國立臺灣大學管理學院會計學研究所

博士論文

Graduate Institute of Accounting

College of Management

National Taiwan University

Doctoral Dissertation

保單取得成本價值攸關性及資訊內涵之研究

An Examination of Deferred Acquisition Cost in Insurance Firms

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中華民國 99 年 6 月

June, 2010

國立臺灣大學博士學位論文
口試委員會審定書

保單取得成本價值攸關性及資訊內涵之研究
An Examination of Deferred Acquisition Cost in Insurance Firms

本論文係 廖懿屏君（D93722002）在國立臺灣大學 會計學系、所完成之博士學位論文，於民國 99 年 5 月 26 日承下列考試委員審查通過及口試及格，特此證明

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誌　謝

時光飛逝，我終於完成在台大求學的這十二年(大學四年、碩士班二年與博士班六年)，而最後這一段博士班的學業，箇中的辛酸苦澀，也許只有老師們與博士班同儕能夠感同身受。

感激劉啟群老師的啟迪與提攜，在我從無到有的研究過程中，孜孜不倦地引導，而您對學術研究的永保熱誠，讓我深深體認到追求知識的真實精神；感激柯承恩老師的指導，您獨到的宏觀的思路，使我免於見樹不見林的盲點；二位指導老師在百忙之中，總還能抽出時間關心我的學業與生活，實在令我深感幸運！

這段長期奮戰中，常感孤單與苦悶，幸好身邊有諸多同儕 (窈菱、德冠、純央、建順、孝倫學姐、貴富學長)，及親愛的文嘉，陪我度過焦頭爛額與灰心喪志的深淵，是我心中的小太陽！

當然，對於我的父母與姊姊，我要說：「辛苦你們了！讓你們久等了！」如果沒有你們無盡的支持與包容，也不會有今日的我，謝謝你們，我希望，成為你們永遠的靠山！

廖懿屏 **99.06.16**

摘要

本論文分為二個部分，針對保單取得成本 (Deferred Acquisition Cost; DAC) 進行深入探討。保單取得成本係影響財務報表之重大項目，其包含簽單與發行成本及佣金支出，依美國會計處理準則可將此支出遞延並於後續期間攤銷轉為費用，其作法與我國及國際會計處理準則(作為當年費用)有極大差異。故第一部份首先探討保單取得成本之資訊有用性，研究問題為：(1)保單取得成本是否為資產？(2)保單取得成本之攤銷與報酬率及未來現金流量之關聯性？(3)費用化(國際會計處理準則)與資本化(美國會計處理準則)，孰能提供較有用之資訊？第二部分探討保單取得成本之攤銷費用，是否因其對淨利之重要性、及受精算假設變動之重大影響，而被保險公司作為盈餘管理的工具，以達成財務報表動機。本論文的研究成果不但為取得成本應資本化與否提供學術證據，同時可供制訂準則者權衡，並增進保單取得成本在實務評價使用上之有用性。

關鍵字：保單取得成本、保險會計、價值攸關性、資訊內涵、盈餘管理

Abstract

This dissertation consists of two parts. The first study examines valuation implication of deferred acquisition cost (DAC, DPAC) for insurance firms. First, the value relevance of DAC items under U.S.GAAP, characterized by capitalization-amortization approach, is investigated, and results show that DAC items play an important role in valuing firm values and explaining stock returns and future cash flows. Second, the relative usefulness of direct-expensing approach is examined. Both the incremental explanatory power analyses and Vuong's Z-statistics indicate that capitalizing approach outperforms expensing one in summarizing information. The second study examines the management of deferred acquisition cost (DAC) for financial reporting incentives. The great importance of DAC amortization on insurers' financial statements and its nature of being sensitive to actuarial estimates affords considerable discretion while management are faced with financial reporting incentives. Results indicate firms manage DAC amortization to smooth earnings, avoid losses and missing analysts' forecasts, and take the big bath in the context of management change after controlling for economic factors.

Keyword: Deferred acquisition cost, insurance accounting, value relevance, information content, earnings management

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Chapter 1.The Valuation Implication of Deferred Acquisition Cost

1.1 Introduction

A central feature of the financial reporting model is accrual accounting, and one of its crucial elements is the application of matching principle. Accounting guidance employs the matching concept extensively, and one of these applications is the deferral of acquisition costs. In the past, the practice of deferring acquisition costs was widely accepted. However, its reasonableness has been questioned due to the fair-value concept that has prevailed in recent years. Therefore, many items that were formerly deferred have for the past 10 years been subject to direct expensing by U.S. GAAP. Exceptions to this practice are acquisition costs as they relate to the insurance industry, namely the deferred acquisition costs (DAC). Specifically, even though the adoption of fair-value-accounting in insurance industry is underway, some practitioners and researchers believe that cost-based accounting is more useful and informative[1]. To empirically address the role of cost-based accounting in insurance industry, I assess the valuation implication of a unique item, deferred acquisition cost (DAC, DPAC) and compare the relative explanatory power of DAC items under cost-based concept with those under fair-value one.

DAC is the direct outlay to acquire insurance policies, mainly consisting of underwriting costs and commissions, and usually carries substantial balance in insurance firms[2]. Interestingly, while FAS 60 mandates the deferral and subsequent amortization of DAC, the International Accounting Standards Board (IASB) takes an approach much closer to fair-value accounting. Under IFRS 4, the deferral of acquisition costs is conceptually prohibited. In paragraph 25, it states:

[1] Beltratti A. and Corvino G. (2007), 'Potential Drawbacks of Price-based Accounting in the Insurance Sector'

[2] Table 1-1 presents the influence of DAC items on insurers' financial statements.

"*An insurer may continue the following practices, but the introduction of any of them does not satisfy paragraph 22.…… using non-uniform accounting policies for the insurance contracts (and related deferred acquisition costs and related intangible assets, if any) of subsidiaries, except as permitted by paragraph 24.....*"

In paragraph 22, it states: "*An insurer may change its accounting policies for insurance contracts if, and only if, the change makes the financial statements more relevant to the economic decision-making needs of users and no less reliable, or more reliable and no less relevant to those needs. An insurer shall judge relevance and reliability by the criteria*." Accordingly, IFRS 4 does not permit introducing the capitalization of DAC because it considers it less relevant or reliable than the expensing approach. However, this viewpoint raises great practitioner concern.

"*An insurance customer intangible asset should be recognized to reflect the initial investment made to acquire the customer relationship. The best proxy for the value of the customer intangible asset at inception should be the initial acquisition cost arising from the contract.*"

—Proposals for IFRS Phase II by CFO forum in IASB meeting

The varying viewpoints demonstrate the distinguishing viewpoints of two fundamental concepts: fair-value accounting and matching principle. Although the fair-value concept has prevailed in these years, many have suspected that the benefits would not outweigh its costs. Specifically, Penman (2007) wrote that "…at a conceptual level, fair value accounting is a plus…but concepts are one thing and implementation another….with fair value defined as exit price, the minuses add up! ..." In addition, some studies have documented the consequences of abandoning the matching concept. Dichev and Tan (2008) states that the decreasing earning relevance and persistence and increasing earnings volatility are due to the poor matching of expenses and revenues

over the past 40 years. Ohlson (2006) further proposes a practical model relying on the income statement approach. The underlying motivation and logic of these studies basically stem from the fact that the abandoning of matching, in many cases, causes problems because investors like to have a natural starting point in the income statement when they try to forecast subsequent periods' sustainable (or permanent) earnings. Besides, the merits of cost-based accounting are also emphasized by recent insurance studies. Beltratti A. and Corvino G. (2007) analytically analyze the impact of fair value approach in insurance sector, indicating that cost-based accounting is an addition from both investors' and firms' viewpoints.

I hypothesize that DAC items under cost-based accounting facilitate valuations of insurance firms by revealing critical actuarial assumptions, which direct-expensing approach would fail to accomplish. Accordingly, I posit that DAC items under direct-expensing approach may induce imprecision in valuing insurance firms. Notably, although an ideal way of comparing these two approaches may be directly testing the relative explanatory power of *ex post* metrics under U.S.GAAP and IFRS 4 respectively, this is not empirically attainable at present because its overall adoption will not come into force until after 2012. Therefore, I conduct the empirical analysis using actual metrics under U.S.GAAP and as-if metrics under suggested direct-expensing. Results indicate that cost-based DAC items are relevant and informative in valuing insurance firms. Also, incremental explanatory power analyses and Vuong's Z-statistic both show that DAC metrics under direct-expensing approach is less useful compared to those under cost-based approach.

This study makes several contributions. First, I provide evidence that DAC items facilitate valuation of firm values by revealing information about critical actuarial assumptions. Second, the comparison between alternative approaches sheds some light

on the long-lasting debate over capitalize-versus-expensing acquisition costs in the context of insurance industry. Although the decision seems to be typically within the domain of accounting, the resulting economic consequences are closely associated with the valuation of insurance firms and in effect gravely concerned by practitioners. Another clear implication, according to the loss of information associated with direct-expensing approach, is that standard-setters should take into account the potential drawbacks associated with fair-value based accounting for insurance firms in the future.

The rest of this paper proceeds as follows. Section 1.2 introduces the insurance accounting related standards and important details about DAC in U.S. GAAP. Section 1.3 briefly reviews related literature and puts forward the hypotheses. Section 1.4 outlines the research design, including empirical models, sample selection and data characteristics. Section 1.5 presents the empirical analyses and findings. The paper concludes with a summary in Section 1.6.

1.2 DAC definition and its influence on insurer's financial statements

FAS 60 states: "…*Commissions and other underwriting costs, such as investigation expense, physical examining charges, that are primarily related to insurance contracts issued or renewed during the period in which the costs are incurred shall be considered acquisition cost.*"

DAC is unique for several reasons. First, its influence on financial statements is considerable. For example, the average percentage of DAC compared with the total assets and total shareholders' equity is around 5% and 34%, respectively; the average percentages of DAC amortization expense and DAC addition compared with the net income before extraordinary items is around 302% and 365%, respectively. Table 1-1 presents the influence of DAC-related items on financial statements. Second, in essence,

DAC is a deferred asset, and many items that were deferred assets in the past, such as organization cost, have recently been expensed under U.S. GAAP. In light of this, the existence of DAC is a striking contrast. Third, DAC is extensively discussed by insurance practitioners. For instance, calculating potential DAC charges is crucial when Merrill Lynch making price forecasts:

"To calculate potential deferred acquisition cost (DAC) charges, we have used the disclosure from Hartford's 10-K. In SEC filings…if we assume another 25% decline…we can calculate the anticipated hits to book value from DAC charges related range from 0% to 7%, specifically speaking."

Also, the great impact of DAC on earnings is commonly emphasized by investment bankers and wealth management agencies. For example, the following statements are excerpted from Smith Barney's U.S. life insurance 2003 industry outlook.

"DAC unlocking Caused Surprise… Retrospective application of adjustment to gross profits margin assumptions significantly impacted 2002 results, and will depress earnings growth in 2003 and beyond."

The accounting treatment of DAC is conceptually straightforward. When commission and underwriting expense are incurred, the outlay is added to DAC account. At the end of each period, amortize DAC in a reasonable systematic approach. For FAS 60[3] contracts, DAC is amortized in proportion to present value of expected future gross premiums. For FAS 97[4] contracts, DAC is amortized in proportion to present value of expected gross profits[5]. Details are illustrated below.

[3] Generally speaking, most property & casualty policies as well as life and health policies without investment components are classified as FAS 60 contracts.

[4] Life policies with investment components, such as universal life, and variable annuities are classified as FAS 97 contracts.

[5] EGP=mortality charge +expense charge +surrender charge +interest spread earned –death benefits –maintenance expense

***Example 1-1*：** A firm acquires a contract with premium income from year 1 through to year 5; this contract is classified as a FAS 60 policy. The discounting rate applied is 6%.

Exhibit 1-1

DAC outlays and Gross premiums

	Year 1	Year 2	Year 3	Year 4	Year 5
DAC	**630**	**27**	**24**	**0**	**0**
Gross Premiums	**1,000**	**900**	**800**	**700**	**600**

Based on the information, the sum of present value of DAC = $677, while the sum of present value of gross premiums = $3,623

The amortization ratio= $\frac{\sum \text{PV of DAC outlays}}{\sum \text{PV of gross premiums}} = \frac{677}{3{,}623} = 0.18686$

Year 1 (Year 2) amortization = 0.18686 × 1,000 = 187 (0.18686 × 900 = 168).

***Example 1-2*：Suppose the policy mentioned above is classified as a FAS 97 policy, and all DAC outlays are the same as those in Example 1-1.**

As specified in FAS 97, EGPs =(Expense charge[6] + Mortality charge[7] + Incurred surrender charge[8]) + (Investment spread[9] earned) — (Net death benefits[10] + Maintenance expense[11]). EGPs data applied in this example follows.

[6] Expense charges refer to the amounts deducted from policyholders' account values by the insurance company to cover its administrative costs.

[7] Mortality charges stand for the cost charged by an insurance company for the insurance protection under an interest-sensitive whole life or universal life insurance policy.

[8] Surrender charges refer to the amount of money deducted from the policy account value at the time a policy is surrendered at the request of the policyholder. The surrender charge, as specifically stated in the contract, usually decreases over a number of years and is often a percentage of the premium in the first policy year.

[9] Interest spread = Investment return —Interest credited to policyholders

[10] Death benefits are the contractual amounts payable, when the person insured on a term or permanent life insurance or deferred annuity policy dies.

[11] Maintenance expenses consist of various costs to administer insurance policies. Some examples of these administrative expenses include the cost of issuing policies, servicing policyholders and paying

Exhibit 1-2

DAC outlays and Expected gross profits

	Year 1	Year 2	Year 3	Year 4	Year 5
DAC	**630**	**27**	**24**	**0**	**0**
Expected Gross Profits	**102**	**184**	**242**	**282**	**313**

Based on the information, the sum of present value of DAC = $677, while the sum of present value of EGPs = $920

Therefore, amortization ratio $= \frac{\sum \text{PV of DAC outlays}}{\sum \text{PV of EGPs}} = \frac{677}{920} = 0.7360$

Year 1 (Year 2) amortization = 0.7360 × 102 = 75 (0.7360 × 184 = 135).

If EGPs remain unchanged eventually, the DAC assets account could be presented as below.

Exhibit 1-3

The account balances of DAC at year ends

Year	Beginning	New Deferrals	Amortization	Interest	Ending
1	0	630	75	38	593
2	593	27	135	37	522
3	522	24	178	33	401
4	401	0	208	24	217
5	217	0	230	13	0

It is evident that the amortization of DAC is closely related to the projection of numerous actuarial assumptions, such as mortality, morbidity, persistency, and investment returns. Due to the inherent long-horizons and high-complexities involved,

benefits. An administrative charge may be deducted each year from the account value of an interest sensitive whole life or universal life insurance policy to pay for some of these expenses.

deviations from original expectations are unavoidable. For FAS 60 contracts, actuarial assumptions are "locked" throughout the life of contracts and all deviations are included in operating expenses when they occur. For FAS 97 contracts, however, assumptions are "unlocked," meaning firms should update assumptions, revise amortization ratio when necessary. See below example for illustration.

***Example 1-3*：Continued from the previous example, and assume that deviations from estimates occur from Year 3 through Year 5, with initial estimates at $242, $282, $313 and revised ones at $262, $300, and $325, respectively.**

Exhibit 1-4

The Revision of EGPs

Year	Initial	Revised Estimates	Discount	Revised PV of
1	102	102	0.94340	96
2	184	184	0.89000	164
3	242	262	0.83962	220
4	282	300	0.79209	238
5	313	325	0.74726	243
				961

As specified in FAS 97, unlocking is required when current or expected future experiences with respect to EGPs vary from those originally assumed; the amortization schedules should also be retrospectively adjusted. Accordingly, at the end of Year 3, firms shall revise the sum of PV of EGP at $\$102 \times 0.94340 + \$184 \times 0.89000 + \$262 \times 0.83962 + \$300 \times 0.79209 + \$325 \times 0.74726 = \$961$

Then, revise the amortization basis and calculate the revised amortization ratio = $\frac{677}{961} = 0.7045$

DAC account balances after retrospective adjustments are presented below.

Exhibit 1-5

DAC account after Revisions

Year	Beginning DAC	New deferrals	Amortization	Interest	Ending DAC
1	0	630	**72**	38	596
2	596	27	**129**	37	531
3	**531**	**24**	**184**	**33**	**404**
4	404	0	212	24	216
5	216	0	229	13	0

Hence, the amortization expense reported during Year 3 equals $184 less the initial adjustment made to the initial DAC balance $8, which is $176 eventually.

Exhibit 1-6

Required adjustment as to unlocking

Year	Initial DAC Ending balance	Revised DAC Ending balance	Adjustment made to the beginning DAC in Year 3
1	593	596	
2	522	530	**8**

In contrast to U.S.GAAP, IFRS 4 conceptually prohibits the deferral of DAC in Phase I. Also, according to its recent exposure draft, it still favors the direct expensing of DAC items in Phase II. If so, after IFRS 4 Phase comes into force, DAC outlay would be directly expensed as is incurred.

1.3 Prior Literature and Hypotheses Development

Prior studies focusing on insurance accounting are limited. Two main issues are covered. First, most studies discuss whether insurance firms manage their earnings, and how they manage their earnings.(Petroni et al.,1992 ; Gaver et al.,1999 ; Nelson, 2000 ; Gaver and Paterson, 2004) Second, some examine the information content of loss reserve development. (Beaver and McNicholas, 2001; Beaver et al., 2003) The rest look into the insolvency problems of insurance firms, and study whether some accounting variables are useful to predict insolvency occurrences.

Beltrtti A. and Corvino G. (2007) is one of the studies that closely relates to my research issue. They analyze the relevance of cost-based accounting in financial markets focusing on the drawbacks associated with a move from cost-based to price-based accounting. From their analytical analysis, issues like the potential increase in earnings volatility and changes in the cost of capital would impact insurance firm values. Also, from the viewpoint of the final investor, they consider liquidity and expected returns, stressing the role of behavioral models. Their conclusion is that cost-based accounting is a useful addition to insurance markets. It may stabilize short-run financial results and may improve the situation of investors with short horizons and loss aversion.

To develop hypotheses, I start from the economic essence of DAC. Simply speaking, two types of outlays constitute DAC. One is the underwriting expenses, such as investigation fees and physical examination charges, and the other is commissions paid to insurance agents. Usually, the amount of the latter item is considerable. For some policies, the commission paid upon the initial-policy-year can be up to 30% of gross premiums. Seemingly “costly” to insurance firms, commissions are necessary and crucial in acquiring policies because they are the most effective incentive for agents. Therefore, in effect, DAC entitles insurers to economic resources that would bring

future economic benefits; namely, DAC is value-relevant. Some may argue that the realization of future premiums may be uncertain as policies might lapse before maturity. However, two pieces of evidence should be considered in terms of this argument. First, based on the actual statistics provided by most practical surveys[12], the lapse rates are not as high as one might assume. For instance, overall lapse rate for whole life plans for all product types and policy years combined is 3.5% on a policy basis, and 4.4% on a face amount basis in 2003 and 2004, and seems to be continually decreasing these years. It is not surprising because policyholders would incur huge amount of surrender charges when policies lapse. Therefore, the future economic benefits arising from DAC are not uncertain. Secondly, although controllability has been emphasized with regard to the decision on capitalization, an alternative interpretation of controllability has been suggested recently. In a standard setters meeting[13] held by IASB during 2006, one discussion paper reinterprets "controllability" as "the rights or other privileged access" to economic resources. In this view, DAC demonstrates the contractual privileges to gain future premiums. In fact, that concept is fairly consistent with empirical findings of the literature on research and development (R&D). Despite the fact that some have argued that the future benefits arising from R&D are not controlled by firms, numerous studies have shown that the adjustments of capitalizing R&D are value-relevant to investors (Lev and Sougiannis, 1996; Abrahams and Sidhu, 1998). In other words, R&D outlays, although seemingly not controlled by firms, in effect give rise to technical advantages, followed by privileged access of future economic benefits. It follows that the contractual relationships initiated by DAC indeed represent the identifiable privileged access to future premiums.

Hypothesis 1：DAC account balance is value-relevant

[12] Refer to Appendix 1 for more detailed statistics regarding lapse experiences report.
[13] World Standard Setters Meeting, Sep 2006, London Agenda Paper 1A

As discussed above, conceptually, amortization expense in period T equals amortization ratio multiplied by realized amount of amortization basis in period T. Since different firms are subject to different actuarial assumptions, their amortization ratios should differ even in terms of identical insurance policies. As a result, varying patterns of amortization expense reveal different actuarial assumptions between firms, making DAC amortization a useful factor to predict future premiums (expected gross profits), and therefore enhance the efficient valuation of insurance firms.

Example 1-4: **Suppose Firm A and B acquires groups of term life insurance policies, and related information is presented as follows[14].**

(1) Annual premiums paid at 1/1 each year, from Year 1 through Year 5 at $600.

(2) The total estimated policy benefits, measured based on the death benefit terms, are $2,000.

(3) Acquisition cost incurred in Year 1 (Year 2) is 50% (25%) of annual premium.

(4) While calculating amortization ratio, both firms use identical assumptions **except** for the expected lapse rates. For brevity, discounting is ignored here.

	Y1	Y2	Y3	Y4	Y5
Lapse rate (A)	0%	0%	0%	0%	0%
Lapse rate (B)	0%	0%	5%	5%	0%

Based on the above information, related calculation and analysis are as follows:

At inception, because the actuarial assumptions applied are unobservable, both firms would have the same market value, which equals $\sum \text{PV}(\text{premiums} - \text{DAC outlays} - \text{policy benefits}) = \$600\times5 - \$2000 - \$600\times50\% - \$600\times25\% = \$550$

[14] This example is adapted from one of conference essays in SOA Life 2006 Spring Meeting

During Year 1, both firms calculate their amortization ratios and report the amortization expenses correspondingly at the year end.

1. *For Firm A：*

$$\text{Amortization ratio} = \frac{300+150}{600\times 5} = \frac{450}{3{,}000} = 0.15$$

$$\text{Amortization expense} = 0.15 \times 600 = \$90$$

2. *For Firm B：*

$$\text{Amortization ratio} = \frac{300+150}{(600\times 2+600\times 95\%+600\times 95\%\times 95\%+600\times 95\%\times 95\%)} = \frac{450}{2{,}853} = 0.158$$

$$\text{Amortization expense} = 0.0158 \times 600 = \$94.8$$

Hence, investors can modify their evaluations based on the ratio of firms' amortization expenses.

$$\frac{\text{Firm B Amotrization}}{\text{Firm A Amortization}} = \frac{94.8}{90} = 1.05 = \frac{3{,}000}{2{,}853} = \frac{\sum \text{PV(FirmA Premiums)}}{\sum \text{PV(FirmB Premiums)}}$$

This equality implies that the amount of future realized premiums earned by Firm A would be 1.05 times that earned by Firm B. Hence, investors can modify the market value of Firm B to be $\$550\times\frac{1}{1.05} = \$523.8$. In brief, other factors being equal, higher amortization expense is correlated with future lower cash-inflows, implying lower market values.

Hypothesis 2：The amortization of DAC has information content

Apparently, the financial statements would be very different if DAC was expensed rather than deferred and amortized. Theoretically, the approach which produces accounting metrics more closely related to the real performance should be preferred. In this view, it is much likely that the capitalization approach is better than the expensing

approach for the following two reasons. First, as illustrated in *Example 1*, during Year 1, both firms have the same amount of DAC addition, so they will report the same DAC expense under the expensing approach. No information regarding their different expected realized premiums would be revealed under the expensing approach. Secondly, practitioners generally believe that the expensing approach would distort the real performance, because the more new policies are acquired, the higher (lower) the amortization expense (net income) would be; however, in effect the increased policies should be good news.

Hypothesis 3：Capitalizing DAC metrics outperform expensing DAC metrics in terms of value relevance explanatory power.

Hypothesis 4：Capitalizing DAC metrics outperform expensing DAC metrics in terms of information content explanatory power.

1.4.1 Research Design

The sample consists of 93 insurance firms, including Life/Health, and Property/Casualty firms, quarterly data from 1994 to 2008. All data, except DAC amortization and DAC addition, is publically available and gathered from COMPUSTAT database. As the DAC amortization and addition are not available in the database, I collected the two items by reviewing the firms' 10-K, and 10-Q reports. As different regression models are composed of different variables, after deleting observations with missing data and outliers larger or smaller than 0.5% of the sample size, the observation number of each regression model ranges from 1379 to 2601. The sample sizes of some models decrease significantly because usually, only 70% (50%) of firms provide DAC amortization (addition). In addition, it is noteworthy that although the sample size seems to be small compared to that in a general industry research, it is

quite sizable in terms of researches focusing on insurance stock firms. Since the insurance industry is one that typically has a scaled economy, the 10 largest firms usually occupy over 70% market share; therefore, even in the United States, the number of insurance firms is quite small compared to that of other industries. For example, only 52 public insurance firms existed in 2005 and 55 public firms existed in 2006. Table 1-2 presents the distribution of observations across sample years.

1.4.2 Empirical models

There are a number of ways to define value relevance. For example, information is value relevant if it aids in the prediction of variables used in valuing the firm, or it correlates with market measures of firm value. I operationalize value relevance as the ability of financial information to explain market measures, consistent with prior research (e.g., Francis and Schipper, 1999; Barth, Beaver and Landsman, 1998; Chambers, Jennings and Thompson, 1999). This definition assumes that market values reflect all public, value-relevant information and that the usefulness of accounting information is in its ability to summarize this information. Specifically, following numerous accounting literatures, this study uses model based on the work of Ohlson (1995) in which market value of equity can be expressed as a function of accounting data with relatively realistic assumptions. Also, to assess the relevance of DAC items in predicting future cash flows, leading cash flows are added up to be regressed on DAC and other balance-sheet items.

Model 1.1： $MKV_t = \alpha_0 + \alpha_1 DAC_t + \alpha_2 OTHDAC_t + \alpha_3 LIB_t + \alpha_4 NETI_t + \varepsilon_t$

Model 2.1： $\sum_{i=1}^{n} CFO_{t+i} = \alpha_0 + \alpha_1 DAC_t + \alpha_2 OTHDAC_t + \alpha_3 LIB_t + \varepsilon_t$

$n = 4, 8, \textit{and } 12 \textit{ repectively}.$

To assess the information content of accounting data, most accounting literatures

follow the basic model suggested by Easton and Harris (1991) and Collins et al. (1994), in which both the level and change in earnings and other value-relevant items are related to buy-and-hold return across the period. Several extended models are applied within the literature. As in Model 3.1(a), $RETQC_t$ (buy-and-hold return less risk-free return) is regressed on both levels and changes in net income before amortization and DAC amortization expenses, with $RTMC_t$, $LOGMV_t$, and $LOGBM_t$, to control for CRSP NYSE/AMEX/NASDAQ value-weighted index less risk-free return, size, and book-to-market ratio, respectively. In Model 3.1(b), replace $RTMVD_t$, $LOGMV_t$, and $LOGBM_t$ with three factors suggested by Fama-French (1993) which are obtained from CRSP database[15]. Model 4.1 tests the predictive ability of DAC amortization for cash flows, following Dechow et al. (1998) and Barth et al. (2001), in which the future operating cash flows are modeled to be associated with earnings and disaggregated earnings components.

Model 3.1(a)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 AM_t + \alpha_3 (BNI_t - BNI_{t-4}) + \alpha_4 (AM_t - AM_{t-4}) + \alpha_5 RTMC_t + \alpha_6 LOGMV_t + \alpha_7 LOGBM_t + \varepsilon_t$$

Model 3.1(b)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 AM_t + \alpha_3 (BNI_t - BNI_{t-4}) + \alpha_4 (AM_t - AM_{t-4}) + \alpha_5 MKTRF_t + \alpha_5 SMB_t + \alpha_6 HML_t + \varepsilon_t$$

Model 4.1： $\sum_{i=1}^{n} CFO_{t+i} = \alpha_0 + \alpha_1 (NETI_t + AMT_t) + \alpha_2 AMT_t + \varepsilon_t$

$n = 4, 8$ *and* 12 *respectively.*

[15] These specifications are consistent with Chiang and Mensah (2004) ; Fama and French (1992); Aboody and Lev (1998)

MKV_t = Market value deflated by lagged total asset

DAC_t = Deferred acquisition cost deflated by lagged total asset

$OTHDAC_t$ = Total asset less DAC, deflated by lagged total asset

LIB_t = Total liability deflated by lagged total asset

$NETI_t$ = Net income before extraordinary items, deflated by lagged total asset

CFO_t = Cash flows from operating activity deflated by lagged total asset

AMT_t = DAC amortization expense deflated by lagged total asset

$RETQC_t$ = Quarterly stock raw return less risk-free return

BNI_t = Net income before amortization expense, deflated by lagged market value

AM_t = DAC amortization expense deflated by lagged market value

$RTMC_t$ = CRSP NYSE/AMEX/NASDAQ value-weighted index less risk-free return

$LOGMV_t$ = Natural log of market value at the end of quarter t

$LOGBM_t$ = Natural log of book-to-market ratio at the end of quarter t

$MKTRF_t$ = Market excess returns, obtained from CRSP Fama-French module

SMB_t = Returns from a zero-investment size portfolio, obtained from CRSP module

HML_t = Returns from a zero-investment book-to-market portfolio, obtained from CRSP

To test Hypothesis 3 and 4, as-if numbers under direct-expensing approach are compared with reported ones under capitalize-amortize one. $NETIDE_t$ equals net income before extraordinary items plus DAC amortization, less DAC addition, deflated by lagged total asset. ADD_t is DAC addition[16], deflated by lagged market value, while ADT_t is DAC addition deflated by lagged total asset. The Vuong (1989) likelihood statistic is applied to assess the statistical significance of the differences in R^2 across the models. The null hypothesis is that the competing models fit the data equally. A significant Vuong's Z-statistic indicates that one model explains more of the variance in the dependent variable relative than the other. See Dechow (1994) for a complete discussion of the test and its implication. In addition, 3.3(a) and 3.3(b) are implemented

[16] DAC addition, i.e. the DAC outlay incurred during that period, is obtained from statements of cash flows, or footnotes in 10-K and 10-Q reports.

to examine the incremental significance of DAC items under two alternative approaches in explaining quarterly return, while 4.3 is for that regarding future cash flows.

Model 1.2： $MKV_t = \alpha_0 + \alpha_1 OTHDAC_t + \alpha_2 LIB_t + \alpha_3 NETIDE_t + \varepsilon_t$

Model 2.2： $\sum_{i=1}^{n} CFO_{t+i} = \alpha_0 + \alpha_1 OTHDAC_t + \alpha_2 LIB_t + \varepsilon_t$

n = 4, 8, and 12 repectively.

Model 3.2(a)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 ADD_t + \alpha_3 (BNI_t - BNI_{t-4}) + \alpha_4 (ADD_t - ADD_{t-4}) + \alpha_5 RTMC_t + \alpha_5 LOGMV_t + \alpha_6 LOGBM_t + \varepsilon_t$$

Model 3.2(b)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 ADD_t + \alpha_3 (BNI_t - BNI_{t-4}) + \alpha_4 (ADD_t - ADD_{t-4}) + \alpha_5 MKTRF_t + \alpha_5 SMB_t + \alpha_6 HML_t + \varepsilon_t$$

Model 3.3(a)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 AM_t + \alpha_3 ADD_t + \alpha_4 (BNI_t - BNI_{t-4}) + \alpha_5 (AMT_t - AM_{t-4}) + \alpha_6 (ADD_t - ADD_{t-4}) + \alpha_7 RTMC_t + \alpha_8 LOGMV_t + \alpha_9 LOGBM_t + \varepsilon_t$$

Model 3.3(b)：

$$RETQC_t = \alpha_0 + \alpha_1 BNI_t + \alpha_2 AM_t + \alpha_3 ADD_t + \alpha_4 (BNI_t - BNI_{t-4}) + \alpha_5 (AM_t - AM_{t-4}) + \alpha_6 (ADD_t - ADD_{t-4}) + \alpha_7 MKTRF_t + \alpha_8 SMB_t + \alpha_9 HML_t + \varepsilon_t$$

Model 4.2： $\sum_{i=1}^{n} CFO_{t+i} = \alpha_0 + \alpha_1 (NETI_t + AMT_t) + \alpha_2 ADT_t + \varepsilon_t$

n = 4, 8 and 12 respectively.

Model 4.3： $\sum_{i=1}^{n} CFO_{t+i} = \alpha_0 + \alpha_1 (NETI_t + AMT_t) + \alpha_2 AMT_t + \alpha_3 ADT_t + \varepsilon_t$

n = 4, 8 and 12 respectively.

1.5.1 Empirical Results and Analysis

Table 1-3 presents the descriptive statistics of all variables, while Table 1-4 further analyzes the descriptive statistics of DAC additions across quarters in which no distinct seasonal variations are evident. Table 1-5 presents the regression results for valuation relevance of DAC balance and corresponding comparison between two approaches. As expected, coefficient on DAC in Model 1.1 is significantly positive, suggesting that DAC balance is value relevant. Also, in Model 2, DAC is significantly positive, implying that the economic benefits arising from DAC are not remote and uncertain. Meanwhile, Vuong's Z-statistic regarding Model 1.1 over 1.2 is 6.89, indicating that Model 1.1 outperform 1.2 in explaining firm values, and the results with respect to cash flow models demonstrate similar patterns.

Table 1-6 presents the regression results regarding information content of DAC amortization and its relative usefulness compared with DAC addition. In Panel A, the results in return models indicate that coefficient on AM_t (DAC amortization) is significantly negative, while that on ADD_t (DAC addition) are "less" negative, suggesting that DAC addition may be viewed associated with some properties of assets. In addition, both results in 3.3(a) and 3.3(b) show that DAC amortization dominates DAC addition in explaining returns, consistent with the Vuong's Z-statistics, 1.72 and 1.68. In brief, DAC amortization is more useful than DAC addition in terms of explaining contemporaneous returns.

Panel B summarize the explanatory ability of DAC amortization and DAC addition. As expected, the coefficient of AMT_t (DAC amortization) is significantly negative (coefficient= -6.679) while that of ADT_t (DAC addition) is significant but less negative (coefficient= -1.681), implying that some portions of DAC additions are associated future positive cash flows. Also, the incremental explanatory power of DAC

amortization over DAC addition is evident in the results. As to the comparison between metrics provided by two approaches, the Vuong's Z-statistic for the regression with $\sum_{i=1}^{4} CFO_{t+i}$ and $\sum_{i=1}^{8} CFO_{t+i}$ as dependent variable, are both significant at 1.67 and 1.77, respectively. In brief, the results in Table 6 demonstrate that the capitalizing-amortizing approach outperforms direct-expensing approach in explaining contemporaneous returns and future cash flows.

1.5.2 Robustness Analyses

Finally, to assess the robustness of my findings, I conducted several additional specification checks. First, as suggested in some prior studies, CFO_t is included as an independent variable in Models 2.1 (2.2) and 4.1 (4.2). Second, to capture the potential structural difference between life/health and property/casualty firms as some insurance literatures do, I include an indicator variable[17] and its corresponding interactions with all variables within all empirical models. Third, as the main findings are based on quarterly data, I also conduct all the empirical works based on annual data to check for any potential difference. Lastly, as the sample period falls within 1994-2007 during which several influential events[18] have occurred, I conducted the Chow test to identify any possible structural change. Un-tabulated findings indicate that the inferences drawn upon are robust to these sensitivity tests.

[17] The indicator variable =1 for life/health firms; 0 otherwise.
[18] These events include the burst of internet bubble, the 911 attack, and the failure of Enron.

1.6 Concluding Remarks

This study explores the valuation relevance of deferred acquisition cost (DAC) and the relative explanatory power of two alternative accounting methods. Results show that DAC items are relevant in summarizing important information to investors. Also, capitalizing-and-amortizing approach is more useful than the direct-expensing one in explaining firms' values, stock returns and future cash flows. Though, one should exercise caution in interpreting our results since the empirical results do not necessarily suggest the preference of one method over the other because in effect, what the evidence demonstrates is that the capitalization and amortization of deferred acquisition cost conveys substantial information, and therefore, if the standard-setters are going to require the direct-expensing method in the future, additional disclosure regarding the amortization information would benefit the investors and market.

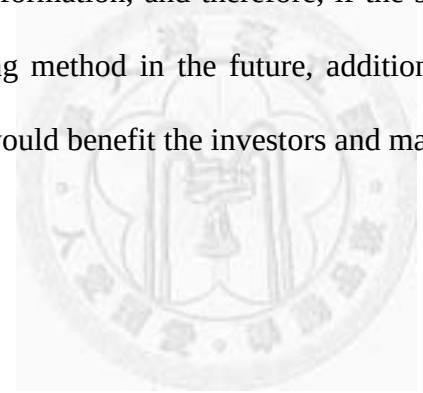

Table 1-1

Influence of DAC, DAC amortization, and DAC addition, 1994-2008

		Min	Mean	Median	Max
$\frac{DAC}{Total\ Asset}$	L&H firms	0.001	0.067	0.057	0.254
	P&C firms	0.001	0.035	0.032	0.103
	All firms	**0.001**	**0.048**	**0.036**	**0.254**
$\frac{DAC}{Total\ Equity}$	L&H firms	0.011	0.626	0.563	7.682
	P&C firms	0.003	0.165	0.130	0.922
	All firms	**0.003**	**0.342**	**0.232**	**7.682**
$\frac{DAC\ Amortization}{Net\ Income}$	L&H firms	0.002	1.790	0.766	198
	P&C firms	0.020	3.988	1.656	151.91
	All firms	**0.002**	**3.015**	**1.091**	**198**
$\frac{DAC\ Amortization}{Net\ Income\ before\ AMT}$	L&H firms	0.001	0.448	0.434	0.995
	P&C firms	0.018	0.570	0.623	0.999
	All firms	**0.001**	**0.513**	**0.522**	**0.999**
$\frac{DAC\ Addition}{Net\ Income}$	L&H firms	0.003	3.328	1.260	439
	P&C firms	0.006	4.122	1.805	165.13
	All firms	**0.003**	**3.655**	**1.485**	**439**
$\frac{DAC\ Addition}{Net\ Income\ before\ ADD}$	L&H firms	0.003	0.909	0.700	7.086
	P&C firms	0.005	0.615	0.662	0.999
	All firms	**0.003**	**0.720**	**0.667**	**7.086**
$\frac{DAC\ Addition}{DAC\ Balance}$	L&H firms	0.001	0.081	0.059	1.387
	P&C firms	0.009	0.545	0.440	14.983
	All firms	**0.001**	**0.356**	**0.165**	**14.983**

The table reports percentiles of the indicated distribution for 2,601 firm-quarters. L&H stand for Life and Health firms, while P&C stand for Property and Casualty firms.

DAC is the reported deferred acquisition cost at the end of quarter.

DAC amortization (AMT) is amortization expense of DAC for the current quarter.

DAC addition (ADD) is new capitalization amount of DAC for the current quarter.

Table 1-2

Distribution of Observations Across Sample Quarters

Year	Life Firms	Property-Casualty Firms	Total
1994	55	40	95
1995	64	78	142
1996	56	109	165
1997	60	108	168
1998	60	120	180
1999	62	120	182
2000	68	119	187
2001	65	111	176
2002	74	113	187
2003	72	112	184
2004	69	124	193
2005	82	133	215
2006	82	136	218
2007	78	131	209
2008	36	64	100
Total	761	1341	2,601

Table 1-3

Descriptive Statistics of all Variables*

	Min	Mean	Median	Max	SD
MKV_t	0.001	0.362	0.231	18.58	0.767
DAC_t	0.000	0.053	0.038	0.317	0.046
$OTHDAC_t$	0.010	0.974	0.973	4.46	0.126
LOR_t**	0.000	0.066	0.049	0.403	0.038
LIB_t	0.004	0.810	0.827	6.016	0.729
$NETI_t$	-1.001	0.004	0.004	0.553	0.029
CFO_t	-0.171	0.027	0.019	0.213	0.036
AMT_t	-0.021	0.008	0.004	0.166	0.010
ADT_t	0.000	0.007	0.007	0.122	0.011
$RETQC_t$	0.031	0.141	–0.560	0.031	0.611
BNI_t	0.062	0.051	–0.200	0.052	0.540
AM_t	0.041	0.063	0.000	0.031	0.831
ADD_t	0.052	0.061	0.000	0.041	0.686
$RTMC_t$	0.033	0.072	-0.151	0.031	0.202
$LOGMV_t$	2.945	0.865	0.635	2.912	5.270
$LOGBM_t$	–6.951	2.262	–12.664	–6.978	–0.606
$MKTRF_t$	0.011	0.041	-0.102	0.010	0.102
SMB_t	0.012	0.041	-0.174	0.002	0.142
HML_t	0.004	0.035	-0.102	0.015	0.081

*Deflated by lagged total assets, except for *RTMC*, *RETQC*, $MKTRF_t$, SMB_t, HML_t, $LOGMV_t$, $LOGBM_t$, BNI_t, AM_t, ADD_t

**LOR_t is the loss reserve, which is the major item representing the amount of loss (benefits) that is payable to policyholders for insurance firms; this item is provided here to demonstrate the comparable importance of DAC_t

Table 1-4

DAC additions across quarters

	Min	Mean	Median	Max	SD
ADD_t*					
Quarter 1	0.000	0.011	0.007	0.091	0.011
Quarter 2	0.000	0.011	0.008	0.121	0.012
Quarter 3	0.000	0.011	0.007	0.090	0.011
Quarter 4	0.000	0.011	0.008	0.082	0.011

*ADD_t defined as the quarterly DAC additions deflated by lagged total assets

Table 1-5

Valuation relevance of DAC items and Comparison between alternative approaches

	1.1	1.2	2.1	2.2				
DEP.Var.	MKV		$\sum^{4} CFO_{t+i}$		$\sum^{8} CFO_{t+i}$		$\sum^{12} CFO_{t+i}$	
DAC	1.167		0.369		0.376		0.335	
	(0.000)		(0.000)		(0.000)		(0.000)	
OTHDAC	1.019	1.662	0.430	0.402	0.407	0.395	0. 355	0.331
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LIB	-1.001	-1.310	-0.433	-0.457	-0.404	-0.609	-0.376	-0.401
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NETI or NETIDE	10.120	6.055						
	(0.000)	(0.000)						
Intercept	0.028	0.004	0.012	0.035	0.008	0.015	0.038	0.071
	(0.372)	(0.469)	(0.371)	(0.160)	(0.411)	(0.031)	(0.143)	(0.006)
# of Obs.	2601	2601	2018	2018	1694	1694	1452	1452
Adjusted R^2	54.63%	47.71%	35.63%	31.36%	33.15%	32.76%	29.82%	28.62%
Vuong's Z-statistic	6.89***		2.10 **		1.59		1.11	

[a]This table is based on regression results with variables deflated by lagged total assets, with p-value for the White's heteroskedasticity adjusted t-test in parentheses.

***, ** Denotes significance at p<0.00, <0.025 levels, respectively, for one-tailed test.

Table 1-6

Information content of DAC amortization and comparison between alternative approaches

Panel A: Return model	3.1(a)	3.2(a)	3.3(a)		3.1(b)	3.2(b)	3.3(b)
$BNETI_t$	0.723	0.419	0.707	**$BNETI_t$**	0.762	0.471	0.748
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
AM_t	-0.661		-0.703	**AMT_t**	-0.672		-0.706
	(0.000)		(0.000)		(0.000)		(0.000)
ADD_t		-0.318	0.059	**ADD_t**		-0.349	0.049
		(0.003)	(0.310)			(0.001)	(0.384)
$BNETI_t$-$BNETI_{t-4}$	-0.019	-0.013	-0.008	**$BNETI_t$-$BNETI_{t-4}$**	-0.006	-0.003	0.004
	(0.245)	(0.291)	(0.392)		(0.412)	(0.453)	(0.441)
AM_t-AM_{t-4}	-0.061		0.021	**AM_t-AM_{t-4}**	-0.032		0.043
	(0.053)		(0.410)		(0.200)		(0.323)
ADD_t-ADD_{t-4}		-0.079	-0.107	**ADD_t-ADD_{t-4}**		-0.043	-0.097
		(0.049)	(0.194)			(0.189)	(0.218)
$RTMC_t$	0.479	0.492	0.484	**$MKTRF_t$**	0.973	0.994	0.977
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
$LOGMV_t$	0.125	0.132	0.125	**SMB_t**	0.857	0.881	0.855
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
$LOGBM_t$	0.045	0.047	0.045	**HML_t**	1.496	1.529	1.497
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Intercept	-0.048	-0.050	-0.048	**Intercept**	-0.008	-0.002	-0.008
	(0.000)	(0.000)	(0.000)		(0.068)	(0.361)	(0.075)
# of Obs.	2165	2165	2165	**# of Obs.**	2165	2165	2165
Adjusted R^2	6.55%	5.71%	6.60%	**Adjusted R^2**	11.33%	10.50%	11.37%
Vuong's Z-statistic	1.72*			**Vuong's statistics**	1.68*		

Panel B: Cash flow models, deflated by lagged total assets

DEP.Var.	$\sum_{i=1}^{4} CFO_{t+i}$			$\sum_{i=1}^{8} CFO_{t+i}$			$\sum_{i=1}^{12} CFO_{t+i}$		
$BNETI_t$	7.780	7.393	7.614	6.573	5.875	6.486	6.161	5.693	6.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AMT_t	-6.679		-6.786	-5.554		-4.530	-4.845		-5.645
	(0.000)		(0.000)	(0.000)		(0.001)	(0.000)		(0.000)
ADT_t		-1.681	2.442		-5.727	3.210		-7.448	3.886
		(0.001)	(0.004)		(0.000)	(0.012)		(0.001)	(0.028)
Intercept	0.045	0.037	0.046	0.050	0.046	0.049	0.047	0.024	0.0380
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
# of Obs.	1994	1994	1994	1680	1680	1680	1379	1379	1379
Adjusted R^2	42.20%	36.95%	43.75%	36.05%	33.30%	38.66%	32.36%	31.14%	33.68%
Vuong's Z-statistics	1.67*			1.77*				1.53	

[a]This table is based on regression results with variables deflated by lagged total assets, with p-value for the White's heteroskedasticity adjusted t-test in parentheses.

*Vuong's Z-statitsic significant at p<0.05; one-tailed test.

Chapter 2. Managing Deferred Acquisition Cost for Financial Reporting Goals in Insurance Firms

2.1 Introduction

A large body of research in accounting has been devoted to assessing the degree to which corporate managers use their discretion to bias accounting numbers. While the use of accrual model is extensively applied in many studies, its limitation and problem is also well-documented. For instance, McNichols (2000) indicates that while little is known about the behavior of accruals in the absence of bias, problematic inferences could be drawn from accrual models, and she suggests researchers identify specific accruals where non-discretionary component is more readily modeled or observed. Petroni (1992) employs this strategy, focusing on accounting bias in loss reserves estimated by firms in the property-casualty insurance industry. Following her study, several papers have focused on the management of loss reserve in property-casualty industry, and consistently find the opportunistic use of loss reserve to achieve regulatory and tax goals. However, there is barely any study identifying the use of other special accruals for financial reporting incentives, which is definitely an important context because general investors rely on GAAP financial statements, rather than regulatory (SAP) statements to facilitate investment decisions. In particular, since insurers' financial statements are highly complicated, identifying critical specific accruals is of significant importance to enhance valuation decisions.

This study is motivated by the void in the literature and identifies a specific item, amortization of deferred acquisition cost, as an important special accrual in achieving financial reporting goals for U.S. insurance firms. Deferred acquisition cost, (hereafter, DAC) is the direct outlay to acquire insurance policies, mainly consisting of underwriting costs and commissions, and usually carries substantial balance in insurance firms[19]. Its amortization expense is subject to complicated actuarial assumptions, and serves as the most important

[19] Table 2-1 presents the influence of DAC items on insurers' financial statements.

expense items on insurers' financial statements, along with loss reserves and policyholders' benefits expense. Due to the nature of uncertainty associated with long term actuarial assumptions, DAC amortization is subject to large managerial discretion and opportunistic management for the purpose of reporting incentives, which is consistent with some practical observations.

"…the volatility in equity returns was directly impacting GAAP earnings…most ad hoc procedures meant that, when you had a market correction, you assumed that the future was going to be significantly better and vice versa. That was a way to (and I hate to use the word) ***manage GAAP earnings****, but effectively that's what companies were doing…"*

— *DAC in A Volatile Equity Return World, 2004 Valuation Actuary Symposium*

Accordingly, I investigate the relation between DAC amortization and various financial reporting incentives. Specifically, DAC amortization related to change in actuarial assumptions is hypothesized to be correlated with reporting incentive proxies after controlling for economic factors. Results indicate that the discretionary component of DAC amortization is significantly positively correlated with proxies for earnings smoothing and taking the big bath, while negatively associated with those for avoiding losses and missing analysts' forecasts.

Major contributions are two-fold. First, this study fills the void in literatures by identifying the opportunistic use of DAC amortization for reporting incentives, which facilitates better investment decisions. Secondly, after appropriate modifications, the approach to partitioning between discretionary components and non-discretionary components is applicable to other potential specific accruals, which serves as foundation for future research.

The rest of this paper is organized as follows. Section 2 briefly introduces the insurance accounting standards in U.S. GAAP and important details about DAC. Section 3 briefly reviews related literature and puts forward hypotheses. Section 4 outlines the research design,

including empirical models, sample selection and data characteristics. Section 5 presents the empirical analyses and findings. The paper concludes with a summary in Section 6.

2. 2 Institutional Backgrounds

FAS 60 states: "…*Commissions and other underwriting costs, such as investigation expense, physical examining charges, that are primarily related to insurance contracts issued or renewed during the period in which the costs are incurred shall be considered acquisition cost.*"

Two types of outlays constitute DAC. One is the underwriting expenses, such as investigation fees and physical examination charges, and the other is commissions paid to insurance agents. Usually, the amount of the latter item is considerable. For some policies, the commission paid upon the initial-policy-year can be up to 30% of gross premiums. Therefore, its influence on financial statements is considerable. For example, the average percentage of DAC compared with the total assets and total shareholders' equity is around 5% and 34%, respectively; the average percentages of DAC amortization expense and DAC addition compared with the net income before extraordinary items is around 302% and 365%, respectively. Table 1 presents the influence of DAC-related items on financial statements.

The accounting treatment of DAC is conceptually straightforward. When commission and underwriting expense are incurred, the outlay is added to DAC account. At the end of each period, amortize DAC in a reasonable systematic approach. For FAS 60[20] contracts, DAC is amortized in proportion with present value of expected future gross premiums. For FAS 97[21] contracts, DAC is amortized in proportion to present value of expected gross profits[22].

Additional adjustments may be needed as to DAC amortization. Since the expectation

[20] Generally speaking, most property & casualty policies as well as life and health policies without investment components are classified as FAS 60 contracts.

[21] Life policies with investment components, such as universal life, and variable annuities are classified as FAS 97 contracts.

[22] EGP= mortality charge +expense charge +surrender charge +interest spread earned –death benefits –maintenance expense

process takes numerous complicated estimations, such as mortality, morbidity, persistency, and investment returns, deviations from original expectations are unavoidable. For FAS 60 contracts, actuarial assumptions are "locked" throughout the life of contracts and all deviations are included in operating expenses when they occur. For FAS 97 contracts, in contrast, assumptions are "unlocked," meaning firms should update assumptions, revise amortization ratio when necessary. Details are illustrated below.

Example 2-1：A firm acquires a contract with premium income from year 1 through to year 5; this contract is classified as a FAS 60 policy. The discounting rate applied is 6%.

Exhibit 2-1

DAC outlays and Gross premiums

	Year 1	Year 2	Year 3	Year 4	Year 5
DAC	**630**	**27**	**24**	**0**	**0**
Gross Premiums	**1,000**	**900**	**800**	**700**	**600**

Based on the information, the sum of present value of DAC = $677, while the sum of present value of gross premiums = $3,623

The amortization ratio= $\frac{\sum \text{PV of DAC outlays}}{\sum \text{PV of gross premiums}} = \frac{677}{3{,}623} = 0.18686$

Year 1 (Year 2) amortization = 0.18686 × 1,000 = 187 (0.18686 × 900 = 168).

Example 2-2：**Suppose the policy mentioned above is classified as a FAS 97 policy, and all DAC outlays are the same as those in Example 1.**

As specified in FAS 97, EGPs =(Expense charge[23] + Mortality charge[24] + Incurred

[23] Expense charges refer to the amounts deducted from policyholders' account values by the insurance company to cover its administrative costs.

[24] Mortality charges stand for the cost charged by an insurance company for the insurance protection under an interest-sensitive whole life or universal life insurance policy.

surrender charge[25]) + (Investment spread[26] earned) — (Net death benefits[27] + Maintenance expense[28]). And EGPs data applied in this example follows.

Exhibit 2-2

DAC outlays and Expected gross profits

	Year 1	Year 2	Year 3	Year 4	Year 5
DAC	**630**	**27**	**24**	**0**	**0**
Expected Gross Profits	**102**	**184**	**242**	**282**	**313**

Based on the information, the sum of present value of DAC = $677, while the sum of present value of EGPs = $920

Therefore, amortization ratio $= \frac{\sum \text{PV of DAC outlays}}{\sum \text{PV of EGPs}} = \frac{677}{920} = 0.7360$

Year 1 (Year 2) amortization = 0.7360 × 102 = 75 (0.7360 × 184 = 135).

If EGPs remain unchanged eventually, the DAC assets account could be presented as below.

Exhibit 2-3

The account balances of DAC at year ends

Year	Beginning DAC	New Deferrals	Amortization	Interest	Ending DAC
1	0	630	75	38	593
2	593	27	135	37	522
3	522	24	178	33	401
4	401	0	208	24	217
5	217	0	230	13	0

[25] Surrender charges refer to the amount of money deducted from the policy account value at the time a policy is surrendered at the request of the policyholder. The surrender charge, as specifically stated in the contract, usually decreases over a number of years and is often a percentage of the premium in the first policy year.

[26] Interest spread = Investment return —Interest credited to policyholders

[27] Death benefits are the contractual amounts payable, when the person insured on a term or permanent life insurance or deferred annuity policy dies.

[28] Maintenance expenses consist of various costs to administer insurance policies. Some examples of these administrative expenses include the cost of issuing policies, servicing policyholders and paying benefits. An administrative charge may be deducted each year from the account value of an interest sensitive whole life or universal life insurance policy to pay for some of these expenses.

It is evident that the amortization of DAC is closely related to the projection of numerous actuarial assumptions, such as mortality, morbidity, persistency, and investment returns. Due to the inherent long-horizons and high-complexities involved, deviations from original expectations are unavoidable. For FAS 60 contracts, actuarial assumptions are "locked" throughout the life of contracts and all deviations are included in operating expenses when they occur. For FAS 97 contracts, however, assumptions are "unlocked," meaning firms should update assumptions, revise amortization ratio when necessary. See below example for illustration.

***Example 2-3*：Continued from the previous example, and assume that deviations from estimates occur from Year 3 through Year 5, with initial estimate at $242, $282, $313 and revised ones at $262, $300, and $325, respectively.**

Exhibit 2-4

The Revision of EGPs

Year	Initial Estimates	Revised Estimates	Discount Factors	Revised PV of EGPs
1	102	102	0.94340	96
2	184	184	0.89000	164
3	242	262	0.83962	220
4	282	300	0.79209	238
5	313	325	0.74726	243
				961

As specified in FAS 97, unlocking is required when current or expected future experiences with respect to EGPs vary from that originally assumed, and the amortization schedules should be retrospectively adjusted. Accordingly, at the end of Year 3, firms shall revise the sum of PV of EGP at $102 × 0.94340＋$184 × 0.89000＋$262 × 0.83962＋$300 × 0.79209 ＋$325 × 0.74726 = $961

Then, revise the amortization basis and calculate the revised amortization ratio = $\frac{677}{961} = 0.7045$

DAC account balances after retrospective adjustments are presented below.

Exhibit 2-5

DAC account after Revisions

Year	Beginning DAC	New deferrals	Amortization	Interest	Ending DAC
1	0	630	**72**	38	596
2	596	27	**129**	37	531
3	**531**	**24**	**184**	**33**	**404**
4	404	0	212	24	216
5	216	0	229	13	0

Hence, the amortization expense reported during Year 3 equals $184 less the initial adjustment made to the initial DAC balance $8, which is $176 eventually.

Exhibit 2-6

Required adjustment as to unlocking

Year	Initial DAC Ending balance	Revised DAC Ending balance	Adjustment made to the beginning DAC in Year 3
1	593	596	
2	522	530	**8**

2.3 Prior Literature and Hypotheses Development

Previous studies on insurance accounting are limited. Petroni (1992) is the first study to explore the management of loss reserves under statutory accounting in insurance firms. She finds that the incentive to underestimate loss reserves is a decreasing function of the actual financial position of the insurer. Petroni and Shackelford (1999) hypothesize that property-casualty insurers allocate premiums from multistate policies to reduce total state taxes, and they find consistent evidence. Gaver and Paterson (1999), in an attempt to explore the trade-off between various specific accruals, examine the use of loss reserve, timing of capital gains, and the net proceeds from equity transactions, to achieve both solvency and tax goals. Several studies further report the management of loss reserves, and capital gains for regulatory and tax purpose, and they find similarly consistent evidence (Nelson, 2000; Gaver and Paterson, 2001; Gaver and Paterson, 2004). In addition, Beaver and McNicholas (2001) examine whether the stock prices of property-casualty insurers fully reflect information contained in loss reserve development, along with earnings and cash flows, and their results indicate market does not underestimate the persistence of development accruals while it do misestimate other accruals. Collectively, previous studies focus exclusively on the use of loss reserves, and capital gains as the source of managerial reporting discretion. Also, only regulatory and tax incentives are taken into account while barely any has considered the financial reporting context, which should serve as a prevailing incentive.

Accordingly, this study intends to identify the use of special accruals other than loss reserves in achieving financial reporting goals, and I hypothesize that DAC amortization serves well for two reasons. First, as illustrated in Section 2.2, while projecting DAC amortization, firms are required to update actuarial assumptions and revise amortization ratios, and that usually has great impact on GAAP earnings[29], which is usually the concern of

[29] Technical illustrations are presented in Appendix 2.

practitioners[30]. Second, in practice, management has great discretion on the revision process, including the timing of modifying assumptions, and the specific actuarial model applied, etc., but it is difficult to *ex post* verify the reasonableness of the modification of assumptions because insurance products are characterized by uncertainty and complexity by nature. Taken together, managing DAC amortization via modifying assumptions opportunistically should be appealing to management when they encounter reporting incentives. Previous studies relating to pension plan provide evidence on this conjuncture. Healy and Palepu (1990) examine a variety of accounting decisions to determine if firms make these decisions to tightening dividend restrictions. They hypothesize that firms change pension actuarial assumptions in response to dividend constraints, test this argument by regressing the income effects of pension changes on measures of the firms' cash flow and level of dividend restrictions, and find supportive evidence. Godwin et al. (1996) examines factors motivating managers to adjust pension expense and pension plan contributions by altering actuarial interest rate assumptions. Their results indicate that managers are likely to increase interest rate assumptions in response to declines in earnings, increasingly restrictive dividend constraints, and tightening debt covenants. Taken together, while projecting DAC amortization should be associated with economic factors, the great impact and discretion involved during this process also serve well for achieving reporting incentives. Specifically, several financial reporting incentives are investigated. First, as earnings smoothness has been substantially emphasized by industry literatures[31] as well as rating agencies[32], I hypothesize that DAC amortization is managed to smooth earnings. In addition, as suggested by Burgstahler and Dichev (1997) and Degeorge et al. (1999), firms manage earnings to avoid reporting losses

[30] "DAC unlocking Caused Surprise… Retrospective application of adjustment to gross profits margin assumptions significantly impacted 2002 results, and will depress earnings growth in 2003 and beyond", quoted from ***Smith Barney's U.S. life insurance 2003 industry outlook***

[31] For instance, Louis J. Lombardi, "Managing the volatility of GAAP earnings" in North American Actuarial Journal

[32] "…financial flexibility and earnings volatility, play an important role in A.M. Best's overall assessment of a company's strength…", quoted from A.M. Best's special report on enterprise risk management and capital models

and to meet analysts' forecasts. The fourth reporting incentive examined is taking a big bath. Moore (1973) and DeAngelo (1988) find that new managers have a tendency to take all potential charges and attribute them to the preceding management team. Meanwhile, Kirschenheiter and Melumad (2002) suggest that firms with sufficiently low earnings will under report earnings by the maximum amount possible. Collectively, the above lead to the following hypotheses.

Hypothesis 1a：DAC amortization is managed to smooth earnings, after controlling for economic factors.

Hypothesis 1b：DAC amortization is managed to avoid reporting a loss, after controlling for economic factors.

Hypothesis 1c：DAC amortization is managed to avoid missing analysts' forecasts, after controlling for economic factors.

Hypothesis 1d：DAC amortization is managed to take a big bath, after controlling for economic factors.

2.4.1 Sample Selection and Data Characteristics

The initial sample consists of all U.S. stock insurance firms, including Life/Health, and Property/Casualty from 1993 to 2009. To be included in the analysis, the firm must have quarterly data regarding DAC amortization, premiums and fees, net incomes before extraordinary items, and analysts' forecast values from I/B/E/S. Apart from the analysts' forecasts, all the financial statement data is collected from 10-Q and 10-K reports. In addition, annual data with respect to lapse rate[33] and investment yield rate[34] is required, which is also obtained from 10-Q, 10-K reports and A.M. Best's rating reports. Finally, after deleting observations with missing data and outliers larger or smaller than 0.5% of the sample size,

[33] Lapse rate is defined as policies lapsed divided by policies in force during the period.
[34] Investment yield rate is defined as net investment income divided by average invested assets, which generally refers to the total investments on the balance sheet.

the observation number of each regression model consists of 1135 firm-quarter observation. Table 2-2 summarizes the sample selection process, and Table 2-3 presents the distribution of observations across sample quarters.

2.4.2 Variable measurements and empirical models

To implement the analysis, DAC amortization expenses is regressed on estimated DAC amortization expense, critical assumption and economic-related variables, and several reporting incentive proxies. The former two sets are included to capture the amortization expense arising from the realized amortization basis and economic factors, while the latter one set is hypothesized not to be correlated with DAC amortization expense if there is no opportunistic management of DAC amortization.

$$AMT_t = \alpha_0 + \alpha_1 ESAMT_t + \alpha_2 LCLAP_t + \alpha_3 LAP_{t-1} + \alpha_4 CYDQ_t + \alpha_5 YDQ_{t-1} + \alpha_6 LF_t + \alpha_7 CPRNIQ_t + \alpha_8 LOSS_t + \alpha_9 MISS_t + \alpha_{10} ISMQ + \alpha_{11} BATQ_t \times MGT_t + \varepsilon_t$$

AMT_t, is defined as the amortization expense during period t deflated by lagged total assets[35]. $ESAMT_t$ equals the actual amortization ratio during period t-1 multiplied by realized amount of amortization-basis[36] during period t, deflated by lagged total assets, i.e., the "expected" amortization expense assuming no change in actuarial assumptions. In addition, as firms should modify actuarial assumptions when initial assumptions differ from realized outcomes, changes in DAC amortization resulting from assumption modifications are reflective of "realized economic factors" at least to some extent, and this component should not be considered opportunistic. Therefore, four variables are applied to control for these "realized deviation"; YDQ_{t-1} is the lagged investment yield rate, and $CYDQ_t$ equals the change of YDQ_t from period t-1 to period t, and the corresponding coefficients are expected

[35] I also use the sum of premiums and fees as the deflator for AMT_t, $ESAMT_t$, BEN_t, EN_t, for robustness check. Both results are reported in the next section.

[36] For FAS 60 policies, the amortization basis refers to gross premiums and fees, and in FAS 97 cases that refers to expected gross profits.

to be negative. LAP_{t-1} stands for the lagged lapse rate in life firms, and $LCLAP_t$ equals the change of LAP_t from period t-1 to period t, and the corresponding coefficients are expected to be positive. LF_t is an indicator variable equal to 1 for L&H firms, 0 otherwise. As for reporting incentive variables, consistent with previous studies (Degeorge, 1999; Myers et al., 2002; Tucker and Zarowin, 2006), BEN_t, the proxy for pre-managed net income, is defined as the net income before extraordinary items during period t plus AMT_t less $ESAMT_t$. While EN_{t-4}, the corresponding quarterly net income before extraordinary items in the previous year, serves as the benchmark for smoothing earnings, ($BEN_t - EN_{t-4}$) proxies for the magnitude of incentive to smooth earnings, and for brevity is labeled as $CPRNIQ_t$. Also, following Francis et al (1996), Riedl (2004), and Linck et al. (2007), when earnings are "unexpectedly" high, firms are particularly inclined to smooth to the median, so $ISMQ_t$ is defined as 1 if ($BEN_t - EN_{t-4}$) is above the positive median and 0 otherwise, with an expected positive association with AMT_t. Similarly, to capture the incentive associated with "unexpectedly" low earnings, $BATQ_t$ equals 1 if ($BEN_t - EN_{t-4}$) is below the negative median and 0 otherwise. MGT_t equals 1 if the firm experiences a change in senior management[37] from period t-1 to t, and 0 otherwise. In particular, the incentive to take a big bath should be much more pronounced while a new CEO is faced with an unexpectedly low negative earnings, therefore the coefficient on $BATQ_t \times MGT_t$ is predicted to be significantly positive. As for incentives to avoid negative earnings and missing analysts' forecasts, consistent with Lim et al. (2008), Dhaliwal et al. (2004), and Lim and Tan (2008), $LOSS_t$ is defined as an indicator variable which equals 1 if the BEN_t is negative, and $MISS_t$ is an indicator variable equal to 1 if BEN_t is less than the latest analysts' forecast value; both are expected to be negatively associated with AMT_t.

[37] Defined as the top three compensation positions within the firm, following Riedl (2004) and Chen et al. (2004)

2.5 Empirical Results and Analysis

Table 2-4 presents the descriptive statistics of all variables. Table 2-5 summarizes the regression results regarding the management of DAC amortization while Panel A with the variable deflated by lagged total assets and Panel B with those deflated by the sum of premiums and fees. The results under the two deflators are qualitatively similar, both with adjusted R^2 above 68%. In Panel A, column (1) demonstrates how current DAC amortization is related to current realized amortization basis and actuarial assumption variables to which I refer as the determinants of non-discretionary components of DAC amortization. As expected, *LCLAPt* (p-value =0.003) and LAP_{t-1} (p-value =0.010) are both positively associated with DAC amortization, while the coefficient on YDQ_{t-1} (p-value =0.025) is significantly negative, and $CYDQ_t$ is not significant. The results means that changes in DAC amortization after controlling for realized amortization basis are related to the lapse rates and investment yield rates in previous periods, as well as changes in lapse rates. From Column (2) through Column (7), the proxies for incentives to smooth incomes, to avoid negative earnings and missing analysts' forecasts, and to take a big bath are included reciprocally, and almost all variables remain significant with predicted signs across models. Specifically, in Column (7), the full model results demonstrates that the discretionary component in DAC amortization is negatively associated with $LOSS_t$ (p-value =0.000) and $MISS_t$ (p-value=0.067) while positively related to $CPRNIQ_t$ (p-value =0.033) , $ISMQ_t$ (p-value =0.002) and $BATQ_t \times MGT_t$ (p-value =0.001). In brief, regression results in Table 2-5 indicate that the discretionary component of DAC amortization is managed for reporting incentives. In particular, the incentives to smooth earnings, and avoid reporting a loss seem to be strongly pronounced than others, corresponding to the great emphasis put on earnings smoothness by rating agencies when evaluating firms.

2.6 Concluding remarks

This study investigates the opportunistic use of deferred acquisition cost (DAC, DPAC) for financial reporting incentives in insurance firms. The great importance of DAC amortization on insurers' financial statements and its nature of being sensitive to actuarial estimates affords considerable discretion while management are faced with financial reporting incentives. Using quarterly data from 1993 through 2009, I examine whether DAC amortization expense is managed to achieve financial reporting goals, after controlling for economic factors. Empirical results reveal that DAC amortization is associated with proxies for incentives to smooth earnings, to avoid reporting negative earnings and failing to meet analysts' forecasts, and to take a big bath when experiencing management changes.

The contributions are two-fold. First, in order to assess the degree to which managers exercise discretion on accounting numbers, the knowledge of "what item" is managed should be broadened. Therefore, investors should understand the potential discretion associated with assumption changes and its influence on DAC amortization, and therefore its valuation-implication. In addition, based on regression results presented in this study, the information regarding amortization basis (gross premiums, gross profits), investment yield rates, and lapse rates are highly useful in explaining DAC amortization, suggesting that these operating measures are critical factors to consider when making an assessment of the degree of managerial discretion. Accordingly, regulators should encourage or require more detailed disclosures regarding those operating measures, which will certainly help investors gain from incorporating the critical information into their valuation.

Table 2-1

Influence of DAC, DAC amortization, and DAC addition, 1994-2008

		Min	Mean	Median	Max
$\frac{DAC}{Total\ Asset}$	L&H firms	0.001	0.067	0.057	0.254
	P&C firms	0.001	0.035	0.032	0.103
	All firms	**0.001**	**0.048**	**0.036**	**0.254**
$\frac{DAC}{Total\ Equity}$	L&H firms	0.011	0.626	0.563	7.682
	P&C firms	0.003	0.165	0.130	0.922
	All firms	**0.003**	**0.342**	**0.232**	**7.682**
$\frac{DAC\ Amortization}{Net\ Income}$	L&H firms	0.002	1.790	0.766	198
	P&C firms	0.020	3.988	1.656	151.91
	All firms	**0.002**	**3.015**	**1.091**	**198**
$\frac{DAC\ Amortization}{Net\ Income\ before\ AMT}$	L&H firms	0.001	0.448	0.434	0.995
	P&C firms	0.018	0.570	0.623	0.999
	All firms	**0.001**	**0.513**	**0.522**	**0.999**
$\frac{DAC\ Addition}{Net\ Income}$	L&H firms	0.003	3.328	1.260	439
	P&C firms	0.006	4.122	1.805	165.13
	All firms	**0.003**	**3.655**	**1.485**	**439**
$\frac{DAC\ Addition}{Net\ Income\ before\ ADD}$	L&H firms	0.003	0.909	0.700	7.086
	P&C firms	0.005	0.615	0.662	0.999
	All firms	**0.003**	**0.720**	**0.667**	**7.086**
$\frac{DAC\ Addition}{DAC\ Balance}$	L&H firms	0.001	0.081	0.059	1.387
	P&C firms	0.009	0.545	0.440	14.983
	All firms	**0.001**	**0.356**	**0.165**	**14.983**

The table reports percentiles of the indicated distribution for 2,601 firm-quarters. L&H stand for Life and Health firms, while P&C stand for Property and Casualty firms.

DAC is the reported deferred acquisition cost at the end of quarter.

DAC amortization (AMT) is amortization expense of DAC for the current quarter.

DAC addition (ADD) is new capitalization amount of DAC for the current quarter.

Table 2-2

Sample Selection

	Firm-Quarters
Available observations with the necessary general quarterly financial data in insurance industries (NAICS 524113, 524114, and 524126)	3,655
Observations deleted due to	
－DAC amortization and addition not available	(1,205)
－Premiums, fees or gross profits not available	(223)
－Lapse rates and investment yield rates not available	(1,081)
－Observations greater or smaller than 0.5% of the sample	(11)
Final sample	1,135

Table 2-3

Distribution of Observations Across Sample Quarters

Year	Life Firms	Property-Casualty Firms	Total
1993	3	0	3
1994	4	0	4
1995	4	22	26
1996	8	39	47
1997	6	49	55
1998	6	43	49
1999	11	56	67
2000	12	58	70
2001	16	58	74
2002	29	60	89
2003	36	63	99
2004	32	67	99
2005	30	76	106
2006	20	85	105
2007	28	103	131
2008	16	85	101
2009	1	9	10
Total	761	1341	1,135

Table 2-4

Descriptive statistics of all variables

	Mean	SD	Min	Median	Max
Panel A: Deflated by lagged total assets					
AMT_t	0.010	0.009	0.000	0.007	0.076
$LCLAP_t$	0.001	0.032	–0.094	0.000	0.232
$CYDQ_t$	–0.001	0.014	–0.103	–0.001	0.281
LAP_t	0.021	0.038	0.000	0.000	0.137
YDQ_t	0.057	0.012	0.013	0.058	0.087
$CPRNIQ_t$	–0.001	0.015	–0.233	–0.001	0.184
$ISMQ_t$	0.394	0.489	0.000	0.000	1.000
$BATQ_t$	0.186	0.389	0.000	0.000	1.000
MGT_t	0.110	0.313	0.000	0.000	1.000
$LOSS_t$	0.124	0.330	0.000	0.000	1.000
$MISS_t$	0.475	0.499	0.000	0.000	1.000
Panel B: Deflated by the sum of premiums and fees during quarter t					
AMT_t	0.176	0.122	0.001	0.159	1.165
$LCLAP_t$	–0.001	0.051	–0.321	0.000	0.311
$CYDQ_t$	–0.001	0.005	–0.036	–0.001	0.027
LAP_t	0.013	0.056	–0.013	0.000	0.442
YDQ_t	0.060	0.012	0.020	0.060	0.091
$CPRNIQ_t$	–0.013	0.301	–3.833	0.001	4.473
$ISMQ_t$	0.243	0.429	0.000	0.000	1.000
$BATQ_t$	0.221	0.415	0.000	0.000	1.000
MGT_t	0.104	0.305	0.000	0.000	1.000
$LOSS_t$	0.122	0.327	0.000	0.000	1.000
$MISS_t$	0.554	0.497	0.000	1.000	1.000

Table 2-5
Managing DAC amortization to achieve reporting incentives

Panel A：Regressions with variables deflated by lagged total assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DEP.Var.	AMT_t						
$ESAMT_t$	0.661	0.672	0.673	0.668	0.673	0.673	0.668
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LIFE_t$	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
$LCLAP_t$	0.005	0.007	0.009	0.009	0.008	0.007	0.008
	(0.003)	(0.000)	(0.001)	(0.003)	(0.004)	(0.013)	(0.010)
$CYDQ_t$	-0.005	-0.003	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.170)	(0.227)	(0.378)	(0.392)	(0.422)	(0.433)	(0.424)
LAP_{t-1}	0.008	0.008	0.007	0.004	0.004	0.004	0.003
	(0.010)	(0.006)	(0.015)	(0.095)	(0.118)	(0.159)	(0.242)
YDQ_{t-1}	-0.023	-0.023	-0.024	-0.022	-0.024	-0.022	-0.022
	(0.025)	(0.018)	(0.012)	(0.017)	(0.011)	(0.019)	(0.016)
$CPRNIQ_t$		0.073	0.058	0.053	0.058	0.052	0.053
		(0.004)	(0.013)	(0.033)	(0.013)	(0.030)	(0.033)
$ISMQ_t$				0.001		0.001	0.001
				(0.002)		(0.013)	(0.002)
$LOSS_t$			-0.002	-0.002	-0.003	-0.002	-0.002
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$MISS_t$					-0.001	-0.001	0.000
					(0.012)	(0.013)	(0.066)
$BATQMG_t$				0.003		0.001	0.003
				(0.001)		(0.058)	(0.001)
MGT_t				-0.002			-0.002
				(0.000)			(0.000)
$BATQ_t$				0.000			0.000
				(0.333)			(0.378)
INTERCT	0.006	0.006	0.006	0.006	0.006	0.006	0.006
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
# of observations	1135	1135	1135	1135	1135	1135	1135
Adjusted R^2	74.13%	75.62%	76.38%	76.79%	76.47%	76.63%	76.83%

[a]This table is based on regression results with variables deflated by lagged total assets, with p-value for the one-tailed t-test in parentheses.

Panel B：Regressions with variables deflated by sum of premiums and fees

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DEP.Var.	AMT_t						
$ESAMT_t$	0.746	0.765	0.773	0.769	0.766	0.771	0.765
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LIFE_t$	-0.056	-0.059	-0.046	-0.045	-0.041	-0.050	-0.041
	(0.046)	(0.031)	(0.067)	(0.071)	(0.087)	(0.019)	(0.009)
$LCLAP_t$	0.859	0.847	0.766	0.827	0.864	0.778	0.906
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
$CYDQ_t$	-0.069	-0.222	-0.280	-0.295	-0.215	-0.257	-0.241
	(0.459)	(0.362)	(0.324)	(0.316)	(0.363)	(0.337)	(0.348)
LAP_{t-1}	0.835	0.892	0.759	0.737	0.678	0.800	0.667
	(0.026)	(0.015)	(0.026)	(0.032)	(0.041)	(0.008)	(0.047)
YDQ_{t-1}	-0.407	-0.416	-0.353	-0.347	-0.407	-0.390	-0.399
	(0.040)	(0.032)	(0.047)	(0.053)	(0.026)	(0.039)	(0.031)
$CPRNIQ_t$		0.062	0.050	0.042	0.049	0.046	0.042
		(0.000)	(0.001)	(0.005)	(0.000)	(0.002)	(0.005)
$ISMQ_t$				0.013		0.010	0.011
				(0.021)		(0.050)	(0.037)
$LOSS_t$			-0.046	-0.045	-0.052	-0.050	-0.049
			(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
$MISS_t$					-0.016	-0.015	-0.014
					(0.000)	(0.000)	(0.006)
$BATQMG_t$				0.034		0.014	0.035
				(0.001)		(0.059)	(0.000)
MGT_t				-0.023			-0.018
				(0.001)			(0.001)
$BATQ_t$				-0.004			-0.005
				(0.274)			(0.214)
INTERCT	0.066	0.063	0.064	0.063	0.079	0.073	0.076
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
# of observations	966	966	966	966	966	966	966
Adjusted R^2	68.66%	70.99%	72.34%	72.61%	72.66%	73.83%	72.86%

[a] This table is based on regression results with variables deflated by the sum of premiums and fees, with p-value for the one-tailed t-test in parentheses.

Appendix 1: Lapse Experiences

Data Source 1: SOA 2008 Annual Meeting & Exhibit, October 19-22, 2008.

Level Term Lapse Experience Six Company Level Period Experience 1998-2006 Anniversary Years			
Anniversary	Number of Lapses	Lapse % in dollar	Lapse % in number
1998	57,989	8.5	7.8
1999	76,549	8.7	7.6
2000	85,283	8.2	7.3
2001	94,535	5.0	4.5
2002	95,623	4.8	4.3
2003	104,747	4.8	4.3
2004	109,660	4.9	4.5
2005	101,048	4.2	4.1
2006	69,374	3.7	3.6
Total	**794,808**	**5.2**	**4.8**
* Decrease is consistent across all lapse variables, including by company, duration, plan, issue amount, and underwriting class.			

Data Source 2: LIMRA, BusinessWire

"*A recent study conducted jointly by* ***Windsor, Conn.-based LIMRA International and the Society of Actuaries, Schaumburg, Ill.****,…. found that for all individual life insurance products combined, early policy year lapses have dropped to a 10-year low. This is driven in large part by the lower early year lapse rates on level premium term plans, and the fact that over time they continue to represent a larger portion of the total in-force business.*

What's more, the overall lapse rate for whole life plans for all product types and policy years combined was 3.5% on a policy basis, and 4.4% on a face amount basis in 2003 and 2004, down from 3.9% and 5.8% respectively in 2001-2002. Although first year lapse rates have

*increased slightly in recent years, at most durations, lapse rates are at levels similar to or lower than the past. Total lapse rates for term insurance for all products and all policy years combined was 7.0% on a policy basis and 6.2% on a face amount basis, a decrease of 3.2% points on a policy basis and 4.1% points on a face amount basis from the 2001-2002 report.***"**

Appendix 2: Effect of DAC unlocking on GAAP earnings

A number of practical studies center on the impact of modifying assumptions on GAAP earnings. For instance, in "*Managing the Volatility of GAAP earnings*", by Louis J. Lombardi in *North American Actuarial Journal, Volume 4, Number 1*, an example is illustrated as follow.

Assume that an insurer has a block of variable universal life contracts and uses a long-term credited rate of 8%. In 1995, if the net return on the assets supporting the variable universal life account balance increased by 32.6%, then the successive DAC asset in 1995 after reflecting only this increase would be shown below**.** Note that the only revision to the original estimate was the 32.6% net investment return. Yet the prior period adjustment shows a significant adjustment of $107. These changes occur even though the investment spread is fixed. So what's causing this adjustment? It is the higher future net investment charges resulting from the 32.6% increase in the account balance.

Successive DAC Assets (after revisions)	
DAC assets (beginning)	**1,732**
Prior period adjustment (resulting from unlocking)	**107**
＋DAC new deferral	**36**
＋Interest on DAC	**150**
－Portion of gross profits used to amortize	**316**
＝DAC asset (ending)	**1,709**

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