© *Risk Management and Insurance Review*, 2006, Vol. 9, No. 2, 205-217

ACCIDENT YEAR DEVELOPMENT, BONUS BANKS, AND INSURANCE INCENTIVE COMPENSATION

Joseph Calandro, Jr.

ABSTRACT

Insurance claims can take years to resolve, which makes insurance performance measurement—and incentive compensation based on such measurement—challenging. The insurance industry utilizes a method of analysis called accident year analysis to manage the temporal challenge inherent in insurance claims. Despite the managerial and economic utility of this method of analysis, it has generally not been applied to incentive compensation programs for insurance company executives and employees. This article will explain accident year analysis, and will show how it can be merged with the bonus bank concept and the Insurance Performance Measure, which is an insurance economic profit metric, to construct an economically consistent insurance incentive compensation program.

INTRODUCTION

Insurance claims can take years to resolve, which makes insurance performance measurement—and compensation based on such measurement—challenging. For example, assume an insurance company underwrote an insurance policy in the year 2000. If no claims were filed in that year the policy sale can appear profitable by the amount of premium collected (less all incurred expenses). However, assume now that a claim was filed against the policy in the following year, 2001, and that the insurance company retained an outside investigative firm to adjust the claim on its behalf. The effective profitability of the policy would erode by the amount of expenses being incurred despite the profitable appearance the year before. If we assume further that a lawsuit was filed on this claim in the year 2002, it can be seen that the insurance company will incur still further costs due to legal and court fees. Finally, assume that the lawsuit was resolved in

Joseph Calandro, Jr. is a financial services consultant with IBM Global Business Services and a finance department faculty member of the University of Connecticut. He can be contacted at jtacalandro@yahoo.com. This article was subject to double-blind peer review.
The author wishes to thank Ian Brodie, Michael J. Farrell, Jr., Bob Flynn, Paul King, Scott Lane, Patrick Maeder, Bill McDonough, Tom O'Brien, Neil Osato, two anonymous referees, and most especially Jim Hilliard for their questions, comments, and suggestions on earlier drafts of this paper. The usual caveat applies.

2005—five years after the insurance policy was sold—and that no further claims will be filed against it. Only at this point is it possible to definitively measure the profitability of the insurance policy sold in the year 2000.

While the above example is both hypothetical and a generalization of the insurance claim process, it is not atypical of many insurance claims. However, despite the temporal challenge that claims pose to insurance performance, the measurement of that performance is generally based on simple 12-month calendar year results,[1] and therefore generally so is incentive compensation.[2] This approach is not consistent with the economics of the insurance industry, as will be explained, and as a result the incentives it generates are at best suboptimal. Instead, consider an alternative approach, one that utilizes accident year analysis (which is explained below), the bonus bank concept (Stewart, 1999 [1991]), and the Insurance Performance Measure (Calandro and Lane, 2002) to construct an economically consistent incentive compensation program for insurance company executives and employees.

Below, background information is provided on the Insurance Performance Measure and bonus bank concept. Then accident year analysis is discussed in detail. The three theories are then integrated into an economically consistent insurance incentive compensation program that we illustrate by way of example. The findings are then summarized in a brief conclusion.

BACKGROUND

The Insurance Performance Measure (IPM) is an insurance economic profit metric that is composed of four key insurance variables: the investment return on all capital resources (including claim reserves), the cost of float (which measures the performance of insurance underwriting and claims handling), the cost of reinsurance (which measures the performance of insurance companies' risk transfer/management programs), and the opportunity cost of policyholders' surplus. Insurance operating profit is calculated as

[1] See Fitzpatrick (2004) for further information. The literature generally does not seem to differentiate between calendar year and accident year performance in compensation studies; however, it does appear to focus on calendar year. For example, Ke, Petroni, and Safieddine (1999) utilize calendar year performance measures, for example, the change in yearly Return on Assets, (p. 201) in their study. Additionally, Grace (2004) studied insurance incentive compensation and her research was based predominantly on calendar year performance.

[2] Insurance incentive compensation can include some form of long-term incentive plan (LTIP). LTIPs can be based on longer-term performance metrics such as a three-year rolling Return on Equity (ROE). While a three-year rolling ROE is a better measure of performance over time than a yearly ROE it differs from our approach in three ways: first, it includes investment performance over time. As the investment return of any calendar year does not change over time, the inclusion of these results could obfuscate the measurement of underwriting and reinsurance performance, which do change over time. Second, ROE calculations can be very subjective while accident year calculations are relatively objective. Lastly, rolling ROE measures are not risk adjusted while our approach is risk adjusted. (See also footnote 23.) However, it has been our experience with LTIPs, as well as a finding of Talmor and Wallace (2001), that this form of compensation typically makes up a small percentage of financial sector executive pay.

the sum of the investment return and cost of float less the cost of reinsurance.[3] The opportunity cost of policyholders' surplus, calculated as the product of the cost of capital and policyholders' surplus (which is the insurance version of stockholders' equity), is subtracted from insurance operating profit to determine the amount of IPM or economic profit generated from insurance operations.[4]

Stewart (1999 [1991]) introduced the bonus bank concept, and it has since become a central feature in the value-based management offering of the successful consulting firm, Stern Stewart.[5] While bonus bank mechanics can be somewhat involved, the basic theory behind the concept is relatively straightforward: part of each yearly bonus is set aside or *banked* for a period of time in order to ensure that the performance generating the bonus is sustainable. If the performance is sustainable, regular bonus payments are made, but if the performance falls short the bonus bank is reduced accordingly. According to Stewart (1999 [1991], pp. 234-235):

> Value can fall just as well as it can rise. If the intent is to make managers behave like owners, . . . then they should face the risks as well as the rewards of ownership . . . . The potential for suffering a negative bonus is made possible because the annual bonus awards are not fully paid out but instead banked forward and put at risk, with their full payout contingent upon continued successful performance.[6]

By negative bonus Stewart is referring to not just putting the banked bonus at risk, but also to carrying any loss forward. Oxelheim and Wihlborg (2003) note, however, that the effects of macroeconomic fluctuations should be recognized in value-based management initiatives. Therefore, we by and large recommend against carrying losses forward because of the potential disincentive effects of doing so, that is, if a loss carry forward is implemented employees could choose not to exert the extra time and effort needed to increase productivity above the set standard.[7]

A significant benefit of the bonus bank concept is that it reduces the incentive of gaming yearly performance numbers. Nevertheless, we are not aware of bonus banks being utilized in the insurance industry. One possible reason for this can be found in the unique economics of the insurance industry as reflected, for example, in the difference between calendar year and accident year performance.

---

[3] Thus, the "cost" of float is a *relative cost* as it can be either a benefit, that is, writing premium at less than market rates for money, or an expense, that is, writing premium at greater than market rates for money. (See footnote 17 for further information.) The same holds true for the "cost" of reinsurance; it is a benefit at a reinsurance underwriting ratio of less than 100 percent, and an expense at a reinsurance underwriting ratio of greater than 100 percent.

[4] See Calandro and Lane (2002) for further information on the IPM.

[5] See Martin and Petty (2000) and Wallace (1997) for further information on value-based management incentive compensation programs.

[6] A bonus in this context is *supplemental* compensation awarded for performance above a set standard. Therefore, and in the context of this article, a bonus should generally not be awarded by an insurance company for substandard performance irrespective of the driver(s) of that performance; for example, operational inefficiency, weather-related super catastrophe, etc.

[7] For an interesting case study on value based management incentive compensation see Reinbergs and Simons (2001a, 2001b).

CALENDAR YEAR VERSUS ACCIDENT YEAR

An insurance company's *calendar year* results are simply a summary of the underwriting and claim activity that occurred over a normal, 12-month calendar year. Thus, calendar year performance is calculated by adding the change in insurance reserves over a given year to the amount of claims paid during that year, or in symbols:

$$CY = C_{P,0} + \Delta RES \tag{1}$$

where

$CY =$ calendar year

$C_{P,0} =$ claims paid during the year

$\Delta RES =$ change in reserves over the year.

To illustrate, consider the example of an insurance company that began selling insurance in 1999, and assume that it incurred only two claims in its history thus far, one in 1999 and the other in 2001. Assume also that the claim development histories have been reported in Figure 1.

Given the claim schedule below, the calendar year losses for this insurance company can be computed as follows: \$60,000 in 1999, \$30,000 in 2000, \$195,000 in 2001, –\$5,000 in 2002, \$20,000 in 2003, and \$20,000 in 2004. Below we summarize the calculations for the years 2000 and 2001:

2000: \$40,000 in claims paid + (\$40,000 – \$50,000) in reserves = \$30,000

2001: \$0 in claims paid + (\$235,000 – \$40,000) in reserves = \$195,000

As can be seen, calendar year performance measurement has the benefit of simplicity. However, it does not capture how well risks were underwritten relative to the claims those risks generate, which develop over time. To capture this dynamic requires the use of *accident year analysis*. An accident year is the reconciliation of claim payments back to the calendar year the event covered by the insurance occurred, and thus accident year analysis is a method of dealing with the temporal challenge that insurance claims pose. Accident year performance is calculated by summing the amount paid on

FIGURE 1
Yearly Claim Schedule

1999 Loss	Dec-99	Dec-00	Dec-01	Dec-02	Dec-03	Dec-04
Paid:	\$10,000	\$40,000	\$0	\$15,000	\$5,000	\$0
Reserve:	\$50,000	\$40,000	\$35,000	\$15,000	\$0	\$0

2001 Loss	Dec-01	Dec-02	Dec-03	Dec-04
Paid:	\$0	\$150,000	\$50,000	\$50,000
Reserve:	\$200,000	\$50,000	\$30,000	\$0

FIGURE 2
Accident Year Results

	12 Months	24 Months	36 Months	48 Months	60 Months	72 Months
1999	$60,000	***$90,000***	***$85,000***	$80,000	$70,000	$70,000
2000						
2001	***$200,000***	$200,000	$230,000	$250,000		
2002						
2003						
2004						

a claim over time, and adding to that sum the reserves currently outstanding, or in symbols,

$$AY = \sum_{i=0}^{-N} C_{P,i} + RES_0 \tag{2}$$

where

AY = accident year

$C_{P,i}$ = claims paid in the ith year

RES_0 = reserves outstanding in the current year.

Continuing with the above example, its accident year results can be illustrated in the *loss triangle* in Figure 2.[8]

The reference to "Months" at the top of each of the above columns refers simply to the cumulative amount of calendar months that have elapsed, for example, during 1999, 12 calendar months have elapsed, during 2000, 24 calendar months have elapsed on 1999 policies, etc. We again summarize the calculations for 2000 and 2001, and highlight the relevant numbers in ***bold italics*** for convenience:

2000: $10,000 paid in 1999 + $40,000 paid in 2000 + $40,000 of reserves in 2000 = ***$90,000***

2001: *For the 1999 claim:* $10,000 paid in 1999 + $40,000 paid in 2000 + $0 paid in 2001 + $35,000 of reserves in 2001 = ***$85,000.*** *For the 2001 claim:* 0 paid + $200,000 reserves in 2001 = ***$200,000***

[8] See Calandro and O'Brien (2004) for further information on the calculation and use of loss triangles.

Clearly, accident year analysis more accurately reflects the economics of the insurance business in that it captures the dynamics of claim development over time.[9] Nevertheless, many insurance incentive compensation programs are based on calendar year performance rather than accident year performance. In addition to being an inadequate insurance performance measurement methodology, calendar year analysis presents an opportunity to game yearly results in order to influence bonus payments. Perhaps this was a reason for the failure of PHICO Insurance Company.

In 1996, PHICO's new executive team initiated a dramatic insurance premium growth program. During the first two years of the program, insurance premium dollars grew 49 percent, earnings rose 62 percent, policyholders' surplus grew 27 percent, and nearly five points were shaved from the expense ratio.[10] These results were so good that, in 1999, PHICO's then chief executive officer was able to negotiate a higher compensation package.[11]

However, as PHICO was producing the above calendar year results, actuarial analysis performed by the firm's outside consulting firm—which included accident year performance measurement[12]—was forecasting "a financial crisis of enormous proportions."[13] The crisis came roughly five years after PHICO's insurance premium growth program began, on August 16, 2001, when it was placed into rehabilitation by the Pennsylvania Department of Insurance. The trigger for the regulatory intervention was the filing of a financial report by PHICO: its $127 million in policyholders' surplus had been drawn down to just $6.8 million (Hillman, 2003).

While the PHICO case is an extreme example, Fitzpatrick (2004, pp. 264-268) observed that, in general, the focus on short-term calendar year results at the expense of long-term accident year results—along with a top-line-driven incentive structure[14]—contributes to overall insurance inefficiency as evidenced by the industry's regular price wars, which are cumulatively known as *the underwriting cycle*.[15]

---

[9] See, for example, Baker (2005), Fitzpatrick (2004), and D'Arcy and Corvett (2004). The significance of accident year analysis to insurance performance measurement is likely the reason why Progressive Insurance decided to disclose accident year measures to the capital markets (Hutton, 2004).

[10] Persofsky Leaves PHICO Presidency. *Medical Insurance News*. May 7, 2002.

[11] M. Diane Koken, Insurance Commissioner of The Commonwealth of Pennsylvania and Statutory Rehabilitator of PHICO Insurance Company *v.* Carolyn F. Scanlan, et al. *Summons and Complaint No. 593 M.D. 2001*. Commonwealth Court of Pennsylvania, pp. 43-44.

[12] For example, such analysis frequently makes use of loss triangles, a simplified version of which is illustrated in Figure 2.

[13] Koken *v.* Scanlan, et al., pp. 9-10. Fitzpatrick (2004, pp. 267-268) explains this phenomenon—simultaneously producing positive calendar year results and negative accident year results—extremely well.

[14] Talmor and Wallace (2001) generally find that overall firm performance is one of the weakest determinants of executive pay in the financial sector, of which the insurance industry is part.

[15] See also Baker (2005).

FIGURE 3
Insurance Incentive Compensation—Year One

	$ in 000s 2001	
Investment return (%) =	3.75%	
Investment portfolio =	$300,000	
Investment return ($) =	***$11,250***	***= 3.75% * $300,000***
Underwriting ratio[16] =	101.00%	
Risk-free rate =	3.00%	
Cost of float[17] (%) =	2.00%	= (100% + 3% risk-free rate) – 101% underwriting ratio
Written premium =	$150,000	
Cost of float ($) =	***$3,000***	***= 2% * $150,000***
Reinsurance underwriting ratio =	99.00%	
Reinsured premium / written =	35.00%	= amt. of premium transferred to reinsurers / written premium
Cost of reinsurance (%) =	0.35%	= (100% – 99%) * 35%
Cost of reinsurance ($) =	***$525***	***= 0.35% * $150,000 of written premium***
Cost of capital =	8.00%	
Policyholders' surplus =	$100,000	
Opportunity cost of surplus =	***$8,000***	***= 8% * $100,000***
IPM =	***$5,725***	***= ($11,250 + $3,000 – $525) – $8,000***
Percent available for bonus[18] =	40.00%	
Bonus pool =	*$2,290*	*= $5,725 * 40%*

	2001	2002	2003	2004	2005	Total
Bonus	**$458**	*$458*	*$458*	*$458*	*$458*	$2,290
	Paid	*Banked*	*Banked*	*Banked*	*Banked*	

We propose an alternative to calendar year-based performance measurement and insurance incentive compensation programs. Our alternative utilizes accident year analysis, the bonus bank concept, and the IPM. As explained above, the IPM is an insurance economic profit metric that is composed of four key insurance variables: the investment return, the cost of float, the cost of reinsurance, and the opportunity cost of policyholders' surplus. Two of these four variables—the cost of float and the cost of reinsurance—change or *develop* over time as insurance claims are reported, managed, and resolved. Consider the example presented in Figure 3.

The IPM calculations in the above table are presented in ***bold italics*** for convenience and are fairly straightforward, so we call attention to the bonus section located at the bottom of the table. Instead of simply distributing the entire bonus amount of $2,290,000 to eligible employees, which would occur if the bonus were awarded based on simple

[16] The underwriting ratio is a basic insurance performance metric, and is essentially calculated by dividing claim and nonclaim related expenses (and also possibly dividend payments) by premium dollars. If the ratio is less/greater than 100 percent, insurance underwriting activities are deemed profitable/unprofitable.

[17] Insurance underwriting creates value if the costs it generates are less than market rates for money. Calandro and Lane (2002) capture this dynamic by increasing the standard underwriting profitability hurdle of 100 percent (see footnote 16 above) by the risk-free rate.

[18] For illustration purposes only.

FIGURE 4
Insurance Incentive Compensation—Year Two

	$ in 000s		
	2001	2002	
Investment return (%) =	3.75%	Same	
Investment portfolio =	$300,000	Same	
Investment return ($) =	***$11,250***	***Same***	
Underwriting ratio =		102.00%	
Risk-free rate =		3.25%	
Cost of float (%) =		1.25%	= (100% + 3.25%) – 102%
Written premium =	$150,000	Same	
Cost of float ($) =		***$1,875***	***= 1.25% * $150,000***
Reinsurance underwriting ratio =		100.00%	
Reinsured premium/written =	35.00%	Same	
Cost of reinsurance (%) =		0%	= (100% – 100%) * 35%
Cost of reinsurance ($) =		***$0***	***= 0% * $150,000***
Cost of capital =	8.00%	Same	
Policyholders' surplus =	$100,000	Same	
Opportunity cost of surplus =	***$8,000***	***Same***	
IPM =		***$5,125***	***= ($11,250 + $1,875 – $0) – $8,000***
Percent available for bonus =	40.00%	Same	
Bonus pool =		*$2,050*	*= $5,125 * 40%*

	2001	**2002**	2003	2004	2005	Total
Bonus	$458	**$410**	*$410*	*$410*	*$410*	$2,098
	Paid	**Paid**	*Banked*	*Banked*	*Banked*	

2001 calendar year performance, the insurer's compensation committee in this example holds in escrow or *banks* 80 percent of it.[19] It does so as insurance claims develop over time, which affect both the cost of float and the cost of reinsurance over time. In other words, the compensation committee is tempering the bonus grant until the performance that generated the bonus can be validated overtime.

Proceeding to the second accident year of this example, its development is presented in Figure 4.

As the above table illustrates, the insurer's 2001 accident year results declined in year two of the example. Even though the cost of reinsurance improved by 1 percent (the reinsurance underwriting ratio increased to 100 percent from 99 percent) and the risk-free rate increased by a quarter point (thus increasing the underwriting profitability hurdle) it was not enough to offset the 1 percent deterioration of the underwriting ratio (up to 102 percent from 101 percent).[20] As a result of this adverse development, the total expected bonus for year 2001 performance has been reduced by 8.4 percent to $2,098,000 from $2,290,000 (see the bottom portion of Table 4 for details). In practice, insurance performance development can either be favorable (i.e., IPM increases), neutral, or adverse as it was in this case.

[19] The rationale for utilizing a five-year bonus bank period is provided below.
[20] See Calandro and Lane (2002) for more information on the IPM.

As indicated above, claim development is a central feature of insurance economics. Some claims are clear-cut and thus develop quickly, while others develop more slowly over time. Two examples will illustrate this. First, consider the claims generated by a hurricane. If an area such as the Gulf Coast, for instance, suffers a hurricane, the claims generated will likely be reported and handled quickly, as people generally want their homes repaired quickly. Contrast this with claims such as those generated by asbestos. Generally speaking, a legal claim for injury caused by asbestos can be filed by anyone who has ever been exposed to asbestos and sustained an injury as a result. Claim complications arise when there is a substantial time lag (or *tail*) between the exposure to asbestos and the manifestation of asbestos-related injuries. In some cases the tail could be decades long, which materially and substantially complicates the handling of asbestos claims.[21] In practice, the great majority of insurance claims fall between these two extremes.

While it is not possible to definitively estimate when all insurance claims will develop, informed estimates must be made in order to manage the business of insurance effectively. For example, such estimates form the basis of Incurred but not Reported (IBNR) reserves. IBNR reserves are estimates of claims that are expected to be made in the future on accidents that have already occurred, but have not yet been reported to insurers (Calandro and O'Brien 2004, p. 180). Such estimates are based on accident year analysis and are a central feature of the insurance business. Therefore, when estimating the claim development horizon for insurance incentive compensation purposes, or simply the incentive–development horizon (IDH), we recommend—in general—that a period of five years be utilized.[22] Anything less than five years will likely not adequately capture the dynamics of insurance claim development, while anything beyond five years is not practical from an incentive perspective.[23]

Applying a five-year IDH to the above example reflects the following measured insurance performance and corresponding bonus payments in Figure 5.

[21] In May of 2005, "legislation creating a $140 billion trust fund to handle asbestos-related injury claims narrowly passed the Senate Judiciary Committee" (Godfrey, 2005), but it is a long way from becoming law. Nevertheless, this development demonstrates the volatility that asbestos claims have generated in the insurance industry. Additional accident year data are reported in each insurer's Annual Statement in Schedule P.

[22] There are no sources we are aware of that address this topic, although Fitzpatrick (2004) touches on it in his conclusion. Additionally, other than Progressive Insurance (see footnote 9) we are not aware of any insurer that discloses accident year measures, and thus it is not possible to definitively recommend an IDH. Nevertheless, the mechanics of our approach are the same for any IDH, even if it is less than or greater than our recommended five years.

[23] And thus yearly bonus payments awarded per our recommended IDH are based on the bonus pools of the five most recent accident years. For example, the total bonus award in year 2005 will contain a 20 percent contribution from the 2001 accident year bonus pool plus 20 percent contributions from the bonus pools for each of the next four accident years, that is, 2002, 2003, 2004, and 2005. This bonus structure is another differentiator of our approach, that is, each tranche is based on current accident year development in contrast, for example, to one blended award based on a rolling ROE measurement.

FIGURE 5
Insurance Incentive Compensation: Five-Year Profile

			$ in 000s		
	2001	2002	2003	2004	2005
Investment return (%) =	3.75%	Same	Same	Same	Same
Investment portfolio =	$300,000	Same	Same	Same	Same
Investment return ($) =	***$11,250***	***Same***	***Same***	***Same***	***Same***
Underwriting ratio =	101.00%	102.00%	103.00%	104.00%	104.10%
Risk-free rate =	3.00%	3.25%	3.50%	3.75%	4.15%
Cost of float (%) =	2.00%	1.25%	0.50%	-0.25%	0.05%
Written premium =	$150,000	Same	Same	Same	Same
Cost of float ($) =	***$3,000***	***$1,875***	***$750***	***($375)***	***$75***
Reinsurance underwriting ratio =	99.00%	100.00%	98.75%	100.00%	100.75%
Reinsured premium / written =	35.00%	Same	Same	Same	Same
Cost of reinsurance (%) =	0.35%	0.00%	0.44%	0.00%	-0.26%
Cost of reinsurance ($) =	***$525***	***$0***	***$656***	***$0***	***($394)***
Cost of capital =	8.00%	Same	Same	Same	Same
Policyholders' surplus =	$100,000	Same	Same	Same	Same
Opportunity cost of surplus =	***$8,000***	***Same***	***Same***	***Same***	***Same***
IPM =	***$5,725***	***$5,125***	***$3,344***	***$2,875***	***$3,719***
Percent available for bonus =	40.00%	Same	Same	Same	Same
Bonus pool =	$2,290	$2,050	$1,337	$1,150	$1,488
Bonus paid =	*$458*	*$410*	*$267*	*$230*	*$298*

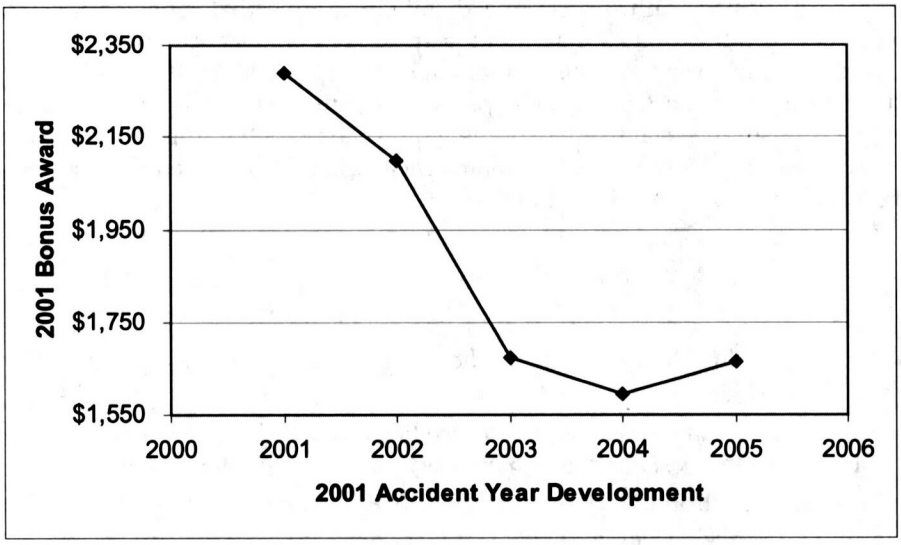
FIGURE 6
Insurance Incentive Compensation Tabular Summary

			$ in 000s			
	2001	2002	2003	2004	2005	Total
2001	***$458***	*$458*	*$458*	*$458*	*$458*	$2,290
2002	$458	***$410***	*$410*	*$410*	*$410*	$2,098
2003	$458	$410	***$267***	*$267*	*$267*	$1,671
2004	$458	$410	$267	***$230***	*$230*	$1,596
2005	$458	$410	$267	$230	***$298***	***$1,663***

As illustrated above, and as expected, measured insurance performance fluctuated each year due to claim development as reflected in both the cost of float and cost of reinsurance. Figure 6 summarizes and compares the resulting bonus payments generated by this fluctuation.

The ***bold italics*** diagonal above reflects the amount of incentive compensation paid out in each year as the performance of accident year 2001 developed over the five-year IDH. As shown in the last column of the table, the total bonus that was ultimately paid, $1,663,000, is 27 percent less than the $2,290,000 that was expected to be paid out in year 2001. The development of this bonus is illustrated in Figure 7.

FIGURE 7
Insurance Incentive Compensation Development



The bonus declined significantly from 2002 to 2004. Because the initial (or calendar year) 2001 level of performance could not be maintained (or improved upon) over time, the bonus awarded for that performance was proportionally reduced as the accident year developed. Adequately pricing risk, controlling the claims management process and claim costs, and efficiently reinsuring or ceding unwanted risk are critical performance variables that must be optimally managed if insurance companies are to create value. Linking incentive compensation to the management of critical performance variables over time aligns the incentive structure with overall value creation (destruction), which is the underlying objective of all incentive compensation initiatives.

CONCLUSION

Insurance claims can take years to resolve, which makes insurance performance measurement—and incentive compensation based on such measurement—challenging. Insurance executives generally manage this challenge through the use of accident year analysis. This method of analysis tracks the development of insurance claims over time, and by doing so increases the accuracy of insurance company performance measurement. However, in spite of its usefulness, accident year analysis is generally not utilized in incentive compensation programs for insurance company executives and employees.

We presented an alternative insurance incentive compensation approach that utilizes accident year analysis, the bonus bank concept, and the Insurance Performance Measure (IPM), which is an insurance economic profit metric. First, accident year analysis was explained and illustrated. It was then shown how accident year analysis could be integrated with the bonus bank concept and the IPM to construct an incentive compensation program that effectively aligns with the economics of the insurance business. Such an

alignment is critically important if economic profit-based incentive compensation programs are to be successful.

Our approach was then illustrated in a detailed example that reflected a significant difference between the total 2001 accident year-derived bonus of $1,663,000, developed over a horizon of five years, versus a potential bonus of $2,290,000 that could have been awarded based on simple 2001 calendar year performance. This difference highlights the dynamism of insurance claims development, and the potential impact that dynamism can have on insurance company performance measurement and incentive compensation based on such measurement, over time.

REFERENCES

Baker, T., 2005, Medical Malpractice and the Insurance Underwriting Cycle, *DePaul Law Review*, 24: 393-438.

Calandro, J., and S. Lane, 2002, The Insurance Performance Measure: Bringing Value to the Insurance Industry, *Journal of Applied Corporate Finance*, 14(4): 94-99.

Calandro, J., and T. O'Brien, 2004, A User-Friendly Introduction to Property and Casualty Claim Reserves, *Risk Management and Insurance Review*, 7(2): 177-187.

D'Arcy, S., and R. Corvett, 2004, The Use of Dynamic Financial Analysis to Determine Whether an Optimal Growth Rate Exists for a Property-Liability Insurer, *The Journal of Risk and Insurance*, 71(4): 583-615.

Fitzpatrick, S., 2004, Fear is the Key: A Behavioral Guide to Underwriting Cycles, *Connecticut Insurance Law Journal*, 10(2): 255-275.

Godfrey, J., 2005, Asbestos Fund Narrowly Approved By Senate Panel, *Wall Street Journal*, http://www.wallstreetjournal.com, May 26.

Grace, E., 2004, Contracting Incentives and Compensation for Property-Liability Insurer Executives, *The Journal of Risk and Insurance*, 71(2): 285-307.

Hillman, J., 2003, Pennsylvania Regulators Recover $10 Million From PHICO Officers, *BestWire Services*, November 18.

Hutton, A., 2004, Beyond Financial Reporting—An Integrated Approach to Disclosure, *Journal of Applied Corporate Finance*, 16(4): 8-16.

Ke, B., K. Petroni, and A. Safieddine, 1999, Ownership Concentration and Sensitivity of Executive Pay to Accounting Performance Measures: Evidence from Publicly and Privately-Held Insurance Companies, *Journal of Accounting & Economics*, 28: 185-209.

Martin, J., and W. Petty, 2000, *Value Based Management* (Boston, MA: HBS Press).

Oxelheim, L., and C. Wihlborg, 2003, Recognizing Macroeconomic Fluctuations in Value Based Management, *Journal of Applied Corporate Finance*, 15(4): 104-110.

Reinbergs, I., and R. Simons, 2001a, *Vyaderm Pharmaceuticals*, HBS Case Services, 9-101-019, January 18.

Reinbergs, I., and R. Simons, 2001b, *Vyaderm Pharmaceuticals Teaching Note*, HBS Case Services, 5-101-043, March 2.

Stewart, B., 1999 [1991], *The Quest for Value* (New York: HarperCollins).

Talmor, E., and J. Wallace, 2001, A Unified Analysis of Executive Pay: The Case of the Financial Sector, *London Business School Accounting Subject Area No. 022*, http://www.ssrn.com/abstrct=215630.

Wallace, J., 1997, Adopting Residual Income-Based Compensation Plans: Do You Get What You Pay For?, *Journal of Accounting & Economics*, 24: 275-300.