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Three Versions of Perfect Pay for Performance (Or The Rebirth of Partnership Concepts in Executive Pay)

by Stephen F. O'Byrne, Shareholder Value Advisors Inc.

During the 19th century and the first half of the 20th century, the compensation of non-founder managers was guided by partnership concepts. Andrew Carnegie made his senior staff co-owners by selling them stock at book value. Alfred Sloan gave the senior staff of General Motors a fixed percentage of the company's "economic profit."

But in the years since World War II, partnership concepts have largely disappeared from executive pay. The current view of executive pay is guided by the concepts of "competitive pay" and pay components. Pay has multiple components—base salary, an annual incentive, a long-term incentive, a retirement plan, benefits, and perquisites—each of which plays a role in attracting, retaining, and motivating executives. An executive pay program is considered to be effective when target total compensation is competitive in the labor market, and when the mix of pay components is viewed as supporting and reinforcing the company's business strategy. We will call this "the human resource model" of executive pay because it developed with the rise of modern human resource management after World War II.

A partnership creates a systematic relationship between pay and profit—pay is a fixed percentage of the profit measure. A partnership also creates a systematic relationship between percentage *changes* in pay and percentage changes in profit. Since pay is a fixed percentage of profit, a 1% increase in profit increases pay by the same percentage. The ratio of percentage change in pay to percentage change in value is a critical measure of incentive strength—one that I will call "pay leverage" throughout the rest of this paper. A partnership has both fixed sharing and fixed pay leverage that is equal to 1.0.

The human resource model does not aim for a systematic relationship between pay and profit. It makes no use of fixed sharing of profit, and does not try to achieve fixed pay leverage *in relation to either profit or shareholder value*. But it does adhere, to a large extent, to the concept of fixed pay leverage *in relation to revenue*. For example, labor market studies of executive pay consistently produce estimates of pay leverage to revenue of about 0.4, which implies that, for every 10% increase in revenue, executive pay increases pay by roughly 4%.

This sensitivity of pay to revenue, but not profit or value, is clearly reflected in the competitive pay values that provide the foundation of the human resource model. Nevertheless, advocates of the model maintain that modern executive pay packages provide strong performance incentives because a high percentage of pay comes from those components of pay—notably bonuses and equity compensation—that are tied to performance. But as I showed in a recent article in this journal,[1] the human resource model provides highly variable—and thus unpredictable—pay leverage to shareholder value, *even in cases where 100% of pay is in stock*.[2]

In sum, the human resources model provides no useful guidance to companies on how to achieve consistent pay leverage. But in recent years, three different model pay plans have been proposed that provide both competitive pay *and* fixed pay leverage in relation to shareholder value. These three "perfect" pay plans are as follows: (1) the Dynamic Incentive Account proposed by finance professors Alex Edmans of London Business School and Xavier Gabaix of NYU; (2) the perfect investment manager fee structure developed and used by Don Raymond, the chief investment strategist of the Canada Pension Plan; and (3) my own Perfect Pay for Performance Plan. Although these three plans look quite different on the surface, I'll show in the pages that follow that they all provide (1) competitive pay for average performance *and* (2) fixed pay leverage to shareholder value. Moreover, in the special case of pay leverage of 1.0, I will also show that *cumulative* perfect pay (that is, pay over the entire life of a plan) can be expressed as the sum of cumulative market pay (the average amount earned by one's peers over the same time period) plus a share of the cumulative value added. And this last factor, it's important to understand, can be negative.

I will also show how these perfect pay plans highlight and address two critical weaknesses of the human resource model of executive pay. The first is that target pay without

1. See O'Byrne, Stephen F. and E. Mark Gressle (2013), "How Competitive Pay Undermines Pay for Performance (and How Companies Can Avoid That)," *Journal of Applied Corporate Finance*, Vol. 25, No. 2 (Spring).

2. Though one would expect a "competitive" pay package consisting entirely of annual awards of stock to have a consistent pay leverage of 1.0, for reasons discussed below Monte Carlo simulation of the human resource model shows that pay leverage is either below 0.7 or above 1.1 in half of all such cases—and below 0.5 or above 1.2 in a fifth of all cases.

value leverage—basically, the idea that executives are entitled to competitive pay for size regardless of past value performance—undermines management's performance incentive by effectively rewarding poor past value performance with a large increase in sharing percentage, while superior value performance is penalized by a reduction in sharing percentage. The second problem with the current pay model is that its focus on pay components leads to periodic bouts of pay inflation—at the expense of investors—that tend to be justified by the argument that changes in the mix of pay warrant increases in the level of pay. I will also show that the perfect pay plans reconcile performance and retention objectives in a more effective way than either the partnership plans of Carnegie and Sloan or the competitive pay plans of modern human resource management.

In what follows, I begin by reviewing the basic objectives of executive pay and then provide a short history of pay practices at U.S. public companies, summarizing the partnership pay plans developed by Carnegie and Sloan and the rise of the human resource view of executive pay. Next I show how shifts to incentive pay led to substantial increases in total pay in two distinct periods of American corporate history: the 1920s and the 1990s. Finally, I present the three perfect pay plans.

The Basic Objectives of Executive Pay

Executive pay programs are expected to accomplish three main, but in some ways competing, goals: (1) provide strong incentives to create shareholder value; (2) retain key talent, particularly in periods of poor performance attributable mainly to market and industry factors; and (3) limit compensation cost to levels that aim to maximize the wealth of the company's shareholders. Although these three main objectives of executive pay plans haven't changed since the rise of large corporations in the late 19th century, the tools used to achieve them have changed considerably.

In the first half of the 20th century, sharing formulas were the primary tools used by American companies for rewarding key managers and employees. For example, in 1922 General Motors adopted an incentive plan that made the total incentive pool equal to 10% of "economic profit," where such profit was defined as after-tax operating profit in excess of a 7% return on total capital. A 1936 study by Harvard Business School professor John Baker found that 18 of the 22 companies he analyzed had similar plans.

In the second half of the 20th century, and since that time, sharing formulas have been largely replaced by competitive pay concepts derived from labor market analysis of peers. One of the main effects of the rise of competitive pay as the controlling concept has been to elevate the importance of the last two objectives—retention and cost—while effectively weakening managers' incentives to increase longer-run efficiency and value.

One important contributor to the rise of competitive pay concepts, not surprisingly, is the difficulty of earning consistently positive economic profits—or, conversely, the prevalence of negative economic profit. When economic profit is negative, the General Motors formula fails to provide either a strong performance incentive or a strong retention incentive.

Executive Pay Under Carnegie

Andrew Carnegie relied on stock ownership to provide strong incentives. Key executives were given the right to purchase stock at book value and to pay for the stock out of future dividends. The right to buy the stock at book value and pay for it out of future dividends, when combined with Carnegie's high return on capital, made the stock worth far more than the present value of the employee's payments.

To see this, let's assume that an executive buys the stock at book value for $100,000 and holds it for 20 years before selling it back to the company at book value. Let's also assume that the company, like the Carnegie Brothers company in 1881, earns a 40% return on book value[3] and pays out 50% of earnings in dividends. After using the first $100,000 of dividends to pay for the stock, the executive receives $3.7 million in dividends plus the ending book value of $3.8 million. The present value of the cash received by the executive, $1.5 million, assuming a discount rate of 10%, is 19 times greater than the present value of the dividends used to pay for the stock, $78,000. The difference, $1.4 million, is the executive compensation embedded in the stock purchase.

Of course, the ability of such a plan to provide substantial compensation through stock purchase at book value depends on the company's ability to earn substantially more than its cost of capital. If Carnegie had earned 12%, not 40%, the value of 20-year ownership would be only twice its cost to the executive.

The performance incentive provided by the stock value was enhanced by a second provision of Carnegie's plan: the stock originally granted was subject to repurchase by the company at book value if 75% of the other stockholders and 75% of the outstanding shares voted in favor of the repurchase. And this meant that if three quarters of the shareholders felt that an executive stockholder was not making a substantial contribution to company performance, the executive could be forced to sell his stock at a fraction of its market value.

In the years Carnegie held majority interests in Keystone Bridge and Carnegie Steel, he forced out 15 executives, buying back their shares at book value. And this was a material fraction of the employee ownership group. When Carnegie

3. Wall, Joseph Frazier (1989), *Andrew Carnegie*. University of Pittsburgh Press, Pittsburgh, PA, p. 360. Originally published by Oxford University Press 1970.

Steel was formed in 1892 through the merger of Carnegie Brothers and Carnegie Phipps, it had only 22 owners, Carnegie with 55%, Phipps and Frick with 11% each, and 19 other executives with 1% each. The other 4% of the shares were reserved for future employee owners.[4]

The plan thus provided a strong performance incentive because poor employee performance was likely to lead to a loss of shares, and superior performance to the award of additional shares. In some cases, exceptionally good performance led to a doubling of an executive's interest in a single year.[5] The plan also provided a strong retention incentive as long as the Carnegie companies earned a superior return on book value.

Although common in the latter half of the 19th century, such plans fell out of use by public companies in the first half of the 20th century, mainly because the success of the Carnegie plan requires both a consistently superior return on book value and a generous controlling shareholder. Such plans can still be seen today, though mainly in professional services firms, where low capital requirements make it possible to maintain consistently high returns on book value.

Executive Pay Under Sloan

The bonus plan adopted by General Motors in 1922 provided incentives for a much larger employee population than Carnegie's partnerships. The bonus plan participants represented 5% of all salaried employees in 1922 and later increased to 9%. The bonus formula governed all incentive compensation received by GM executives, stock as well as cash, and was used without any change until 1947, when the sharing percentage was increased to 12%, and the capital charge was reduced to 5%.

The plan provided a strong performance incentive because an individual's bonus was tied to an assessment of the individual's contribution to GM. In Sloan's words:

> *But while bonus awards depend on profits, the bonus system is not a profit-sharing plan. It does not entitle any employee to any regular share in the earnings of the corporation or any of its divisions… each man must earn the right to be considered for a bonus award each year by his own effort. Since his effort is judged each year, his bonus award may fluctuate widely from year to year—if, indeed, he receives one every year. The knowledge that his contribution to the corporation is weighed periodically, and a price put on it, acts as an incentive for each executive at all times.*[6]

The GM plan provided an adequate retention incentive, even during the worst years of the Depression, because even if (as happened in 1932) there was no bonus accrual in a given year, there was typically some bonus payout because bonuses were paid in five-year annual installments. Other companies were not so fortunate. In a study of 57 large industrial companies, John Calhoun Baker found that the number of companies paying bonuses dropped from 39 in 1929 to 16 in 1936, and that one in seven companies dropped their bonus plan during the years 1928-1936.[7] The inability of the GM plan design to provide competitive pay when poor performance was attributable to market and industry factors—or to the actions of a prior management team—was one important reason for the rise of the human resource model.

The Rise of the Human Resource Model of Executive Pay

After World War II corporate human resource practice became increasingly focused on the concepts of "job value" and "competitive pay." The rise and growing influence of these concepts can be seen in both the Hay Guide Chart for job evaluation, which was standardized in 1951, and in the American Management Association (AMA) surveys of executive pay, which were initiated in 1950. The AMA surveys were designed by Arch Patton of McKinsey & Company, the leading compensation consultant of the early post-war years.

In 1951, Patton reported that "within an industry the profit level of the individual company is by far the more important determinant of executive compensation"—and he went on to conclude that "this survey points to a basic principle of compensation that is frequently overlooked: salary increases can only come from profit increases."[8] Fifteen years later, however, Patton reported finding a strong relationship between pay and sales, but no significant relationship between pay and profit, noting that:

> *[T]he disassociation between pay and profits is a development of relatively recent years. McKinsey studies up to about five years ago—and those made by others as well—indicated that high or low top management pay tended to coincide with high or low company profitability. The erosion of this profit-oriented relationship may well stem, at least in part, from the increasing management use of compensation surveys which gauge company size in terms of sales volume.*[9]

As executive pay surveys expanded in the post-WWII period, executive pay administration increasingly relied on the concept of "target total compensation." Target total compensation was largely derived from compensation survey data that reported regression equations that related pay to

4. Liversay, Harold C. (1975), *Andrew Carnegie and the Rise of Big Business*. Harper Collins, New York, NY.
5. Wall, p. 666.
6. Sloan, Alfred P., Jr. (1963), *My Years With General Motors*. Doubleday, New York, NY, p. 408.
7. Baker, John Calhoun (1938), *Executive Salaries and Bonus Plans*. McGraw-Hill, New York, NY, pp. 187, 199.
8. Patton, Arch (1951), "Current Practices in Executive Compensation," *Harvard Business Review* Vol. 29, Num 1 (Jan), p. 58.
9. Patton, Arch (1966), "Top Executive Pay: New Facts & Figures," *Harvard Business Review* Vol. 44, Num. 5 (Sep/Oct), p. 96.

sales. More precisely, such equations related the log of pay to the log of sales to arrive at a formula like the following: ln(pay) = 6 + 0.4 x ln(sales), where pay is in thousands and sales is in millions.

This equation implies that pay = \$403,000 x sales$^{0.4}$, which in turn implies that a 1% increase in sales increases pay by 0.4%, or that pay leverage to sales is 0.4. This pay formula could have been easily extended to achieve similar pay leverage to relative shareholder wealth—for example, pay = \$403,000 x (sales)$^{0.4}$ x (relative shareholder wealth)$^{0.4}$. Or it could have aimed to produce still *higher* pay leverage to provide a stronger incentive to increase shareholder wealth instead of sales, as in the following formula: pay = \$403,000 x (sales)$^{0.4}$ x (relative shareholder wealth)$^{0.8}$.

But there is little evidence of companies taking this approach. To understand why, let's examine the implications of this last expanded pay formula by making a few simplifying assumptions—that pay is a simple stock grant, sales are constant, and industry shareholder wealth is flat. With these assumptions, we can see that a 50% decline in the stock price would increase the number of shares granted by only 15%. By contrast, in the standard human resources pay plan, which in fact has pay leverage in relation to value of 0,[10] the increase in the number of shares would be 100%! So, the lesson here is that pay leverage of 0.8 gets us much closer to partnership pay, where the number of shares granted would be unchanged.

Why did the human resource model embrace sales leverage of 0.4, while resisting any value leverage? There was a widely held belief, which continues to this day, that there was no need for value leverage in target pay because the pay components tied to performance—bonuses and equity compensation—provide strong value leverage. But, as I noted above, the human resource model provides highly erratic pay leverage to shareholder value even when 100% of pay is in stock.

Pay Components and Executive Pay Inflation

A second important element of modern human resource management was the development of plans with multiple pay components. While supplemental pay plans became much more popular after WWII, many began earlier. For example, Sears adopted a deferred profit sharing plan in 1916, Kodak adopted an employee stock purchase plan in 1917, General Motors adopted a group life insurance plan in 1926, and AT&T adopted a career earnings pension plan in 1936. The use of employee benefit plans accelerated during WWII in large part because the War Labor Board ruled that employee benefits were excluded from pay controls.[11] Executive stock incentives became much more popular after WWII, due in large part to favorable tax treatment. The Revenue Act of 1950 authorized stock options that were not taxable until the stock was sold. Moreover, the gain was taxed as a capital gain at 25% when the maximum marginal rate on ordinary income was 91%.

Over time, human resource professionals came to the view that more pay components and more active management of the mix of pay leads to more effective compensation strategy. Compensation consultant David McLaughlin expressed this view in 1990 when he wrote,

[W]hat has changed is that the tools available to attract, retain, and motivate others have become vastly more extensive and sophisticated. Just twenty-five years ago, most executive compensation programs consisted of base salaries, restricted stock options, and, in perhaps six out of ten companies, annual bonuses. Today, there are a dozen types of long-term incentives alone, and most companies use at least two or three…. Compensation has become strategic. Companies…adopt different mixes of short- and long-term incentives for different divisions…[12]

Strategic changes in the mix of pay can easily lead to increases in the level of pay, particularly when the new strategy calls for lower emphasis on salary and benefits, which are difficult to reduce in absolute dollars without triggering employee complaints.

There have been two historical periods where strategic changes in pay mix led to substantial increases in pay level. Prior to WWI, few companies had incentive compensation plans. When Harvard economics professor F.W. Taussig studied the executive pay practices of 400 manufacturing companies during the years 1905-1914, he found that insiders owned about a quarter of the capital stock, but that only 13% of the companies paid any incentive compensation during that ten-year period, and only 5% had a formal incentive compensation plan.[13] But over the next 25 years, there was widespread adoption of formal incentive compensation. After studying the executive pay practices of 100 publicly traded manufacturing companies during the years 1928-1936, Harvard Business School professor John Calhoun Baker reported that 75 of the companies had stock option or stock purchase plans, and that two thirds of the firms had bonus plans. Baker also found that the bonus payments were almost entirely incremental compensation:

10. The calculations of competitive pay and shares granted are:

$$\text{Competitive pay}_0 = \$403{,}000 \text{ x } (\text{sales}_0)^{0.4} \text{ x } (1.00)^{0.8}$$
$$\text{Shares}_0 = \text{competitive pay}_0/\text{price}_0 = \$403 \text{ x } (\text{sales}_0)^{0.4} \text{ x } (1.00)^{0.8}/\text{price}_0$$
$$\text{Competitive pay}_1 = \$403 \text{ x } (\text{sales}_1)^{0.4} \text{ x } (\text{price}_1/\text{price}_0)^{0.8}$$
$$\text{Shares}_1 = \$403 \text{ x } (\text{sales}_1)^{0.4} \text{ x } (\text{price}_{1/}\text{price}_0)^{0.8}/\text{price}_1 = \text{shares}_0 \text{ x price}_0 \text{ x } (\text{price}_{1/}\text{price}_0)^{0.8}/\text{price}_1$$
$$\text{Shares}_1 = \text{shares}_0 \text{ x } (\text{price}_0/\text{price}_1)^{-0.2} = \text{shares}_0 \text{ x } (\text{price}_0/\text{price}_1)^{1\text{-pay leverage}}$$
$$\text{shares}_0 \text{ x } (\text{price}_0/\text{price}_1)^{-0.2} = \text{shares}_0 \text{ x } (\text{price}_0/\text{price}_1)^{1\text{-pay leverage}}$$

11. Ellig, Bruce R. (2005), *The Evolution of Employee Pay and Benefits in the United States*. Temin, New York.

12. McLaughlin, David J. (1990), "The Rise of A Strategic Approach to Executive Compensation" in Fred K. Foulkes, editor, *Executive Compensation: A Strategic Guide for the 1990s*. Harvard Business School Press, Boston, MA.

13. Taussig, F.W. and W.S. Barker (1925), "American Corporations and Their Executives: A Statistical Inquiry," *The Quarterly Journal of Economics* 40 Nov 1-51.

[O]n average the chief executive who received a bonus also was paid a salary within a few thousand dollars as large as a president who was simply paid a fixed salary… total compensation to presidents of companies not paying bonuses in 1929 averaged $80,000 as contrasted with $196,000 paid to presidents of companies paying bonuses.[14]

This was clearly inconsistent with the concept of partnership pay. A partner isn't entitled to a bigger share just because pay is received in stock or at year end.

Another major change in pay mix occurred in the 1990s, largely in response to calls by shareholder advocates for greater focus on value-based management. In a widely cited 1990 article in the *Harvard Business Review*, finance professors Michael Jensen and Kevin Murphy argued that "in most publicly held companies, the compensation of top executives is virtually independent of performance. On average, corporate America pays its most important leaders like bureaucrats."[15] Over the next decade, there were huge increases in top management pay driven by a rising percentage of pay in the form of stock options. In a study of the top three executives at 102 public companies, Carola Frydman and Raven E. Saks found that inflation-adjusted pay rose 3.1% a year in the 1970s, 5.6% a year in the 1980s, and 18.5% a year in the 1990s.[16] Most of the increase was attributable to the increase in the value of option grants, which increased 32% a year during the 1990s, and accounted for 50% of annual total compensation by the year 2000. While 50% of executives received option grants in the 1960s, by the late 1990s 80% of executives were receiving option grants every year.

My "Perfect Pay for Performance" Plan

As I define the concept in this paper, perfect pay for performance (or PP4P) compensation plans are distinguished by three main features. First, there is a perfect correlation between executives' *relative* pay and the *relative* performance of their companies. That is to say, the total compensation of those executives relative to that of executives in comparable or "peer" companies should vary directly with the difference between the companies' stock returns and the stock market performance of their peers. Second, executives should expect to earn a "zero premium"—that is, the same as the market average for executives in peer companies—for performance that meets that of the peer group average. And third, the pay leverage of the plan—that is, the sensitivity of relative pay to relative performance—must be fixed and positive.

But having identified these three main features, let me mention two other things. In illustrating my own PP4P plan, I will use a share plan that provides shareholder leverage of 1.0—that is, a plan where each 1% increase in relative shareholder wealth increases relative pay by 1%. But a perfect pay plan could also be designed to have target leverage of 0.5 or 1.5. A perfect pay plan also requires a starting point or base period for measuring relative pay and relative performance. Once launched from that starting point, the plan can continue indefinitely. In illustrating my own plan, I will use a plan that runs for five years.

The three objectives that are necessary for perfect pay for performance can be achieved using annual grants of performance shares, provided such grants satisfy two conditions. First, target pay—which determines the number of shares granted—must be market pay that is adjusted to reflect the company's relative return *from the base period, or the start of the perfect pay plan*. As discussed in more detail below, this implies that the number of shares granted is increased to offset poor *industry* performance, but not poor *relative* performance. This first condition ensures that pay tracks relative performance from the start of the perfect pay plan up to the date of grant.

The second condition ensures that pay tracks relative performance from the date of grant to the termination of the perfect pay plan by using the vesting formula to take out the industry component of the stock return after the date of grant. It does this by making the percentage of shares that vest at the end of plan *inversely* related to the performance of the industry from the date of grant to the end of the plan. That is, the higher the industry return over the life of the plan, the smaller the fraction of shares that vest.

If we set target pay leverage at 1.0 (as in my plan illustrated below), the vesting multiple is set according to the following formula: 1/(1 + post-grant industry TSR). So, for example, if the industry TSR from the grant date until retirement turns out to be 50%, then the percentage of shares that ultimately vests is about two thirds (1/(1 + 0.5) = .67).[17]

To see how my PP4P plan would actually work, let's look at an example from the recent past. Table 1 shows the calculation of stock grant shares for a perfect pay plan for the top five executives of Dow Chemical that begins at the start of 2006 and runs through the end of 2010.[18] The illustration assumes that the stock grants are made at the end of each year, so that the number of shares granted is equal to target compensation divided by the stock price at the end of the year. Target compensation is market compensation—that is,

14. Baker, John Calhoun (1938), *Executive Salaries and Bonus Plans*. McGraw-Hill, New York, NY, p. 222.

15. Jensen, Michael C. and Kevin J. Murphy (1990), "CEO Incentives - It's Not How Much You Pay, But How," *Harvard Business Review*, May-June, 138-153.

16. Frydman, Carola and Raven E. Saks, "Historical Trends in Executive Compensation 1936-2003," available at ssrn.com.

17. When target leverage is not equal to 1.0, the vesting multiple is equal to = (1 + TSR)^(target leverage - 1) x [1 / (1 + peer group return)^target leverage].

18. More detail on this case is available in O'Byrne, Stephen F. and E. Mark Gressle (2013), "How Competitive Pay Undermines Pay for Performance (and How Companies Can Avoid That)," *Journal of Applied Corporate Finance*, Vol. 25, No. 2 (Spring).

Table 1 **Target Compensation and Stock Grant Shares**

	Calculation of Target Compensation and Stock Grant Shares							
Year	Top 5 Market Compensation ($000)	Stock Price with Dividends	Company Cumulative Wealth Ratio	Peer Group Cumulative Wealth Ratio	Company Relative Wealth Ratio	Premium For Loss of Expected Industry Return	Target Compensation ($000)	Stock Grant Shares
2005		43.82	1.00	1.00				
2006	48,383	41.43	0.95	1.19	0.80	10%	42,350	1,022.146
2007	48,383	42.52	0.97	1.31	0.74	10%	39,285	924.033
2008	48,383	17.35	0.40	0.91	0.43	10%	23,144	1,334.098
2009	48,383	33.00	0.75	1.33	0.57	10%	30,234	916.286
2010	48,383	41.64	0.95	1.75	0.54	10%	28,866	693.147

Market compensation is based on peer group data adjusted for size differences.

Target comp = market comp x company relative wealth ratio ^ target leverage x (1 + premium for loss of expected industry return). Stock grant shares = target compensation divided by ending stock price.

10% = Premium for the loss of the future industry return on equity compensation.

Pay premium is needed to provide competitive compensation in present value terms since the perfect P4P plan does not reward management for stock price increases due to industry factors

average compensation for peer chemical companies of similar size[19]—but with two adjustments.

The first adjustment adds a premium to market compensation so that the expected future value of market compensation with the perfect pay plan—which does not reward executives for stock appreciation due to industry factors—will be equal to the expected future value of market compensation under a typical pay plan, which effectively rewards all stock appreciation, including that due to industry factors. The second adjustment ties target pay to relative *cumulative* performance—that is, performance *since the start of the plan*—by increasing target compensation when relative performance is positive and reducing target compensation when relative performance is negative. (More specifically, target compensation is set using the following formula: market compensation x (1 + premium for loss of the expected industry return) x (1 + relative TSR)[20]).

In 2008, market compensation for the top five executives in a chemical company of Dow's size ($49 billion in revenue) would have been about $48.4 million, or $53.2 million when we add a 10% premium for the loss of the expected industry return. But since Dow's relative TSR from the start of the plan in 2006 was -57% (Dow's stock had fallen by 60% when the industry was down only 9%),[21] when we adjust market compensation for this poor relative performance, target compensation drops to $23.1 million ($53.2 x (1 – 57%)). Dividing target compensation by the 2008 ending stock price of $17.35, we get a grant of 1.334 million shares for the top five executives.

Table 2 shows the projected vesting multiples, which are calculated from the peer company cumulative wealth ratios in Table 1. For the 2008 grant, the projected vesting multiple at the end of 2010 is 0.52, which is equal to 1/(1 + 0.92), where 0.92 is the industry return from the end of 2008 to the end of 2010.[22] This means that only 52% (or 0.693 million) of the 1.334 million shares awarded at the end of 2008 end up vesting at the end of 2010. The vesting multiple, as noted earlier, removes the effect on pay of the industry component of the stock return. The value of the vesting shares is $28.87 million (0.693 million x $41.64), which is equal to the initial grant value, $23.14 million, increased by Dow's excess return of 24.7%. (The value of the vesting shares can always be expressed as initial grant value x (1 + the excess return from the date of grant to the end of the plan).)

Table 2 also shows that the value of all the shares vesting would have been $144.33 million. This is equal to cumulative market compensation multiplied by the cumulative relative wealth ratio, which is a measure of managements' cumulative value added over the life of the plan. In equation form, the value of vesting shares is equal to cumulative market compensation x (1 + the excess return over the life of the plan).[23] In this case, cumulative market compensation, after an adjustment for the loss of the expected industry return, was $266.1 million. And with the second factor, 1 + the excess return, equal to 0.542, the value of vesting shares would have been $144.33 million ($266.1 million x 0.542).

In the article published last year in this journal, I showed that this perfect pay plan provides leverage of 1.0, as well as alignment of 1.0 and a zero pay premium for (peer group) average performance.[24] This is important in part because, when target pay leverage is 1.0, we can express perfect pay as the sum of cumulative market compensation, adjusted

19. Market compensation is average top 5 compensation for chemical companies of similar size. A regression model relating log pay to log sales is used to calculate top 5 compensation for chemical companies of similar size.

20. When target leverage above or below 1.0, target compensation = market compensation x (1 + premium for loss of the expected industry return) x (1 + relative TSR)$^{\text{target leverage}}$

21. -57% = [(1 - .6)/(1 - .09)] -1.

22. The peer company wealth ratio is 1.75 at the end of 2010 and 0.91 at the end of 2008, so the two year return is equal to (1.75/0.91)-1 = 0.92

23. We'll see this equation again when we discuss Edmans and Gabaix's Dynamic Incentive Account.

24. See O'Byrne and Gressle (2013), cited earlier.

for the loss of the expected industry return, plus a share of the dollar excess return, which is a measure of management's value added.[25] Also worth noting here is the *sharing percentage*, which is equal to the ratio of cumulative market compensation (again adjusted for the loss of the expected industry return) to expected shareholder wealth, which is calculated as beginning shareholder wealth multiplied by (1 + industry TSR). The excess return sharing percentage for the Dow top five in this case would have been very low—less that four tenths of one percent.[26] We will see a version of this sharing formula again when we discuss Raymond's perfect investment manager plan.

My plan does not provide for the payment of any cash compensation prior to the end of the five-year measurement period. While cash compensation would be treated as a draw against the ultimate value of the shares vesting, the plan does not help us understand the incentive effects of either paying a draw or of a full payout at the end of the five-year measurement period. But, as we shall see later, the plan devised by Edmans & Gabaix addresses both of these difficult issues.

Raymond's Perfect Plan for Investment Managers

Raymond's perfect plan for investment managers makes the total fee the sum of a base fee and a performance fee. We will see that the base fee is analogous to market compensation for a corporate executive and that the performance fee represents a share of the manager's cumulative excess return, or value added.

The basic objectives of Raymond's plan correspond to the three basic objectives of executive compensation. The first is to attract and retain capable managers. The plan tries to achieve this by providing a base fee that is tied to assets under management, just as operating companies try to attract and retain capable managers by providing target compensation tied to revenue or size. Raymond calls the base fee "the keeping-the-lights-on component" of manager compensation.

A second objective is to create a strong incentive to increase owner or beneficiary value. The plan tries to achieve this by (1) providing a performance fee tied to the manager's cumulative excess return, or "alpha," and by (2) calibrating the plan "in such a way that the base fee does not dominate the performance fee." The base fee creates "an asset-gathering incentive for the manager," just as competitive pay gives executives an incentive for revenue growth regardless of its effect on value. Since assets are a poor proxy for alpha, the base fee can undermine the incentive created by the performance fee, just as competitive pay concepts undermine the incentive created by stock compensation.

The third objective is cost efficiency. The plan tries to achieve this by (1) tying the performance fee to the manager's "information ratio" and cumulative excess return and by (2) treating the base fee as a draw against the performance fee. The information ratio is excess return divided by risk—that is, the manager's alpha divided by the standard deviation of the portfolio's tracking error vs. the benchmark.

Raymond's plan is built on two negotiated parameters, a base fee rate B and a performance fee rate P. To illustrate his plan, Raymond uses 2.5% for B and 25% for P. The base fee is calculated by multiplying the base fee rate (in this case, 2.5%) by the manager's active risk target, σ, which is calculated by multiplying assets under management by the acceptable level of volatility. For example, with \$500 million in assets under management and acceptable volatility of 4%, the active risk target is \$20 million and the base fee is \$500,000 (2.5% x \$20 million).

The performance fee is calculated as follows: $P \times Q_N \times X_N$, where P is the performance fee (25% in this case); Q_N is a quality, or skill, factor; and X_N is the manager's cumulative dollar excess return versus the benchmark. Q_N is calculated from the information ratio, the number of years the manager has run the portfolio (N), and the cumulative normal distribution function, $Q_N = \text{cdf.normal}(I_N \times \sqrt{N})$. For those managers who perform in the top quartile—which generally means having an information ratio of at least 0.5[27]—Q will increase from 0.69 in year 1 to 0.94 in year 10. The quality factor, like vesting generally, has the effect of deferring compensation and reducing the risk of paying for performance that is not sustained.

In any given year, the actual fee is the greater of the base fee or the cumulative performance fee in excess of total prior fees. Expressed as an equation, $f_N = \max\{B \times \sigma; (P \times Q_N \times X_N) - F_{N-1}\}$, where f_N is the actual fee for year N and F_{N-1} are the cumulative fees, including base fees, paid through the end of year N-1. If Q_N is close to 1, the formula becomes $f_N \approx \max\{B \times \sigma; (P \times X_N) - F_{N-1}\}$. If we define expected value added as the amount needed to generate the base fee—that is, expected $\Delta X = (B \times \sigma)/P$—we can then express the cumulative total fee as the sum of the cumulative base fee plus a fixed percentage of positive excess value added, where excess value added is equal to value added minus cumulative expected value added:

25. Perfect pay = cumulative market pay x (1+TSR)/(1+industry TSR)
= cumulative market pay x (1 + [(1+TSR)/(1+industry TSR)] – 1)
= cumulative market pay + cumulative market pay x [(1 + TSR – (1 + industry TSR)]/(1+industry TSR)
= cumulative market pay + [cumulative market pay/(1 + industry TSR)] x (TSR – industry TSR)
= cumulative market pay + [cumulative market pay/(1 + industry TSR)] x (market equity$_0$/market equity $_0$] x(TSR – industry TSR)
= cumulative market pay + [cumulative market pay/[market equity$_0$ x (1 + industry TSR)]] x (market equity$_0$ x(TSR – industry TSR)
= cumulative market pay + [cumulative market pay/[market equity$_0$ x (1 + industry TSR)]] x dollar excess return

26. More precisely, 0.358. The market equity value of Dow at the start of the plan is \$42.4 billion, based on 967 million shares outstanding a stock price of \$43.82. Adding the five year industry return of +75%, gives 2010 expected shareholder wealth of \$74.3 billion. Dividing market compensation of \$266 million by expected shareholder wealth of \$74.3 billion gives a sharing percentage of 0.358%.

27. Grinold, Richard C. and Ronald N. Kahn (1999), *Active Portfolio Management, 2nd Edition*. McGraw Hill, New York, NY, p. 114.

Table 2 **Vesting Multiples**

Year	Stock Grant Shares (000s)	Calculation of Vesting Multiples Projected Vesting Multiple 2006	Projected Vesting Multiple 2007	Projected Vesting Multiple 2008	Projected Vesting Multiple 2009	Projected Vesting Multiple 2010
2005						
2006	1,022.146	1.00	0.90	1.31	0.90	0.68
2007	924.033		1.00	1.44	0.99	0.75
2008	1,334.098			1.00	0.69	0.52
2009	916.286				1.00	0.76
2010	693.147					1.00
Stock Price		41.43	42.52	17.35	33.00	41.64
Stock Value		42,350	78,571	69,433	120,937	144,328
Cumulative Adj Mkt Comp		53,222	106,443	159,665	212,887	266,109
Company Relative Wealth Ratio		0.796	0.738	0.435	0.568	0.542

Projected vesting multiple = (1 + TSR)^(tgt leverage - 1) x [1 / (1 + peer group return)^tgt leverage] Stock value = shares x price x vesting multiple

Since 1 + relative TSR = (1 + TSR) / (1 + peer group return), the vesting stock value is equal initial stock value x (1 + relative TSR)^tgt leverage; this means that the vesting stock value will perfectly track relative TSR from the date of grant forward

F_N = cumulative B x σ + P x max{X_N - cumulative expected ΔX,0}.

The following more stringent version of Raymond's formula would make zero the floor for the total fee, not just the performance fee: F_N = max{0,cumulative B x σ + P x (X_N - cumulative expected ΔX)}. With this modification, Raymond's pay plan would have the same basic formula as my plan with pay leverage of 1.0—that is, *total pay is equal to cumulative market pay plus a fixed share of the cumulative value added.*

Raymond identifies the ratio of B to P as the "breakeven information ratio" because it is the information ratio that makes the performance fee equal to the base fee. In the case where B = 2.5% and P = 25%, the breakeven information ratio would be 0.1. But, as Raymond points out, "we would… expect the manager to have an IR significantly greater than 0.1; otherwise, the base fee will dominate the performance fee, which can lead to asset-gathering incentives."

Edmans & Gabaix's Dynamic CEO Incentive Account

Alex Edmans of the London Business School and Xavier Gabaix of NYU have proposed an "optimal compensation" plan that they call a "Dynamic Incentive Account" (DIA).[28] Before its final publication in the October 2012 *Journal of Finance*, their paper received the 2009 Best Paper Award from the Financial Research Association and was a finalist for the HBR/McKinsey Management Innovation of the Year Award.

Edmans & Gabaix's pay plan is particularly interesting because it is derived from more fundamental premises than either my or Raymond's plans. My plan is derived from the goals of perfect correlation of relative pay with relative performance and a zero pay premium at average performance. Raymond's plan is derived from the goal of paying only for alpha, subject to the constraint of providing a competitive base fee. I assume, as does Raymond, that relative shareholder return can be calculated and that it provides a reasonable measure of the manager's contribution to shareholder value.

Edmans & Gabaix (hereafter E&G), by contrast, derive their plan from a more basic set of assumptions—assumptions about the risk-free rate, the risk of the business, the CEO's life expectancy, the CEO's expected tenure, the CEO's discount rate, the time horizon of short-term benefits at the expense of long-term value, and the CEO's marginal disutility of effort. They assume that part of the stock return is due to manager's effort and part is due to external factors; but they also assume, unlike Raymond or I, that the owner knows only the total return, not the manager's contribution to the return. Their derivation identifies the specific plan features that are needed to maintain effort, prevent private savings from undermining incentive objectives, and eliminate any benefit from maximizing short-term value at the expense of the long-term value. Unlike my or Raymond's plans, they attempt to derive the annual pay leverages and vesting schedules that are needed to achieve optimal compensation.[29]

Here's how their proposed plan works. When the CEO takes office, the DIA is funded with the present value of the

28. Edmans, Alex, Xavier Gabaix, Tomasz Sadzik and Yuliy Sannikow (2012), "Dynamic CEO Compensation," *The Journal of Finance*, Vol. LXVII, No. 5 (October).

29. Edmans & Gabaix use two criteria to establish that the DIA provides optimal compensation. They show that any change in the contract reduces the CEO's utility and that the DIA is the cheapest of all the contracts that (locally) maximize the CEO's utility. The CEO's utility has two components: the utility from consumption, which they assume is proportional to the log of consumption, and the disutility from effort where effort is used to broadly "to encompass any decision that improves firm value but is personally costly to the manager. Low effort can refer to shirking, diverting cash flows, or extracting private benefits" (E&G, p. 1609). Although E&G begin by assuming that the utility from consumption is proportional to the log of consumption, they also show that their propositions hold under the more general assumption of constant relative risk aversion (CRRA).

CEO's expected future pay. Normally, this would be the present value of future market pay. On the first day of the CEO's tenure, a target percentage of the DIA is invested in the company's stock at the current stock price, with the remainder in cash earning the risk-free rate. During the year, the DIA is continuously rebalanced to maintain the target percentage in stock; and at the end of each year, a percentage of the DIA is paid out in cash to the CEO. At the start of each subsequent year, the target percentage invested in the company's stock is adjusted to reflect the CEO's shorter expected remaining tenure.

In E&G's plan, the fraction of the DIA in company stock is a direct measure of the sensitivity of pay to firm performance.[30] But E&G's plan, unlike my plan, is not explicitly designed to provide constant cumulative pay leverage. It's designed instead to provide the most cost-efficient incentive, which (given E&G's premise that the cost, or "disutility," of effort remains constant) is assumed to be achieved by maintaining a constant lifetime utility reward for successful effort. But if E&G start with different premises, their conclusion that "time t income should be linked to the return not only in period t, but also in all previous periods" is strikingly similar to my plan's requirements that target compensation reflect relative performance from the outset of the plan. And E&G's prescription that "the relevant measure of incentives is the percentage change in pay for a percentage change in firm value" is consistent with the concept of pay leverage that is at the core of my PP4P plan. But unlike my plan, E&G's provides increasing annual pay leverage as the CEOs age to reflect their shrinking time horizons, the reality that "there are fewer remaining periods over which to smooth out this lifetime increase" in utility.

But it's important to remember here that, unlike my plan, the E&G plan includes annual distributions of cash. And the main function of the increasing annual pay leverage can also be seen as offsetting the zero pay leverage of distributed cash and, by so doing, keeping cumulative pay leverage more or less constant.

E&G show that optimal compensation requires that the annual compensation distributed in cash equals market compensation x (1 + TSR_1)^target $leverage_1$ x … x (1 + TSR_n)^target $leverage_n$), where target leverage for year n is the percentage of the DIA invested in company stock in that year. If we make the simplifying assumption that the CEO has an infinite time horizon—in other words, that he or she is intent on maximizing the net present value of the firm—then target pay leverage will be constant (for a demonstration of this, see the Appendix), and annual cash compensation can be expressed with the following simple formula:

market compensation x (1 + cumulative TSR_n)^target leverage.

This is the same formula that governs pay in both my plan and Raymond's. In each of these three cases, total compensation starts with a market level of compensation—a level that is intended to reward average performance over time—and then adjusts that market level to reflect a manager's *cumulative* performance relative to peers.

Conclusion

Executive pay practice at U.S. public companies has shifted from sharing concepts to the current human resources model of competitive pay with the "pay mix" as the perceived driver of strong incentives to increase shareholder value. On closer inspection, however, a high percentage of pay "at risk" provides a weak incentive to increase shareholder value when combined with competitive pay policies that target dollar pay levels regardless of past performance. Target dollar pay provides a strong retention incentive and limits the shareholder cost of superior performance, but it undermines pay leverage and alignment by rewarding poor performance with an increase in sharing percentage and penalizing superior performance with a reduction in sharing percentage.

Recent years have seen the emergence of three remarkably similar versions of what I refer to as "perfect pay plans" that aim to provide strong incentives for both retention and performance. In this article, I show that pay under all three plans can be expressed as the sum of competitive pay plus a fixed share of some measure of *cumulative* excess return (as opposed to just year-by-year returns, in which pay packages are recalibrated annually). Each of these plans thus combines competitive pay, which provides retention incentives, with fixed sharing of the cumulative value added, which provides strong performance incentives. One of the main virtues of such fixed sharing in *cumulative* value added is that perfect pay plans provide competitive pay only when cumulative past performance has been at least "average," or the equal of its peer group's (by contrast, most current competitive pay plans aim to provide competitive pay every year regardless of past performance). This is probably the most important policy change that is needed to improve executive pay in public companies.

STEPHEN O'BYRNE is the President of Shareholder Values Advisors, a consulting firm that helps companies improve shareholder value through better performance measurement, incentive compensation and valuation analysis. He is the co-author, with David Young of INSEAD, of EVA and Value-Based Management.

30. Edmans & Gabaix use the terms "pay sensitivity," "pay elasticity," and "percent-percent" incentives to describe the DIA incentive; but since these concepts are all consistent with my concept of pay leverage, I refer to them all collectively as pay leverage to be consistent with the discussion earlier.

Appendix: More on E&G's Dynamic Incentive Account Plan

Edmans and Gabaix show that the leverage of annual cash compensation to the current year log return[31] in the DIA is given by the following formula:

$$\theta_s = g'(a^*_s)/(1 + \rho + \rho^2 + \ldots + \rho^{T-s})$$

where $g'(a^*_s)$ is the marginal disutility of effort in years, ρ is the CEO's annual discount factor,[32] T is the CEO's life expectancy, and s is the CEO's tenure to date.[33] Assuming that the marginal disutility of effort, $g'(a^*_s)$, is constant, this formula implies that annual cash compensation must become more sensitive to performance with each additional year of tenure.

They also show that $\ln c_t = \ln c_0 + \Sigma\theta_s r_s + \Sigma\theta_s^2\sigma_s^2$ where r_s is the log return in year s, σ_s is the standard deviation of the stock return in year s, and the sum is taken over the years from the start of the CEO's tenure to the current year.

Re-arranging this expression for c_t, we get $\ln c_t = \ln c_0 + \Sigma\theta_s^2\sigma_s^2 + \Sigma\theta_s r_s$. Taking the anti-log, we get $c_t = c_0 \exp(\Sigma\theta_s^2\sigma_s^2) \exp(\Sigma\theta_s r_s) \approx$ market pay x $\exp(\Sigma\theta_s r_s)$. This expression shows that, in equilibrium, competitive pay increases with pay risk (i.e., pay leverage θ_s) and business risk (σ_s) at the start of the plan and actual pay depends on each component of the cumulative return (r_s) since the start of the CEO's tenure. In the simplifying cases where θ_s is constant, the actual pay is equal to market pay x $(1+\text{cumulative TSR})^{\theta}$.

31. The log return is equal to ln(1 + TSR).

32. $\rho = 1/(1 + r)$ where r is the CEO's annual discount rate

33. When the possibility of short termism is taken into account, a slightly more complicated formula is needed after the first year of the CEO's tenure. See Edmans & Gabaix, *Journal of Finance*, p. 1633.

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