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对新加坡审计收费决定的系统研究[1]

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摘要

本研究对审计收费决定有两方面的补充。首先，本文选取1985至2004年间全部新加坡上市公司为样本，全面系统地研究了新加坡审计收费的决定因素。在新加坡，政府关联公司(Government-Linked Companies，简称GLCs)在高效廉洁的政府领导下，在经济中发挥了举足轻重的作用，其政府的特殊性为我们提供了独特的研究背景。其次，我们在审计收费研究中引入了在会计研究中相对较少采用的面板数据分析方法。面板数据有利于更好地控制缺失变量问题，并让我们能够更精确和简便地在一个系统中研究审计收费的决定。除了传统的公司层面因素，本研究还发现特定时间事件，如大会计师事务所的兼并、安达信的倒闭等也会对审计收费产生影响。我们进一步发现，紧接着二十世纪八十年代末和九十年代初的私有化改革之后，新加坡政府倾向于为政府关联公司提供担保和支持，并主动控制对GLCs的寻租行为。本文的结论不受变量和样本期间选取的影响。

关键词：审计收费、审计风险、兼并、BIG N、面板数据、政府关联公司(GLCs)
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一、引言

关于审计收费决定的文献非常之多，我们的研究对已有文献有两方面的补充。首先，我们对新加坡上市公司审计收费决定进行了系统研究。在新加坡，政府关联公司(以下简称GLCs)在高效廉洁的政府领导下，在经济的发展中发挥了决定性的作用，其政府的特殊性为我们提供了独特的研究背景。其次，我们在审计收费研究中引入了在会计研究中相对较少采用的面板数据分析方法。[3]

自从Simunic(1980)关于审计收费的第一篇文章问世之后，针对不同国家审计收费决定的文献不断出现，比如，美国(Simunic, 1980; Francis and Stokes, 1986; Palmrose, 1986a)、澳大利亚(Craswell *et al.,* 1995)、英国(Baker and Taylor, 1981; Chan, Ezzamel and Gwilliam, 1993)、香港(DeFond, Francis and Wong, 2000)、新西兰(Firth, 1985)、荷兰(Blokdijk *et al.,* 2002)以及印尼 (Basioudis and Fifi, 2004)等。我们研究1985至2004年间新加坡审计市场的收费。之前Koh, Low and Teo(1990)采用291家在新加坡证券交易所上市的公司为样本，研究了1986年的审计收费问题，但是这其中大约有180家上市公司是在马来西亚注册，同时在新加坡和吉隆坡证券交易所上市，[4]很多由这两国的审计师同时审计，甚至仅由马来西亚的审计师进行审计。我们通过对1985到2004年间新加坡本地公司的研究，可以较全面并更有代表性的探讨新加坡公司审计收费的决定因素。

新加坡在很多方面具有特殊性。虽然对新加坡法律和会计环境的评级和美国的基本一致(La Porta *et al.,* 1998)，但是新加坡政府控制了45%的大型和20%的中型公众公司，而美国政府控制的公众公司比例为0(La Porta *et al.,* 1999)。在新加坡，当政府控制公司的比重达到20%，该公司被称为政府关联公司(GLCs)。大量的文献检验了政府关联对于公司行为和业绩的影响 (Shleifer and Vishny, 1994; Shleifer, 1998; Johnson and Mitton, 2003; Faccio, 2006)。政府干预对审计风险的影响可能有两种方式：一方面，政府的"掠夺"可以通过各种寻租的方式(Shleifer and Vishny, 1994)或者通过低效干预损害公司的价值，这些都提高了审计风险。Wang, Wong and Xia (2008)发现政府控制扭曲了管理层选择审计师的动机。另一方面，政府的"援助"给予了政府关联公司正式或者非正式的支持，进而降低了审计风险。新加坡政府被认为是比较高效廉洁的(见美国驻新加坡大使馆发布的2001财年新加坡国家商务指南)，因而第二种效应可能占主导地位。除了政府干预的影响，政府关联公司本身的经营效率也会影响审计收费。根据Feng, Sun and Tong (2004)的研究，新加坡政府关联公司被认为是世界范围内最有效的政府控制公司。如果政府关联公司确实和私有公司一样高效，但是具有较低的政治风险，那么这种特殊的制度特征将会反映在审计收费的决定中，因而对该问题的实证检验将是一个非常有趣的课题。

现有关于审计收费决定的文献一般使用截面数据来检验公司特征如何影响对审计投入的需求。我们认为为了更全面的理解该问题，需要加入时间因素。因而在我

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[3] 当然也有少数文章采用面板数据的方法，比如Henderson and Kaplan (2000)采用该方法研究审计报告时滞的决定因素。

[4] 1989年10月，马来西亚政府要求所有的马来西亚公司在1990年12月31日从新加坡证券交易所退市。Sun *et al.* (2002) 提供更多的细节。

们的研究中引入了面板数据分析框架，[5]该方法有助于分析审计收费及其决定因素之间的复杂关系，比如，相同的公司特征可能在经济周期的不同阶段对审计收费产生不同的影响。审计市场结构的变化，比如大所的兼并，也会对不同时期的审计收费产生影响。虽然不同年份的截面数据分析也能够反映审计收费随时间的变化以及事务所兼并对于审计收费的影响问题，但是面板数据分析方法能够更好地控制缺失变量问题，并在一个系统中对这些问题进行更精确和简便的检验。

最后，新加坡是一个城市国家，每个事务所仅有一个分所。同一会计师事务所不同分所的声誉可能不同(Francis *et al.,* 1999)，DeFond *et al.* (2000)建议使用香港数据研究审计师的声誉溢价问题。虽然我们的样本期间为1985至2004年，但是每个事务所仅有一个分所，因而分所层面的差异也即事务所层面的差异。

我们主要做了两方面的研究。第一，我们检验在标准的审计收费模型中是否需要考虑时间效应。随着时间的变化，审计环境发生变化同时对审计成本产生影响，如审计范围的扩大(可能由更加严格的新的财务报告规则导致)、审计技术的改进(审计中计算机技术以及风险评估模型的广泛采用)等。

具体而言，我们利用面板数据分析方法研究时间相关事件是否影响新加坡审计收费市场，如经济周期、1997至1998年间的亚洲金融危机、1989年和1998年的大事务所兼并，以及2002年的安达信倒闭等。[6]大的会计师事务所兼并和倒闭改变了审计市场的结构，因而可能影响审计服务和品牌声誉的均衡定价。另一方面，近年来最大的亚洲金融危机将是检验重大宏观经济事件是否影响审计收费和审计投入的很好案例。除了品牌声誉，我们还检验了行业专长是否可以获取审计收费溢价，事务所兼并对于不同类型公司的影响是否存在差异。我们的研究扩展了以往的文献，为更好的理解审计市场收费提供了新的视角。

第二，我们研究了政府关联公司可以享受审计收费折价，还是支付审计收费溢价。政府干预和经营效率对于GLCs的不同影响，我们试图通过按照行业和资产收益率选取配对样本的方法来控制经营效率，进而研究政府干预对于审计收费的影响。我们还将样本分为1994年之前和之后来检验政府干预中"援助"和"掠夺"的变化，因为新加坡政府在上个世纪八十年代中期发起了一次重大的私有化改革，其影响在改革初期可能更大。

我们的结果表明存在时间特定效应。特定时间事件会影响审计收费，比如1998年大会计师事务所的兼并以及2002年安达信的倒闭。我们还发现相比非GLCs，GLCs支付了较少的审计收费，尤其是在八十年代末和九十年代初私有化改革后，这和新加坡政府主要提供"援助"的假说一致，因为在此期间GLCs更需要政府的支持。最后，我们还发现除了审计师的品牌声誉，审计师的行业专长也能产生显著的审计

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[5] 在一些会计研究中，面板数据或者混合数据指的是将不同年份的数据混合到一起，形成所谓的公司年度数据，而实际采用的回归技术仍然是截面方法。一个例子就是，Pong and Whittington (1994)采用577家英国上市公司1981至1998年的数据，虽然该数据是面板数据，但是仍采用OLS，只是在回归中加入时间趋势变量以及与时间的交互变量。本研究中，我们采用真实的面板数据分析方法。

[6] 在八十年代末掀起了一波会计师事务所的合并浪潮。1987年KMG Main Hurdman与Peat Marwick & Mitchell 合并变为KPMG；1989年Arthur Young与Ernst & Whinney合并变为Ernst & Young，Deloitte Haskins & Sells与Touche Ross合并变为Deloitte & Touche，从而原来的八大变为六大；1998年，Price Waterhouse和Coopers & Lybrand合并变更为PricewaterhouseCoopers，使得六大变为五大；最后2002年的安然事件使得Arthur Andersen倒闭，五大变为现在的四大。

收费溢价，这和Craswell *et al.* (1995)、Balsam *et al.* (2003)、Ferguson *et al.* (2003)、Krishnan (2004)，以及Francis (2004) 的发现一致。

我们的研究也存在一些不足，我们仅仅考察了审计收费，由于数据的不可获得性，我们无法考察非审计收费。以往文献发现审计收费和非审计收费之间相关(Palmrose, 1986b; Davis *et al.,* 1993; Bell *et al.,* 2001等等)，Raghunandan *et al.* (2003)表明审计收费和非审计收费是同时决定的。

本文余下部分的安排如下，第二节介绍背景并提出假说，第三节介绍数据和研究设计，并进行初步分析，第四节报告并讨论面板数据分析的结果，第五节给出结论。

二、背景介绍和假说

会计师事务所收取的审计收费应该能够补偿审计师的审计投入和审计风险。在审计收费研究的开篇之作中，Simunic (1980) 以审计收费支付为衡量指标，[7]探索了决定审计努力程度的因素，该研究开拓了对审计收费决定因素的研究领域。

然而，关于审计收费的动态差异以及审计收费与其决定因素之间关系的动态变化的研究很少。Broman *et al.* (1992) 比较了1977年和1981年的审计收费，发现经消费物价指数(CPI)调整的实际审计收费在样本期间下降。他们认为这可能与审计市场竞争度的增加有关，然而他们的研究仅选择了两个会计年度，只是对市场的一瞥。Menon and Williams (2001) 使用在SEC申报中自愿披露审计收费的公司为样本，检验了1980至1997年间审计收费的年度变化，发现1989年兼并后三年内六大会计师事务所仅能够获得暂时的审计收费溢价。他们的样本公司均由六大或八大审计，可能只有大所(BIG N)[8]能够享受到兼并好处，而小所(非BIG N)无法享受这种好处。也有可能仅是自愿披露审计收费数据的公司愿意支付审计收费溢价，而其他公司不愿意。Iyer and Iyer (1996)比较了1987年和1991年英国公司支付的审计收费，得出了不同的结论，他们没有发现兼并能够带来审计收费的提高。Firth and Lau (2004)使用香港数据分析1998年Coopers & Lybrand 和Price Waterhouse 的兼并，他们也没有发现兼并之后审计收费有显著变化，他们认为客户并不愿意为五大的重组支付更高的审计收费。

通过考察新加坡的面板数据，我们的研究有助于更好的了解审计收费的决定因素，特别是时间维度对审计收费的影响。所有新加坡上市公司必须披露审计收费数据，因此我们能够获得由BIG N或非BIG N会计师事务所审计的公司连续20年的审计收费数据，从而探讨以往研究中未曾涉及的诸多问题。

第一，我们试图检验标准审计收费模型的解释能力随着时间如何变化，以及审计收费模型中关键因素的相对重要性是否随着时间变化。

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7 审计努力程度通过一年中审计师投入的审计活动来体现，鉴于审计投入时间的数据不可获得以及收集该数据非常困难，大多采用审计收费作为代理变量。Blokdijk *et al.* (2002) 做了一项关于审计投入时间的研究，该研究数据源于荷兰公司1998年和1999年的113项审计。

8 为了简便起见，下面我们直接用BIG N来表示国际大所，而用非BIG N来表示非国际大所。

第二，我们检验GLCs是否可以享受审计收费折价。新加坡政府在独立之后立即在关键行业组建了一批政府关联公司，这些公司在新加坡经济发展中扮演了非常重要的战略角色。虽然GLCs是政府控制的公司，[9]但和其他商业主体一样，GLCs也是在竞争性的市场中生产、销售产品及提供服务。大多数GLCs在六、七十年代建立，主要是为了支持特定行业的发展。而形成于八、九十年代的GLCs，主要由政府部门公司化改制产生。1985年3月新加坡政府开始了一轮私有化改革，并且设立了专门的委员会(Public Sector Divestment Committee (PSDC))，目的是识别哪些政府关联公司需要剥离以及剥离的方式。根据美国驻新加坡大使馆出版的2001财年新加坡国家商务指南，"新加坡的GLCs不像一个典型的'半国家组织'，公司运行良好、有效而且盈利"。Feng, Sun, and Tong (2004)的研究发现GLCs和同类型的私人公司的运营效率相当。另外，GLCs通常采取更加稳健的会计政策，并且能够获取较强的政府支持，通常被投资者看作风险较低的公司。因而，检验GLCs相比非GLCs是否具有不同的审计收费结构是一个非常有趣的问题。

第三，我们检验宏观经济因素对于审计收费市场的影响。我们关心公司经营的宏观环境的变化对于审计收费可能产生的影响。一方面，当经济环境较好时，会计师事务所在定价的时候更加激进，而且公司也愿意支付审计师提出的合理审计收费。但是当经济处于萧条期，会计师事务所的激进程度降低，向客户收取较高的审计费比较困难。另一方面，相反的力量也可能存在。在经济危机中，由于较高审计风险的存在，市场对于高质量审计服务的需求增加，进而提高了审计收费。而且在市场处于萧条时，事务所对于预期的诉讼成本和声誉损害的担忧增加，审计师需要更多的审计投入以降低这些风险，从而要求更高的审计收费(Gul and Tsui, 1998)。如果第二种影响强于第一种影响，那么在经济处于萧条时，审计收费反而会增加。一个典型的例子便是1997年的亚洲金融危机，除了中国，几乎所有的亚洲国家在这次金融危机中都受到了很大影响，并花费了较长时间才从危机中走出来。该事件为我们研究经济危机是否影响审计市场收费提供了很好的背景。我们预期，总体上审计收费与GDP的增长正相关，但在亚洲金融危机期间可能有所不同，审计收费不但没有下降反而可能增加。

第四，我们通过一个动态设置，重新检验了事务所兼并的影响。Pong (1999)使用英国1991至1995年间的数据，发现：最大的四家审计师审计客户的数量占60%，而收取的审计收费占79%；其中的5个行业全部由六大审计，29个其他行业中六大占主导地位。因而，事务所的兼并可能进一步提高了大所的垄断地位。根据Sullivan (2002)的研究，事务所兼并的经济学原理有两个：一是反竞争理论，兼并削弱了竞争，提高了审计收费，从而对事务所是有好处的；二是效率理论，兼并降低了兼并公司的成本从而要求较低的审计收费。大所的兼并对于不同细分市场可能有不同的影响。比如，兼并对于BIG N的审计收费的正面或负面影响要大于非BIG N。同理，兼并对于兼并涉及公司的影响要大于对非兼并涉及公司的影响。此外，兼并的影响可能仅是暂时而非持续的。实证研究中对于1989年八大兼并影响的结论并不一致，Sullivan (2002) 发现1989年的兼并事件导致了大所成本的降低，尤其对于兼并

[9] 定义第一层(或第二层)GLC分别为20%的控制权由政府控制(或实际控制)。

公司。Iyer and Iyer (1996) 发现兼并并没有导致审计收费的变化。相反，Menon and Williams (2001) 发现该事件导致了短期内审计收费的提高。Goddard (1998) 评估了澳大利亚Coopers & Lybrand和Price Waterhouse兼并的影响，并没有发现反竞争影响的存在。使用面板数据分析方法，我们重新检验了以下问题：(1)BIG N的兼并降低了竞争还是提高了效率？ (2)兼并对于BIG N的影响是否大于对非BIG N的影响？(3)兼并的影响是否仅是短期的？

第五，我们进一步检验2002年安达信倒闭事件对于审计收费的影响。一方面，该事件可以认为是五大变为四大的一次强制性兼并，从而会产生如前面讨论的两种效应。另一方面，该事件提高了审计师对审计风险的感知，促使审计师更多的审计投入和更高的审计收费。而究竟是哪种效应是一个实证问题。

最后，我们采用面板数据分析方法，重新检验了BIG N溢价以及行业专长溢价。BIG N可以要求更高的审计收费溢价(Francis and Stokes, 1986; Palmrose, 1986a)。此外，审计师的行业专长可以进一步获取审计收费溢价(Craswell *et al.*, 1995; Balsam *et al.*, 2003; Krishnan, 2004; Francis, 2004)。以往的研究表明行业领导者可以获取额外的行业专长溢价。DeFond *et al.* (2000)、Ferguson *et al.* (2003)、Francis *et al.* (2005)分别对香港、澳大利亚和美国审计市场的行业专长进行了分析，得出行业专家的审计收费溢价在10%至30%之间。然而这些溢价可能随着时间而变化，尤其当事务所的兼并导致审计公司数目降低。

三、数据及初步分析

3.1 样本选择与研究设计

我们检验1985至2004年在新加坡上市的公司。数据源于Pacific-Basin Capital Market Database (PACAP)和Company Analysis Database。对于缺失的数据，我们通过查阅年报进行补充。由于金融行业的特殊性不适合与其他行业一起研究，我们剔除了该行业 (Simunic, 1980; Francis, 1984; DeFond *et al.*, 2000)。我们进一步去除了由多个事务所审计、跨国审计和审计师信息缺失的样本。[10]表1详列了1985至2004年在新加坡股票市场上市的公司数量(去除马来西亚公司)以及样本公司的行业分布。

如表1所示，在样本期间新加坡的上市公司数目有了显著的提高，然而最近新上市的公司大多为外国公司。[11]

基于以往的研究，我们从一个标准的审计收费模型开始(Simunic, 1980; Francis, 1984)检验模型随着时间变化的有效度。为了检验政府关联对于审计收费的影响，我们包括了一个哑变量*GLC*表明该公司是否为政府关联公司。

$$\begin{aligned} LAF_{i,t} = {} & a_o + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + \\ & a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + \\ & a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + e_{i,t}, \\ & t = 1985, \cdots, 2004 \end{aligned} \qquad (1)$$

[10] 当存在联合审计时，我们无法知道任何一个审计师的审计收费；当由外国审计师进行审计，审计收费不完全由新加坡审计市场决定，因此将这些样本去除。

[11] 比如，2003至2004年间有超过40家的中国公司在新加坡上市，而这些公司大多在维尔京群岛注册。

表1 样本分布

本表详列了1985至2004年在新加坡证券交易所上市的公司数量(去除马来西亚公司)以及样本公司的行业分布。

年份	全部上市公司	样本公司	商业	建筑业	酒店餐饮业	制造业	混合行业	房地产业	服务业	交通运输业
1985	134	77	10	6	13	15	14	13	2	4
1986	135	78	10	6	13	16	14	13	2	4
1987	139	92	12	7	13	24	15	14	2	5
1988	145	97	13	7	13	27	15	15	2	5
1989	151	103	14	7	13	27	15	17	3	7
1990	172	114	15	7	14	32	16	17	3	10
1991	183	117	14	7	14	33	16	18	5	10
1992	188	128	18	9	15	40	15	15	5	11
1993	205	140	19	11	15	47	15	15	6	12
1994	229	163	23	13	15	59	16	16	8	13
1995	248	187	31	13	15	72	15	16	11	14
1996	266	208	36	14	14	85	17	16	11	15
1997	294	229	39	17	15	97	17	17	11	16
1998	307	243	40	20	15	103	17	18	13	17
1999	328	243	41	21	15	99	18	19	12	18
2000	388	235	41	20	14	95	18	17	13	17
2001	386	200	36	16	11	83	14	13	13	14
2002	385	189	35	16	11	78	12	11	13	13
2003	413	172	31	14	10	71	13	10	11	12
2004	462	159	26	13	10	66	12	11	10	11

其中，

$LAF_{i,t}$	=	公司i在年度t经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数目的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，当公司是政府关联公司（公司20%及以上的股权直接或者间接由新加坡政府所有）；或0，当公司不是政府关联公司。

审计客户的规模（*LTA*，经通胀调整后总资产的自然对数）、子公司的数目（*SUB*，子公司数目的平方根）、外国子公司的比例（*FOR*，外国子公司的数目占所有子公司数目的比例）、应收账款占总资产的比重（*DEB*）以及存货占总资产的比重（*INV*）反映了审计的复杂性，以往的文献表明这些均与审计收费正相关。以长期负债占总资产的比重（*GEAR*）衡量的负债程度应与审计收费正相关。而高的速动比率（*QUICK*，流动资产与存货的差值与流动负债的比率）表明公司具有较好的财务状况和较低的审计风险，与审计投入负相关。总资产报酬率（*ROA*）与审计收费负相关，当盈余降低时审计风险提高，从而需要更高的审计收费来补偿提高的审计风险。过去一年是否为亏损（*LOSS*）与审计收费正相关，当客户过去一年面临亏损，客户的审计风险上升。GLCs具有较高的经营效率和较低的风险，预期支付较低的审计费用。

现有文献发现BIG N能够获取审计收费溢价（Francis and Stokes, 1986; Francis and Simon, 1987; Francis and Simon, 1988），当公司由BIG N审计时，*BIG*取值为1。以往研究（Craswell *et al.,* 1995; Beasley and Petroni, 2001, Owhoso *et al.,* 2002）假设并发现除了审计师的品牌声誉，审计师的行业专长也提高了审计师提供的服务的可靠性，因而行业专长可以带来额外的审计收费溢价。Hogan and Jeter (1999) 认为行业专长的培育或许是美国七十年代中到八十年代间审计市场集中度提高的一个重要原因。然而审计师的行业专长无法直接衡量（Balsam *et al.,* 2003），行业专长建立在相似事项的重复执行，因而审计师在某一行业中的大量业务量可以间接反映行业专长。和以往的研究一致，我们也使用审计师在某一行业的审计收费占该行业审计收费总额的比例来衡量行业专长（*SPEC*）。[12]

[12] 在章节4.4中，我们还讨论了不同行业专长衡量下的结果。

3.2 描述性统计

表2是分析中主要变量的描述性统计和相关系数矩阵。Panel A报告了变量年度截面的均值和标准差。经通胀调整后的审计收费的均值随时间而上升，按照新元计价的审计收费均值在2002年达到最高值418,000新元，而后降至2004年的380,000新元。在1998年的亚洲金融危机冲击下，审计收费有所下降。应收账款占总资产的比重呈现递增趋势，而其他变量并没有显著的时间趋势。我们还发现新加坡国内生产总值的平均增速为6.5%，仅在1985、1998和2001年表现为负增长，样本期间的消费物价指数水平总体较低。

Panel B中自变量之间的相关系数大多在1%的水平下显著为正，一般都低于0.4。然而*LTA*和*SUB*的相关系数为0.56。我们还计算了分年度自变量之间的相关系数，分年度相关度要高于混合数据的相关度，这和混合数据能够降低多重共线性一致。

3.3 时间趋势

在进行面板数据分析之前，我们先检验是否存在时间效应。我们对回归模型(1)进行了分年度的回归。基于文章篇幅的考虑，我们不详列结果而仅是汇总报告主要结论。首先，回归的截距在过去的20年有很大差异，表明存在一些时间效应。其次，由于不同年度样本量不同或者特定时间事件不同，有些变量(比如*GEAR*)的系数不十分一致。而且，模型经调整后的判定系数在2004年仅为0.47，而在1991年为0.84，均值为0.69。结果表明，审计收费模型的估计可能受到时间因素的影响。

参考Menon and Williams (2001)，我们进一步对分年度回归的系数估计进行检验，考察是否存在时间趋势，进行如下回归：

$$a_i = d_o + d_1 YEAR + e_i, \qquad i = 0, \cdots, 20 \tag{2}$$

其中，a_i是回归模型(1)第i个变量的系数，*YEAR*是时间趋势变量，取值为1至20，1985年取值为1，2004年取值为20。如果审计收费结构不随时间而变化，那么d_1应该不显著区别于0。

表3是模型(2)的回归结果，和Menon and Williams (2001)的研究结论相似，大多数系数并没有时间趋势，而两个代表审计复杂程度变量*SUB*和*FOR*的系数具有显著负的时间趋势和显著正的截距。结果表明，审计复杂度的提高平均而言提高了审计收费，但是其边际影响随着时间降低，这和审计努力程度随着审计技术的提高而降低一致。

表2 描述性统计

表2为分析中主要变量的描述性统计和相关系数矩阵。Panel A报告了相关变量会计年度截面的均值和标准差。Panel B报告了自变量之间的相关系数。*、**、***分别表示在10%、5%和1%的水平下显著。

Panel A: 描述性统计

	审计收费（千新元）		总资产（千新元）		子公司的数目		国外子公司的数目		总资产回报率		
年份	均值	标准差	均值	标准差	均值	标准差	均值	标准差	均值	标准差	样本量
1985	166.150	237.707	340225.1	430950.3	15.35	19.60	6.55	11.85	0.0001	0.0801	75
1986	182.426	268.738	437393.5	1118925.0	15.17	19.41	6.43	11.72	0.0026	0.1137	77
1987	184.069	286.903	417494.9	920871.6	15.18	18.38	6.38	11.36	0.0320	0.0863	91
1988	233.075	456.929	466313.0	978561.9	14.95	18.04	6.14	11.12	0.0469	0.1112	96
1989	195.555	268.954	577997.8	1166944.0	21.06	27.26	9.05	14.44	0.0634	0.0888	102
1990	202.242	242.907	646180.7	1336833.0	19.75	26.36	8.41	13.88	0.0557	0.0613	113
1991	218.151	250.754	662532.3	1396447.0	20.66	26.09	8.85	13.82	0.0430	0.0616	116
1992	219.843	269.999	606024.5	1376043.0	19.57	26.17	8.70	13.85	0.0558	0.0700	127
1993	230.021	248.474	677599.9	1588590.0	20.68	27.82	9.06	12.94	0.0561	0.0575	139
1994	213.759	256.609	758200.3	1773348.0	23.10	33.95	10.44	16.86	0.0510	0.0727	162
1995	232.560	291.203	721365.5	1823732.0	22.51	31.37	10.25	14.71	0.0453	0.0611	186
1996	234.741	268.817	1075232	5141517.0	24.50	35.96	11.36	17.09	0.0397	0.0784	207
1997	246.532	309.288	830767.3	2288931.0	23.96	37.21	11.95	19.94	0.0216	0.1172	228
1998	234.626	300.226	1240152.0	7539313.0	23.71	36.24	12.15	19.29	-0.0183	0.1457	242
1999	243.214	343.966	789613.9	2752761.0	23.58	37.87	11.86	21.32	0.0183	0.1444	243
2000	272.840	390.835	715773.8	2950194.0	25.66	40.90	12.90	23.21	0.0209	0.1248	235
2001	303.194	457.288	845296.6	2356162.0	20.24	23.41	10.88	14.71	-0.0034	0.1078	199
2002	417.901	942.079	776164.5	3106821.0	21.27	24.29	11.11	15.23	-0.0167	0.1510	189
2003	354.569	576.941	794283.3	3305030.0	22.65	25.02	11.32	15.69	0.0031	0.1057	172
2004	379.839	665.350	689769.4	2888551.0	22.62	25.71	11.34	16.16	0.0295	0.1386	159
平均	257.861	422.692	763919.4	3232979.0	20.81	30.00	9.89	16.07	0.0244	0.1113	

Panel A: 描述性统计(续)

	INV		*DEB*		*GEAR*		*QUICK*			宏观变量	
年份	均值	标准差	均值	标准差	均值	标准差	均值	标准差	样本数	*GDP*	*CPI*
1985	0.1197	0.1238	0.1054	0.1067	0.0435	0.0773	1.2116	1.1535	75	-1.4	0.800
1986	0.1125	0.1175	0.1082	0.1065	0.0379	0.0784	1.4284	1.5901	77	2.1	0.789
1987	0.1299	0.1375	0.1005	0.0870	0.0460	0.0877	1.3851	1.1008	91	9.8	0.793
1988	0.1263	0.1320	0.1061	0.0951	0.0414	0.0847	1.5880	1.6442	96	11.5	0.806
1989	0.1079	0.1237	0.1077	0.0997	0.0448	0.0812	1.7291	1.4751	102	10.0	0.823
1990	0.1008	0.1124	0.1078	0.1016	0.0589	0.1015	1.6979	1.4922	113	9.2	0.852
1991	0.1000	0.1067	0.1129	0.1100	0.0635	0.1054	1.5540	1.2694	116	6.6	0.881
1992	0.0982	0.1065	0.1407	0.1289	0.0633	0.1036	1.5019	1.1095	127	6.3	0.901
1993	0.1135	0.1203	0.1442	0.1326	0.0687	0.1075	1.5547	1.1900	139	11.7	0.922
1994	0.1151	0.1287	0.1438	0.1291	0.0727	0.1007	1.6233	1.2942	162	11.6	0.950
1995	0.1316	0.1427	0.1560	0.1327	0.1001	0.1208	1.4939	1.1920	186	8.1	0.967
1996	0.1167	0.1347	0.1543	0.1231	0.1091	0.1218	1.3908	0.9949	207	7.8	0.980
1997	0.1331	0.1340	0.1506	0.1165	0.1203	0.1302	1.2626	0.9666	228	8.3	1.000
1998	0.1222	0.1209	0.1448	0.1158	0.1347	0.1436	1.2448	1.0859	242	-1.4	0.997
1999	0.1075	0.1131	0.1449	0.1174	0.2426	0.8195	1.4980	1.7283	243	7.2	0.998
2000	0.1090	0.1172	0.1542	0.1217	0.2430	0.6827	1.8257	3.0300	235	10.0	1.010
2001	0.1293	0.1413	0.1295	0.1090	0.2693	0.2172	2.4303	2.3466	199	-2.3	1.021
2002	0.1237	0.1287	0.1845	0.1259	0.1130	0.1464	1.5775	1.6147	189	4.0	1.017
2003	0.1270	0.1216	0.1937	0.1244	0.0957	0.1053	1.4720	1.1619	172	2.9	1.022
2004	0.1371	0.1321	0.1993	0.1293	0.0889	0.1078	1.7441	2.5460	159	8.7	1.040
平均	0.1188	0.1259	0.1456	0.1211	0.1205	0.3173	1.5691	1.6719	3137	6.5	

Panel B: 相关系数矩阵

	LAF	*LTA*	*SUB*	*FOR*	*INV*	*DEB*	*GEAR*	*QUICK*	*ROA*	*GDP*	*BIG*
LTA	0.648**										
SUB	0.585**	0.556**									
FOR	0.251**	0.072**	0.384**								
INV	0.053**	-0.184**	-0.048**	0.193**							
DEB	0.002	-0.291**	-0.128**	0.085**	0.281**						
GEAR	0.059**	0.075**	0.063**	-0.043*	-0.091**	-0.088**					
QUICK	-0.133**	-0.064**	-0.143**	-0.075**	-0.204**	-0.112**	-0.031				
ROA	-0.003	0.136**	0.046*	0.015	0.000	-0.015	0.022	0.132**			
GDP	-0.041*	0.008	0.173**	0.108**	-0.021	-0.005	-0.062**	-0.018	0.180**		
BIG	0.256**	0.191**	0.164**	0.080**	0.026	-0.027	0.028	-0.007	0.057**	0.013	
SPEC	0.375**	0.266**	0.263**	0.049**	0.060**	-0.037*	0.043*	-0.008	0.043*	0.011	0.502**

变量定义：

$LAF_{i,t}$	=	公司*i*在年度*t*经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数量的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，为政府关联公司（公司20%及以上的股权直接或者间接由新加坡政府所有）；或0，为非政府关联公司。

表3 1985-2004分年度回归系数的时间趋势

表3是方程(2)的回归结果。根据方程(1)分年度截面回归的系数对时间趋势变量进行回归。表中的五列分别代表变量名称、常数项、会计年度(*YEAR*)的系数估计、判定系数以及回归中的样本数。括号中的数值代表经调整后的t值。*、**、***分别表示在10%、5%和1%的水平下显著。

	截距	会计年度	判定系数	样本数
截距	-0.9529	0.0191	-0.0460	20
	(2.010)**	(0.4097)		
LTA	(0.3284)	(0.0042)	-0.0033	20
	(7.503)***	(0.9754)		
SUB	0.2374	-0.0077	0.5548	20
	(18.067)***	(-5.472)***		
FOR	0.5114	-0.0165	0.2545	20
	(7.542)***	(-2.510)***		
INV	0.8704	-0.0185	0.0053	20
	(4.468)***	(-1.1545)		
DEB	1.2465	-0.0245	0.0375	20
	(6.644)***	(-1.4867)		
GEAR	-1.6933	0.1055	0.5322	20
	(-4.561)***	(3.880)***		
QUICK	0.0024	-0.0022	0.0803	20
	(0.1319)	(-1.4874)		
ROA	-0.0152	-0.0333	0.0447	20
	(-0.0491)	(-1.2443)		
LOSS	0.1148	-0.0018	-0.0562	19
	(1.1150)	(-0.2638)		
BIG	0.2366	-0.0070	0.0376	20
	(4.580)***	(-1.0980)		
SPEC	0.5224	0.0103	-0.0323	20
	(2.320)**	(0.5172)		
GLC	-0.1601	0.0010	-0.0533	20
	(-2.253)***	(0.1731)		
调整后判定系数	0.8133	-0.0117	0.4530	20
	(26.702)***	(-3.662)***		

注：回归的模型为：

$$a_i = d_o + d_1 YEAR + e_i , \qquad i = 0, \cdots, 20 \tag{2}$$

其中，a_i是方程(1)第i个变量的系数。*YEAR*是时间趋势变量，取值为1至20，1985年时取值为1，2004年取值为20。如果审计收费结构没有发生变化，那么d_1应该不显著。

变量定义：

$LAF_{i,t}$	=	公司*i*在年度*t*经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数量的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，当公司为政府关联公司(公司20%及以上的股权直接或者间接由新加坡政府所有)；或0，当公司不是政府关联公司。

此外，*GEAR*也具有显著的时间趋势，时间趋势为0.106，在1%的水平下显著为正。该变量衡量公司风险，表明对于一家保持以往负债水平的公司，审计师在以后年度将提高审计收费，这和审计师更多关心审计风险一致。但是该回归模型的系数为负，表明平均而言*GEAR*和审计收费负相关，这和直观情况不一致。因此，这里对*GEAR*的回归无法得出强有力的推断。

有趣的是，调整的判定系数的回归模型呈现显著正的截距和显著负的时间趋势。这表明标准的审计收费模型确实对于审计收费的截面变化具有解释能力，但是其解释能力逐渐降低。

总体而言，我们的结果表明在研究审计收费决定因素时需要考虑时间效应和其他缺失变量。因此，下面我们将转向面板数据分析方法。

四、面板数据分析

面板数据方法同时考虑了截面数据和时间序列数据，该研究方法能够有效控制时间相关事件的影响，而审计收费确实受到审计环境的影响，因而该方法对于我们研究审计环境变化如何影响审计收费变化非常必要。从计量经济学的角度来看，该方法能够降低缺失变量和解释变量相关而带来的内生性问题，并能够提供更加可靠的系数估计(Hsiao, 1986)，并且还能够降低变量之间相关而带来的多重共线性问题。

为了检验特定时间事件，比如经济周期、大事务所兼并、亚洲金融危机以及安达信倒闭等的影响，我们在面板数据回归中加入了五个实验变量：*GDP*、*MERGER1*、*MERGER2*、*CLPS*和*CRISIS*，具体的回归模型如下：

$$\begin{aligned} LAF_{i,t} = {} & a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + \\ & a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + \\ & a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + \\ & a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t} \end{aligned} \quad (3)$$

其中，

GDP = 新加坡年度国内生产总值的实际增长率；

MERGER1 = 1，对于1989年及之后的会计年度；

MERGER2 = 1，对于1998年及之后的会计年度；

CLPS = 1，对于2002年及之后的会计年度；

CRISIS = 1，当会计年度为1997或者1998；[13]

其他变量的定义详见回归模型(1)。

4.1 全样本期间的回归结果

表4是采用面板数据方法对于1985至2004全样本用模型(3)进行回归的结果。表4的第一列是全样本回归的结果。与我们的假说一致，审计复杂度(*LTA*、*SUB*、*FOR*、*INV*和*DEB*)与审计收费在1%水平下显著正相关，而*ROA*与审计收费在1%的水平下显著负相关。其他审计风险的代理变量*GEAR*、*QUICK*和*LOSS*不显著。*LOSS*不显著，可能是该变量衡量比较粗糙，利润为零不是审计师判断审计风险的重要临界点，而且很多证据表明零利润附近存在盈余管理(Hay *et al.*, 2006)。*BIG*和*SPEC*均在5%或更低的水平下显著为正，表明存在品牌声誉溢价和行业专长溢价，通过系数我们还可以判断行业专长溢价比品牌声誉溢价更大。

我们关心的变量*GLC*在10%水平下显著为负，支持GLCs支付了较低的审计收费，表明新加坡政府的"援助"优于"掠夺"。五个特定时间事件变量的影响不一致。*MERGER2*和*CLPS*在1%水平下显著为正，表明1998年Price Waterhouse和Coopers & Lybrand的兼并以及2002年安达信的倒闭确实带来了审计收费的变化，这和反竞争理论一致。*CLPS*的系数显著为正，表明安达信的倒闭可能提高了事务所的审计风险，从而事务所要求更高的审计收费。*GDP*、*MERGER1*以及*CRISIS*的系数并不显著，表明经济周期、1989年的兼并浪潮以及亚洲的金融危机对于审计收费的影响有限。

[13] 虽然亚洲金融危机始于1997年对泰铢的影响，在1998年才蔓延到新加坡，但是我们认为事务所在1997年应该能够预测到该危机的发生。

表4 全样本期间的面板数据分析

表4是基于回归方程(3)在1985至2004年全样本期间进行面板数据分析的结果。三列分别报告了所有公司、非BIG N审计公司以及BIG N审计公司的结果。括号中的参数代表两维聚类调整之后的t值。样本数目和调整后的判定系数在表中最后两行。*、**、***分别表示在10%、5%和1%的水平下显著。

	(1) 所有公司	(2) 非BIG N 审计公司	(3) BIG N 审计公司
LTA	0.3662***	0.4230***	0.3526***
	(8.173)	(4.236)	(8.378)
SUB	0.1336***	0.1325**	0.1366***
	(5.623)	(2.403)	(5.984)
FOR	0.2996***	0.0419	0.3273***
	(3.391)	(0.224)	(3.431)
INV	0.7316***	0.6914*	0.7242***
	(4.031)	(1.957)	(3.668)
DEB	1.0267***	0.9666*	1.0331***
	(4.169)	(1.910)	(3.961)
GEAR	-0.0049	0.6368*	-0.0230
	(-0.104)	(1.712)	(-0.518)
QUICK	-0.0104	-0.0478	-0.0075
	(-0.805)	(-1.096)	(-0.535)
ROA	-0.4427***	-0.6198	-0.3374*
	(-2.600)	(-1.517)	(-1.778)
LOSS	0.0638	0.0549	0.0625
	(1.581)	(1.062)	(1.436)
BIG	0.1744**		
	(2.079)		
SPEC	0.7202***		0.7220***
	(4.484)		(4.456)
GLC	-0.1611*	-0.3628	-0.1448
	(-1.717)	(-0.960)	(-1.552)
GDP	-0.0149	-0.0141	-0.0149
	(-1.203)	(-1.422)	(-1.194)
MERGER1	0.1344	0.3757***	0.0895
	(1.337)	(3.229)	(0.881)
MERGER2	0.1773***	0.1827*	0.1727**
	(2.583)	(1.861)	(2.508)

	(1) 所有公司	(2) 非 BIG N 审计公司	(3) BIG N 审计公司
CLPS	0.4627***	0.3220*	0.5005***
	(2.760)	(1.910)	(2.865)
CRISIS	-0.1584	-0.1050	-0.1598
	(-1.041)	(-0.676)	(-1.083)
样本数	3049	393	2656
调整后判定系数	0.6374	0.5939	0.6215

注：回归模型为：

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

其中，

$LAF_{i,t}$	=	公司 i 在年度 t 经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数量的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，当公司是政府关联公司（公司20%及以上的股权直接或者间接由新加坡政府所有）；或0，当公司不是政府关联公司；
GDP	=	新加坡年度国内生产总值的实际增长率；
MERGER1	=	1，对于1989年及之后的会计的年度；
MERGER2	=	1，对于1998年及之后的会计年度；
CLPS	=	1，对于2002年及之后的会计年度；
CRISIS	=	1，当会计年度为1997或者1998。[14]

[14] 虽然亚洲金融危机始于1997年对泰铢的影响，在1998年才蔓延到新加坡，但是我们认为事务所在1997年应该能够预测到该危机的发生。

Sullivan (2002)指出BIG N相比非BIG N在自身规模、客户类型以及资源上都存在很大的区别，因而兼并可能带来的成本降低的好处并不能传导给非BIG N。而且，BIG N和非BIG N对于风险的感知不同。DeAngelo (1981)认为BIG N更多关心自身声誉资本的投入，而非BIG N没有较多声誉资本可以损失。因此，我们将样本分为两个部分：BIG N审计和非BIG N审计的公司，这样我们能够检验宏观经济事件对于不同细分审计市场的影响是否存在差异。表4的第二列和第三列分别报告了非BIG N和BIG N审计公司的结果。第三列(BIG N)的结果和第一列的结果非常相似，可能是87%的样本公司是由BIG N审计所致，这和Tonge and Wootton (1991)发现的90%在纽约证券交易所(NYSE)和美国证券交易所(ASE)上市的公司是由BIG N审计一致。但是*GLC*不显著为负，表明BIG N审计的公司来自政府的"援助"并不显著的强于"掠夺"。*SPEC*的系数非常显著的为正，表明BIG N除了品牌声誉溢价，仍存在行业专长溢价。

第二列相比第一列差异较大。许多传统因素的显著性水平有很大程度的下降，而且*FOR*和*ROA*变得不显著。*GEAR*在10%水平下仍显著为正，表明高的杠杆提高了审计风险，进而审计师要求更高的审计收费。五个实验变量的结果如下：*MERGER1*显著为正，表明1989年八大的兼并导致了非八大审计收费的提高，而对于BIG N审计的公司的影响有限。因而，审计行业的兼并提高了非BIG N的审计风险，并没有提高BIG N的审计风险。*MERGER2*和*CLPS*仍为正，但是显著性水平下降，而*GDP*和*CRISIS*不再显著。1998年Price Waterhouse和Coopers & Lybrand的兼并以及2002年安达信的倒闭提高了审计师对风险的评估，但同时也影响客户支付审计收费的能力，从而降低了对于非BIG N审计收费的影响。

4.2 两个子样本期间的回归结果

我们进一步将样本分为两个子样本期间：1985至1994年和1995至2004年。采取该分类的理由为：第一，1985年新加坡开始对GLCs实施重大私有化改革，该改革的初期对公司可能有较大的影响。第二，可能存在其他时间特有因素无法由模型中的*GDP*或其他宏观事件代表，将样本分为两个子样本有助于我们更好地控制其他时间特有效应的影响。第三，Menon and Williams (2001)发现1989年八大的兼并对审计收费是暂时而非永久的影响。上面的回归中，我们没有发现1989年兼并事件存在持续影响，但是仍可能存在暂时性影响。将样本分为两个子样本有助于我们研究这种可能性。第四，我们的面板数据包括20年，样本的不平衡程度较高，对样本进行分组能够降低不平衡程度。最后，分组之后的每个子样本仅包含一个兼并事件，能够更好地检验兼并对于兼并事务所的影响是否要大于对其他事务所的影响。我们采用面板数据分析方法重新用模型(3)进行回归，回归结果在表5的Panel A和Panel B中。每个部分包括了四种情况：(1)所有公司；(2)非BIG N审计的公司；(3)BIG N审计的公司；(4)兼并涉及事务所审计的公司。

表5 两个子样本期间的面板数据分析

表5为在两个子样本期间对方程(3)进行面板数据分析的结果，Panel A为1985至1994年期间，Panel B为1995至2004年期间。四列分别为：所有公司、非BIG N审计公司、BIG N审计公司以及兼并涉及事务所审计公司(Panel A为1989年的兼并，Panel B为1998年的兼并)。括号中的参数代表经两维聚类调整之后的t值。样本数目和经调整后的判定系数在最后两行。*、**、***分别表示在10%、5%和1%的水平下显著。

Panel A：1985至1994年

	(1) 所有公司	(2) 非BIG N审计公司	(3) BIG N审计公司	(4) 1989年兼并涉及事务所审计公司
LTA	0.3679***	0.3483***	0.3689***	0.3952***
	(11.014)	(6.576)	(9.869)	(8.343)
SUB	0.1770***	0.2491***	0.1724***	0.1576***
	(7.766)	(7.816)	(7.343)	(5.706)
FOR	0.3845***	-0.1292	0.4277***	0.3161*
	(2.927)	(-0.644)	(2.921)	(1.781)
INV	0.8437***	1.2228***	0.8733***	0.6136**
	(3.299)	(3.104)	(3.074)	(2.093)
DEB	1.3603***	0.5774	1.4784***	1.6953***
	(5.529)	(1.108)	(4.920)	(5.434)
GEAR	-0.9449***	1.0785	-0.9834***	-1.1400***
	(-3.270)	(1.375)	(-3.189)	(-3.100)
QUICK	-0.0059	0.0081	-0.0039	-0.0278
	(-0.329)	(0.135)	(-0.185)	(-1.198)
ROA	-0.3351*	-0.9187*	-0.2274	-0.3712
	(-1.681)	(-1.866)	(-1.145)	(-1.589)
LOSS	0.0929	0.0085	0.1009	0.1255
	(1.048)	(0.071)	(0.934)	(0.910)
BIG	0.1879*			
	(1.909)			
SPEC	0.7969***		0.8056***	0.8102***
	(4.323)		(4.336)	(3.557)
GLC	-0.2240**	0.0000	-0.2130**	-0.2104
	(-2.457)	(.)	(-2.272)	(-1.496)
GDP	0.0060*	0.0061	0.0053	0.0148***
	(1.852)	(.)	(1.152)	(3.017)
MERGER1	-0.0068	0.2020***	-0.0351	-0.0027
	(-0.122)	(3.195)	(-0.553)	(-0.042)
样本数	1079	145	934	615
调整后判定系数	0.7535	0.8104	0.7211	0.7004

Panel B：1995至2004年

	(1) 所有公司	(2) 非BIG N审计公司	(3) BIG N审计公司	(4) 1989年兼并涉及事务所审计公司
LTA	0.3678***	0.4433***	0.3518***	0.2282***
	(6.531)	(3.033)	(6.893)	(5.253)
SUB	0.1135***	0.0597	0.1199***	0.1328***
	(4.275)	(0.725)	(4.854)	(6.012)
FOR	0.2581***	0.1323	0.2794***	0.5799***
	(2.976)	(0.539)	(3.063)	(4.644)
INV	0.5626***	0.4557	0.5684***	0.9649***
	(2.840)	(0.852)	(2.651)	(3.289)
DEB	0.7401***	0.9991	0.6985***	0.1607
	(2.793)	(1.376)	(2.629)	(0.486)
GEAR	0.0145	0.4972	-0.0006	0.0914
	(0.349)	(1.194)	(-0.016)	(0.916)
QUICK	-0.0208*	-0.0778	-0.0157	-0.0232
	(-1.696)	(-1.591)	(-1.129)	(-0.789)
ROA	-0.4666***	-0.5516	-0.3896*	-0.4109
	(-2.677)	(-1.161)	(-1.948)	(-1.281)
LOSS	0.0384	0.0524	0.0296	0.0084
	(0.881)	(0.653)	(0.662)	(0.112)
BIG	0.1747*			
	(1.830)			
SPEC	0.5653***		0.5538***	0.4223
	(2.820)		(2.736)	(1.206)
GLC	-0.0896	0.2698	-0.0788	-0.2050
	(-0.763)	(0.677)	(-0.665)	(-1.488)
GDP	-0.0235*	-0.0209	-0.0229*	-0.0224
	(-1.733)	(-1.483)	(-1.665)	(-1.260)
MERGER2	0.0713	0.0673	0.0752	0.0291
	(0.808)	(1.021)	(0.837)	(0.294)
CLPS	0.4242***	0.1790	0.4717***	0.8510***
	(2.646)	(1.008)	(2.779)	(5.731)
CRISIS	-0.2253	-0.1661	-0.2239	-0.2223
	(-1.538)	(-1.286)	(-1.540)	(-1.600)
样本数	1970	248	1722	461
调整后判定系数	0.5824	0.4656	0.5825	0.7105

注：回归方程为：

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

其中

$LAF_{i,t}$	=	公司i在年度t经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数量的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，当公司是政府关联公司（公司20%及以上的股权直接或者间接由新加坡政府所有）；或0，当公司不是政府关联公司；
GDP	=	新加坡年度国内生产总值的实际增长率；
MERGER1	=	1，对于1989年及之后的会计年度；
MERGER2	=	1，对于1998年及之后的会计年度；
CLPS	=	1，对于2002年及之后的会计年度；
CRISIS	=	1，当会计年度为1997或者1998。[15]

表5的Panel A和表4的结果基本一致，仍存在一些区别。第一，除了在非BIG N的回归中，*GEAR*变得非常显著为负。对数据的进一步分析表明第一个子样本期间的平均负债水平要低于第二个期间的。因而，可能的解释为：公司的负债水平较低时，负债的增加表示债权人进行更多的监督，从而间接降低了审计师的审计风险和审计收费。第二，*GLC*在5%水平下显著为负，表明GLCs被认为低风险，支付了较低的审计费用。第三，对于所有公司的回归，*GDP*显著为正，表明审计师在经济较好期间更加的激进并要求更高的审计费用。最后，对于兼并涉及事务所审计公司的

[15] 虽然亚洲金融危机始于1997年对泰铢的影响，在1998年才蔓延到新加坡，但是我们认为事务所在1997年应该能够预测到该危机的发生。

回归结果和BIG N审计公司的回归结果基本一致，但是*GLC*不再显著，而*GDP*显著为正。这表明，政府关联对于1989年兼并涉及事务所审计公司没有显著的影响，而且兼并涉及的公司在兼并之后支付了更高的审计费用。我们还发现非BIG N审计公司回归中的判定系数比整个样本的判定系数要大。

表5的Panel B是对第二个子样本期间的回归结果，该结果和表4中全样本回归结果基本一致，尤其对于实验变量。第一，*GLC*不显著，表明GLCs所具有的较低审计风险是暂时性的，在该样本期间来自政府的援助和掠夺基本相当。第二，在所有公司以及BIG N审计公司的回归中，*GDP*显著为负，表明在经济萧条时，事务所需要更多的审计投入，这也可能是该样本期间BIG N兼并、倒闭、金融危机等事件共同作用的结果。第三，*MERGER2*在该样本期间对审计收费并没有显著的影响。兼并涉及事务所审计的公司的回归模型的拟合优度最高，和BIG N审计公司的回归结果相比，除了*ROA*、*SPEC*和*GDP*不再显著，其他变量的结果基本一致。虽然我们发现在不同的样本期间，参数的估计不同，但是基本一致。

4.3 对于GLCs的进一步检验

虽然我们发现GLCs相比非GLCs支付较低的审计费用，但是没有区分审计折价来自政府援助还是GLCs本身的经营效率。在表6中，我们试图控制影响经营效率的因素，进而分离出来自政府援助的影响。对于GLCs，我们按年份、行业和*ROA*为标准选取一家最相近的公司作为配对样本，采用配对样本回归方法在全样本和两个子样本期间分别对回归模型(3)重新进行估计。

表6第一列表明*GLC*在全样本不显著为负，表明在控制了企业的经营效率之后，来自政府的“援助”对GLCs的正面影响仅是稍微高于“掠夺”的负面影响。而在第一个子样本的检验中，*GLC*在1%水平下显著为负，这和表4第一列以及表5 (Panel A)第一列的结论一致。在分样本的回归中，GLCs在八十年代末和九十年代初支付了较低的审计费用，而在第二个子样本期间没有享受审计收费折价。结论表明，当新成立的私有化公司在公开市场上需要政府援助时，政府将担保并控制对GLCs的寻租行为。而当GLCs已经在公众投资者中树立声誉之后，政府将会降低援助。

4.4 稳健性检验

我们做了很多稳健性检验，基于篇幅的考虑，我们不报告具体的结果而仅是做简要的说明。

第一，为了消除非平衡样本的影响，我们采用平衡数据重新进行回归。第一个样本期间有57家具有连续10年数据的公司，第二个样本期间有67家具有连续10年数据的公司。采用平衡样本的结果基本一致，仅是*MERGER2*在兼并涉及事务所审计公司的回归中更加显著为正。

第二，参考Menon and Williams (2001)对兼并的定义方法，在兼并当年以及随后两年定义为1，其他年份为0，这样能够识别兼并的短期影响。具体而言，当会计年度为1989、1990和1991年时，*MERGER1* = 1，其他为0，而当会计年度为1998、1999和2000年时，*MERGER2* = 1，其他0。结论基本一致。

表6 对于政府关联公司的面板数据分析

该表为对GLCs以及按照行业和*ROA*配对的非GLCs公司进行面板数据分析的结果。第一列为全样本期间的结果，第二列和第三列分别为两个子样本期间的结果。括号中的参数代表经两维聚类调整之后的t值。样本数目和调整后的判定系数在最后两行。*、**、***分别表示在10%、5%和1%的水平下显著。

	(1) 1985-2004	(2) 1985-1994	(3) 1995-2004
LTA	0.4207***	0.4962***	0.4111***
	(9.626)	(8.230)	(8.026)
SUB	0.0940***	0.1016***	0.0792***
	(3.924)	(2.660)	(3.660)
FOR	0.5136***	0.2495	0.6595***
	(2.743)	(1.131)	(3.466)
INV	1.2876***	1.4591***	1.4574***
	(3.027)	(3.194)	(2.687)
DEB	1.1703**	1.1640	1.1336**
	(2.480)	(1.625)	(2.117)
GEAR	-0.2030	-1.7770***	0.0984
	(-0.780)	(-3.171)	(0.743)
QUICK	0.0543	0.1132***	0.0453
	(1.618)	(2.695)	(1.177)
ROA	-0.8973	-2.4886**	-0.6804
	(-1.387)	(-2.047)	(-0.923)
SPEC	0.3154	0.9021***	-0.0891
	(0.992)	(2.887)	(-0.230)
BIG	0.1937	-0.0588	0.3868**
	(1.273)	(-0.294)	(2.068)
LOSS	0.0817	0.2308	-0.0131
	(0.694)	(1.443)	(-0.093)
GLC	-0.1432	-0.3176***	-0.0291
	(-1.426)	(-3.112)	(-0.256)
GDP	-0.0153**	-0.0072	-0.0156*
	(-2.491)	(.)	(-1.810)
MERGER1	0.0461	0.0396	
	(0.345)	(0.372)	
MERGER2	0.2053***		0.1030
	(2.737)		(1.399)
CLPS	0.3990***		0.4155***
	(4.476)		(4.788)
CRISIS	-0.1077		-0.1691**
	(-0.951)		(-2.469)
样本数	594	254	340
调整后判定系数	0.7165	0.7167	0.7280

注：回归方程为：

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

其中

$LAF_{i,t}$	=	公司*i*在年度*t*经通胀调整后审计收费的自然对数；
LTA	=	经通胀调整后的总资产的自然对数；
SUB	=	子公司数量的平方根；
FOR	=	外国子公司的比例；
INV	=	存货占总资产的比例；
DEB	=	应收账款占总资产的比例；
GEAR	=	长期负债占总资产的比例；
QUICK	=	流动资产与存货的差值与流动负债的比率；
ROA	=	净利润与总资产的比率；
LOSS	=	1，当上一年度亏损；或0，当上一年度盈利；
BIG	=	1，当由1989年前的八大事务所或者1989至1998年间的六大事务所或者1999至2001年间的五大事务所或者2002至今的四大事务所进行审计；或0，当由其他事务所进行审计；
SPEC	=	事务所在某一行业的市场份额；
GLC	=	1，当公司是政府关联公司(公司20%及以上的股权直接或者间接由新加坡政府所有)；或0，当公司不是政府关联公司；
GDP	=	新加坡年度国内生产总值的实际增长率；
MERGER1	=	1，对于1989年及之后的会计年度；
MERGER2	=	1，对于1998年及之后的会计年度；
CLPS	=	1，对于2002年及之后的会计年度；
CRISIS	=	1，当会计年度为1997或者1998。[16]

[16] 虽然亚洲金融危机始于1997年对泰铢的影响，在1998年才蔓延到新加坡，但是我们认为事务所在1997年应该能够预测到该危机的发生。

第三，我们采用了*SPEC*的其他三种定义方法。Gramling and Stone (2001)和Krishnan (2001)认为采用市场份额衡量的行业专长存在缺陷，无法知道行业专长产生于审计某一行业的多家客户还是审计某一行业的几家大客户。参考Balsam *et al.* (2003)的方法，对于行业市场份额最大的审计师，我们将*SPEC*定义为1，其他为0。此外，我们还以审计客户的数量为基础分别计算市场份额连续变量和行业专长哑变量。以审计收费衡量的行业专长哑变量以及以客户数量衡量的市场份额连续变量作为行业专长变量的结果基本一致。但是，当以客户数量为基础衡量行业专长哑变量时，结果大多不显著，而且有时候为负，表明行业专长溢价受行业专长衡量方法的影响。

此外，我们还做了如下的稳健性检验。1995年，Barings因未授权而进行衍生产品交易并最终倒闭。因此，我们还建立1995年哑变量，来检验该事件是否会影响审计收费市场，我们并没有发现该事件的显著影响。*LTA*和*SUB*之间高相关，其相关系数为0.56，我们首先将*SUB*对*LTA*进行回归，而后采用残差来取代*SUB*再回归，结果仍不变。总之，我们的结论非常稳健。

五、结论

我们使用新加坡1985至2004年间所有上市公司为样本，对新加坡审计收费决定进行了系统的研究。新加坡拥有大量的政府关联公司(GLCs)，这些公司被认为是高效的政府控制公司，而且新加坡政府也被认为高效率和低腐败的政府。我们检验了GLCs可以享受审计收费折价还是支付了更高的审计收费溢价。我们采用面板数据分析方法，不仅可以对审计收费进行截面分析还可以进行时间序列分析，这样我们能够观测审计收费随着时间和重要事件的动态变化。

采用面板数据分析方法，我们发现在1985至1994年间，政府控制公司可以享受审计收费折价，这和新加坡政府提供更多担保而非搜刮从而降低GLCs风险的假说一致。而在1995至2004年间，政府控制公司无法享受审计收费折价。结果表明，政府“援助”仅是其为了支持私有化改革的暂时性帮助。在控制了经营效率的可能影响之后，结论仍然不变。

我们进一步发现，1998年Price Waterhouse和Coopers & Lybrand的兼并以及2002年安达信的倒闭对审计收费的影响为正；而1989年八大的兼并对非BIG N审计公司的影响为正，但是对于BIG N审计公司的影响不显著。结果表明，事务所的兼并提高非BIG N的审计风险，但并没有提高BIG N的审计风险。我们还发现以国内生产总值增长率衡量的经济周期代理变量和亚洲金融危机哑变量并没有显著地影响审计收费。总的来说，我们的结论非常稳健。

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Audit Fee Determination in Singapore: A Comprehensive Analysis*

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Abstract

We add to the literature on audit fee determination in two respects. First, we offer a comprehensive study on how audit fees are determined in Singapore, where government-linked companies (GLCs) play a critical role in business under the direction of an efficient and relatively clean government. Our study covers all listed firms in Singapore for the period 1985–2004. Second, we introduce panel data analysis, a relatively uncommon technique in accounting research, into audit fee studies. The panel data setting allows us to better control for omitted variables and to examine audit fee determination more succinctly and accurately within a single setting. In addition to conventional firm-specific determinants of audit fees such as firm size, work complexity, risk, and so forth, we find that time-specific events such as mergers of big audit firms and the collapse of Arthur Andersen do have an impact on audit fees. Furthermore, we find that the Singapore government tended to vouch for and control rent seeking from GLCs in the late 1980s and early 1990s following a major privatisation program. Our results are robust to various proxies used in the analysis and across different sample periods.

Keywords: Audit Fee, Audit Risk, Merger, Big N, Panel Data, Government-Linked Companies
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I. Introduction

The literature on audit fee determination is extensive. We add to this literature in two respects. First, we offer a comprehensive study on how audit fees are determined in Singapore, where government-linked companies (GLCs) play a critical role in business under the direction of an efficient and relatively clean government. Second, we introduce panel data analysis, a relatively uncommon technique in accounting research, into audit fee studies.[2]

Since the seminal work by Simunic (1980), audit fee studies have been extended to various markets such as the United States (Simunic, 1980; Francis and Stokes, 1986; Palmrose, 1986a), Australia (Craswell *et al*., 1995), the United Kingdom (Baker and Taylor, 1981; Chan, Ezzamel, and Gwilliam, 1993), Hong Kong (DeFond, Francis, and Wong, 2000), New Zealand (Firth, 1985), Holland (Blokdijk *et al*., 2002), and Indonesia (Basioudis and Fifi, 2004). Here we examine the audit fee market of Singapore for the period 1985–2004. An early study by Koh, Low, and Teo (1990) uses 1986 data of 291 firms listed on the Singapore Stock Exchange. But about 180 of these firms were incorporated in Malaysia and were dually listed on both the Singapore and Kuala Lumpur exchanges.[3] Many of these firms were thus jointly audited by auditors in Singapore and Malaysia, or even solely by Malaysian auditors. By focusing only on Singapore firms, and through the period 1985 to 2004, our study is much more comprehensive and representative of audit fee determination in Singapore.

Singapore is unique in several ways. Although the rating of Singapore's legal and accounting environment is generally on par with that of the US (La Porta *et al*., 1998), the Singapore government controls 45 per cent of large publicly traded firms and 20 per cent of medium publicly traded firms, whereas the US government controls none at all (La Porta *et al*., 1999). In Singapore, companies that are owned 20 per cent or more by the government are called government-linked companies (GLCs). Additionally, a growing body of research has examined the role of political connections on firm behaviour and performance (e.g. Shleifer and Vishny, 1994; Shleifer, 1998; Johnson and Mitton, 2003; Faccio, 2006). Government intervention may affect audit risk in two possible ways. On one hand, grabbing-hand intervention may destroy the value of a company through various means of rent extraction (Shleifer and Vishny, 1994) or inefficient guidance, which increases audit risk. For example, Wang, Wong, and Xia (2008) find that government ownership distorts management incentives to choose auditors. On the other hand, helping-hand intervention may provide formal or informal backup to GLCs and hence lower audit risk. Since the Singapore government is known to be less corrupt

[2] A notable exception is Henderson and Kaplan (2000), who use such a technique to examine the determinants of audit report lag.

[3] In October 1989, the Malaysian Government ordered that all Malaysian firms were to delist from the Singapore Stock Exchange on 31 December 1990. See Sun *et al*. (2002) for details.

and efficient (e.g. *Singapore Country Commercial Guide FY2001*, published by the US Embassy), it is likely that the latter effect will dominate. In addition to the government intervention effect, the operating efficiency of GLCs will also affect audit fees. According to Feng, Sun, and Tong (2004), Singapore GLCs are probably the most efficient state-controlled companies in the world. If GLCs are indeed as efficient as private companies yet with lower political risk, this unique feature may be factored into the audit fees charged to these GLCs. It would be interesting to see if this is the case.

Existing studies on audit fee determination typically use cross-sectional data to examine what sorts of firm characteristics can explain the amount of audit effort a firm demands. We believe that for a better and more complete understanding of the issue, a time-series element should be added in. Hence, we introduce in our study a panel data framework,[4] which can provide for a more complex relationship between the audit fee and its determinants. For instance, the same set of firm characteristics may have different impacts on audit fees during different phrases of an economic cycle. Changes in the audit market structure, such as mergers of big audit firms, may also have a bearing on audit charges over time. Although cross-sectional analyses may collectively address the change in audit fees through time and the impact of the mergers of big audit firms on audit fees, the panel data setting allows us to better control for omitted variables and to examine these issues more succinctly and accurately within a single system.

Finally, Singapore is a city state where audit firms have only one office each. The reputation of an audit firm may differ among various branches of the same firm (Francis *et al*., 1999); hence, DeFond *et al*. (2000) argue for the use of Hong Kong data in their study of the reputation premium. This consideration is even more important for our study because our sample covers the period from 1985 to 2004. A divergence or change in audit quality between different branches of the same audit firm could be more serious for such a long period.

We carry out two major investigations. First, we examine whether there are time-specific effects that should be taken into consideration in the standard audit fee model. Changes in the audit environment through time, such as an increase in the scope of audits (because of new and more stringent financial reporting rules and auditing requirements, for instance) and advances in the technology used to conduct audits (such as the increasing use of computer technology and risk assessment models), will have an impact on audit costs. Specifically, we use panel data analysis to investigate whether general economic conditions, such as the business cycle, the Asian economic crisis in 1997–1998, the mergers of big audit firms in 1989 and 1998, and the collapse of Arthur Andersen

[4] In some accounting studies, *panel data* or *pooled data* refers to the pooling of data from different years to form so-called firm-year data. Yet the regression techniques used are typically cross-sectional. A relevant example is a study on the audit fee model by Pong and Whittington (1994) using 577 UK listed companies over the period 1981 to 1988. Although the data were panel data, the authors still used the OLS estimation process (p. 1083) but introduced a time-trend variable and time-interactive variables in their regression models. In this paper, we use the technical meaning of the term, that is, a pooled time-series cross-sectional regression.

in 2002, affected Singapore's audit fee market.[5] The mergers and the collapse of big audit firms changed the audit market structure and hence might affect the equilibrium pricing of audit services and the brand premium. On the other hand, the Asian economic crisis, arguably the biggest such crisis in the region in recent history, should be a good occurrence to use to examine whether a significant macroeconomic event has any effect on audit fees and audit efforts. We also examine whether a specialist premium exists in addition to the brand premium, and whether mergers have different impacts on different groups of firms. Our study therefore expands the existing literature and provides a wider and richer scope for understanding the audit fee market.

Second, we investigate whether GLCs get any discount or pay some premium to auditors. Government intervention and operating efficiency may affect the audit risk of GLCs in different ways. We attempt to disentangle the two effects by using a control sample matched by industry and return on assets (ROA) to control for the possible different operating efficiencies of GLCs and non-GLCs. We also split the sample into two subsamples before and after 1994 to examine the weights of the helping- versus grabbing-hand interventions, since the Singapore government launched a major privatisation program in the mid-1980s and its influence may have been stronger within the first few years.

Our results show that there is a possible time fixed effect. The panel data analyses show that time-specific events, such as the merger of big audit firms in 1998 and the Arthur Andersen collapse in 2002, have some impact on audit fees. We also find evidence that GLCs pay lower audit fees than non-GLCs, especially in the late 1980s and early 1990s following a major privatisation campaign. This is consistent with the conjecture that the Singapore government tends to support more than it grabs GLCs when these companies are in great need of government sponsorship. Finally, we observe a significantly positive and pervasive specialist premium in addition to the brand premium charged by the big audit firms, which is consistent with the findings by Craswell *et al*. (1995), Balsam *et al*. (2003), Ferguson *et al*. (2003), Krishnan (2004), and Francis (2004).

One caveat that should be mentioned upfront is that we examine only audit fees and not non-audit fees, since data on the latter are unavailable. Prior studies have found some association between audit and non-audit fees (Palmrose, 1986b; Davis *et al*., 1993; Bell *et al*., 2001, among others). A study by Raghunandan *et al*. (2003), however, shows that the two fees are jointly determined.

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[5] A wave of mergers occurred in the late 1980s, when KMG Main Hurdman merged with Peat Marwick & Mitchell in 1987 to become KPMG; Arthur Young merged with Ernst & Whinney to become Ernst & Young; and Deloitte and Haskins & Sells merged with Touche Ross to become Deloitte & Touche in 1989. The wave reduced the Big 8 audit firms to the Big 6. Another major merger of Price Waterhouse and Coopers & Lybrand to form PricewaterhouseCoopers took place in 1998, reducing the number of big audit firms to five. In addition, the Enron scandal brought down Arthur Andersen in 2002, further reducing the number of firms to four.

The remainder of the paper is organised as follows. The next section provides the background information and develops the hypotheses to be tested. Section III discusses the data, methodology, and preliminary analyses. Section IV presents and discusses the results of the panel data analyses. Section V concludes the paper.

II. Background and Development of Hypotheses

The audit fees charged by audit firms should be commensurate with the audit efforts and the risks involved in audit engagements. In his pioneering study, Simunic (1980) tries to trace the factors that determine audit effort, using audit fee payments as a proxy.[6] The study has since established the path of research on the determination of audit fees.

There have, however, been few studies on the dynamics of variations in audit fees and the link between the audit fee and its determinants through time. Broman *et al*. (1992) compare audit fees in 1977 and 1981 and find that real audit fees (adjusted by the Consumer Price Index) decrease in this period. They suspect that this is related to the emergence of a more competitive market in audit services. But this is only a snapshot of two selected years. Menon and Williams (2001) examine year-by-year audit fees in the period 1980–1997. Their data come from firms that voluntarily disclose audit fees in SEC filings, and are all audited by the Big 6(8) audit firms. Therefore, their findings of a short-lived audit fee premium earned by the Big 6 auditors in the three years following the Big 8 mergers in 1989 could be sample specific. It is possible that only the Big N audit firms benefited from the mergers but not the non-Big N ones. It is also possible that only those firms that voluntarily disclose data on audit fees are willing to pay a premium to their auditors, while other firms are not. In fact, Iyer and Iyer (1996), comparing audit fees paid by UK firms in 1987 and 1991, come to a different conclusion, finding no significant increase in audit fees resulting from the mergers. Also, Firth and Lau (2004) analyse the 1998 merger between Coopers & Lybrand and Price Waterhouse using Hong Kong data and find no change in audit fees after the merger. They conclude that clients are unwilling to pay higher fees for within-the-Big-5 re-branding.

We believe that our research approach, which is applied to a far more complete dataset in Singapore, will shed light on longitudinal studies of audit fees in particular, and on studies of audit fees in general. All listed companies in Singapore need to report the fees they pay for audit services. This enables us to obtain 20 continuous years of audit fee information on companies audited by Big N as well as non-Big N auditors. As a result, we can tackle a richer set of issues that have not been fully addressed before.

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[6] Audit effort is supposed to be measured by the number of audit hours an auditor spends in a year. Given that the data on audit hours are generally unavailable to the public and that the collection of such data is not easy and could be problematic, audit fees are used as the proxy. Blokdijk *et al*. (2002) conducted a study on audit hours collected from a cross-section of 113 audits of Dutch companies in 1998/99.

First, we wish to see how well a standard audit fee model performs through time in terms of its explanatory power. We also wish to see whether the relative importance of the explanatory factors identified in the audit fee model varies over time.

Second, we test whether GLCs enjoy any audit fee discount. The Singapore government set up a group of GLCs in key industries immediately after the country became independent. These companies helped to propel the country's economy forward and have played a strategic and important role in the economic development of Singapore. GLCs are companies in which significant shares are owned by the government.[7] Like all commercial entities, GLCs also produce and sell goods and services in a competitive market environment. Most of these companies were established in the 1960s and 1970s, primarily to facilitate Singapore's economic development in specific sectors. In the 1980s and 1990s, GLCs were formed mainly from the corporatisation of former government departments and statutory boards. In March 1985, a major privatisation program began, and a committee known as the Public Sector Divestment Committee (PSDC) was set up to identify the GLCs for divestment as well as the way to divest. According to the *Singapore Country Commercial Guide FY2001* published by the US Embassy in Singapore, "GLCs, unlike typical parastatals, are generally well-run, efficient and profitable." Additionally, Feng, Sun, and Tong (2004) provide evidence that GLCs operate as efficiently as their private peers. GLCs are also perceived by investors as companies with low risk since they practice conservative accounting and have government backup. Hence, it would be interesting to see whether GLCs face a different audit fee structure – that is, a low audit fee – compared with ordinary, non-GLCs.

Third, we examine the impact of macroeconomic forces on the audit fee market through time. We are interested in the possible impact of changes in the economic conditions under which firms operate on the audit fees they pay. It is conceivable that when the economy is good, audit firms are more aggressive in pricing, and firms are more willing to pay whatever reasonable fees are charged by their auditors. But when the economy is poor, audit firms are less aggressive and find it more difficult to charge their clients higher prices for their services. But there may also be countervailing forces involved. During an economic crisis, the market demand for high-quality audits becomes stronger as a result of higher audit risk, which would push up audit fees. Moreover, additional costs of expected litigation and the tarnished reputation of auditors are much more likely in a market downturn. Auditors try to mitigate these risks by more substantive audit work, which also translates into higher audit fees (Gul and Tsui, 1998). If these countervailing effects dominate the previous effect – say, the impact of a drop in the ability to pay owing to a big drop in gross domestic product (GDP) – then audit fees may go up. A dramatic case is that of the Asian economic crisis in 1997. With the

[7] First-tier (second-tier) GLCs are defined as companies in which at least 20 per cent of voting shares are owned (or effectively owned) by a government unit.

notable exception of China, almost all Asian countries were hit hard during the crisis and struggled a long time to recover. Hence, it is a good case to use in examining how the audit fee market changes during a major crisis. In short, we expect that audit fees will be positively related to GDP growth in general, but that the Asian economic crisis led to a fee hike rather than a reduction.

Fourth, we re-examine the impact of the mergers of big audit firms in a dynamic setting. The study by Pong (1999) on the UK audit market in 1991–1995 shows that the largest four auditors held 60 per cent of the total number of audits and earned collectively 79 per cent of total audit fees. Furthermore, the Big 6 had complete dominance in five industry sectors and a highly dominant position in 29 others. Given that, a further consolidation among these big audit firms may likely enhance their oligopolistic positions further. According to Sullivan (2002), merger theories or economic reasons for the mergers of big accounting firms can be classified into two types: anticompetitive theories, whereby a merger is profitable because it reduces competition and increases prices, and efficiency theories, whereby a merger reduces the costs of the merged firm and results in lower prices. The big auditor mergers could also have different impacts on different sectors of the market. For instance, they may have a more positive or negative impact on fees charged by the Big N firms than by non-Big N firms. Similarly, they may have more impact on merged firms than on non-merged Big N firms. In addition, the impact of the merger may be temporary rather than permanent. The empirical evidence on the impact of the 1989 Big 8 mergers is mixed. Sullivan (2002) documents that the Big 8 accounting firm mergers in 1989 led to cost reductions for big auditors, especially for the constituent merging firms. Iyer and Iyer (1996) find that the mergers did not lead to audit fee hikes. On the other hand, Menon and Williams (2001) show a short-lived increase in fees charged by the merged firms following the 1989 Big 8 mergers in the US. Goddard (1998) assesses the merger of Coopers & Lybrand and Price Waterhouse in Australia and concludes that no anticompetitive effect resulted. Using panel data with a long time span, we re-examine these issues: (1) whether mergers among Big N firms are anticompetitive or efficiency enhancing, (2) whether the mergers have more impact on fees charged by Big N firms (merger constituent firms) or non-Big N firms (other Big N firms), and (3) whether the merger effect is short-lived.

Fifth, we further examine whether the collapse of Arthur Andersen in 2002 had any impact on the audit fee market. On the one hand, the collapse can be viewed as a forced merger reducing the Big 5 to the Big 4, which might lead to the two conflicting predictions as previously discussed. On the other hand, it may serve as a warning for audit risk, which might prompt auditors to spend more effort on auditing and thus increase audit fees. The actual effect of this event on audit fees is an empirical question.

Last, we re-examine the Big N premium as well as the specialist premium in the panel data framework to see if they change over time. Big audit firms can charge a premium for their quality services (Francis and Stokes, 1986; Palmrose, 1986a). In addition, an auditor's industry expertise may further enhance audit quality (Craswell *et*

al., 1995; Balsam *et al*., 2003; Krishnan, 2004; Francis, 2004). Studies typically show that industry leaders earn a specialist premium relative to other Big N auditors (see DeFond *et al*., 2000, on the Hong Kong market; Ferguson *et al*., 2003, on the Australian market; and Francis *et al*., 2005, on the US market). The fee premiums in these studies range from 10 to 30 per cent. Yet, such premiums may increase or decrease through time, especially when the number of suppliers of such services diminishes as a result of Big N firm mergers.

III. Data and Preliminary Analyses

3.1 Sample and Methodology

We examine firms listed in Singapore for the period 1985–2004. Companies in the finance industry are excluded from this study because they have financial characteristics that are unsuitable for the estimation of audit fees (Simunic, 1980; Francis, 1984; DeFond *et al*., 2000). The data are drawn from the Pacific-Basin Capital Market Database (PACAP) and the Company Analysis Database. Information not available in these databases is hand-collected from the companies' published annual reports. We further exclude companies with joint auditors, foreign auditors, and missing information.[8] Table 1 shows the total number of firms (excluding Malaysian firms) listed on the Singapore Stock Exchange (previously the Stock Exchange of Singapore) and the distribution of our sample firms across industries from 1985 to 2004.

As shown in Table 1, the number of listed firms in Singapore increases significantly during our sample period. But a large portion of the new listings consists of foreign incorporated firms, especially in recent years.[9]

Following prior studies, we start from a standard audit fee model (Simunic, 1980; Francis, 1984; Gul and Tsui, 1998) as follows to examine its validity through time. To examine the influence of the government on audit fees, we include a dummy variable *GLC* to indicate government-linked companies.

$$\begin{aligned} LAF_{i,t} = {} & a_o + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + \\ & a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + \\ & a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + e_{i,t}, \\ & t = 1985, \ldots, 2004 \end{aligned} \quad (1)$$

[8] We cannot separate the fees charged by either auditor in the case of joint auditors. As for foreign auditors, their charge structure will not depend solely on the Singapore local audit market.

[9] For example, more than 40 Chinese firms were listed in Singapore for the period 2003-2004, and most were registered in places like the Virgin Islands.

Table 1 Sample Distribution

This table shows the total number of firms (excluding Malaysian firms) listed on the Singapore Stock Exchange and the distribution of the sample firms across industries from 1985 to 2004.

Year	Total listed firms	Sample firms	Commerce	Construction	Hotel	Manufacture	Multi-industry	Property	Service	Transport
1985	134	77	10	6	13	15	14	13	2	4
1986	135	78	10	6	13	16	14	13	2	4
1987	139	92	12	7	13	24	15	14	2	5
1988	145	97	13	7	13	27	15	15	2	5
1989	151	103	14	7	13	27	15	17	3	7
1990	172	114	15	7	14	32	16	17	3	10
1991	183	117	14	7	14	33	16	18	5	10
1992	188	128	18	9	15	40	15	15	5	11
1993	205	140	19	11	15	47	15	15	6	12
1994	229	163	23	13	15	59	16	16	8	13
1995	248	187	31	13	15	72	15	16	11	14
1996	266	208	36	14	14	85	17	16	11	15
1997	294	229	39	17	15	97	17	17	11	16
1998	307	243	40	20	15	103	17	18	13	17
1999	328	243	41	21	15	99	18	19	12	18
2000	388	235	41	20	14	95	18	17	13	17
2001	386	200	36	16	11	83	14	13	13	14
2002	385	189	35	16	11	78	12	11	13	13
2003	413	172	31	14	10	71	13	10	11	12
2004	462	159	26	13	10	66	12	11	10	11

where:

$LAF_{i,t}$ = natural log of inflation-adjusted total audit fees for firm i in year t;
LTA = natural log of inflation-adjusted total assets;
SUB = square root of the number of subsidiaries;
FOR = proportion of subsidiaries that are foreign;
INV = ratio of inventory to total assets;
DEB = ratio of accounts receivable to total assets;
GEAR = ratio of long-term debt to total assets;
QUICK = ratio of current assets (minus inventories) divided by current liabilities;
ROA = ratio of net income to total assets;
LOSS = indicator variable with the value of 1 for a net income loss in the previous year, and 0 otherwise;
BIG = indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, for the Big 4 since 2002, and 0 otherwise;
SPEC = share of audit fees by an audit firm in a particular industry;
GLC = indicator variable with the value of 1 for government-linked companies, defined as companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.

The size of the auditees (using the proxy of *LTA*, the natural log of inflation-adjusted total assets), number of subsidiaries (*SUB*, measured by the square root of the number of subsidiaries), the proportion of foreign subsidiaries (*FOR*, represented by the ratio of the number of foreign subsidiaries to total number of subsidiaries), the ratio of accounts receivables to total assets (*DEB*), and the ratio of inventories to total assets (*INV*) reflect audit complexity, and hence are found in the literature to be positively related to audit fees. The extent of leverage, using the proxy of long-term debts to assets (*GEAR*), reflects audit risk. To compensate for this risk, audit fees are positively related to leverage. On the other hand, a higher quick ratio (*QUICK*, defined as the ratio of current assets net of inventory to current liabilities) indicates a firm with a better financial position and, hence, a lower audit risk. *QUICK* should be negatively correlated with audit effort. The return on assets (*ROA*) should also be negatively related to audit fees since, when earnings drop, audit risk will increase and higher audit fees will be charged to compensate for the higher risk involved in conducting the audit. Similarly, a previous year loss (*LOSS*) should be positively related to audit fees, since audit risk is higher when the company suffers a loss in the previous year. In line with the discussion in the previous section, GLCs should have a negative impact on audit fees owing to their operating efficiency and low risk profile.

Studies have found that large audit firms (Big N) earn higher fees (Francis and Stokes, 1986; Francis and Simon, 1987; Francis and Simon, 1988). Thus, we code the indicative variable *BIG* as 1 for the Big N audit firms. Additionally, prior researchers (e.g. Craswell *et al*., 1995; Beasley and Petroni, 2001; Owhoso *et al*., 2002) hypothesise and find evidence that, in addition to the brand name, an auditor's industry specialisation contributes positively to the credibility offered by the auditor, and thus claims some premium. This suggests that audit firms are making an effort to increase their levels of specialisation, with varying degrees of success. Hogan and Jeter (1999) argue that that might be a reason for a significant increase in levels of concentration in the US audit market from the mid-1970s into the 1990s. Since the auditor's specialist status is not directly observed (Balsam *et al*., 2003), and since industry expertise is built by repetition in similar settings, a large volume of business in an industry should indicate expertise. We follow the previous researchers and use an auditor's audit-fee market share in a particular industry, *SPEC*, to measure industry specialisation.[10]

3.2 Summary Statistics

Table 2 presents the descriptive statistics and correlation matrix of the variables involved in the analysis. Panel A reports the cross-sectional mean and standard deviation of the relevant variables over the years. Despite adjustment for inflation, mean audit fees increase through time in general. The absolute amount in dollars of audit fees reaches its historical high, 418,000 Singapore dollars, on average, in 2002, and then drops to 380,000 Singapore dollars in 2004. Audit fees also drop in 1998, the year the Asian crisis struck. While accounts receivable as a percentage of total assets exhibit an upward trend over time, all other variables do not. We also see in Panel A that Singapore has enjoyed high GDP growth, 6.5 per cent on average, with negative growth occurring only in 1985, 1998 (the year following the Asian economic crisis), and 2001. On the other hand, inflation as measured by the Consumer Price Index (CPI) is generally low over the sample period.

The correlation coefficients between the independent variables shown in Panel B are mostly significant at the 1 per cent level, although they are generally lower than 0.4. The coefficient between *LTA* and *SUB*, however, is 0.56. We also compute the correlation matrix on a year-by-year basis. For many years, we observe stronger correlations between independent variables than the correlations reported for the pooled data in Panel B. This is consistent with the view that pooled data reduce the multicollinearity problem.

[10] We further discuss the robustness of our results to different proxies for *SPEC* at the end of Section IV.

3.3 The time trend

Before doing the panel data analysis, we check for any time-specific effects. To do so, we conduct year-by-year cross-sectional regressions of Equation (1). To save space, we do not tabulate the results but only summarise the main findings here. First, the regression intercept term varies significantly over the 20 years, indicating the existence of some year-specific effects. Second, there are some inconsistent results for variables such as *GEAR* owing to time-specific effects or different numbers of observations in each year. Third, the adjusted R^2 varies from 0.47 in 2004 to 0.84 in 1991 with an average of 0.69. All these results suggest that the estimates of the audit fee model may be affected by some time-specific variables.

Following Menon and Williams (2001), we further make a rough check of the possible time trend of the coefficient (factor loading) estimates obtained from the year-by-year regressions by running a simple regression:

$$a_i = d_o + d_1 YEAR + e_i , \qquad i = 0, \ldots, 20, \tag{2}$$

where a_i is the coefficient of the ith factor in Equation (1) and *YEAR* is the time-trend variable that takes the value of 1 for year 1985 through to 20 for year 2004. If the audit fee structure does not change through time, d_1 should be statistically indifferent from zero.

Table 3 shows the results. Like Menon and Williams's (2001) findings, most of the coefficients do not have a time trend in our sample. But two coefficients, *SUB* and *FOR*, the proxies for audit complexity, show a negative and significant time trend with positive and significant intercept terms. The results suggest that high audit complexity does lead to high audit fees on average, but that its marginal impact on audit fees declines through time. This is consistent with the notion that audit effort declines as audit technology improves.

The only other coefficient which has a time trend is *GEAR*, the debt ratio. The time trend estimate, 0.106, is positive and significant at the 1 per cent level. Since *GEAR* is a proxy for risk, the positive time trend means that for a firm that maintains the same debt level as before, auditors will now charge a higher audit fee. This is consistent with the notion that auditors are more concerned with audit risk due to increasing litigation costs. The negative intercept in the *GEAR* regression, however, indicates that *GEAR* is associated with low audit fees on average, which is counterintuitive. Hence, no strong inference can be made from the *GEAR* regression here.

Table 2 Summary Statistics

This table shows the descriptive statistics and correlation matrix of the variables involved in the analysis. Panel A reports the cross-sectional mean and standard deviation of the relevant variables over the years. Panel B reports the correlation coefficients between independent variables. *, **, and *** denote significance at the 10, 5, and 1 per cent levels, respectively.

Panel A: Descriptive Statistics

	Audit fees (in S$'000)		Total assets (in S$'000)		Subsidiary numbers		Foreign sub numbers		Return on assets		No. of
Year	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	obs.
1985	166.150	237.707	340225.1	430950.3	15.35	19.60	6.55	11.85	0.0001	0.0801	75
1986	182.426	268.738	437393.5	1118925.0	15.17	19.41	6.43	11.72	0.0026	0.1137	77
1987	184.069	286.903	417494.9	920871.6	15.18	18.38	6.38	11.36	0.0320	0.0863	91
1988	233.075	456.929	466313.0	978561.9	14.95	18.04	6.14	11.12	0.0469	0.1112	96
1989	195.555	268.954	577997.8	1166944.0	21.06	27.26	9.05	14.44	0.0634	0.0888	102
1990	202.242	242.907	646180.7	1336833.0	19.75	26.36	8.41	13.88	0.0557	0.0613	113
1991	218.151	250.754	662532.3	1396447.0	20.66	26.09	8.85	13.82	0.0430	0.0616	116
1992	219.843	269.999	606024.5	1376043.0	19.57	26.17	8.70	13.85	0.0558	0.0700	127
1993	230.021	248.474	677599.9	1588590.0	20.68	27.82	9.06	12.94	0.0561	0.0575	139
1994	213.759	256.609	758200.3	1773348.0	23.10	33.95	10.44	16.86	0.0510	0.0727	162
1995	232.560	291.203	721365.5	1823732.0	22.51	31.37	10.25	14.71	0.0453	0.0611	186
1996	234.741	268.817	1075232	5141517.0	24.50	35.96	11.36	17.09	0.0397	0.0784	207
1997	246.532	309.288	830767.3	2288931.0	23.96	37.21	11.95	19.94	0.0216	0.1172	228
1998	234.626	300.226	1240152.0	7539313.0	23.71	36.24	12.15	19.29	-0.0183	0.1457	242
1999	243.214	343.966	789613.9	2752761.0	23.58	37.87	11.86	21.32	0.0183	0.1444	243
2000	272.840	390.835	715773.8	2950194.0	25.66	40.90	12.90	23.21	0.0209	0.1248	235
2001	303.194	457.288	845296.6	2356162.0	20.24	23.41	10.88	14.71	-0.0034	0.1078	199
2002	417.901	942.079	776164.5	3106821.0	21.27	24.29	11.11	15.23	-0.0167	0.1510	189
2003	354.569	576.941	794283.3	3305030.0	22.65	25.02	11.32	15.69	0.0031	0.1057	172
2004	379.839	665.350	689769.4	2888551.0	22.62	25.71	11.34	16.16	0.0295	0.1386	159
Average	257.861	422.692	763919.4	3232979.0	20.81	30.00	9.89	16.07	0.0244	0.1113	

Panel A: Descriptive Statistics *(continued)*

	Inventory/Assets		Receivables/Assets		Debt/Assets		Quick ratio		No. of	Macro variables GDP	
Year	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	obs.	growth	CPI
1985	0.1197	0.1238	0.1054	0.1067	0.0435	0.0773	1.2116	1.1535	75	-1.4	0.800
1986	0.1125	0.1175	0.1082	0.1065	0.0379	0.0784	1.4284	1.5901	77	2.1	0.789
1987	0.1299	0.1375	0.1005	0.0870	0.0460	0.0877	1.3851	1.1008	91	9.8	0.793
1988	0.1263	0.1320	0.1061	0.0951	0.0414	0.0847	1.5880	1.6442	96	11.5	0.806
1989	0.1079	0.1237	0.1077	0.0997	0.0448	0.0812	1.7291	1.4751	102	10.0	0.823
1990	0.1008	0.1124	0.1078	0.1016	0.0589	0.1015	1.6979	1.4922	113	9.2	0.852
1991	0.1000	0.1067	0.1129	0.1100	0.0635	0.1054	1.5540	1.2694	116	6.6	0.881
1992	0.0982	0.1065	0.1407	0.1289	0.0633	0.1036	1.5019	1.1095	127	6.3	0.901
1993	0.1135	0.1203	0.1442	0.1326	0.0687	0.1075	1.5547	1.1900	139	11.7	0.922
1994	0.1151	0.1287	0.1438	0.1291	0.0727	0.1007	1.6233	1.2942	162	11.6	0.950
1995	0.1316	0.1427	0.1560	0.1327	0.1001	0.1208	1.4939	1.1920	186	8.1	0.967
1996	0.1167	0.1347	0.1543	0.1231	0.1091	0.1218	1.3908	0.9949	207	7.8	0.980
1997	0.1331	0.1340	0.1506	0.1165	0.1203	0.1302	1.2626	0.9666	228	8.3	1.000
1998	0.1222	0.1209	0.1448	0.1158	0.1347	0.1436	1.2448	1.0859	242	-1.4	0.997
1999	0.1075	0.1131	0.1449	0.1174	0.2426	0.8195	1.4980	1.7283	243	7.2	0.998
2000	0.1090	0.1172	0.1542	0.1217	0.2430	0.6827	1.8257	3.0300	235	10.0	1.010
2001	0.1293	0.1413	0.1295	0.1090	0.2693	0.2172	2.4303	2.3466	199	-2.3	1.021
2002	0.1237	0.1287	0.1845	0.1259	0.1130	0.1464	1.5775	1.6147	189	4.0	1.017
2003	0.1270	0.1216	0.1937	0.1244	0.0957	0.1053	1.4720	1.1619	172	2.9	1.022
2004	0.1371	0.1321	0.1993	0.1293	0.0889	0.1078	1.7441	2.5460	159	8.7	1.040
Average	0.1188	0.1259	0.1456	0.1211	0.1205	0.3173	1.5691	1.6719	3137	6.5	

Panel B: Correlation Matrix of Regressors

	LAF	*LTA*	*SUB*	*FOR*	*INV*	*DEB*	*GEAR*	*QUICK*	*ROA*	*GDP*	*BIG*
LTA	0.648**										
SUB	0.585**	0.556**									
FOR	0.251**	0.072**	0.384**								
INV	0.053**	-0.184**	-0.048**	0.193**							
DEB	0.002	-0.291**	-0.128**	0.085**	0.281**						
GEAR	0.059**	0.075**	0.063**	-0.043*	-0.091**	-0.088**					
QUICK	-0.133**	-0.064**	-0.143**	-0.075**	-0.204**	-0.112**	-0.031				
ROA	-0.003	0.136**	0.046*	0.015	0.000	-0.015	0.022	0.132**			
GDP	-0.041*	0.008	0.173**	0.108**	-0.021	-0.005	-0.062**	-0.018	0.180**		
BIG	0.256**	0.191**	0.164**	0.080**	0.026	-0.027	0.028	-0.007	0.057**	0.013	
SPEC	0.375**	0.266**	0.263**	0.049**	0.060**	-0.037*	0.043*	-0.008	0.043*	0.011	0.502**

Variable definitions:

LTA = natural log of inflation-adjusted total assets;
SUB = square root of the number of subsidiaries;
FOR = proportion of subsidiaries that are foreign;
INV = ratio of inventory to total assets;
DEB = ratio of accounts receivable to total assets;
GEAR = ratio of long-term debt to total assets;
QUICK = ratio of current assets (minus inventories) divided by current liabilities;
ROA = ratio of net income to total assets;
LOSS = indicator variable with the value of 1 for an operating loss in the previous year, and 0 otherwise;
BIG = indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, and for the Big 4 since 2002, and 0 otherwise;
SPEC = share of audit fees by an audit firm in a particular industry;
GLC = indicator variable, with 1 for companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.

Table 3 Time Trend of Cross-Sectional Regression Coefficients from 1985 to 2004

This table presents the time trend regression results of Equation (2). The coefficient (factor loading) estimates obtained from the year-by-year cross-sectional regressions of Equation (1) are regressed on a time trend variable. The five columns report the variable name, intercept, the coefficient on *YEAR*, R^2, and the number of observations for each regression, respectively. Figures in parentheses represent the heteroscedasticity-consistent t-value. *, **, and *** denote significance at the 10, 5, and 1 per cent levels, respectively.

	Intercept	***YEAR***	R^2	**No. of obs.**
Intercept	-0.9529	0.0191	-0.0460	20
	(2.010)**	(0.4097)		
LTA	(0.3284)	(0.0042)	-0.0033	20
	(7.503)***	(0.9754)		
SUB	0.2374	-0.0077	0.5548	20
	(18.067)***	(-5.472)***		
FOR	0.5114	-0.0165	0.2545	20
	(7.542)***	(-2.510)***		
INV	0.8704	-0.0185	0.0053	20
	(4.468)***	(-1.1545)		
DEB	1.2465	-0.0245	0.0375	20
	(6.644)***	(-1.4867)		
GEAR	-1.6933	0.1055	0.5322	20
	(-4.561)***	(3.880)***		
QUICK	0.0024	-0.0022	0.0803	20
	(0.1319)	(-1.4874)		
ROA	-0.0152	-0.0333	0.0447	20
	(-0.0491)	(-1.2443)		
LOSS	0.1148	-0.0018	-0.0562	19
	(1.1150)	(-0.2638)		
BIG	0.2366	-0.0070	0.0376	20
	(4.580)***	(-1.0980)		
SPEC	0.5224	0.0103	-0.0323	20
	(2.320)**	(0.5172)		
GLC	-0.1601	0.0010	-0.0533	20
	(-2.253)***	(0.1731)		
Adj. R^2	0.8133	-0.0117	0.4530	20
	(26.702)***	(-3.662)***		

Note: The regression equation is specified as follows

$$a_i = d_o + d_1 YEAR + e_i \,, \qquad i = 0, \ldots, 20, \qquad (2)$$

where

a_i is the coefficient of the i-th factor in Equation (1);
YEAR is the time-trend variable that takes the value of 1 for year 1985 through to 20 for year 2004.

Variable definitions:

LTA	=	natural log of inflation-adjusted total assets;
SUB	=	square root of the number of subsidiaries;
FOR	=	proportion of subsidiaries that are foreign;
INV	=	ratio of inventory to total assets;
DEB	=	ratio of accounts receivable to total assets;
GEAR	=	ratio of long-term debt to total assets;
QUICK	=	ratio of current assets (minus inventories) divided by current liabilities;
ROA	=	ratio of net income to total assets;
LOSS	=	indicator variable with the value of 1 for an operating loss in the previous year, and 0 otherwise;
BIG	=	indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, and for the Big 4 since 2002, and 0 otherwise;
SPEC	=	share of audit fees by an audit firm in a particular industry;
GLC	=	indicator variable with the value of 1 for companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.

One thing interesting to note is that the adjusted R^2 regression shows a significantly positive intercept and a significantly negative time trend. This suggests that the standard audit fee model does have explanatory power for the cross-sectional change in audit fees, but that the explanatory power also declines slightly over the years.

Overall, our results indicate that the time-specific effect and other omitted variables should be taken into consideration in the study of audit fee determination. Therefore, we now turn to the panel data analysis.

IV. Panel Data Analyses

The panel data method pools together cross-sectional and time-series data. This is particularly useful to our investigation because the panel data technique can help control for time-specific events, which is crucial to our search for possible audit fee changes following changes in the audit environment. Econometrically, such a technique also reduces the magnitude of the problem caused by omitted (mismeasured, not observed) variables that are correlated with explanatory variables and provides more reliable estimates of the coefficients (Hsiao, 1986). Panel data can further help reduce the problem of multicollinearity, which often plagues cross-sectional regressions with many related independent variables.

To examine the time-specific effect, such as the impact of the business cycle, the mergers of big audit firms in 1989 and 1998, the Asian economic crisis, and the collapse of Arthur Andersen in 2002, on the audit fee market, we add five experimental variables – *GDP, MERGER1, MERGER2, CLPS,* and *CRISIS* – into Equation (1) in the panel data framework as follows:

$$\begin{aligned} LAF_{i,t} = {} & a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + \\ & a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + \\ & a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + \\ & a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t} \end{aligned} \quad (3)$$

where:

GDP = annual real GDP growth rate in Singapore;

MERGER1 = indicator variable with the value of 1 for 1989 and succeeding years;

MERGER2 = indicator variable with the value of 1 for 1998 and succeeding years;

CLPS = indicator variable with the value of 1 for 2002 and succeeding years;

CRISIS = indicator variable with the value of 1 for 1997 and 1998.[11]

Other variables are defined in Equation (1).

[11] Although the Asian crisis started with the attack on the Thai baht in July 1997 and spread into Singapore in 1998, we believe that the audit firms should have clearly perceived the risk in 1997.

4.1 Results for the Whole Sample Period

Table 4 presents the panel data analysis results based on Equation (3) for the whole sample period from 1985 to 2004. Column (1) in Table 4 contains the results for all firms in the sample. Consistent with the hypothesis that audit fees are positively related to audit complexity, *LTA, SUB, FOR, INV,* and *DEB* are all positive and significant at the 1 per cent level, whereas *ROA*, one of the risk proxies, is negative and significant at the 1 per cent level, indicating that low risk (high profitability) is associated with low audit fees. The other risk proxies *GEAR, QUICK,* and *LOSS* are not significant. The lack of supportive evidence on *LOSS* is in line with the observation that the *LOSS* dummy is only a crude measure and may not reflect the threshold at which auditors actually begin to perceive increased risk, especially with pervasive earnings management at zero profit among the public firms (Hay *et al.*, 2006). *BIG* and *SPEC* are both positive and significant at the 5 per cent or lower level, indicating the existence of both a brand premium and a specialist premium. The coefficients and t-values show that the specialist premium effect is more significant than the brand premium.

The variable of our interest, *GLC*, is negative and statistically significant at the 10 per cent level. Hence, it provides some evidence to support the hypothesis that GLCs pay lower fees for the audit service rendered them, suggesting that the helping-hand intervention of the Singapore government outweighs the grabbing hand to an extent. The evidence on the five time-specific variables is mixed. *MERGER2* and *CLPS* are significantly positive at the 1 per cent level, suggesting that the Price Waterhouse and Coopers & Lybrand merger in 1998 and the collapse of Arthur Andersen in 2002 did result in audit fee hikes, which is consistent with the anti-competitive hypothesis regarding the merger. The highly positive and significant coefficient on *CLPS* is also consistent with the argument that the collapse of Arthur Andersen raised the risk for audit firms, which, in turn, resulted in higher audit fees being charged. But *GDP, MERGER1*, and *CRISIS* are not statistically significant, indicating that the general business cycle, the 1989 merger wave among the Big 8 audit firms, and the Asian economic crisis did not have much impact on audit fees in Singapore.

Table 4 Panel Data Analysis for the Whole Sample Period

This table presents the panel data analysis results based on Equation (3) for the whole sample period from 1985 to 2004. Columns (1)-(3) report the results for all firms, for firms audited by non-Big N auditors, and for firms audited by Big N auditors. Figures in parentheses represent two-way clustered t-values. The number of observations and adjusted R^2 are in the last two rows. *, **, and *** denote significance at the 10, 5, and 1 per cent levels, respectively.

	(1) All firms	(2) Non-Big	(3) Big
LTA	0.3662***	0.4230***	0.3526***
	(8.173)	(4.236)	(8.378)
SUB	0.1336***	0.1325**	0.1366***
	(5.623)	(2.403)	(5.984)
FOR	0.2996***	0.0419	0.3273***
	(3.391)	(0.224)	(3.431)
INV	0.7316***	0.6914*	0.7242***
	(4.031)	(1.957)	(3.668)
DEB	1.0267***	0.9666*	1.0331***
	(4.169)	(1.910)	(3.961)
GEAR	-0.0049	0.6368*	-0.0230
	(-0.104)	(1.712)	(-0.518)
QUICK	-0.0104	-0.0478	-0.0075
	(-0.805)	(-1.096)	(-0.535)
ROA	-0.4427***	-0.6198	-0.3374*
	(-2.600)	(-1.517)	(-1.778)
LOSS	0.0638	0.0549	0.0625
	(1.581)	(1.062)	(1.436)
BIG	0.1744**		
	(2.079)		
SPEC	0.7202***		0.7220***
	(4.484)		(4.456)
GLC	-0.1611*	-0.3628	-0.1448
	(-1.717)	(-0.960)	(-1.552)
GDP	-0.0149	-0.0141	-0.0149
	(-1.203)	(-1.422)	(-1.194)
MERGER1	0.1344	0.3757***	0.0895
	(1.337)	(3.229)	(0.881)
MERGER2	0.1773***	0.1827*	0.1727**
	(2.583)	(1.861)	(2.508)
CLPS	0.4627***	0.3220*	0.5005***
	(2.760)	(1.910)	(2.865)
CRISIS	-0.1584	-0.1050	-0.1598
	(-1.041)	(-0.676)	(-1.083)
No. of obs.	3049	393	2656
Adj. R^2	0.6374	0.5939	0.6215

Note: The regression equation is specified as follows:

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

where

$LAF_{i,t}$	=	natural log of inflation-adjusted total audit fees for firm *i* in year *t*;
LTA	=	natural log of inflation-adjusted total assets;
SUB	=	square root of the number of subsidiaries;
FOR	=	proportion of subsidiaries that are foreign;
INV	=	ratio of inventory to total assets;
DEB	=	ratio of accounts receivable to total assets;
GEAR	=	ratio of long-term debt to total assets;
QUICK	=	ratio of current assets (minus inventories) divided by current liabilities;
ROA	=	ratio of net income to total assets;
LOSS	=	indicator variable with 1 for an operating loss in the previous year, and 0 otherwise;
BIG	=	indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, and for the Big 4 since 2002, and 0 otherwise;
SPEC	=	share of audit fees by an audit firm in a particular industry;
GLC	=	indicator variable with the value of 1 for companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.
GDP	=	annual real GDP growth rate in Singapore;
MERGER1	=	indicator variable with the value of 1 for 1989 and succeeding years, and 0 otherwise;
MERGER2	=	indicator variable with the value of 1 for 1998 and succeeding years, and 0 otherwise;
CLPS	=	indicator variable with the value of 1 for 2002 and succeeding years, and 0 otherwise;
CRISIS	=	indicator variable with the value of 1 for 1997 and 1998, and 0 otherwise.[12]

[12] Although the Asian crisis started with the attack on the Thai baht in July 1997 and spread into Singapore in 1998, we believe that the audit firms should have clearly perceived the risk in 1997.

Sullivan (2002) points out that non-Big N firms differ greatly from Big N firms in terms of size, type of client, and resources, so that the possible cost efficiency or collusion resulting from mergers might not be passable onto or involve non-Big N firms. In addition, the risk perceptions of Big N and non-Big N firms are quite different. DeAngelo (1981) argues that whereas Big N firms care about their reputation capital, non-Big N firms do not have much reputation capital to lose. Therefore, we partition our sample into two market sectors: those audited by Big N firms, and those not. This allows us to examine whether macro events have different impacts on different market sectors. Columns 2 and 3 in Table 4 report the regression results for firms audited by non-Big N and Big N audit firms, respectively. The results in Column 3 (Big N sector) are very similar to those in Column 1 (All firms). This is probably because 87 per cent of our sample firms are audited by Big N firms, and is similar to Tonge and Wootton's (1991) finding that 90 per cent of companies listed on the New York and American Stock Exchange are audited by Big N firms. There is, however, one difference: *GLC* remains negative but becomes insignificant, suggesting that the government's grabbing-hand intervention does not strongly overtake its helping-hand intervention for firms audited by Big N auditors. Also worth noting is the significantly positive estimate for *SPEC* in Column 3, which clearly indicates the existence of a specialist premium among Big N audit firms, since *SPEC* is a subset of *BIG* in our sample.

The results in Column 2, however, are quite different. The significance levels of many traditional determinants drop greatly, and for *FOR* and *ROA* they even become insignificant. But *GEAR* has the expected positive sign, which is significant at the 10 per cent level, indicating that high leverage increases audit risk and hence audit fees. Among the five experimental variables, *MERGER1* becomes positive and highly significant, indicating that the Big 8 mergers in 1989 led to an increase in audit fees charged by non-Big auditors but did not affect the Big sector. The consolidation of the industry appeared to push up the audit risk for non-Big auditing firms but not for the Big auditors. *MERGER2* and *CLPS* remain positive and significant but at a lower significance level, while *GDP* and *CRISIS* remain insignificant. The Price Waterhouse and Coopers & Lybrand merger in 1998 and the collapse of Arthur Andersen may have increased the perceived audit risk for big auditors, but these may also have affected the ability to pay for non-Big N clients, leading to less significant results.

4.2 Results for the Two Subsample Periods

We further partition the whole sample period into two subsample periods: 1985–1994 and 1995–2004. This is informative in several ways. First, the important privatisation program for Singapore GLCs started in 1985, the impact of which could be more perceivable in the first few years. Second, there could be time-specific effects which cannot be captured by GDP and other macro events included in the regressions. Partitioning the whole sample period into two subsample periods may help us better control for such effects. Third, Menon and Williams (2001) find that the 1989 Big 8

merger did not result in a permanent audit fee hike but did result in a temporary fee increase. Although we do not find a permanent effect for this merger, there is a possible temporary effect. Partitioning the whole sample period into two subsample periods could help us investigate this possibility. Fourth, since our panel data cover a period of 20 years, they are severely unbalanced, and so sample partitioning could balance them better. Finally, since each subsample period contains only one merger, we can further examine whether the merger affects firms audited by merger-involved Big N auditors more than other firms. We repeat the panel data regressions for the two subsample periods using Equation (3) and report the results in Panels A and B of Table 5, respectively. Each panel contains four specifications: (1) all firms, (2) the non-Big N sector, (3) the Big N sector, and (4) the sector audited by the merger-involved Big N firms.

From Panel A we see that the results are largely the same as those reported in Table 4. But there are some exceptions. First, *GEAR* becomes negative and highly significant for all samples except the non-Big. Further scrutiny of the data shows that the average leverage level for the first subsample is significantly lower than for the second. It is likely that at the lower level of leverage, more debt indicates a higher level of monitoring from lenders, which may lower audit risk. Second, *GLC* is now negative and significant at the 5 per cent level, indicating that GLCs are perceived as firms with low risk and thus pay lower audit fees in the period 1985–1994. Third, *GDP* turns positive and significant for all firms, suggesting that auditing firms are priced more aggressively in a good economy in the first sample period. Finally, the results of the merger-related firms in the last column do not show much difference relative to the Big sector, except that *GLC* becomes insignificant while *GDP* turns significantly positive. The government's intervention thus appears to have had little effect on those firms audited by firms involved in the 1989 merger. On the other hand, merger-related auditing firms charged higher fees following the industry consolidation. The adjusted R^2 is even higher in the first subsample regressions than in the whole time sample.

Table 5 Panel Data Analysis for the Two Subsample Periods

This table presents the panel data analysis results based on Equation (3) for the two subsample periods: 1985–1994 in Panel A and 1995–2004 in Panel B. Columns (1)-(4) reports the results for all firms, for firms audited by non-Big N auditors, for firms audited by Big N auditors, and for firms audited by merger-related auditors (the 1989 merger in Panel A and the 1998 merger in Panel B). Figures in parentheses represent two-way clustered t-values. The number of observations and adjusted R^2 are in the last two rows. *, **, and *** denote significance at the 10, 5, and 1 per cent levels, respectively.

Panel A: 1985–1994

	(1) All firms	(2) Non-Big	(3) Big	(4) Merged 1
LTA	0.3679***	0.3483***	0.3689***	0.3952***
	(11.014)	(6.576)	(9.869)	(8.343)
SUB	0.1770***	0.2491***	0.1724***	0.1576***
	(7.766)	(7.816)	(7.343)	(5.706)
FOR	0.3845***	-0.1292	0.4277***	0.3161*
	(2.927)	(-0.644)	(2.921)	(1.781)
INV	0.8437***	1.2228***	0.8733***	0.6136**
	(3.299)	(3.104)	(3.074)	(2.093)
DEB	1.3603***	0.5774	1.4784***	1.6953***
	(5.529)	(1.108)	(4.920)	(5.434)
GEAR	-0.9449***	1.0785	-0.9834***	-1.1400***
	(-3.270)	(1.375)	(-3.189)	(-3.100)
QUICK	-0.0059	0.0081	-0.0039	-0.0278
	(-0.329)	(0.135)	(-0.185)	(-1.198)
ROA	-0.3351*	-0.9187*	-0.2274	-0.3712
	(-1.681)	(-1.866)	(-1.145)	(-1.589)
LOSS	0.0929	0.0085	0.1009	0.1255
	(1.048)	(0.071)	(0.934)	(0.910)
BIG	0.1879*			
	(1.909)			
SPEC	0.7969***		0.8056***	0.8102***
	(4.323)		(4.336)	(3.557)
GLC	-0.2240**	0.0000	-0.2130**	-0.2104
	(-2.457)	(.)	(-2.272)	(-1.496)
GDP	0.0060*	0.0061	0.0053	0.0148***
	(1.852)	(.)	(1.152)	(3.017)
MERGER1	-0.0068	0.2020***	-0.0351	-0.0027
	(-0.122)	(3.195)	(-0.553)	(-0.042)
No. of obs.	1079	145	934	615
Adj. R^2	0.7535	0.8104	0.7211	0.7004

Panel B: 1995–2004

	(1) All firms	(2) Non-Big	(3) Big	(4) Merged 2
LTA	0.3678***	0.4433***	0.3518***	0.2282***
	(6.531)	(3.033)	(6.893)	(5.253)
SUB	0.1135***	0.0597	0.1199***	0.1328***
	(4.275)	(0.725)	(4.854)	(6.012)
FOR	0.2581***	0.1323	0.2794***	0.5799***
	(2.976)	(0.539)	(3.063)	(4.644)
INV	0.5626***	0.4557	0.5684***	0.9649***
	(2.840)	(0.852)	(2.651)	(3.289)
DEB	0.7401***	0.9991	0.6985***	0.1607
	(2.793)	(1.376)	(2.629)	(0.486)
GEAR	0.0145	0.4972	-0.0006	0.0914
	(0.349)	(1.194)	(-0.016)	(0.916)
QUICK	-0.0208*	-0.0778	-0.0157	-0.0232
	(-1.696)	(-1.591)	(-1.129)	(-0.789)
ROA	-0.4666***	-0.5516	-0.3896*	-0.4109
	(-2.677)	(-1.161)	(-1.948)	(-1.281)
LOSS	0.0384	0.0524	0.0296	0.0084
	(0.881)	(0.653)	(0.662)	(0.112)
BIG	0.1747*			
	(1.830)			
SPEC	0.5653***		0.5538***	0.4223
	(2.820)		(2.736)	(1.206)
GLC	-0.0896	0.2698	-0.0788	-0.2050
	(-0.763)	(0.677)	(-0.665)	(-1.488)
GDP	-0.0235*	-0.0209	-0.0229*	-0.0224
	(-1.733)	(-1.483)	(-1.665)	(-1.260)
MERGER2	0.0713	0.0673	0.0752	0.0291
	(0.808)	(1.021)	(0.837)	(0.294)
CLPS	0.4242***	0.1790	0.4717***	0.8510***
	(2.646)	(1.008)	(2.779)	(5.731)
CRISIS	-0.2253	-0.1661	-0.2239	-0.2223
	(-1.538)	(-1.286)	(-1.540)	(-1.600)
No. of obs.	1970	248	1722	461
Adj. R^2	0.5824	0.4656	0.5825	0.7105

Note: The regression equation is specified as follows:

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

where

$LAF_{i,t}$	=	natural log of inflation-adjusted total audit fees for firm *i* in year *t*;
LTA	=	natural log of inflation-adjusted total assets;
SUB	=	square root of the number of subsidiaries;
FOR	=	proportion of subsidiaries that are foreign;
INV	=	ratio of inventory to total assets;
DEB	=	ratio of accounts receivable to total assets;
GEAR	=	ratio of long-term debt to total assets;
QUICK	=	ratio of current assets (minus inventories) divided by current liabilities;
ROA	=	ratio of net income to total assets;
LOSS	=	indicator variable with the value of 1 for an operating loss in the previous year, and 0 otherwise,
BIG	=	indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, and for the Big 4 since 2002, and 0 otherwise;
SPEC	=	share of audit fees by an audit firm in a particular industry;
GLC	=	indicator variable with the value of 1 for companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.
GDP	=	annual real GDP growth rate in Singapore;
MERGER1	=	indicator variable with the value of 1 for 1989 and succeeding years, and 0 otherwise;
MERGER2	=	indicator variable with the value of 1 for 1998 and succeeding years, and 0 otherwise;
CLPS	=	indicator variable with the value of 1 for 2002 and succeeding years, and 0 otherwise;
CRISIS	=	indicator variable with the value of 1 for 1997 and 1998, and 0 otherwise.[13]

[13] Although the Asian crisis started with the attack on the Thai baht in July 1997 and spread into Singapore in 1998, we believe that the audit firms should have clearly perceived the risk in 1997.

The second subsample period results presented in Panel B of Table 5 are also largely similar to those reported in Table 4 for the whole sample period, especially for the experimental variables. First, *GLC* turns insignificant, suggesting that the previous result of lower audit risk for GLCs is a temporary effect, and that the helping-hand and grabbing-hand government interventions are roughly balanced in the second sample period. Second, *GDP* shows a negative and marginally significant sign both for all firms and for the Big N firms, indicating that the firms, and especially the Big N, make greater audit efforts when the economy is bad. This may be a result of the concentrated events of the Big N merger, collapse, and financial crisis in this period. Third, *MERGER2* appears to have no significant effect in this subsample period. For merger-related firms, the goodness of fit as measured by the adjusted R^2 is the best among all five regressions. The results are quite similar to the Big sector regressions, even though a few explanatory variables such as *ROA, SPEC,* and *GDP* become insignificant. Although we find that some estimates differ across the subsample periods, most are consistent across these periods.

4.3 Further Tests on GLCs

Although we find some evidence that GLCs pay lower audit fees than non-GLCs, it is still not clear whether this is due to the helping-hand intervention of the government or the good operating efficiency of the GLCs. In Table 6, we attempt to isolate the government-intervention effect from the other factor by controlling for the possible different operating efficiencies of GLCs and non-GLCs. For each GLC, we identify a control firm with the closest ROA within the same industry in the same year. Equation (3) is re-run with the matched sample for the whole sample period as well as two subsample periods of 10 years each.

Column (1) shows that the *GLC* dummy remains negative and insignificant for the whole sample period. This indicates that after controlling for operating efficiency, the helping hand of the government may be slightly heavier on GLCs than its grabbing hand. But in the first subsample test, the *GLC* dummy becomes significant at the 1 per cent significance level, consistent with the whole sample test in Column (1) of Table 4 and Column (1) of Table 5 (Panel A). In unreported year-by-year regressions, the results also indicate that GLCs were charged lower audit fees in the late 1980s and early 1990s. The evidence suggests that in this period, the government's helping hand outweighed its grabbing hand. In 1985, the Singapore government initiated a major privatisation campaign and divested a large number of GLCs. Hence, our findings suggest that the government tends to vouch for and control its rent seeking from GLCs when newly privatised companies need more government sponsorship to establish themselves in the public market. After this period, when the GLCs have established their reputation among public investors, the government may withdraw its support. Consistent with this conjecture, we see that the *GLC* dummy becomes insignificant in the second subsample period.

Table 6 Panel Data Analysis for Government-Linked Companies

This table presents the panel data analysis results with common intercept specifications for government-linked companies (GLCs) and the control firms matched by industry and ROA. Column (1) shows the results for the whole sample period from 1985 to 2004, and Columns (2) and (3) for the two subsample periods 1985–1994 and 1995–2004, respectively. Figures in parentheses represent two-way clustered t-values. The number of observations and adjusted R^2 are in the last two rows. *, **, and *** denote significance at the 10, 5, and 1 per cent levels, respectively.

	(1) 1985–2004	(2) 1985–1994	(3) 1995–2004
LTA	0.4207***	0.4962***	0.4111***
	(9.626)	(8.230)	(8.026)
SUB	0.0940***	0.1016***	0.0792***
	(3.924)	(2.660)	(3.660)
FOR	0.5136***	0.2495	0.6595***
	(2.743)	(1.131)	(3.466)
INV	1.2876***	1.4591***	1.4574***
	(3.027)	(3.194)	(2.687)
DEB	1.1703**	1.1640	1.1336**
	(2.480)	(1.625)	(2.117)
GEAR	-0.2030	-1.7770***	0.0984
	(-0.780)	(-3.171)	(0.743)
QUICK	0.0543	0.1132***	0.0453
	(1.618)	(2.695)	(1.177)
ROA	-0.8973	-2.4886**	-0.6804
	(-1.387)	(-2.047)	(-0.923)
SPEC	0.3154	0.9021***	-0.0891
	(0.992)	(2.887)	(-0.230)
BIG	0.1937	-0.0588	0.3868**
	(1.273)	(-0.294)	(2.068)
LOSS	0.0817	0.2308	-0.0131
	(0.694)	(1.443)	(-0.093)
GLC	-0.1432	-0.3176***	-0.0291
	(-1.426)	(-3.112)	(-0.256)
GDP	-0.0153**	-0.0072	-0.0156*
	(-2.491)	(.)	(-1.810)
MERGER1	0.0461	0.0396	
	(0.345)	(0.372)	
MERGER2	0.2053***		0.1030
	(2.737)		(1.399)
CLPS	0.3990***		0.4155***
	(4.476)		(4.788)
CRISIS	-0.1077		-0.1691**
	(-0.951)		(-2.469)
No. of obs.	594	254	340
Adj. R^2	0.7165	0.7167	0.7280

Note: The regression equation is specified as follows:

$$LAF_{i,t} = a_{o,i} + a_1 LTA_{i,t} + a_2 SUB_{i,t} + a_3 FOR_{i,t} + a_4 INV_{i,t} + a_5 DEB_{i,t} + a_6 GEAR_{i,t} + a_7 QUICK_{i,t} + a_8 ROA_{i,t} + a_9 LOSS_{i,t} + a_{10} BIG_{i,t} + a_{11} SPEC_{i,t} + a_{12} GLC_{i,t} + a_{13} GDP_t + a_{14} MERGER1_t + a_{15} MERGER2_t + a_{16} CLPS_t + a_{17} CRISIS_t + e_{i,t}, \quad (3)$$

where

$LAF_{i,t}$	=	natural log of inflation-adjusted total audit fees for firm *i* in year *t*;
LTA	=	natural log of inflation-adjusted total assets;
SUB	=	square root of the number of subsidiaries;
FOR	=	proportion of subsidiaries that are foreign;
INV	=	ratio of inventory to total assets;
DEB	=	ratio of accounts receivable to total assets;
GEAR	=	ratio of long-term debt to total assets;
QUICK	=	ratio of current assets (minus inventories) divided by current liabilities;
ROA	=	ratio of net income to total assets;
LOSS	=	indicator variable with the value of 1 for an operating loss in the previous year, and 0 otherwise,
BIG	=	indicator variable with the value of 1 for the Big 8 audit firms before 1989, for the Big 6 during 1989–1998, for the Big 5 during 1999–2001, and for the Big 4 since 2002, and 0 otherwise;
SPEC	=	share of audit fees by an audit firm in a particular industry;
GLC	=	indicator variable with the value of 1 for companies in which 20 per cent or more of the shares are directly or indirectly owned by the Singaporean government, and 0 otherwise.
GDP	=	annual real GDP growth rate in Singapore;
MERGER1	=	indicator variable with the value of 1 for 1989 and succeeding years, and 0 otherwise;
MERGER2	=	indicator variable with the value of 1 for 1998 and succeeding years, and 0 otherwise;
CLPS	=	indicator variable with the value of 1 for 2002 and succeeding years, and 0 otherwise;
CRISIS	=	indicator variable with the value of 1 for 1997 and 1998, and 0 otherwise.[14]

[14] Although the Asian crisis started with the attack on the Thai baht in July 1997 and spread into Singapore in 1998, we believe that the audit firms should have clearly perceived the risk in 1997.

4.4 Robustness Checks

We perform various robustness tests, but to save space, we do not report them here but instead summarise the main findings. First, to fully address the concern that the results may be driven by unbalanced data, we repeat the regressions with fully balanced data sets, namely, 57 and 67 firms with a full 10 years of data in the first and second subsample periods, respectively. The results are largely the same, except that *MERGER2* is significantly positive for the merger-related firms.

Second, we follow Menon and Williams (2001) to define the merger dummies as 1 for the merger year and the two succeeding years, and 0 otherwise, to capture the possible temporary effects of the mergers. Specifically, we set *MERGER1* to 1 for 1989, 1990, and 1991, and 0 for all other years, and *MERGER2* to 1 for 1998, 1999, and 2000, and 0 otherwise. We obtain almost identical results.

Third, we try three alternative *SPEC* proxies. As pointed out by Gramling and Stone (2001) and Krishnan (2001), using market share as a proxy for specialisation is subject to some limitations. For example, it is not clear whether the advantage of specialising in an industry accrues from auditing a large number of clients or a few large clients. To address these problems, we follow Balsam *et al.* (2003) and use a few alternative measures. In addition to our current measure of continuous audit-fee market share, we use a dummy variable to identify the largest supplier in each industry as an alternative proxy. Furthermore, we compute the market share and specialist dummy based on the number of clients as another two measures of *SPEC*. The regression results using an audit-fee-based dummy and a client-based market-share measure are qualitatively the same as those using an audit-fee-based market-share measure reported in previous tables. But when the client-based dummy is used, *SPEC* is mostly insignificant and sometimes even associated with the negative sign. This suggests that the specialisation premium may be sensitive to the specialisation measures.

We also create a dummy for year 1995, when Barings was brought down by unchecked derivative trading, and examine whether this incident had any impact on the audit fee market. The regression results do not show any significance. Since the correlation coefficient between *LTA* and *SUB* is high at 0.56, we also make *SUB* orthogonal to *LTA* and use the residual in place of *SUB* in the regressions. The results are qualitatively the same. Overall, our empirical results are quite robust.

V. Conclusion

We conduct a comprehensive study on the determination of audit fees in Singapore using data from 1985 to 2004 for all listed firms. Singapore has a significant number of GLCs, which are among the most efficient government-owned companies in the world. The Singapore government also has a good reputation with high efficiency and relatively less corruption worldwide. We examine whether GLCs pay higher or lower audit fees than their non-government peers.

We introduce panel data analysis into the study to put the audit fee analysis not only under a cross-sectional framework but also under a time-series framework. The time span is long enough to allow us to observe the dynamics of audit fee movements through time and across important events.

Using panel data analysis, we find that the *GLC* dummy is negative and significant in the first subsample period of 1985–1994, which is consistent with the hypothesis that GLCs have lower audit risk when the Singapore government is more likely to vouch for than "steal" from the GLCs. But it is not significant in the second subsample period, suggesting that the stronger helping-hand effect is temporary, probably to support the government's major privatisation campaign. The result remains after controlling for the potential difference in operating efficiency with non-GLCs.

We further find that *MERGER2* (the merger of Price Waterhouse & Coopers Lybrand in 1998) and *CLPS* (the Arthur Andersen collapse) did have positive impacts on audit fees. The impact of *MERGER1* (the merger waves among the Big 8 audit firms in 1989) is positive for the non-Big N sector but not the Big N sector. These results indicate that the consolidation of the industry increased the audit risk for non-Big N auditing firms but not the Big N auditors. We also find that the business cycle using GDP growth as a proxy and *CRISIS* (the Asian economic crisis) do not significantly affect audit fees. Our results are also robust in general.

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