业绩表现

	0 年	+1 年	+2 年	+3 年	0 年	+1 年	+2 年	+3 年
ROE (%)					*AROE* (%)			
COREB = 1	10.80	10.20	7.46	4.62	−1.37	−0.05	−1.46	−3.03
	(10.70)	(10.92)	(9.27)	(7.39)	(−1.08)	(−0.41)	(0.18)	(−0.10)
COREB = 0	10.90	9.18	4.69	−24.46	−0.58	−0.41	−3.59	−31.63
	(10.45)	(10.13)	(9.27)	(6.81)	(−0.76)	(0.29)	(−0.65)	(−0.10)
T/Z	0.14 /−1.47	−1.16/-3.79***	−1.39/-3.48***	−1.04/−1.78*	1.09/1.16	−0.41/−0.85	−1.07/−2.09**	−1.02/−0.08
CHANGE = 1	9.40	7.57	−0.47	−18.17	−2.30	−2.10	−8.85	−25.39
	(9.39)	(9.70)	(6.57)	(6.32)	(−1.71)	(−0.01)	(−1.20)	(−0.21)
CHANGE = 0	11.01	10.02	7.06	5.04	−0.89	0.02	1.62	2.43
	(10.66)	(10.66)	(8.48)	(7.26)	(−0.81)	(0.46)	(0.03)	(−0.09)
T/Z	1.72*/2.13**	1.22/2.88***	3.13***/1.13	1.07/1.63	1.54/1.38	1.06/1.88*	1.09/1.88*	1.07/0.38
SLACK = 1	10.15	7.93	3.91	−30.79	−0.95	−1.31	−4.13	−37.80
	(10.09)	(9.30)	(6.68)	(6.38)	(−1.36)	(−0.19)	(−0.78)	(−0.69)
SLACK = 0	11.21	10.73	7.52	4.30	−1.08	0.38	−1.44	−3.37
	(10.97)	(10.97)	(9.37)	(7.62)	(−0.67)	(0.66)	(0.19)	(0.04)
T/Z	1.5/3.78***	2.97***/5.71***	1.59/4.91***	1.01/3.94***	−0.2/2.82***	1.81*/2.98***	1.18/ 2.66***	0.99/1.69*
ROA (%)					*AROA* (%)			
COREB = 1	12.39	9.73	8.26	6.60	2.32	0.24	0.37	−0.11
	(11.69)	(9.64)	(8.08)	(6.89)	(1.84)	(0.18)	(0.48)	(0.10)
COREB = 0	11.63	8.27	6.24	5.48	2.07	−0.44	−1.07	−0.77
	(10.89)	(7.84)	(6.06)	(6.05)	(1.42)	(−0.56)	(−0.40)	0.00
T/Z	−1.85*/−1.75*	−3.18***/−4.25***	−3.88***/−4.10***	−2.07**/−1.93*	−0.67/−1.31	−1.5/-2.09**	−2.81***/-1.93*	−3.17***/1.72*
CHANGE = 1	10.69	7.61	5.43	3.67	0.99	−1.23	−1.96	−2.69
	(9.83)	(7.31)	(5.48)	(6.17)	(0.72)	(−1.04)	(−0.67)	(−0.47)
CHANGE = 0	12.23	9.28	7.63	6.41	2.36	0.09	−0.04	−0.13
	(11.51)	(9.13)	(7.51)	(6.49)	(1.87)	(0.02)	(0.13)	(0.13)

表 2　续

	0 年	+1 年	+2 年	+3 年	0 年	+1 年	+2 年	+3 年
T/Z	2.33**/1.87*	2.23**/2.63***	1.13*/1.38	1.95*/0.88	2.17**/2.37**	1.79*/2.38**	1.85*/1.38	1.89*/1.38
SLACK = 1	11.28	7.55	5.81	5.15	1.79	−0.89	−1.29	−1.01
	(10.45)	(7.34)	(5.80)	(5.41)	(1.15)	(−0.88)	(−0.82)	(−0.49)
SLACK = 0	12.48	9.93	8.24	6.64	2.44	0.39	0.31	−0.07
	(11.86)	(9.63)	(8.09)	(6.92)	(1.97)	(0.26)	(0.50)	(0.39)
T/Z	2.82***/3.28***	5.00***/5.39***	4.41***/4.26***	2.65***/3.46***	1.59/1.99**	2.73***/3.62***	2.92***/3.30***	1.68*/2.98***
CROA (%)					*ACROA* (%)			
COREB = 1	15.26	14.53	13.89	13.18	2.16	−0.03	0.70	0.80
	(14.60)	(13.25)	(12.50)	(11.69)	(1.56)	(−0.78)	(−0.21)	(−0.23)
COREB = 0	15.42	12.86	12.31	12.05	2.12	−1.26	−0.69	−0.01
	(13.83)	(11.64)	(11.59)	(11.33)	(1.01)	(−1.82)	(−1.47)	(−0.92)
T/Z	0.27/−0.82	−2.78***/−2.78***	−2.72***/−1.31	−1.92*/−0.70	0.10/-1.87*	−2.11**/−2.09**	−2.38**/−2.09**	−1.40/−1.69*
CHANGE = 1	14.24	11.30	11.92	11.29	0.70	−3.06	−1.17	−0.81
	(12.83)	(9.57)	(10.04)	(10.29)	(0.32)	(−3.74)	(−1.65)	(−0.81)
CHANGE = 0	15.45	14.11	13.37	12.86	2.31	−0.27	0.26	0.61
	(14.57)	(12.90)	(12.34)	(11.64)	(1.55)	(−0.91)	(−0.56)	(−0.41)
T/Z	1.27/1.37	2.88***/2.13**	1.52/1.63	1.62/1.13	1.86*/1.87*	3.29***/3.13***	1.51/1.73*	1.48/0.88
SLACK = 1	15.58	12.47	12.36	12.35	2.00	−1.28	−0.40	0.21
	(14.28)	(11.53)	(11.72)	(11.33)	(1.11)	(−1.29)	(−0.80)	(−0.68)
SLACK = 0	15.19	14.53	13.67	12.88	2.22	−0.18	0.37	0.59
	(14.31)	(13.13)	(12.44)	(11.61)	(1.54)	(−1.11)	(−0.58)	(−0.40)
T 检验	1.24/0.56	3.49***/2.33**	2.23**/1.21	0.88/0.40	0.39/0.94	1.89*/0.40	1.32/0.56	0.65/2.14**

ROE、*ROA*、*CROA* 分别表示净资产回报率、息税前总资产回报率、主营业务资产回报率。*AROE*、*AROA*、*ACROA* 分别表示经行业中位数调整后的净资产回报率、息税前资产回报率、主营业务资产回报率。*COREB*，*CHANGE*，*SLACK* 分别为是否投资主业、是否发生明显变更和是否闲置哑变量，1 为是，0 为否。括号中为中值。***，**，* 分别表示在 1%、5% 和 10% 的水平下显著。

绩[16]。资金按承诺项目投资的公司业绩要好于资金发生明显变更的公司业绩。募集资金未闲置的公司业绩好于资金闲置的公司业绩。

（二）IPO 后首次再融资的成本（对假设 2–4 的检验）

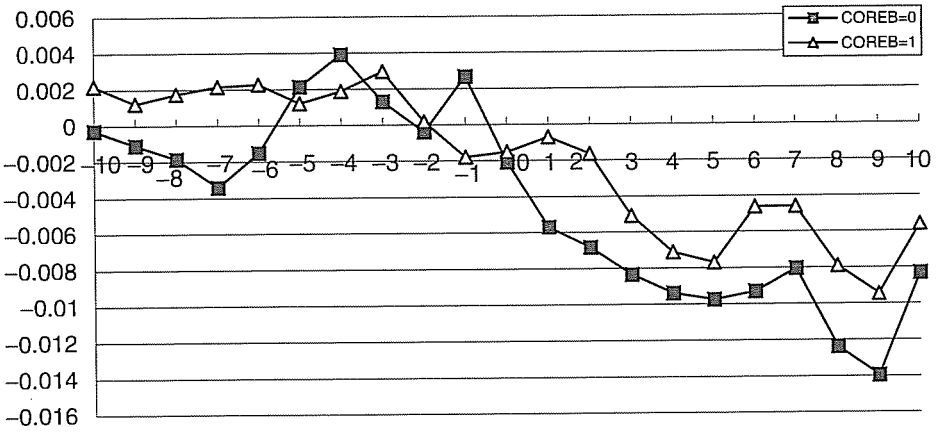
1．配股公告日前后的市场反应（假设 2）

公司在年报中会披露前次募集资金的使用情况，因此公司募集资金的使用及其对业绩的影响可以看作是公共信息。如果投资者根据已知的前次募集资金使用情况来预期再融资的使用效率，则公司发布配股公告时，投资者对那些前次资金使用效率低下（比如资金未投资于主业、变更投资项目或资金发生闲置）的公司应该有更为负面的评价。

本文以配股说明书公告日期作为事件日来研究市场对 IPO 后首次配股行为的反应。中国上市公司的配股持续时间很长，董事会公布的预案仅公布了配售比例和配股价格的区间，而且董事会预案需要经股东大会通过，最后需要监管部门批准，有些不符合相关条件的公司会被否决。但配股说明书则包括了有关配股的详细资料，比如配股价格、配股资金的用途等等，一般而言，公司一旦公布配股说明书都会实施配股。所以我们以配股说明书的公告为事件日来观察市场对 IPO 募集资金不同使用效果下公司的配股行为如何反应。设配股说明书公告日为第 0 日，观察前后各 10 天的市场反应。

[−10, +10] 窗口内各对照组的累积超额收益率（*CAR*）见图 1 ，图 2 和图 3 。

图 1　IPO 资金是否投入主业对照样本组在配股宣告日 [−10，+10] 窗口内的市场反应



[16] 我们还按照所投资的其他行业是否与主业有关联进行了分组检验。结果证明无论是相关多元化还是非相关多元化，对业绩的影响都是负面的。

图 2 IPO 资金投向是否变更对照样本组在配股宣告日[−10，+10]窗口内的市场反应

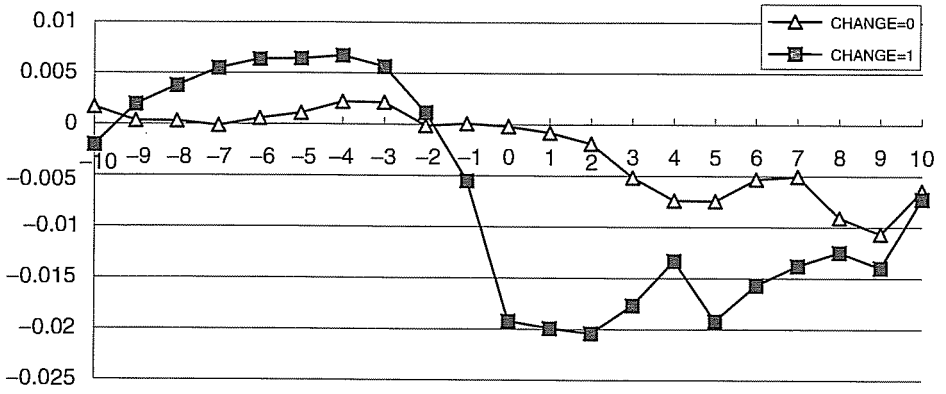


图 3 IPO 资金是否闲置对照样本组在配股宣告日[−10，+10]窗口内的市场反应

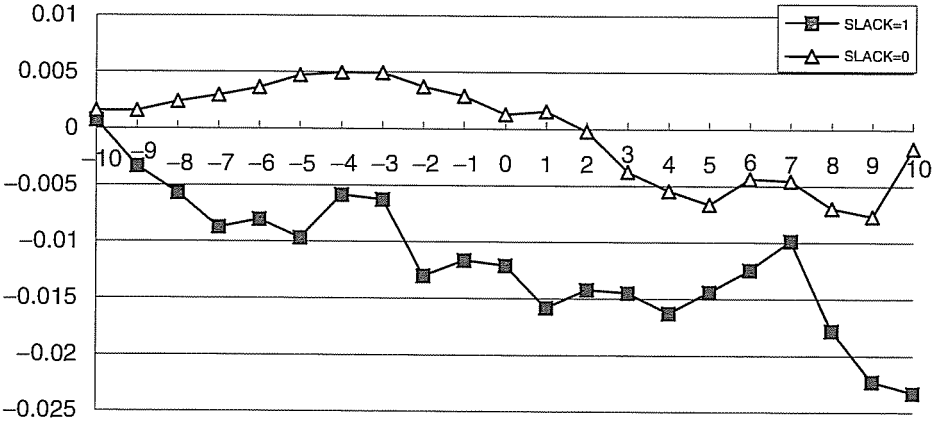


图 1 是 IPO 资金投入主业和未投入主业对照组在配股公告前 10 日到后 10 日的的累积超额报酬率。在 −10 日到 −2 日，资金投入主业样本组 *CAR* 为正。在宣告日，投入主业组的 *AR* 略微上升，说明市场对前次募集资金投入主业公司的配股行为做出了正面反应。而未投入主业样本组宣告日前的 *CAR* 在 10 个交易日中有正有负，在宣告日，未投入主业样本组的 *AR* 显著为负，说明市场对 IPO 资金未投入主业公司的后续配股行为做出了负面反应。配股宣告日后 10 日，投入主业样本组的 *CAR* 均高于未投入主业样本组的的 *CAR*。

图 2 是 IPO 资金投向发生明显变更和未发生明显变更对照组在配股公告前 10 日到后 10 日的的累积超额报酬率。在宣告日，资金投向发生明显变更样本组的超额报酬率(*AR*)显著为负，说明市场对发生明显变更组的配股行为做出了负面反应。资金未发生明显变更样本组在宣告日的 *AR* 略微下降，但幅度要小的多。配股宣告日后 10 日，发生明显变更组的 *CAR* 均低于未发生明显变更组的 *CAR*。

图 3 是 IPO 资金未闲置和闲置对照样本组在配股公告前 10 日到后 10 日的累积超额报酬率。配股宣告日前后 10 日内，资金闲置样本组的 *CAR* 均低于资金未闲置样本组。在宣告日，两组均有略微下降。

各对照组在配股宣告日的超额报酬率和宣告日前后的累积报酬率的均值和中值检验列示在表 3 中。

表 3　各对照样本组在配股宣告日的市场反应

A 按 IPO 资金是否投入主业分组的超额报酬率（*AR*）和累积超额报酬率（*CAR*）				
	COREB = 0	*COREB* = 1	T 检验	Z 检验
置换宣告日超额回报率（*AR*）(%)	−0.47	0.03	−1.48	−1.93*
	(−0.77)***	(−0.24)		
置换宣告日前后各十日累积超额回报率（*CAR*）(%)	−0.83	−0.56	−0.23	−0.26
	(−1.87)**	(−1.31)**		
B 按资金投向是否发生明显变更分组的超额报酬率（*AR*）和累积超额报酬率（*CAR*）				
	CHANGE = 0	*CHANGE* = 1	T 检验	Z 检验
置换宣告日超额回报率（*AR*）(%)	−0.03	−1.37**	2.30**	1.94*
	(−0.32)**	(−0.63)**		
置换宣告日前后各十日累积超额回报率（*CAR*）(%)	−0.62	−1.02	0.19	0.36
	(−1.29)***	(−3.10)***		
C 按资金是否闲置分组的超额报酬率（*AR*）和累积超额报酬率（*CAR*）				
	SLACK = 0	*SLACK* = 1	T 检验	Z 检验
置换宣告日超额回报率（*AR*）(%)	−0.16	−0.05	−0.30	0.23
	(−0.32)**	(−0.74)		
置换宣告日前后各十日累积超额回报率（*CAR*）(%)	−0.17	−2.33*	1.68*	2.12**
	(−1.01)**	(−4.16)***		

COREB：实际投入主业的资金占募集资金总额超过 70% 的为 1，否则为 0。*CHANGE*：变更金额占募集资金总额的比例超过 50% 为 1，反之为 0。*SLACK*：按 IPO 后第三年年末资金是否还有闲置，有为 1，反之为 0。***，**，* 分别表示在 1%、5% 和 10% 的水平上显著。

表3-PANEL-A分别对IPO资金投入主业和未投入主业的两组样本在配股宣告日的 *AR* 和 [−10, +10] 窗口内的 *CAR* 进行了检验。投入主业样本组在配股宣告日 *AR* 的平均数和中位数分别为 0.03% 和 −0.24% ，高于未投入主业的样本组的 −0.47% 和 −0.77% ， Z 检验显著。投入主业的样本组在 [−10, +10] 窗口内 *CAR* 平均为 −0.56% ，中位数为 −1.31% ，未投入主业样本组的 *CAR* 平均数为 −0.83% ，其中位数为 −1.87% ，说明市场对前次募集资金未投入主业的样本组评价更差。

表3-PANEL-B是IPO资金投向是否发生明显变更的两组样本的*AR*和*CAR*的对比。 IPO 资金投向发生明显变更样本组配股宣告日 *AR* 的平均数和中位数分别为 −1.37% 和 −0.63% ， 低于未发生明显变更组的 −0.03% 和 −0.32% ，T检验和Z检验均显著。发生明显变更组在 [−10, +10] 窗口内 *CAR* 平均为 −1.02% ，中位数为 −3.10% ，均低于未发生明显变更组的 −0.62% 和 −1.29% 。

表 3-PANEL-C 检验的是资金是否闲置两组样本的 *AR* 和 *CAR* 。资金闲置样本组在配股宣告日 *AR* 的平均数和中位数分别为 −0.05% 和 −0.74% ，资金未闲置样本组在配股宣告日 *AR* 的平均数和中位数分别为 −0.17% 和 −1.01% 。资金闲置组在 [−10, +10]窗口内 *CAR* 平均数和中位数分别为 −2.33% 和 −4.16% ，显著低于资金未闲置组的 −0.17% 和 −1.01 。

综上所述，图 1– 图 3 以及表 3 中的检验结果与我们的假设 2 一致。即如果 IPO 募集资金未投入主营业务、投向发生明显变更或闲置的公司在再融资时，市场反应更差。

为了进一步分析市场是否能够解读 IPO 募集资金不同使用效率下的配股行为，我们采用如下线形模型进行多变量分析：

$$CAR = a_0 + a_1X + a_2ISRT + a_3LnPRO + a_4NONTR + a_5FCFD + a_6LEV + a_7MBT + a_8Y + a_{9\text{-}12}YEAR + a_{13\text{-}17}IND + \varepsilon \quad (1)$$

CAR 为配股公告日[−10, +10] 的累积超额收益率。

*X*代表 *COREB* ， *ZYCHANGL* 和 *SLACK* ，即 IPO 募集资金是否投入主业，投向是否发生明显变更和是否闲置，根据变量定义与研究假设，三个哑变量的预期符号分别为正，负和负。

*Y*代表*AGE*或*MODE*。用来控制业务的成熟程度或稳定性。本文只列出了加入 *AGE* 的回归结果。加入 *MODE* 的结果与 *AGE* 结果相似，篇幅所限未列出。

表 4 是模型（1）的回归结果，可以看出，市场对 IPO 募集资金主要投入主业（*COREB*）组做出了正面反应，符号与我们预期一致，但在统计上不显著。对投向发生明显变更组（*CHANGE*）和资金闲置组（*SLACK*）做出负面反应，符号与预期一致，统计上显著。公司稳定性对市场反应无显著影响。

表 4 IPO 募集资金投向与配股宣告日市场反应

Variable	符号预测	模型 1	模型 2	模型 3	模型 4
Intercept	?	0.155	0.148	0.148	0.156
		(1.81)*	(1.77)*	(−1.78)*	(1.83)*
COREB	+	0.004			0.005
		(0.38)			(0.43)
CHANGE	−		−0.016		−0.017
			(−2.29)**		(−2.31)**
SLACK	−			−0.023	−0.023
				(−1.79)*	(−2.93)***
ISRT	+	0.281	0.282	0.296	0.295
		(4.19)***	(4.20)***	(4.42)***	(4.38)***
LnPRO	+	−0.024	−0.023	−0.023	−0.024
		(−2.87)***	(−2.84)***	(−2.85)***	(−2.87)***
NONTR	+	−0.010	−0.010	−0.009	−0.010
		(−0.56)	(−0.55)	(−0.52)	(−0.55)
FCFD	+	0.050	0.045	0.055	0.060
		(0.23)	(0.21)	(0.26)	(0.28)
LEV	−	−0.014	−0.015	−0.010	−0.010
		(−0.75)	(−0.78)	(−0.54)	(−0.50)
MBT	+	0.012	0.011	0.011	0.011
		(1.47)	(1.44)	(1.35)	(1.33)
AGE	−	−0.000	−0.000	−0.000	−0.000
		(−1.25)	(−1.25)	(−1.24)	(−1.23)
年度		控制	控制	控制	控制
行业		控制	控制	控制	控制
F Value		2.06	2.06	2.23	2.06
Adj R-Sq		0.07	0.07	0.09	0.15
N		314	314	314	314

因变量定义：以配股公告日为 0 日，[−10, +10] 窗口内的 *CAR*。自变量定义：*COREB*：实际投入主业的资金占募集资金总额的比例超过 70% 的为 1，否则为 0。*CHANGE*：变更金额占募集资金总额的比例超过 50% 为 1，反之为 0。*SLACK*：按 IPO 后第三年年末资金是否还有闲置，有为 1，反之为 0。*ISRT*：配售比例。*LnPRO*：配股募集资金总额的自然对数。*NONTR*：非流通股认购比例，即非流通股股东实际认购数 / 其应认购数。*FCFD*：自由现金流 /10000。*LEV*：配股上一年的负债比率。*MBT*：配股上一年的市净率。表示公司成长性。公司上一年年末市场价值与权益的比值。其中，上年年末的市场价值为非流通股账面值与流通股市场价值的和。*AGE*是公司到IPO当年已经存续的年限。另外，在本模型中还控制了年度的影响，估计系数未在表中列出。括号中为 t 值，***，**，* 分别表示在 1%、5% 和 10% 的水平上显著。

2．IPO后首次配股的发行费用（假设3）

既然投资者会根据IPO募集资金使用效率来对公司的再融资行为做出不同的反应，投资银行在为公司配股承销时就应该考虑到投资者行为对承销难易程度的影响，从而调整收取的承销费用。

表5-PANEL-A对发行费用的整体分布情况做了简单的描述。

表5　上市公司IPO后首次配股发行费用和配股折价年度分布

A: 发行费用占配股募集资金总额的比例（%）

年份	一分位数	中位数	三分位数	均值	样本数
1997	2.09	2.83	3.39	2.90	36
1998	2.32	3.06	3.84	3.10	89
1999	2.80	3.26	3.87	3.48	78
2000	2.53	3.05	3.50	3.06	86
2001	2.6	3.09	3.88	3.25	25
总样本	2.52	3.09	3.72	3.17	314

B: 配股价相对于配股前一天市价的折价（%）

年份	一分位数	中位数	三分位数	均值	样本数
1997	32.63	48.13	57.82	44.66	36
1998	31.51	42.67	52.56	42.95	89
1999	28.69	37.51	44.53	37.23	78
2000	21.63	32.10	45.84	33.43	86
2001	15.73	23.53	37.19	26.13	25
总样本	26.01	37.69	49.15	37.78	314

表5是在1996至2001年进行IPO后首次配股的314个样本公司的发行费用率和配股折价的基本分布。从样本分布看，1998年、1999年以及2000年实施配股的公司较多，而1997年和2001年的最少，分别为36家和25家。这里我们先看PANEL-A：从配股发行费用率看，每年之间的差别不大，平均发行费用率基本在3%左右，最低和最高的分别是1997年和1999年，平均发行费率分别是2.90%和3.48%。

在表6中我们进一步分析了IPO资金是否用于主业、是否改变投向和是否闲置对配股发行费和配股折价的影响。

从表6-PANEL-A可以看到，IPO资金投入主业样本组在配股时支付的发行费用率平均为3.12%（中位数为3.09%），低于未投入主业组的3.39%（中位数为3.22%）；IPO资金投向未发生明显变更组在配股时的发行费用率平均为3.12%（中位数为3.11%），低于投向发生明显变更组的3.55%（中位数为

表 6 上市公司 IPO 募集资金投向与 IPO 后首次配股发行费用和配股折价

A：发行费率

	均值	中值	T	Z
COREB				
0	3.39	3.22	1.72*	1.39
1	3.12	3.09		
CHANGE				
0	3.12	3.11	−2.17**	−3.11***
1	3.55	3.18		
SLACK				
0	3.22	3.09	0.59	−0.08
1	3.14	3.13		

B：配股折价

	均值	中值	T	Z
COREB				
0	33.68	36.21	−0.11	−0.01
1	33.98	35.20		
CHANGE				
0	33.34	34.47	−2.05**	−1.14
1	40.74	37.66		
SLACK				
0	30.52	30.56	1.33	−1.12
1	34.68	36.26		

COREB：实际投入主业的资金占募集资金总额的比例超过 70% 的为 1 ，否则为 0 。*CHANGE*：变更金额占募集资金总额的比例超过 50% 为 1 ，反之为 0 。*SLACK*：按 IPO 后第三年年末资金是否还有闲置，有为 1 ，反之为 0 。*** ，** ，* 分别表示在 1% 、 5% 和 10% 的水平上显著。

3.18%）；IPO资金未闲置组在配股时的发行费用率的平均数和中位数分别为 3.22% 和 3.09% ，资金闲置组的发行费用率的平均数和中位数分别为 3.14% 和 3.13% 。以上结果表明除了资金是否闲置组的均值外，其他各组与假设 3 的预期一致，统计上也基本显著。

为了近一步控制其他变量对发行费用的影响，我们采用如下模型进行多变量分析：

$$SEOFEE = a_0 + a_1 X + a_2 REP + a_3 LnPRO + a_4 LEV + a_5 MBT + a_6 Y + a_{7\text{-}8} YEAR_i + a_{9\text{-}13} IND + \varepsilon \quad (2)$$

因变量为发行费用占募集资金总额的比率。

*REP*为承销商声誉变量，排名前10为1，否则为0。其他变量含义同公式（1）。根据变量设计与假设分析，*COREB*，*CHANGE*和*SLACK*，的预期符号分别为负、正和正。

表7为模型（2）的回归结果，从表7可知，公司IPO募集资金是否投入主业（*COREB*）和投向是否发生明显变更（*CHANGE*）确实是显著影响主承销商收取费用的主要变量。如果公司IPO募集资金投入主业或IPO募集资金投向未发生明显变更，配股的发行费用率相对较低。公司IPO募集资金是否闲置对配股的发行费用率没有显著影响，说明主承销商可能把IPO募集资金是否投入主业和投向是否发生明显变更作为收取服务费用的主要考虑因素。另外，从表7的结果我们还发现主承销商的声誉越高，发行费用率越低。可能的解释是声誉越好的主承销商承销发行的公司股票质量越高，承销的风险越低，因而发行费用率越低。配股募集资金规模（*LnPRO*）越大，发行费用率越低。符合规模经济的特征。公司稳定性对发行费率无显著影响。研究结果支持本文提出的假设3A和假设3B，未支持假设3C。

3．IPO后首次配股的折价 (假设4)

发行人和承销商都应考虑到投资者会根据公司前次募集资金的使用效率对其后续融资进行评价，从而调整配股价格。由于发行人和承销商都希望股票按计划发行成功，所以一个合理的预期是IPO募集资金使用效率差的公司在首次配股时的折价应该较大。

表5-PANEL-B对配股折价的整体分布情况做了简单的描述。

从配股折价看，平均配股折价呈每年递减的趋势，1997年折价最高，为44.66%；2001年折价最低，为26.13%。

从表6-PANEL-B可知，IPO资金投入主业样本组的配股折价平均数和中位数分别为33.98%和35.20%，未投入主业组的配股折价为33.68%和36.21%；IPO资金投向未发生明显变更组的配股折价平均数为33.34%（中位数为34.47%），低于IPO资金投向发生明显变更组的配股折价平均数为40.74%（中位数为37.66%）；IPO资金闲置样本组的配股折价平均数和中位数分别为34.68%和36.26%，高于IPO资金未闲置样本组的30.52%和30.56%。

为了控制其他因素对配股折价程度的影响，我们采用如下线形回归模型：

$$DISC = a_0 + a_1 X + a_2 ISRT + a_3 LnPRO + a_4 LEV + a_5 MBT + a_6 Y + a_{7\text{-}8} YEAR_i + a_{9\text{-}13} IND + \varepsilon \quad (3)$$

因变量为配股价相对于配股公告前1天收盘价的变化率。其他变量含义同公式（1）。根据变量设计与假设分析，*COREB*，*CHANGE*和*SLACK*，的预期符号分别为负、正和正。

表 7 IPO 资金投向与 IPO 后首次配股的发行费用

Variable	符号预测	模型 1	模型 2	模型 3	模型 4
Intercept	?	0.095	0.089	0.091	0.093
		(9.09)***	(8.57)***	(8.75)***	(8.68)***
COREB	–	−0.003			−0.002
		(−2.02)**			(−2.36)**
CHANGE	+		0.003		0.002
			(1.72)*		(1.78)*
SLACK	+			0.001	0.001
				(0.33)	(0.30)
REP	–	−0.002	−0.003	−0.003	−0.002
		(−1.94)*	(−2.28)**	(−2.12)**	(−2.01)**
LnPRO	–	−0.006	−0.005	−0.006	−0.006
		(−5.66)***	(−5.25)***	(−5.36)***	(−5.46)***
LEV	+	−0.001	−0.001	−0.001	−0.001
		(−0.22)	(−0.16)	(−0.33)	(−0.17)
MBT	–	0.001	0.001	0.001	0.001
		(0.72)	(0.81)	(0.84)	(0.74)
AGE	–	0.001	0.002	0.001	0.001
		(1.14)	(1.52)	(1.49)	(1.19)
年度		控制	控制	控制	控制
行业		控制	控制	控制	控制
F Value		5.47	5.31	5.1	4.89
Adj R-Sq		0.33	0.32	0.31	0.32
N		162	162	162	162

因变量为发行费用占配股资金总额的比例。自变量定义：*COREB*：实际投资主业占募集资金总额的比例超过 70% 的为 1 ，否则为 0 。*CHANGE*：变更金额占募集资金总额的比例超过 50% 为 1 ，反之为 0 。*SLACK*：按 IPO 后第三年年末资金是否还有闲置，有为 1 ，反之为 0 。*REP*：主承销商的声誉，排名在前 10 名的为 1 ，否则为 0 。*LnPRO*：募集资金总额取对数。*LEV*：配股上一年的负债比率。*MBT*：配股上一年的市净率。表示公司成长性。公司上一年年末市场价值与权益的比值。其中，上年年末的市场价值为非流通股账面值与流通股市场价值的和。*AGE* 是公司到 IPO 当年已经存续的年限。另外，在本模型中还控制了年度的影响，估计系数未在表中列出。括号中为 t 值，*** ，** ，* 分别表示在 1% 、5% 和 10% 的水平上显著。

表8是回归结果。从表8可以看出，投向是否发生明显变更（*CHANGE*）和资金是否闲置（*SLACK*）变量符号与假设4一致，即变更投资项目或将资金闲置不用的样本在再融资时的折价幅度更大。IPO募集资金是否主要投入主业（*COREB*）对折价影响不显著。

表8 IPO资金投向与IPO后首次配股的折价

Variable	符号预测	模型1	模型2	模型3	模型4
Intercept	?	0.694	0.707	0.708	0.673
		(4.65)***	(4.87)***	(4.87)***	(4.53)***
COREB	−	0.009			0.020
		(0.45)			(0.98)
CHANGE	+		0.059		0.078
			(1.69)*		(2.04)**
SLACK	+			0.031	0.034
				(1.49)	(1.70)*
ISRT	+	0.298	0.289	0.317	0.313
		(2.53)**	(2.46)**	(2.68)***	(2.66)***
LnPRO	−	−0.048	−0.049	−0.049	−0.047
		(−3.33)***	(−3.42)***	(−3.43)***	(−3.25)***
LEV	+	−0.011	−0.011	−0.004	−0.007
		(−0.34)	(−0.35)	(−0.13)	(−0.22)
MBT	−	0.056	0.054	0.054	0.052
		(3.98)***	(3.90)***	(3.91)***	(3.76)***
AGE	−	0.000	0.000	0.000	0.000
		(0.25)	(0.30)	(0.28)	(0.35)
年度		控制	控制	控制	控制
行业		控制	控制	控制	控制
F Value		3.84	4.00	3.97	3.84
Adj R-Sq		0.16	0.17	0.17	0.18
N		314	314	314	314

因变量为配股价相对于配股前一天市价的折价的绝对值。自变量定义：*COREB*：实际投资主业占募集资金总额的比例超过70%的为1，否则为0。*CHANGE*：变更金额占募集资金总额的比例超过50%为1，反之为0。*SLACK*：按IPO后第三年年末资金是否还有闲置，有为1，反之为0。*ISRT*：配售比例。*LnPRO*：配股募集资金总额取对数。*LEV*：配股上一年的负债比率。*MBT*：配股上一年的市净率。*AGE*是公司到IPO当年已经存续的年限。另外，在本模型中还控制了年度的影响，估计系数未在表中列出。括号中为t值，***，**，*分别表示在1%、5%和10%的水平上显著。

另外，从表 8 可知，配售比例（*ISRT*）越大，配股折价则越大，统计检验显著，符合我们的预期。配股募集资金规模（*LnPRO*）越大，配股折价显著越低。市净率（*MBT*）越大，配股折价越大。

综合上述分析，实证结果支持假设 4B 和 4C ，但并未支持假设 4A 。

六、研究结论及经济意义

本文分别按照 IPO 募集资金是否投资于主营业务、是否投向招股说明书的承诺项目和资金是否闲置进行分类来分析资金运用方式对资金使用效率和后续再融资成本的影响。我们用公司 IPO 当年和之后 3 年的会计业绩来衡量资金的使用效率，用配股公告的市场反应、配股的发行费用率和折价幅度来衡量再融资成本。实证研究结果发现，（1）IPO 募集资金的运用情况对 IPO 后的长期业绩（反映了资金的使用效率）有显著影响: IPO 募集资金投入主业的公司业绩显著好于未投入主业的公司；IPO募集资金投向未发生明显变更的公司业绩显著好于发生明显变更的公司；IPO募集资金未闲置公司的业绩显著好于资金闲置的公司。（2）IPO 募集资金的使用效率对配股的发行成本产生显著影响。从市场对公司配股的反应看，分组检验结果表明市场对资金使用效率高的样本的再融资行为评价高于使用效率低的样本。多变量回归检验表明，对IPO资金投向发生明显变更或闲置的样本如果进行再融资，市场能做出显著负面反应。从配股的发行费用率看， IPO 资金投入主业样本的配股发行费用率显著低于未投入主业的样本；IPO资金未发生明显变更的样本的配股发行费用率显著低于发生明显变更的样本；但 IPO 募集资金是否闲置对配股发行费用率的影响不明显。从配股价格的折价看， IPO 资金未投入主业的样本、资金闲置的样本和资金投向发生明显变更的样本在再融资时，配股折价分别高于投入主业的样本、未闲置的样本和投向发生明显变更的样本。

综上所述，募集资金用于主营业务的发展、按照计划投向承诺项目、资金被充分运用所产生的效率要分别高于资金用于非主营业务、改变资金投向和资金闲置的情况。而且，资金使用效率对后续再融资成本产生影响，表现在配股时的发行费率、配股折价幅度以及市场反应等方面。其中， IPO 资金投向是否变更对再融资成本的影响最大，在所有的检验中都与预期方向一致且显著。

本文的结果给我们如下启示：一是承销商会关注上市公司的“历史”，如果公司前次募集资金使用效率较低，则会增加发行新股的难度，因此承销商在确定发行费用时，会要求较高的发行费率。二是投资者也会根据公司过去的投资表现做出判断，对于资金使用效率差的公司会做出负面反应。这些都会增加再融资成本。三是资金投向非主营业务或者说公司的多元化经营未必是明智选择。这可能与我国上市公司规模和管理能力等因素有关。尽管大多数公司在改变募集资金投向时，都声称是由于经济条件发生了变化，但从其资金使用效率

看，其真正的原因恐怕是上市公司在募集资金时本来并没有好的投资项目，可行性研究报告中的项目只是为了达到圈钱目的而拼凑起来的。募集资金闲置的情况进一步证实这一猜想，即公司的筹资行为具有相当的盲目性。因此，本文的研究结果具有重要的经济意义。对于证券监管机构，在对公司的配股申请进行审核的过程中，应该关注其前次募集资金的运用情况，因为证券监管的目标就是要保证资源配置到有效率的企业。对投资银行，本文的结果也为其提供了考察包销服务风险的有价值的线索。对上市公司而言，也有诸多启示：如实行多元化战略应该慎重、不应随意改变募集资金投向以及要考虑资金闲置成本等。资金运用的效率对上市公司的后续再融资应该有“前车之鉴”的作用。

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INVESTMENT EFFICIENCY OF THE IPO FUND AND THE COST OF THE FOLLOWING EQUITY ISSUING[1]

Shuang Xue[2] and Jing Yang[3]

ABSTRACT

How is the IPO fund used? Is it invested in the core business or projects as laid down in the prospectus? Is there any idle fund? All these matters may affect the investment efficiency and the cost of the following equity financing. We take the accounting performance in the initial public offering (IPO) and the next three years as the proxy of investment efficiency. To measure the cost of financing, the abnormal return during the seasoned equity offering (SEO) announcement, the SEO costs, and the SEO discount are used. The empirical results show that (i) the investment becomes more efficient when the IPO fund is maximised and is invested in the core business and committed projects, rather than the fund being kept unused and invested in the non-core business and non-committed projects; (ii) the higher the IPO fund efficiency, the lower the cost of the following equity financing; that is, there is less negative market reaction, and lower SEO costs and discount. Our results could be useful for the regulatory authority, investment banks, and listed companies.

Keywords: Investment Efficiency, Following Equity Issuing, SEO Costs, SEO Discount

I. INTRODUCTION

How do firms invest after they have raised funds from the capital market? Does the investment behaviour affect investment efficiency? Can investment banks and investors make the right judgement and decision accordingly that will in turn affect

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the following equity financing of the company? This paper attempts to provide empirical evidence in answering these questions.

Resource allocation in the stock market is in fact an on-going cycle of making financing arrangements and investment by corporations. Financing can be made through initial public offerings (IPOs), seasoned equity offerings (SEOs), and other means. Chinese regulations on IPOs and SEOs require issuing candidates to present a feasibility analysis in their prospectus. The conclusion of the feasibility analysis always claims that the projects laid down in the prospectus will have a high return, a short payback period, and a low risk. Investors make investment decisions in accordance with the feasibility analysis, offering price and the temporal market price. Issuers will only be able to raise enough funds should there be adequate subscription. After raising the funds, the issuers should then invest in projects as committed in the prospectus. Investment is a risky yet crucial activity through which firms attain sustainable development and create value for shareholders. However, there are an increasing number of listed companies that fail to fulfil their promises in respect of the use of funds and investment efficiency. Some companies claim that their core business is highly risky so that they have to invest elsewhere. In some cases, companies pump funds into industries that have no relation whatsoever to their current business, or they use the funds to repay debt and supply working capital; in some extreme cases, the funds are even appropriated by large shareholders. The empirical results (Zhang and Zhai, 2004; Li, 2003) show that after an IPO or an SEO, the accounting performance of issuers in general, such as their return on equity (ROE), drops year by year, and return on investment or investment efficiency is low.

If the market is efficient[4] and the relation between issuers and investors is a lasting one — that is, listed companies need to refinance from time to time — then the market will compel the issuers to use funds effectively. The reasons for this are threefold. Firstly, if issuers anticipate that they have to refinance in the stock market, they should maximise funds in order to build up a good reputation or confidence in the market, or else refinancing will become a total failure. Secondly, investors may ask for a greater discount before they are willing to subscribe for shares issued by companies whose funds have been poorly utilised since the last fund-raising exercise as this news of refinancing cannot possibly attract a positive[5] reaction in the market; hence, this will increase the refinancing cost of companies. Thirdly, as underwriters need to bear the risk of failure on stock issue, they will also consider the investment efficiency of the funds raised from the previous fund-raising exercise when they help the issuers fix the offering prices or charge the spread.

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[4] The existing empirical results in China support the weakly efficient hypothesis of the Chinese security market.

[5] The empirical results suggest that the market has a negative reaction to the SEO announcement. One explanation is that there is information asymmetry between investors and managers who tend to finance by equity when the stock price has been overvalued. *Ceteris paribus*, the market reaction is more negative with lower investment efficiency of funds raised in the last fund-raising exercise.

Our empirical results clearly demonstrate that the investment efficiency is higher when the IPO fund is invested in the core business rather than other businesses, whereas if the use of the fund is changed or the fund is not used, the result will be low investment efficiency. Low investment efficiency will also affect the cost of refinancing as reflected in higher SEO costs and discount, coupled with a relatively poorer market reaction.

This paper is structured as follows. Section II reviews the research results of previous relevant literature. Section III develops four hypotheses based on the theoretical analysis. Section IV introduces the samples and variables. Section V discusses the model and explains the empirical results. Section VI ends with the conclusions.

II. LITERATURE REVIEW

2.1 Research on the Use of Funds and Investment Efficiency

Overseas research on investment efficiency has focused on how to prevent managers from over-investing and abusing free cash flow (Harris and Raviv, 1990; Stulz, 1990; Jensen, 1986). Pierre (2000) has studied the relation of SEO-fund usage and firms' long-term performance in the French market, where the performance drops drastically if the fund is used for new projects but remains quite steady if the fund is used to improve the financial structure.

Two approaches are adopted by Chinese researchers on the use of funds, namely *why do firms shift in the use of funds? and how will firm performance be affected by the way funds are used?*

Concerning the first question, Liu *et al.* (2002) study issuers that have raised funds in 2000. They find that only less than 50 per cent of companies invest funds in the committed projects as laid down in the prospectus. Zhu (2002) tries to explain the reasons for fund shifting from the perspective of limitations in the investment-approving mechanism. Zhang and Zhai (2004) even find that the largest shareholder of certain issuers engages in tunnelling activity through related transactions out of fund shifting. The scale of financing and fund shifting has a significantly positive relationship, and fund shifting is more likely to happen shortly after the financing. Liu and Dai (2004) find that the extent of fund shifting is more notable for the IPO fund than for the SEO fund, and a large proportion of the IPO fund is kept unused. It is also found that the relation between firm size and fund shifting is significantly negative; this is primarily attributed to the lack of regulations and supervisions on fund shifting.

Zhang and Zhai (2004) study the impact of investment on firms' accounting performance and find that firms' performance drops significantly after fund shifting. They opine that the higher the agency cost, the poorer the investment returns. This is to some degree consistent with Liu's (2004) finding that IPO fund shifting has a negative effect on the short-term performance of firms. While Xu (2004) concludes that the growth rate has no significant relationship with equity financing, Li (2003) studies the influence of the usage of the SEO fund on firms' accounting and market

performance. He finds that (1) the accounting performance of firms whose SEO fund is used to improve the financial leverage is worse than that of firms whose SEO fund is invested in specific projects, whereas the stock performance goes rightabout; (2) related transactions have no effect on a firm's performance; and (3) fund shifting and change in schedule have a significantly negative correlation to a firm's performance.

2.2 Research on Equity Financing Cost

Overseas research on equity financing cost focuses on the *SEO costs* and the *SEO discount*, which is defined as the difference between the offering price and the market price the day before the SEO announcement.

Altinkilic and Hansen (2000) find that the larger the offering proceeds, the lower the SEO costs. Butler *et al.* (2002) consider that the SEO costs are an integral part of the issuing cost, and they find that the stronger the stock liquidity, the lower the SEO costs.

With respect to the SEO discount, Bowen *et al.* (2004) reckon that the SEO discount is an important part of the issuing cost. They analyse the influence of analysts' coverage on the SEO discount. While Kim and Shin (2001) find that the underwriter's reputation is negatively correlated with the SEO discount, Gerard and Nanda (1993) find that the higher the ratio of newly issued shares to outstanding shares, the higher the SEO discount.

To sum up, as the research on the relation of the investment efficiency of the IPO fund and the cost of the following equity issuing is highly inadequate, this paper serves to further explore this issue.

III. THEORIES AND HYPOTHESES

Our research is focused on the investment efficiency of the IPO fund and its influence on the cost of the following equity issuing. We take the accounting performance in the IPO and the subsequent three years as the proxy of investment efficiency.

Based on the existing research results, we will study the relationship between the investment of the IPO fund and its efficiency. Firstly, we analyse whether the IPO fund is used in the core business. A body of literature indicates that business diversification has a negative impact on a firm's value. For example, while Lang and Stulz (1994), and Berger and Ofek (1995) all find that the value of conglomerates is lower than that of specialised firms, Commen and Jarrell (1995), and John and Ofek (1995) find that specialisation can improve shareholders' wealth. Gillan *et al.* (2000) analyse the case of Sears, Roebuck & Co. This firm moved back to specialisation after suffering a setback in their diversification strategy that made their shareholders suffer enormous opportunity losses as the firm missed the prime time for development. Feng and Wu (2001) show that mergers have not brought any contribution to long-term return, and Xue (2004) finds that there is a negative correlation between business diversification and firm performance.

It is not uncommon for listed companies in China to invest in industries that have

no or little relation to their core business[6] after fund raising. They may also use the fund to repay debt and supply working capital; though all these can improve their financial structure, no contribution whatsoever will be made to enhance their long-term profitability. It is therefore expected that firm performance will be better for firms that invest in their core business than for those that do not.

Secondly, a shift in the use of the IPO fund may affect investment efficiency. If the shift is made out of objective factors such as a change in the market environment or government policies, the shift tends to have a small or even a positive influence on the firm's performance. However, should the projects in the prospectus be fabricated solely for the purpose of grabbing money from investors, fund shifting will most probably have a negative impact on firm performance. Therefore, we should take these two sides into consideration when considering the impact of fund shifting on investment efficiency, and current research tends to support that the impact is likely to be negative.

Thirdly, many issuers use the IPO fund to repay debt, supplement work capital, invest in securities, make loans to the largest shareholders, or deposit in banks — all these provide insiders with a good opportunity for fund appropriation, which will definitely undermine the corporate value and hence its long-term performance.

Based on the extant research results and the above analysis, we have constructed the following hypotheses:

H1A: The long-term performance is better when the IPO fund is invested in the core business[7] than when it is invested in diversified businesses.
H1B: The long-term performance is better when the IPO fund is invested as planned than when it is invested as non-planned.[8]
H1C: There is a negative relationship between an idle IPO fund[9] and a firm's long-term performance.

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[6] In recent years, listed firms have been crazy about the idea of 'concept' and investing in highly risky industries such as the Internet and bioengineering. With the bursting of the bubble, the investment will seriously suffer.

[7] Here, 'IPO fund is invested in the core business' means more than 70 per cent of the IPO fund is invested in the core business. Our observations for the IPO fund investment run up to the end of the third year after the IPO. The same applies to hypotheses H1B and H1C.

[8] According to a circular on further enhancing the management of the securities investment funds issued by the China Securities Regulatory Commission (CSRC) on 15 November 2001, based on the projects laid down in the IPO prospectus, the IPO fund is considered to be shifted in usage if (i) there is a cancellation or addition of projects; (ii) the change in investment for one single project exceeds 20 per cent; and (iii) those cases are recognised by the CSRC. To eliminate the shift in fund usage brought about by the macroeconomic environment, we regard a change of 50 per cent compared with the IPO fund to be a notable case of fund shifting.

[9] 'Idle fund' refers to an IPO fund that is still deposited in banks or financial institutions, invested in short-term securities, or loaned to the largest shareholders three years after the IPO.

Return on investment may be affected if issuers do not invest the IPO fund in the core business, change the use of the fund, or leave the fund unused. With all these non-compliances, investors will have reservations about these companies. When issuers announce their SEO, investors will naturally evaluate the offerings according to the investment efficiency of the IPO fund. We thus come up with the following hypotheses:

H2A: Investors react less negatively to the following SEO when the IPO fund is invested in the core business than when it is invested in diversified businesses.
H2B: Investors react less negatively to the following SEO when the IPO fund is invested as planned than when it is invested as non-planned.
H2C: There is a negative relationship between an idle IPO fund and investors' market reaction to the following SEO.

The investment efficiency of the IPO fund is one of the key factors that affect investors' decision in the SEO, or a crucial factor in determining whether or not the SEO can be successfully launched. For this reason, underwriters should also take into account the investment efficiency of the IPO fund when setting the underwriters' spread for the SEO as they are obliged to undrewrite all unsold shares. Accordingly, three hypotheses are set out as follows:

H3A: The SEO costs[10] are lower when the IPO fund is invested in the core business than when it is invested in diversified businesses.
H3B: The SEO costs are lower when the IPO fund is invested as planned than when it is invested as non-planned.
H3C: There is a positive relationship between an idle IPO fund and SEO costs.

Underwriters control the risk of underwriting by either adjusting the spread or influencing the SEO price. In general, the SEO price is an outcome of bargaining between the underwriter and the issuer, where both parties will take into consideration the investment efficiency of the IPO fund in order to ensure a successful launch of the SEO. The following hypotheses are thus constructed:

H4A: The SEO discount[11] will be lower when the IPO fund is invested in the core business than when it is invested in diversified businesses.
H4B: The SEO discount will be lower when the IPO fund is invested as planned than when it is invested as non-planned.
H4C: There is a positive relationship between an idle IPO fund and the SEO discount.

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[10] The SEO costs are defined as the ratio of the issue fee of SEO to the total revenue of the SEO fund.

[11] The SEO discount = (the closing price on the day before the SEO – the SEO price) / the closing price on the day before the SEO.

IV. DESIGN OF SAMPLES AND VARIABLES

4.1 Samples

We select a total of 685 Chinese A-share firms that have gone through an IPO from 1996 to 2000 as our samples. Among them, 403 went through their first SEO from 1997 to 2001; 89 firms were eliminated due to incomplete data, and the remaining 314 observations constitute our final sample.

The financial data such as the data on stock price and stock return all come from the Genius Stock Market Information System and the China Stock Market & Accounting Research Database (CSMAR).

4.2 Variables Design

4.2.1 Investment Efficiency of the IPO fund

To assess the impact of the usage of the IPO fund on investment efficiency, samples are examined by the use of the fund (whether the IPO fund is used in the core business or elsewhere), the impact on the use of the fund (whether there is a shift in fund usage), and the nature of the fund (whether there is an idle fund).

We take the profitability and industry-adjusted profitability in the IPO year and three years after the IPO as the proxies of investment efficiency, and we come up with the following variables:

(1) Return on equity (*ROE*) and industry-adjusted return on equity (*AROE*). Currently, the China Securities Regulatory Commission (CSRC) uses *ROE* as a rigid indicator to examine the SEO qualification of listed firms. Though SEO candidates may manipulate this ratio, they cannot manipulate it endlessly. Therefore, we still use *ROE* as one of our efficiency variables. *AROE* equals *ROE* minus the median of industry *ROE*.

(2) Raw and industry-adjusted return on assets (*ROA* and *AROA*). Earnings before interest and tax divided by total assets are used here. *ROA* is used in this paper to control for the influence of a different capital structure and tax rate. *AROA* equals the firm's *ROA* minus the median of industry *ROA*.

(3) Raw and industry-adjusted core return on assets (*CROA* and *ACROA*). This refers to the core earnings before interest and tax divided by total assets. *CROA* is used here to address the concern that *ROA* may be manipulated through below-the-line items.

4.2.2 The Cost of SEO

(1) The Abnormal Return on the Announcement Date

The method used to calculate the *AR* by Spiess and John (1995)[12] is adopted. *AR* is defined as follows:

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[12] This paper states that the result of the *AR* calculation is consistent no matter whether it is calculated by the method used in our study, by the CAPM method, or the market regression method. Xue (2001) finds that these three methods are highly correlated when they are used in the Chinese capital market.

$$AR_i = R_{it} - R_{mt},$$

where R_{it} and R_{mt} refer to the return of company i and the market return in time t respectively.

Meanwhile, the cumulated abnormal return (*CAR*) is also calculated. We define *CAR* as follows:

$$CAR_i = \left[\prod_{t=t1}^{t=t2}(1+AR_{it})\right]-1$$

(2) The SEO costs (*SEOFEE*) are the proportion of issue fee[13] to SEO proceeds. It is a continuous variable.

(3) SEO Discount (*DISC*). We define it as follows:

$$DISC = (P_t - P_s)/P_t,$$

where P_t refers to the closing price on the day before SEO. P_s refers to the SEO offering price. The larger the *DISC*, the higher the SEO discount.

4.2.3 Other Control Variables

(1) The reputation of the leading underwriter (*REP*). We set this as 1 if the underwriter is ranked among the top 10 in the Chinese market, and 0 otherwise. Other things being equal, a reputed investment bank can charge a higher offering price when offering a confirmation to SEO candidates (Kim and Shin, 2001). That is, the SEO discount will be lower, so the bank deserves a higher fee.

(2) SEO ratio (*ISRT*), which is the ratio of newly issued shares to outstanding shares before the SEO. Gerard and Nanda (1993) indicate that this ratio is positively correlated to the SEO discount. Therefore, we use it as a control variable in our model.

(3) SEO proceeds (*LnPRO*), which refer to the natural log of the SEO proceeds.

(4) *NONTR* is the subscribing ratio of non-negotiable shareholders. It equals actually subscribed non-negotiable shares / total non-negotiable shares available for subscription. Yuan (2003) finds that the security market reacts positively to the huge subscription of non-negotiable shareholders.

(5) *FCFD* is a dummy variable that equals 1 if the free cash flow before the SEO is greater than zero, and 0 otherwise. A negative FCF implies that the firm is in urgent need of capital; in contrast, if the free cash flow is greater than zero, this suggests that the firm tries to finance through the SEO even if the investment opportunity is not available, hence inducing a negative market reaction.

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[13] According to item 22 of a regulation on the underwriting business of security firms issued by the CSRC on 17 June 1996, the commission for underwriting should be set at a range between 1.5 per cent and 3 per cent of the proceeds. In practice, underwriters usually charge the issuers a package fee that covers the service of consultancy, guarantee, and issuing. Eighty-five per cent or more of this package fee will be devoted to the issuing service. In this research, the package fee is used.

(6) *Leverage in the year* before SEO *(LEV)*. This may affect investors' valuation of shares since this implies a wealth transfer from shareholders to creditors.
(7) *MBT* is the ratio of the market price to net assets. Gaver and Gaver (1993) reveal that *MBT* measures a firm's growth potential, and the larger the *MBT*, the higher is the growth rate. After considering that not all shares are negotiable, the calculation for *MBT* is as follows:

MBT = (the market price* of negotiable shares + net assets per share of * non-negotiable shares)/equity

(8) *AGE and MODE*. These variables are proxies for the maturity or stability of the core business. Some have argued that fund shifting is a result of the instability of the core business.[14] *AGE* is the firm's history before the IPO. The longer the history, the more stable is its business and the lower the probability of a change in the investment plan. *MODE* includes three dummy variables, namely split-off, binding, and integrity.[15] By split-off, businesses with better performance go public by splitting with their parent company. For binding, several independent firms are bound together for listing, whereas for integrity, the Group will be listed as a whole. Split-off- or integrity-type listed companies perform better than binding-type listed companies as the co-ordination among firms is poor for the latter, which results in a high propensity of fund shifting as reaching a consensus among different parties is highly unlikely.
(9) $YEAR_i$. The security market trend and policy change may influence the launch of the SEO, which will in turn affect the cost of financing. Therefore, $YEAR_i$ is used as a control variable and i represents the calendar year.
(10) *IND* is a variable that controls for industry effects. The Classification Standard of Chinese Listed Firms of 2001 is used here.

V. EMPIRICAL RESULTS

5.1 Investment Efficiency (Hypothesis 1)

To examine the investment efficiency, samples are grouped into sub-samples by the use of the fund (whether the IPO fund is used in the core business or elsewhere), the impact on the use of the fund (whether there is a shift in fund usage), and the nature of the fund (whether there is an idle fund).

The description statistics of these sub-samples are shown in Table 1.

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[14] The valuable suggestions of the referees are deeply appreciated.
[15] The ceiling of the issuing volume has been imposed under the policy of 'size control and quota system'. Split-off then becomes the most common way for firms to go public. With the introduction of 'controlling the size and the number of issuers' policy, firms are bound together by the local government to go public so that more firms can get the necessary financing. Out of 685 firms in our sample, 448 of them are listed by split-off, 122 by integrity, and 155 by binding. Out of 314 firms in our regression sample, the respective numbers for split-off, integrity, and binding are 212, 58, and 44.

Table 1 Investment of IPO fund

Year	No. of IPO firms	Invested in the core business		Invested as non-planned		There is an idle fund	
		Yes	No	Yes	No	Yes	No
1996	171	110	61	14	157	43	128
1997	185	114	71	17	168	60	125
1998	101	60	41	9	92	18	83
1999	92	51	41	15	77	37	55
2000	136	59	77	16	120	77	59
total	685	394	291	71	614	235	450
%	100%	57.52%	42.48%	10.36%	89.64%	34.31%	65.69%

'IPO fund is invested in the core business' refers to more than 70 per cent of the IPO fund being invested in the core business. We regard a change of 50 per cent compared with the IPO fund to be a notable case of fund shifting.
'Idle fund' refers to an IPO fund that is still deposited in banks or financial institutions, invested in short-term securities, or loaned to the largest shareholders three years after the IPO.

In Table 1, we summarise the sub-samples in each year during 1996–2000. The observing period of IPO fund investment runs up to the end of the third year after the IPO. 'IPO fund is invested in the core business' means more than 70 per cent of the IPO fund is invested in the core business. We regard a change of 50 per cent compared with the IPO fund to be a notable case of fund shifting. 'Idle fund' refers to the existence of an idle IPO fund three years after the IPO.

Out of 685 firms, 394 of them (57.52 per cent) invest their IPO fund in the core business, 71 of them (10.36 per cent) change their investment plans remarkably, and 235 of them (34.31 per cent) have an idle fund at the end of the third year after the IPO.

Does the usage of the IPO fund influence a firm's performance? Table 2 shows the accounting performance of the sub-samples in the IPO year and the three subsequent years, including *ROE* and *AROE* (Panel A), *ROA* and *AROA* (Panel B), and *CROA* and *ACROA* (Panel C). It is found that firms perform better when the IPO fund is invested in the core business[16] or as planned, and when there is no idle fund. All these results support our Hypothesis 1.

5.2 The Cost of the Following SEO (Hypotheses 2–4)

5.2.1 Market Reaction to SEO Announcement (Hypothesis 2)

The investment efficiency of the IPO fund and its impact on firms' performance are made known to the public as such information will have to be disclosed in the

[16] We also consider if the investment in other businesses is related to their core business, and find that business diversification, no matter whether it is related to the core business or not, has a negative effect on firms' performance.

Table 2 Investment of the IPO Fund and Long-Term Performance

Year	0	+1	+2	+3	0	+1	+2	+3
ROE (%)					*AROE* (%)			
COREB = 1	10.80	10.20	7.46	4.62	−1.37	−0.05	−1.46	−3.03
	(10.70)	(10.92)	(9.27)	(7.39)	(−1.08)	(−0.41)	(0.18)	(−0.10)
COREB = 0	10.90	9.18	4.69	−24.46	−0.58	−0.41	−3.59	−31.63
	(10.45)	(10.13)	(9.27)	(6.81)	(−0.76)	(0.29)	(−0.65)	(−0.10)
T/Z	0.14 /−1.47	−1.16/−3.79***	−1.39/−3.48***	−1.04/−1.78*	1.09/1.16	−0.41/−0.85	−1.07/−2.09**	−1.02/−0.08
CHANGE = 1	9.40	7.57	−0.47	−18.17	−2.30	−2.10	−8.85	−25.39
	(9.39)	(9.70)	(6.57)	(6.32)	(−1.71)	(−0.01)	(−1.20)	(−0.21)
CHANGE = 0	11.01	10.02	7.06	5.04	−0.89	0.02	1.62	2.43
	(10.66)	(10.66)	(8.48)	(7.26)	(−0.81)	(0.46)	(0.03)	(−0.09)
T/Z	1.72*/2.13**	1.22/2.88***	3.13***/1.13	1.07/1.63	1.54/1.38	1.06/1.88*	1.09/1.88*	1.07/0.38
IDLE = 1	10.15	7.93	3.91	−30.79	−0.95	−1.31	−4.13	−37.80
	(10.09)	(9.30)	(6.68)	(6.38)	(−1.36)	(−0.19)	(−0.78)	(−0.69)
IDLE = 0	11.21	10.73	7.52	4.30	−1.08	0.38	−1.44	−3.37
	(10.97)	(10.97)	(9.37)	(7.62)	(−0.67)	(0.66)	(0.19)	(0.04)
T/Z	1.5/3.78***	2.97***/5.71***	1.59/4.91***	1.01/3.94***	−0.2/2.82***	1.81*/2.98***	1.18/ 2.66***	0.99/1.69*
ROA (%)					*AROA* (%)			
COREB = 1	12.39	9.73	8.26	6.60	2.32	0.24	0.37	−0.11
	(11.69)	(9.64)	(8.08)	(6.89)	(1.84)	(0.18)	(0.48)	(0.10)
COREB = 0	11.63	8.27	6.24	5.48	2.07	−0.44	−1.07	−0.77
	(10.89)	(7.84)	(6.06)	(6.05)	(1.42)	(−0.56)	(−0.40)	0.00
T/Z	−1.85*/−1.75*	−3.18***/−4.25***	−3.88***/−4.10***	−2.07**/−1.93*	−0.65/−2.07**	−1.5/−2.09**	−2.81***/−1.93*	−1.74*/−0.90
CHANGE = 1	10.69	7.61	5.43	3.67	0.99	−1.23	−1.96	−2.69
	(9.83)	(7.31)	(5.48)	(6.17)	(0.72)	(−1.04)	(−0.67)	(−0.47)
CHANGE = 0	12.23	9.28	7.63	6.41	2.36	0.09	−0.04	−0.13
	(11.51)	(9.13)	(7.51)	(6.49)	(1.87)	(0.02)	(0.13)	(0.13)
T/Z	2.33**/1.87*	2.23**/2.63***	1.13*/1.38	1.95*/0.88	2.17**/2.37**	1.79*/2.38**	1.85*/1.38	1.89*/1.38
IDLE = 1	11.28	7.55	5.81	5.15	1.79	−0.89	−1.29	−1.01
	(10.45)	(7.34)	(5.80)	(5.41)	(1.15)	(−0.88)	(−0.82)	(−0.49)
IDLE = 0	12.48	9.93	8.24	6.64	2.44	0.39	0.31	−0.07
	(11.86)	(9.63)	(8.09)	(6.92)	(1.97)	(0.26)	(0.50)	(0.39)
T/Z	2.82***/3.28***	5.00***/5.39***	4.41***/4.26***	2.65***/3.46***	1.59/1.99**	2.73***/3.62***	2.92***/3.30***	1.68*/2.98***

Table 2 *Continued*

Year	0	+1	+2	+3	0	+1	+2	+3
CROA (%)					*ACROA* (%)			
COREB = 1	15.26	14.53	13.89	13.18	2.16	−0.03	0.70	0.80
	(14.60)	(13.25)	(12.50)	(11.69)	(1.56)	(−0.78)	(−0.21)	(−0.23)
COREB = 0	15.42	12.86	12.31	12.05	2.12	−1.26	−0.69	−0.01
	(13.83)	(11.64)	(11.59)	(11.33)	(1.01)	(−1.82)	(−1.47)	(−0.92)
T/Z	0.27/−0.82	−2.78***/−2.78***	−2.72***/−1.31	−1.92*/−0.70	0.10/−1.87*	−2.11**/−2.09**	−2.38**/−2.09**	−1.40/−1.69*
CHANGE = 1	14.24	11.30	11.92	11.29	0.70	−3.06	−1.17	−0.81
	(12.83)	(9.57)	(10.04)	(10.29)	(0.32)	(−3.74)	(−1.65)	(−0.81)
CHANGE = 0	15.45	14.11	13.37	12.86	2.31	−0.27	0.26	0.61
	(14.57)	(12.90)	(12.34)	(11.64)	(1.55)	(−0.91)	(−0.56)	(−0.41)
T/Z	1.27/1.37	2.88***/2.13**	1.52/1.63	1.62/1.13	1.86*/1.87*	3.29***/3.13***	1.51/1.73*	1.48/0.88
IDLE = 1	15.58	12.47	12.36	12.35	2.00	−1.28	−0.40	0.21
	(14.28)	(11.53)	(11.72)	(11.33)	(1.11)	(−1.29)	(−0.80)	(−0.68)
IDLE = 0	15.19	14.53	13.67	12.88	2.22	−0.18	0.37	0.59
	(14.31)	(13.13)	(12.44)	(11.61)	(1.54)	(−1.11)	(−0.58)	(−0.40)
T/Z	1.24/0.56	3.49***/2.33**	2.23**/1.21	0.88/0.40	0.39/0.94	1.89*/0.40	1.32/0.56	0.65/2.14**

ROE, *ROA* and *CROA* represent return on equity, return on assets before interest and tax, and return on assets before interest and tax of core business respectively. *AROE*, *AROA*, *ACROA* represent industry-adjusted *ROE*, *ROA*, *CROA* respectively. *COREB* (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. The median is shown in parentheses. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

annual report. Should investors forecast the efficiency of SEO proceeds in accordance with the efficiency of the IPO fund, they will react negatively to those SEO firms that have used an IPO fund with low efficiency.

We choose the SEO prospectus announcement day as the event day to study investors' reaction to SEO firms that have used the IPO fund in different ways. The SEO prospectus contains information such as the offering price and the use of SEO proceeds. We choose the SEO announcement date as the event day and a [−10, +10] window around the announcement date to study the market reaction over this period.

The cumulated abnormal return (CAR) in the [−10, +10] window for each sample around the announcement date is shown in Figures 1, 2, and 3.

Figure 1 *CAR* in [−10, +10] Window around SEO Announcement: Whether the IPO Fund is Invested in Core Business

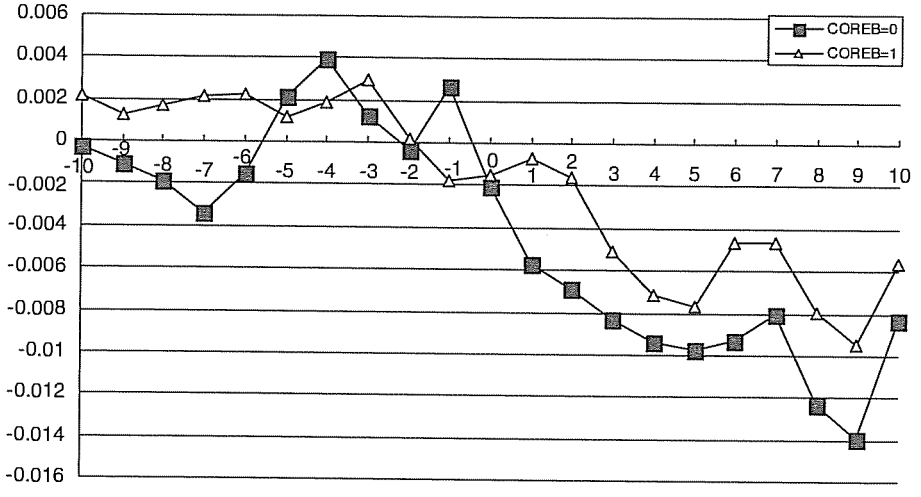

Figure 2 *CAR* in [−10, +10] Window around SEO Announcement: Whether the IPO Fund is Invested as Non-Planned

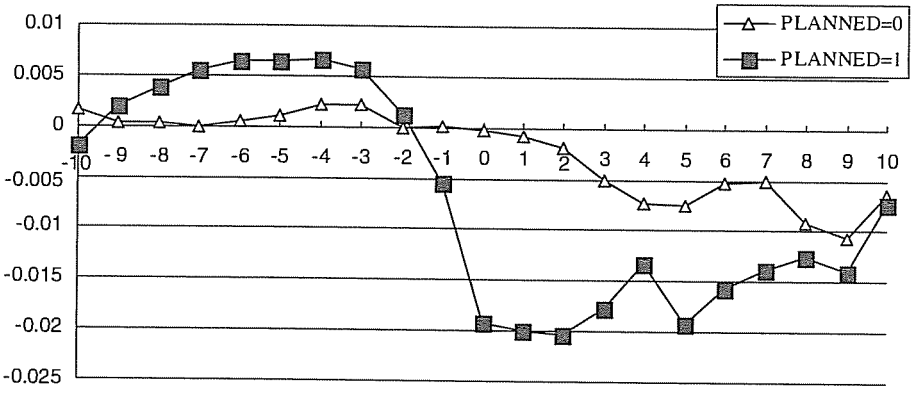

Figure 3 *CAR* in [−10, +10] Window around SEO Announcement: Whether There Is an Idle Fund

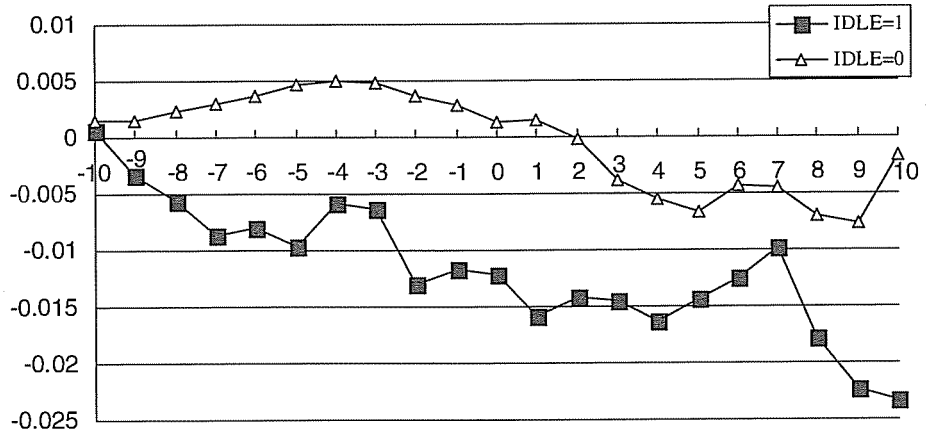

Figure 1 provides the cumulated abnormal return (*CAR*) of samples before and after the IPO fund is invested in the core business. It shows that on the SEO announcement date, the *AR* is positive if the IPO fund is invested in the core business (the core business group), but the *AR* is negative if the IPO fund is invested in the non-core business (the non-core business group).

Figure 2 shows the cumulated abnormal return (*CAR*) of samples whose IPO fund is used as planned and non-planned. On the announcement date, the *AR* of the non-planned group is significantly negative, which suggests that the market reacts negatively to these firms. At the same time, the *AR* of the planned group decreases slightly, and the *CAR* of the non-planned group is lower than that of the planned-group after the announcement date.

Figure 3 shows the cumulated abnormal return (*CAR*) of samples with or without an idle fund. The *CAR* of the idle group is lower than that of the non-idle group during the whole window, and the *AR* of both groups decreases slightly on the announcement date.

Table 3 lists the statistic results of the *AR* on the announcement date and the *CAR* of the [−10, +10] window.

Panel A of Table 3 shows the *AR* on the announcement date and the *CAR* of the [−10, +10] window for the core business and the non-core business groups. The mean and median of *AR* for the core business group on the announcement date are 0.03 per cent and −0.24 per cent respectively, which are higher than those for the non-core business sample, namely −0.47 per cent and −0.77 per cent respectively. The Z test for median difference is significant. The mean and median of *CAR* in the [−10, +10] window for the core business group are −0.56 per cent and −1.31 per cent respectively. The mean and median for the non-core business group are −0.83 per cent and −1.87 per cent respectively. The above analysis suggests that the market reacts more negatively to the non-core business firms.

Table 3 Investment of the IPO fund and Abnormal Return of SEO

A. *AR* on SEO Announcement Date and *CAR* in [−10, +10] Window: Whether or Not the IPO Fund is Invested in the Core Business

	COREB = 0	*COREB* = 1	T test	Z test
Abnormal Return on SEO Announcement Date (*AR*) (%)	−0.47 (−0.77)***	0.03 (−0.24)	−1.48	−1.93*
Cumulated Abnormal Return during SEO Announcement [−10, +10] (*CAR*) (%)	−0.83 (−1.87)**	−0.56 (−1.31)**	−0.23	−0.26

B. *AR* on SEO Announcement Date and *CAR* in [−10, +10] Window: Whether or Not the IPO Fund is Invested as Non-Planned

	CHANGE = 0	*CHANGE* = 1	T test	Z test
Abnormal Return on SEO Announcement Date (*AR*) (%)	−0.03 (−0.32)**	−1.37** (−0.63)**	2.30**	−1.94*
Cumulated Abnormal Return during SEO Announcement [−10, +10] (*CAR*) (%)	−0.62 (−1.29)***	−1.02 (−3.10)***	0.19	−0.36

C. *AR* on SEO Announcement Date and *CAR* in [−10, +10] Window: Whether There is an Idle IPO Fund

	IDLE = 0	*IDLE* = 1	T test	Z test
Abnormal Return on SEO Announcement Date (*AR*) (%)	−0.16 (−0.32)**	−0.05 (−0.74)	−0.30	−0.23
Cumulated Abnormal Return during SEO Announcement [−10, +10] (*CAR*) (%)	−0.17 (−1.01)**	−2.33* (−4.16)***	1.68*	−2.12**

COREB (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. The median is shown in parentheses. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

Panel B of Table 3 reports the *AR* on the announcement date and the *CAR* in the [−10, +10] window for the planned and non-planned groups. The mean and median of *AR* on the event date for the non-planned sample are −1.37 per cent and −0.63 per cent respectively, which is lower than that for the planned sample, namely −0.03 per cent and −0.32 per cent respectively. Both the T test and Z test are significant. The mean and median of *CAR* have the same patterns as those of *AR*.

Panel C of Table 3 lists the *AR* on the announcement date and the *CAR* in the [−10, +10] window for the idle and the non-idle groups. The relationship of the

mean and median of *AR* between these two groups is opposite to our expectation, but not significant. Meanwhile, the mean and median of *CAR* for the idle sample are –2.33 per cent and –4.16 per cent respectively, which are significantly lower than those for the non-idle sample, namely –0.17 per cent and –1.01 per cent respectively. Both the T test and Z test are significant.

To summarise the results from Figures 1 to 3 and Table 3, we conclude that Hypothesis 2 is supported.

To further study different investment behaviours under different degrees of efficiency of the IPO fund, we construct a linear model as follows:

$$CAR = a_0 + a_1 X + a_2\, ISRT + a_3 LnPRO + a_4 NONTR + a_5 FCFD + a_6 LEV + a_7 MBT + a_8 Y + a_{9\text{-}12} YEAR + a_{13\text{-}17} IND + \varepsilon, \quad (1)$$

where *CAR* represents the cumulated abnormal return in the [–10, +10] window around the SEO announcement; and *X* represents *COREB*, *ZYCHANGL*, and *IDLE*. According to the above analysis, the expected signs of these three dummy variables are positive, negative, and negative respectively.

Y is the maturity proxy for *AGE* or *MODE*. This paper shows only the regression results of *AGE*, which are similar to those of *MODE*; the latter are not reported here for the sake of simplicity.

Definitions of other variables are stated in Section IV.

Table 4 lists the regression results of model (1). We can see that the coefficient of *COREB* is in line with our expectation but statistically insignificant. Again, the coefficients of *IDLE* and *CHANGE* are in line with our expectation but statistically significant. As such, firms' stability does not have much influence on the market.

5.2.2 The SEO Costs (Hypothesis 3)

Since investors will take into consideration the investment efficiency of the IPO fund of a firm before deciding what approach will be adopted towards its SEO activity, underwriters may consider the impact of investors' reaction on underwriting when determining the SEO costs.

The distributions of SEO costs and discount are shown in Table 5.

The sample in Table 5 involves 314 observations that went public and then undertook an SEO at least once between 1996 and 2001. From the table, we can see that the number of firms that undertook an SEO from 1998 to 2000 is more than that in other years. The yearly SEO costs are more or less the same, with an average of 3 per cent. The minimum is 2.90 per cent in 1997, whereas the maximum is 3.48 per cent in 1999.

Table 6 shows the effect of the use and the status of the IPO fund on both the underwriters' spread and the SEO discount.

As shown in Table 6, the mean of the SEO costs ratio for the core business group is 3.12 per cent (the median is 3.09 per cent). The ratio for the non-core business group is higher, namely 3.39 per cent (the median is 3.22 per cent). The mean of the SEO costs ratio for the planned group is 3.12 per cent (the median is 3.11 per cent), which is lower than the 3.55 per cent of the non-planned group (the median is 3.18

Table 4 Investment of the IPO Fund and Market Reaction to the Following SEO

Variable	Expected Sign	Model I	Model II	Model III	Model IV
Intercept	?	0.155	0.148	0.148	0.156
		(1.81)*	(1.77)*	(1.78)*	(1.83)*
COREB	+	0.004			0.005
		(0.38)			(0.43)
CHANGE	–		–0.016		–0.017
			(–2.29)**		(–2.31)**
IDLE	–			–0.023	–0.023
				(–1.79)*	(–2.93)***
ISRT	+	0.281	0.282	0.296	0.295
		(4.19)***	(4.20)***	(4.42)***	(4.38)***
LNPRO	+	–0.024	–0.023	–0.023	–0.024
		(–2.87)***	(–2.84)***	(–2.85)***	(–2.87)***
NONTR	+	–0.010	–0.010	–0.009	–0.010
		(–0.56)	(–0.55)	(–0.52)	(–0.55)
FCFD	+	0.050	0.045	0.055	0.060
		(0.23)	(0.21)	(0.26)	(0.28)
LEV	–	–0.014	–0.015	–0.010	–0.010
		(–0.75)	(–0.78)	(–0.54)	(–0.50)
MBT	+	0.012	0.011	0.011	0.011
		(1.47)	(1.44)	(1.35)	(1.33)
AGE	–	–0.000	–0.000	–0.000	–0.000
		(–1.25)	(–1.25)	(–1.24)	(–1.23)
YEAR		control	control	control	control
IND		control	control	control	control
F Value		2.06	2.06	2.23	2.06
Adj R-Sq		0.07	0.07	0.09	0.15
N		314	314	314	314

Dependent variable: *CAR* in the [–10, +10] window around the SEO announcement. Independent variables: *COREB* (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. *ISRT* is the ratio of newly issued shares to outstanding shares before the SEO. *LnPRO* denotes the natural log of SEO proceeds. *NONTR* represents actually subscribed non-negotiable shares to total non-negotiable shares available for subscription. *FCFD* is a dummy variable that equals 1 if the free cash flow before the SEO is greater than zero, and 0 otherwise. *LEV* is the debt ratio before the SEO year. *MBT* represents the ratio of market price to net assets in the year before the SEO. *AGE* is the firm's history before the IPO. In addition, the influences of year and industry have been controlled for in this model, and the estimated coefficients are not reported. The median is shown in parentheses. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

Table 5 Distribution of SEO Costs and SEO Discount

A: SEO Costs (%) Year	Q1	Median	Q3	Mean	Sample No.
1997	2.09	2.83	3.39	2.90	36
1998	2.32	3.06	3.84	3.10	89
1999	2.80	3.26	3.87	3.48	78
2000	2.53	3.05	3.50	3.06	86
2001	2.60	3.09	3.88	3.25	25
Total	2.52	3.09	3.72	3.17	314

B: Discount Percentage of SEO Price to Market Price One Day before SEO Announcement (%) Year	Q1	Median	Q3	Mean	Sample No.
1997	32.63	48.13	57.82	44.66	36
1998	31.51	42.67	52.56	42.95	89
1999	28.69	37.51	44.53	37.23	78
2000	21.63	32.10	45.84	33.43	86
2001	15.73	23.53	37.19	26.13	25
Total	26.01	37.69	49.15	37.78	314

per cent). While the mean of the SEO costs ratio for the non-idle group is 3.22 per cent (the median is 3.09 per cent), the ratio for the idle sample is 3.14 per cent (the median is 3.13 per cent). Except for the results of the idle and non-idle groups, the above analyses are all in line with our expectation and statistically significant.

To further control for the influence of other factors on the SEO costs, we adopt a linear model as follows:

$$SEOFEE = a_0 + a_1 X + a_2 REP + a_3 LnPRO + a_4 LEV + a_5 MBT + a_6 Y + a_{7\text{-}8} YEAR + a_{9\text{-}13} IND + \varepsilon \quad (2)$$

SEOFEE is the ratio of underwriter fee to the SEO proceeds.

REP represents underwriters' reputation; it equals 1 if the underwriter is ranked among the top 10, and 0 otherwise. The definitions of variables are the same as those in equation (1). We predict that the coefficients of *COREB*, *CHANGE*, and *IDLE* are negative, positive, and positive respectively.

Table 7 shows the regression results of model (2), in which *COREB* and *CHANGE* are the two major variables that significantly influence the SEO costs. The coefficients of *COREB* and *CHANGE* are in line with our expectation and statistically significant, but the coefficient of *IDLE* is not significant. These results indicate that the underwriter only considers *COREB* and *CHANGE* as the major factors in determining their spread ratio. Table 7 also shows that the higher the reputation of the leading underwriter, the lower the SEO costs. This may be due to the positive relation between the reputation of underwriters and the quality of shares issued; the risk

Table 6 IPO Fund Investment, and SEO Costs and SEO Discount

A: SEO Costs Ratio	Mean	Median	T	Z
COREB				
0	3.39	3.22	1.72*	1.39
1	3.12	3.09		
CHANGE				
0	3.12	3.11	−2.17**	−3.11***
1	3.55	3.18		
IDLE				
0	3.22	3.09	0.59	−0.08
1	3.14	3.13		
B: SEO Discount	Mean	Median	T	Z
COREB				
0	33.68	36.21	−0.11	−0.01
1	33.98	35.20		
CHANGE				
0	33.34	34.47	−2.05**	−1.14
1	40.74	37.66		
IDLE				
0	30.52	30.56	1.33	−1.12
1	34.68	36.26		

COREB (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. The SEO costs ratio is the underwritten spread divided by the SEO proceeds. The SEO discount is the discount of the offering price of the SEO to the stock price one day before the SEO. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

involved in underwriting will then be reduced, thus leading to low SEO costs. At the same time, the larger the SEO size (*LnPRO*), the lower the SEO costs, which explains the theory of economies of scale. In summary, H3A and H3B are supported, but not H3C.

5.2.3 The SEO Discount (Hypothesis 4)

In determining a proper offering price to ensure a successful launch of an SEO, both issuers and underwriters need to consider investors' evaluation of the SEO based on the investment efficiency of the IPO fund. We then expect that the larger the SEO discount, the lower is the investment efficiency.

Table 7 IPO Fund Investment and SEO Costs

Variable	Expected Sign	Model I	Model II	Model III	Model IV
Intercept	?	0.095	0.089	0.091	0.093
		(9.09)***	(8.57)***	(8.75)***	(8.68)***
COREB	–	–0.003			–0.002
		(–2.02)**			(–2.36)**
CHANGE	+		0.003		0.002
			(1.72)*		(1.78)*
IDLE	+			0.001	0.001
				(0.33)	(0.30)
REP	–	–0.002	–0.003	–0.003	–0.002
		(–1.94)*	(–2.28)**	(–2.12)**	(–2.01)**
LnPRO	–	–0.006	–0.005	–0.006	–0.006
		(–5.66)***	(–5.25)***	(–5.36)***	(–5.46)***
LEV	+	–0.001	–0.001	–0.001	–0.001
		(–0.22)	(–0.16)	(–0.33)	(–0.17)
MBT	–	0.001	0.001	0.001	0.001
		(0.72)	(0.81)	(0.84)	(0.74)
AGE	–	0.001	0.002	0.001	0.001
		(1.14)	(1.52)	(1.49)	(1.19)
YEAR		controlled	controlled	controlled	controlled
IND		controlled	controlled	controlled	controlled
F Value		5.47	5.31	5.1	4.89
Adj R-Sq		0.33	0.32	0.31	0.32
N		162	162	162	162

The dependent variable is the ratio of SEO costs to SEO proceeds. Independent variables: *COREB* (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. *REP* represents underwriters' reputation; it equals 1 if the underwriter is ranked among the top 10, and 0 otherwise. *LEV* is the debt ratio before the SEO year. *MBT* represents the ratio of market price to net assets in the year before the SEO. *AGE* is the firm's history before the IPO. In addition, the influences of year and industry have been controlled for in this model, and the estimated coefficients are not reported. The median is shown in parentheses. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

A description of the SEO discount is shown in Panel B of Table 5, through which we notice that the average SEO discount decreases year by year, with the largest being 44.66 per cent in 1997 and the smallest being 26.13 per cent in 2001.

As shown in Panel B of Table 6, while the means of the SEO discount of the core and non-core business groups are 33.98 per cent (the median is 35.20 per cent) and 33.68 per cent (the median is 36.21 per cent) respectively, the means of the SEO

discount for the planned and non-planned samples are 33.34 per cent (the median is 34.47 per cent) and 40.74 per cent (the median is 37.66 per cent) respectively. Finally, the means of the SEO discount for the idle and non-idle samples are 34.68 per cent (the median is 36.26 per cent) and 30.52 per cent (the median is 30.56 per cent) respectively. These results are consistent with the predictions in Hypothesis 4.

To further control for the influence of other factors on the SEO discount, we regress on a linear model as follows:

$$DISC = a_0 + a_1 X + a_2 ISRT + a_3 LnPRO + a_4 LEV + a_5 MBT + a_6 Y + a_{7\text{-}8} YEAR + a_{9\text{-}13} IND + \varepsilon \quad (3)$$

$DISC = (P_t - P_s)/P_t$, where P_t refers to the closing price on the day before the SEO and P_s refers to the offering price of the SEO. All definitions of independent variables are the same as those in the above equations. We predict that the coefficients of *COREB*, *CHANGE*, and *IDLE* will be negative, positive, and positive respectively.

The regression results are presented in Table 8. The coefficient of *COREB* is not statistically significant. *CHANGE* and *IDLE* are positively correlated with DISC; that is, should the IPO fund be invested as non-planned or idle, the SEO discount in the following SEO will become larger. Hypotheses 4B and 4C are supported.

In addition, the larger the SEO ratio (*ISRT*), the higher the SEO discount that has passed the significant test and is consistent with our expectation. The coefficients of *LnPRO* are significantly negative, which is again in line with our prediction. The coefficient of *MBT* is positive, which may imply that a high *MTB* is perhaps a result of bubbles instead of high growth. In sum, H4B and H4C are supported but not H4A.

VI. CONCLUSIONS

To assess the impact of the use of the IPO fund on investment efficiency and the cost of the following equity financing, samples are examined by the use of the fund (whether the IPO fund is used in the core business or elsewhere), the impact on the use of the fund (whether there is a shift in fund usage), and the nature of the fund (whether there is an idle fund). We take the accounting performance in the IPO year and the subsequent three years as the proxies of investment efficiency. To measure the cost of the following SEO, the abnormal return during the SEO announcement, the SEO costs, and the SEO discount are used. The empirical results show that i) compared with the diversification strategy, the investment efficiency is higher when the IPO fund is invested in the core business and as planned, and is non-idle; ii) the higher the IPO fund efficiency, the lower the cost of the following equity issuing; hence, leading to less negative market reaction, lower SEO costs, and lower SEO discount. All the results show expected signs and almost all of the results are statistically significant.

Our empirical results have several implications. Firstly, we know that the underwriters may pay attention to the history of issuers and may require a higher compensation if the firm's investment efficiency on the IPO fund is low. Secondly,

Table 8 IPO Fund Investment and SEO Discount

Variable	Expected sign	Model I	Model II	Model III	Model IV
Intercept	?	0.694	0.707	0.708	0.673
		(4.65)***	(4.87)***	(4.87)***	(4.53)***
COREB	–	0.009			0.020
		(0.45)			(0.98)
CHANGE	+		0.059		0.078
			(1.69)*		(2.04)**
IDLE	+			0.031	0.034
				(1.49)	(1.70)*
ISRT	+	0.298	0.289	0.317	0.313
		(2.53)**	(2.46)**	(2.68)***	(2.66)***
LNPRO	–	–0.048	–0.049	–0.049	–0.047
		(–3.33)***	(–3.42)***	(–3.43)***	(–3.25)***
LEV	+	–0.011	–0.011	–0.004	–0.007
		(–0.34)	(–0.35)	(–0.13)	(–0.22)
MBT	–	0.056	0.054	0.054	0.052
		(3.98)***	(3.90)***	(3.91)***	(3.76)***
AGE	–	0.000	0.000	0.000	0.000
		(0.25)	(0.30)	(0.28)	(0.35)
YEAR		controlled	controlled	controlled	controlled
IND		controlled	controlled	controlled	controlled
F Value		3.84	4.00	3.97	3.84
Adj R-Sq		0.16	0.17	0.17	0.18
N		314	314	314	314

The dependent variable: $DISC = (P_t - P_s)/P_t$, where P_t refers to the closing price on the day before the SEO. P_s refers to the SEO price. Independent variables: *COREB* (the IPO fund is invested in the core business), *CHANGE* (the IPO fund is invested as planned), and *IDLE* (there is an idle fund) are dummy variables with 1 for positive and 0 for negative responses. *COREB* equals 1 when the proportion of the actual fund invested in the core business is greater than 70 per cent, and 0 otherwise. *CHANGE* equals 1 when more than 50 per cent of the IPO fund is used in non-committed projects, and 0 otherwise. *IDLE* is 1 if there is still an idle IPO fund three years after the IPO, and 0 otherwise. *ISRT* is the ratio of newly issued shares to outstanding shares before the SEO. *LnPRO* denotes the natural log of SEO proceeds. *LEV* is the debt ratio before the SEO year. *MBT* represents the ratio of market price to net assets in the year before the SEO. *AGE* is the firm's history before the IPO. In addition, the influences of year and industry have been controlled for in this model, and the estimated coefficients are not reported. The median is shown in parentheses. ***, **, and * represent significance at the 1 per cent, 5 per cent, and 10 per cent levels respectively.

investors will react negatively to those firms with poor investment performance in the past, which will increase the refinancing cost of the company. Thirdly, business diversification may not be a wise choice. Though most issuers claim that the change in their investment plan is in response to the change in macroeconomic conditions, this is far from credible. We guess that their real intention is to fish for money instead of having a proper investment plan at hand in the first place. The fact that an idle fund is found in so many IPO firms confirms our conjecture. That is to say, some firms finance just for financing's sake.

Our research findings provide valuable insights for the regulator, investment banks, and issuers. In order to effectively allocate resources, the regulator should consider applicants' record in investment efficiency. For underwriters, our results offer them a clue to detect the underwriting risk. For issuers, they may be inspired to focus more on their core business, to maximise the use of the fund, as well as to consider the cost of the following issuing when they make investment decisions.

REFERENCES

Please refer to P.74–75