

THOMAS ECONOMETRICS

**quantitative solutions
for workplace issues**

**Compensation Reviews:
How To Use The Most
Important Tool in the Risk
Management Arsenal**

By Stephanie R. Thomas, Ph.D.

Thomas Econometrics
925 Canal Street
7th Floor
Bristol, PA 19007
P: (215) 642-0072

www.thomasecon.com



Contents

- INTRODUCTION.....4**
- THE CHALLENGE OF INTERNAL PAY EQUITY4**
- 1. INVOLVE LEGAL COUNSEL.....6**
- 2. ESTABLISH GOALS.....7**
- 3. PLANNING8**
 - Areas of the Organization to be Studied 8
 - Types of Compensation to be Studied 8
 - Internal and External Involvement..... 9
- 4. EMPLOYEE GROUPINGS.....10**
- 5. DATA.....13**
 - Determinants of Compensation 13
 - Data Accessibility and Measurability 14
 - Data Collection and Assembly 16
 - Identifying Data Gaps and Data Cleaning 17
- 6. MODEL BUILDING AND ESTIMATION19**
 - Multiple Regression Analysis 19
 - Model Specification..... 20
 - Estimation of the Model 21
- 7. EVALUATION OF RESULTS.....24**

Statistical Significance	24
Practical Significance.....	25
Sample Size	25
Goodness of Fit	27
8. FOLLOW UP INVESTIGATIONS.....	29
9. MODIFICATIONS TO COMPENSATION.....	30
10. REVISION AND RE-ESTIMATION OF THE MODEL	31
CONCLUSION.....	32

INTRODUCTION

The last two years have brought major changes in the legal and regulatory environment regarding compensation discrimination, and there are even more changes on the horizon. These changes encompass both individual claims and claims of systemic discrimination, and affect the policies and procedures employers need to have in place to combat discrimination.

The compensation review is a valuable tool in the employer's risk management arsenal, yet few organizations put this tool to use. In light of the new regulatory environment and the additional changes coming within the next twelve to twenty four months, employers can no longer afford to ignore this important tool.

This paper outlines the challenges employers are now facing with respect to internal pay equity and discrimination claims, and presents a comprehensive discussion of the compensation review. Each stage of the review process is presented, from the planning stage through the application of analysis inferences to business processes. Common pitfalls and data issues are discussed, and the importance of grouping employees properly for comparison purposes is emphasized.

THE CHALLENGE OF INTERNAL PAY EQUITY

The last two years have brought major changes in the legal and regulatory environment regarding compensation discrimination, and there are even more changes on the horizon:

Changes Already In Effect	Proposed Changes
Ledbetter Fair Pay Act	Paycheck Fairness Act
Creation of the National Equal Pay Enforcement Task Force	Department of Labor’s “Plan – Prevent – Protect” Compliance Strategy
Regulatory focus on both systemic and individual claims of discrimination	OFCCP’s rescissions of Compensation Standards & Guidelines
	OFCCP’s focus on “broad Title VII Principles”

For example, the Ledbetter Fair Pay Act greatly increases the time period for which compensation decisions can be challenged. As a result of the Act, employers could be facing charges of discrimination surrounding compensation decisions that were made ten, twenty, or even thirty years ago. Additionally, the Ledbetter Fair Pay Act allows claims related to the application of a “discriminatory compensation decision or other practice.” Because of this, decisions involving shift assignment, departmental or divisional assignment and other decisions typically thought of as “non-compensation” decisions may be challenged as compensation discrimination.

Compensation discrimination – and gender compensation discrimination in particular – is a priority issue for the current administration. The formation of the inter-agency National Equal Pay Enforcement Task Force, along with proposed regulatory changes, means that compensation discrimination will be under a spotlight, and every compensation decision you make will be met with more scrutiny from regulatory agencies.

The legal and regulatory changes encompass both individual claims and claims of systemic compensation discrimination, and affect the policies and procedures employers should have in place to combat discrimination.

The compensation review is a valuable tool in the employer's risk management arsenal, yet few organizations put this tool to use. In light of the new legal and regulatory environment, along with the likely changes coming in the next twelve to twenty four months, employers can no longer afford to ignore this important tool.

1. INVOLVE LEGAL COUNSEL

Any proactive or potentially self-critical study should be done under the auspices of legal counsel. It is imperative that legal counsel be involved in the compensation review. In-house counsel, and ideally outside counsel, should be involved from the very outset. Attorneys who are familiar with compensation reviews and the laws governing internal pay equity should be brought on board as early on in the process as possible.

The participation of legal counsel throughout the compensation review process will, in most cases, allow you to take advantage of attorney-client privilege and attorney work product, which can help to maintain the confidentiality and non-discoverability of your analyses.¹ Ideally, all correspondence, communication, data exchanges, and analysis results – particularly if outside consultants are involved – should be handled through legal counsel.

¹ Privilege issues are very complicated, and beyond the scope of the current discussion. Readers are encouraged to contact legal counsel with any questions regarding attorney-client privilege, self-critical analysis, or discoverability.

2. ESTABLISH GOALS

Having a clear understanding of what the organization is hoping to accomplish by conducting a compensation review is essential. If the goals of the review are clearly articulated, the process of tailoring the analysis to achieve those goals is greatly simplified.

Common goals of a compensation review include:

- Assessing an organization's exposure to compensation discrimination litigation;
- Assessing an organization's exposure to regulatory investigation;
- Assessing internal pay equity for all employees, irrespective of membership in a protected class;
- Planning for integration of new employees as a result of a merger, acquisition or other corporate transaction;
- Assessing whether compensation policies and practices of the organization are being executed correctly;
- Monitoring compensation as part of an integrated risk management strategy.

Irrespective of what you hope the compensation review will accomplish, it is critical to follow up on what the analysis reveals. If the organization is not prepared to make the necessary modifications as indicated by the compensation review, engaging in the analysis is essentially wasting time and money. Follow up will be discussed in more detail in a subsequent section.

3. PLANNING

During the planning phase, the groups of employees to be studied and the specific compensation metrics to be examined are defined. It's also important at this stage to determine which internal personnel will be involved, and how outside counsel and consultants will be utilized.

Areas of the Organization to be Studied

The first issue to be addressed during the planning stage is what areas of the organization will be studied. Depending on what you are hoping to learn from the compensation review, you may limit your analysis to a particular set of job titles, specific departments, locations within a specific geographic region, employees reporting to a given supervisor, etc. Having a well-defined study population will facilitate all of the other decisions made during the planning stage, such as what aspects of compensation will be examined, who will be involved in the compensation review process, and what data is required.

The choice of study population will be guided by the underlying goals of the analysis. If you are interested in evaluating a new sales compensation plan that was recently implemented, you may choose to limit the study population to the sales force. If there have been informal complaints of pay inequities among a group of employees reporting to a particular supervisor, you may choose to limit the study population to that supervisor's direct reports. If you are interested in an ongoing monitoring program as part of your overall risk management strategy, you may choose to examine the compensation of your entire workforce.

Types of Compensation to be Studied

When we think of compensation, we typically think of hourly pay rates or annual salary figures. While these two measures usually serve as the starting point for the

compensation review, there are other kinds of compensation to consider. For example, it may be useful to examine total compensation, annual salary, the hourly earnings rate, the regular rate of pay,² overtime earnings, commissions, bonuses or other components of compensation.

In most cases, the types of compensation to be studied will be governed by the study population. For example, if the study population consists of hourly warehouse workers, you may want to examine hourly rates and overtime pay. If the study population consists of exempt salaried employees, overtime pay would be irrelevant. If the study population consists of salespersons who are paid commissions, then commission earnings, in addition to base rates of compensation, would be a logical choice for examination.

Because different groups of employees are likely to receive different types of compensation, it's important to identify which types of compensation are appropriate. The measure of compensation will likely vary across different employee groupings; this is perfectly acceptable as long as the measure is consistent *within* each employee grouping.

Internal and External Involvement

When laying out the plan for the compensation review, it's important to determine who will be involved. A decision should be made as early as possible about the external

² An employee's regular rate of pay is not always equivalent to his hourly rate of pay. The regular rate includes the hourly rate plus the value of some other types of compensation such as bonuses and shift differentials.

personnel and internal personnel that will be involved in the project. Making this decision early on in the process has some distinct advantages.

As previously noted, it's preferable to involve outside legal counsel in the process. It may also be useful to involve outside consultants to perform the statistical analysis. Aside from potentially offering an additional layer of privilege and confidentiality, a qualified outside consultant will be best positioned to carry out the actual statistical analysis. A qualified outside consultant will have the expertise, experience and statistical tools required to perform the analysis, and can assist in interpreting the analysis results.

One of the biggest concerns of compensation reviews is confidentiality within the organization. Limiting involvement of internal personnel can address this concern directly. Fewer employees working on the compensation review means fewer potential leaks. Only those individuals with instrumental knowledge of compensation plans and those who will be directly involved in data collection and production should be involved. In most cases, these individuals will be senior human resources, payroll and information systems employees.

4. EMPLOYEE GROUPINGS

In order for the compensation review to generate meaningful results, it is important that the employees being compared against one another are "similar". It would be inappropriate, for example, to compare the compensation of the CEO of the organization against the compensation of entry-level administrative support staff; we would expect large differences in compensation between the CEO and the support staff, because they each serve completely different purposes within the organization. The grouping of employees, or construction of "similarly situated employee groupings" must

be performed with the utmost care. The manner in which employees are grouped can have a very strong effect on the results generated from the compensation self-audit.

There are no definitive rules for constructing similarly-situated employee groupings. However, the Office of Federal Contract Compliance Programs (OFCCP) proposed the following definition of a grouping of similarly situated employees:

Groupings of employees who perform similar work, and occupy positions with similar responsibility levels and involving similar skills and qualifications.³

The OFCCP notes that other “pertinent factors” should also be considered in the formation of groupings of similarly situated employees:

... otherwise similarly-situated employees may be paid differently for a variety of reasons: they work in different departments or other functional divisions of the organization with different budgets or different levels of importance to the business; they fall under different pay plans, such as team-based pay plans or incentive-based pay plans; they are paid on a different basis, such as hourly, salary, or through sales commissions; some are covered by wage scales set through collective bargaining, while

³ Federal Register, Department of Labor, Employment Standards Administration, Office of Federal Contract Compliance Program; Voluntary Guidelines for Self—Evaluation of Compensation Practices for Compliance with Nondiscrimination Requirements of Executive Order 11246 With respect to Systemic Compensation Discrimination; Notice, Part V, p. 35114 (Vol. 71, No. 116, June 16, 2006).

others are not; they have different employment statuses, such as full-time or part-time...⁴

In addition to those mentioned above, other “pertinent factors” may include geography⁵, business unit or department⁶, or some other measure of location.

In the construction of similarly situated employee groupings, it is important to think about the number of employees being grouped together. While it would be inappropriate to place the CEO and the CEO’s administrative support staff in the same SSEG, it would be equally inappropriate to place each employee in the organization in his or her own SSEG. The SSEGs should be “large enough” that meaningful statistical analysis can be performed.

The definition of “large enough” is somewhat subjective. At a minimum, there must be more individuals being studied than there are explanatory factors in the compensation model. If there are more explanatory factors than there are individuals being studied, the “effect” of each explanatory factor cannot be calculated using multiple regression analysis.

⁴ Federal Register, Department of Labor, Employment Standards Administration, Office of Federal Contract Compliance Program; Voluntary Guidelines for Self—Evaluation of Compensation Practices for Compliance with Nondiscrimination Requirements of Executive Order 11246 With respect to Systemic Compensation Discrimination; Notice, Part V, p. 35115 (Vol. 71, No. 116, June 16, 2006).

⁵ For example, locality adjustments or cost of living adjustments may be given to employees working in certain geographic locations.

⁶ Payroll budgets may differ by business unit or department. This, in turn, may lead to differing compensation amounts between employees performing identical tasks with identical job titles but working in different business units or departments.

The construction of SSEGs is one of the most important components of the compensation review. Errors in groupings can render the results generated from the review meaningless. Additionally, the SSEGs constructed by the employer serve as a memorialization of the organization's view of its employees and the functions they serve. Utmost care should be exercised in the construction of similarly situated employee groupings.

5. DATA

The compensation review hinges on data. The data phase of the process begins with identifying the types of data that will be required for the analysis. It is important to then consider whether the required data is accessible and measurable. If it isn't, it may be necessary to identify appropriate proxy variables. Once the relevant data has been identified and collected, it should be cleaned and examined for missing information. Properly cleaning and filling in any missing information is essential, since errors or gaps in the dataset can greatly increase both the time required and financial expense of the compensation review.

Determinants of Compensation

After defining the groups of similarly situated employees, the determinants of compensation within each employee grouping should be identified. Typically, these factors include such things as length of service, time-in-job or time-in-grade, relevant experience in previous employment, education and certifications, and performance evaluation ratings. Collectively, these factors are commonly referred to as "edge factors".

It may be the case that the determinants of compensation differ by employee grouping. For example, a CPA certification may be an edge factor for employees

working in the accounting department. It is likely, however, that this certification will have no importance for those employees working in the sales and marketing department. It is important to understand which edge factors apply to which groups of employees, and to build these edge factors into the compensation review as appropriate.

In the above example, the model for the accounting department would include a flag indicating the possession or absence of a CPA certification, whereas the model for the sales and marketing department would not. Model structures across groupings of similarly situated employees do not have to be identical; if different edge factors exist for different employee groupings, the model structures should reflect this.

Data Accessibility and Measurability

After identifying all relevant edge factors for each of the employee groupings, the question then becomes whether these factors can be measured and whether data for these factors readily exists within the organization.

Some factors will be relatively easy to quantify using readily-available data. For example, length of service can be calculated using date-of-hire, a measure that is commonly maintained in human resources databases.

Other factors, such as relevant prior experience in previous employment, may be difficult to quantify because of data limitations. The employer may not maintain information on prior experience in an easily-accessible computerized format. If, for example, the only available source of prior experience information is hard-copy resumes, and these resumes exist for only some, but not all, employees, the costs involved in data collection and data entry may be prohibitive.

Finally, some edge factors do not lend themselves to quantification because of their subjective nature. For example, assume that one of the edge factors identified is

the number of publications authored by an individual that are published in a “top-tier” peer-reviewed journal. While it may be easy to count the number of articles an individual publishes, defining the array of “top-tier” journals is a more difficult, if not impossible, task.

If an edge factor cannot be easily quantified, or if data collection would be prohibitive, a proxy variable is often substituted. A good proxy variable is one that is easily measurable and is highly correlated with the edge factor for which it is being substituted. In some cases, a good proxy variable will be easy to identify. In other cases, a proxy variable may be difficult to identify and/or may be less than perfect.

One of the most commonly used proxy variables is potential prior work experience. It is often substituted for actual prior work experience when collecting actual experience is prohibitive. There are two problems with using potential work experience as a proxy or a substitute for actual work experience.

First, potential work experience may not reflect relevant actual work experience. If an individual changes from one job to another, changes occupation to another, and the skill sets and human capital requirements are different for those two occupations, potential work experience is likely to overstate actual relevant work experience.

Second, using potential work experience in a compensation model can introduce an artificial gender bias. This artificial gender bias stems from the fact that women typically experience greater periods of absence from the labor force than men. Because potential experience does not consider leaves of absence, it may overestimate actual work experience for women.

Consider the following example. A thirty-five year old male employee and a thirty five year old female employee hold the same job and have identical educational backgrounds. Both entered the labor force at age 22, right after completing bachelor’s degrees. Assume that the male employee has thirteen years of prior relevant

experience, while the female employee has eight years of relevant prior experience because she left the labor force after giving birth and did not return until her child began elementary school. Further assume that the male earns \$2,500 per year more than the female employee, and we know with certainty that this \$2,500 difference is attributable to the five year difference in experience, and nothing else.

Using potential work experience does not, and in fact cannot, account for the situation described above. Our calculation of potential work experience would indicate that both individuals have thirteen years of experience. If we compare the compensation of the male employee and the female employee in the above example and control for gender and potential work experience, the model will indicate that the \$2,500 difference in earnings is attributable to gender. More specifically, one might infer that the \$2,500 difference is attributable to gender discrimination, when in fact the difference is attributable to differences in actual work experience.

The choice of proxy variables should be carefully considered, and the positive and negative implications of each proxy variable should be weighed against their accessibility.

Data Collection and Assembly

When collecting and assembling data for the compensation review, the goal is to construct an employee-level data set that captures all relevant information for each employee in the study population. The relevant information will be defined by the determinants of compensation. It is not enough to simply extract each employee's identification number and compensation amount; information regarding all of the edge factors, as well as any other relevant information should be collected as well.

The manner in which data collection and assembly will proceed depends on the information systems of the organization. If the organization maintains its human resources and compensation information in an electronic database, then a query should

be carefully constructed to extract the relevant information from that database. When constructing the query, ensure that all relevant job codes, departments, divisions, etc., are included so that information for all individuals in the study population are captured.

Extracting all relevant information about each employee in the study population in the same query allows the creation of one comprehensive data set. If required information is missing from the initial query, if relevant job codes are inadvertently missing from the initial query, etc., it will be necessary to either re-extract all information or create a supplemental file which will then have to be appended to the original file. This can be a costly process, both in terms of financial cost and time. It also introduces the opportunity for mistakes to be made when appending files. Take the time necessary to formulate a complete and comprehensive query for extracting all relevant information for all relevant employees in one file.

If the organization does not maintain its human resources and compensation information in an electronic database, the required information will need to be assembled by hand. All of the above guidelines hold for manual assembly of data. Ensure that all relevant information for all employees in the study population is captured. When constructing the data set for the compensation review manually, the financial cost and time required to repair an inaccurate or incomplete file is substantially increased. Ensure that all relevant information for all relevant employees is captured in the initial file.

Identifying Data Gaps and Data Cleaning

Prior to sending the assembled data to the consultant or person actually performing the statistical analysis, it must be cleaned and reviewed for gaps and missing data. All problems should be identified, and if possible, corrected. If, for example, the compensation rates for a given grouping of similarly situated employees contain a mixture of hourly rates and annual salary figures, it is necessary to convert

the hourly rates to annual salaries, or vice versa. Adjustments to “full time equivalents” may be necessary if the standard number of hours per day differ across employees. The point here is that the data should be *internally consistent* among employee groupings.⁷ If there are any gaps in the data⁸ that can be filled, this additional data should be collected and integrated into the data set. If the gaps are sufficiently large and / or are unable to be filled, and no suitable proxy variables exist, it may be necessary to remove that factor from the analysis.

Aside from ensuring a correct and comprehensive data set for the compensation review, examining gaps in data can provide valuable insight into your processes and procedures. Missing pieces of information for one or two employees is probably not indicative of a larger problem. If large numbers of employees are missing the same piece of information, it could indicate a problem in your process. Systemic data gaps should be investigated and any deficiencies in data processes should be corrected so that future problems can be avoided.

⁷ It is not problematic from a statistical point of view to express compensation in terms of an hourly rate for some employee groupings and in terms of an annual salary for other employee groupings. The key here is consistency within grouping, since the grouping of similarly situated employees will serve as the unit of analysis for the multiple regression analysis.

⁸ For example, if date-of-birth is missing for some employees, and age-at-hire is to be used in the multiple regression analysis, this information should be collected and integrated. Entering “0” for those individuals with no available date-of-birth can potentially have a strong impact on the estimated effect of age-at-hire on compensation.

6. MODEL BUILDING AND ESTIMATION

After constructing a correct and comprehensive data set containing all relevant information for all employees in the study population, the statistical model can be built and estimated. The most commonly used model form for a compensation review is multiple regression analysis.

Multiple Regression Analysis

Multiple regression analysis is a generally accepted and widely used statistical technique. It shows how one variable – in this case, compensation – is affected by changes in another variable. In the current context, it provides a dollar estimate of the “effect” of the edge factors on compensation.

Multiple regression analysis is one of the preferred techniques because the calculations involved in estimating the effects are relatively simple, interpretation of the estimated “effects” is straightforward, and the entire compensation structure can be expressed with one equation.

The beauty of multiple regression analysis is that it estimates these effects net of all of the other edge factors in the model. In other words, multiple regression analysis allows one to estimate how many more dollars of compensation an individual would be expected to receive if (s)he had one additional year of length of service, holding all other edge factors constant. The effects of each of the edge factors can be separated out, and a separate effect is estimated for each of the individual edge factors.

However, multiple regression analysis does have some limitations. One limitation is that the sample size (i.e., the number of individuals being studied in each of the employee groupings) must be “sufficiently large”.

The definition of “sufficiently large” is somewhat subjective. At a minimum, there must be more individuals being studied than there are explanatory factors. If there are more explanatory factors than individuals being studied, the “effects” of each of the factors simply cannot be estimated.

Assuming that the sample size meets this minimum threshold, determining whether the sample size is “sufficiently large” becomes a question of judgment. For example, assume that compensation is thought to be a function of total length of service with the organization and time in grade.

The minimum threshold in this case would be three employees (since there are two explanatory variables – length of service and time in grade). However, the minimum threshold sample size of three is not “sufficiently large” to generate any *meaningful* results. In general, more observations (in this case, each employee is an observation) used in the estimation generate more powerful statistical tests and more robust results.

Model Specification

While all multiple regression models share the same underlying features – namely examining how changes in an independent variable affect the dependent variable – there are hundreds of variations in terms of model specification. Choosing an appropriate model specification for your particular compensation review will be based on the goals of the review, the kind(s) of compensation being examined, the determinants of compensation, and other factors unique to your organization. There is no “one-size-fits-all” specification for compensation models.

That being said, the most common specification used in compensation reviews is the “classical” model specification.⁹ In the classical model, protected group effects can be measured directly via inclusion of a protected group status variable. The common form of the classical model is as follows:

$$\$ = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 \text{PROTECTED} + \varepsilon$$

where

a = intercept term

β₁ = coefficient of X₁

X₁ = determinant #1 of compensation

β₂ = coefficient of X₂

X₂ = determinant #2 of compensation

β₃ = coefficient of protected variable

PROTECTED = protected variable

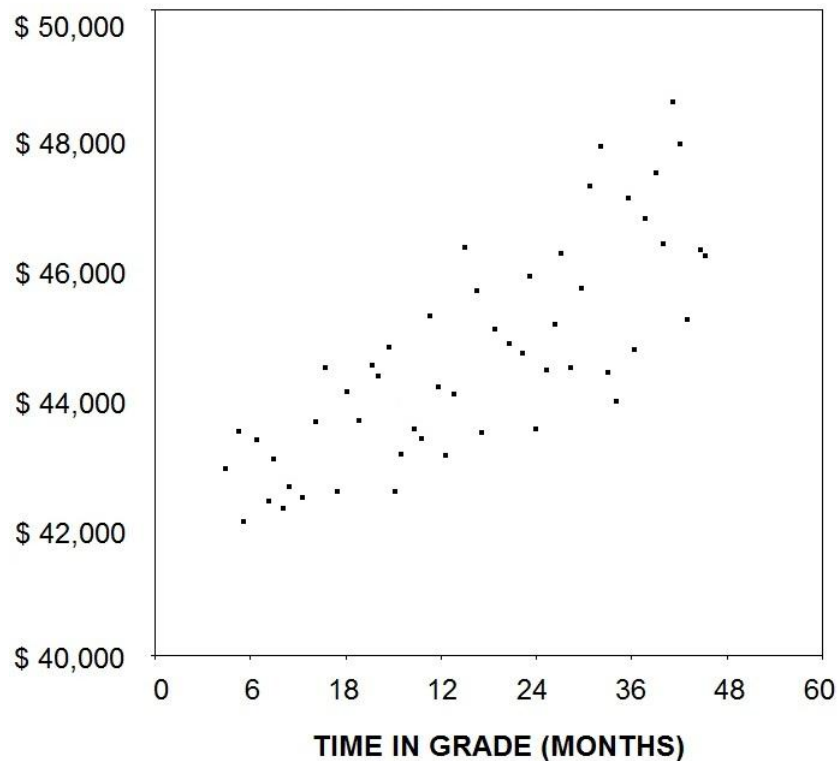
The main advantage of the “classical” model is that protected effects can be estimated directly.

Estimation of the Model

When the model is actually estimated, one is estimating how changes in an independent variable (e.g., edge factors and the determinants of compensation) affect the dependent variable (e.g., compensation), holding all other independent variables constant.

⁹ For simplicity of explanation, the discussion will be limited to linear regression. There are a variety of non-linear specifications; these specifications are beyond the scope of the current discussion.

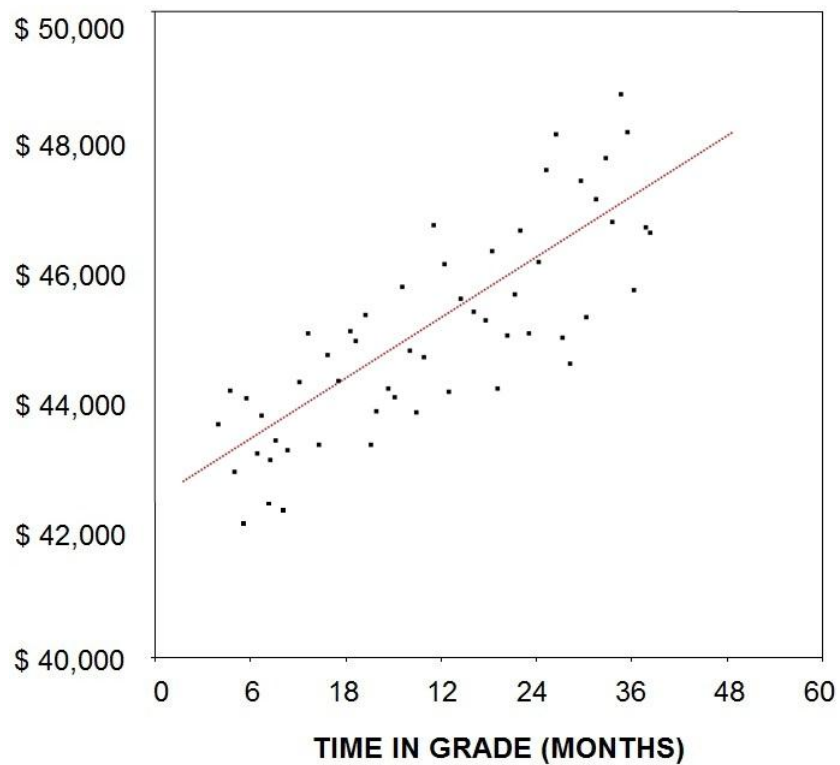
Consider the following simple example. Assume that we're interested in exploring the relationship between compensation and time in grade. When the compensation levels and time in grade measures are plotted for the individuals in our employee grouping, we see the following pattern:



The linear estimation process identifies the line that best fits the collection of data points.¹⁰ In the case of this simple model with only one explanatory variable, the linear estimation process will identify the two key pieces of information that describe this line:

¹⁰ The determination of which line fits “best” is a complex statistical calculation that is beyond the scope of the current discussion. For those readers interested, details can be found in any statistics or econometrics textbook.

(1) the intercept, or where the line crosses the vertical axis, and (2) the slope of the line. The results of the linear estimation process can be graphically represented as follows:



When more than two variables are involved, multiple regression analysis allows one to estimate how changes in an independent variable (e.g., edge factor) change the dependent variable (e.g., compensation), holding all other independent variables constant

The actual estimation of the parameters in the model involves a complex statistical calculation that is beyond the scope of this discussion. If readers are interested in learning more about the estimation process, calculation details can be found in any statistics or econometrics textbook.

7. EVALUATION OF RESULTS

When reviewing and evaluating the results of a multiple regression analysis, there are four key issues to keep in mind: (a) statistical significance, (b) practical significance, (c) sample size, and (d) goodness of fit. Failing to consider all four of these issues when evaluating results can lead to inappropriate or inaccurate conclusions about your compensation process. Only by examining all four can you draw sound inferences that can reliably guide decision-making.

Statistical Significance

Statistical significance refers to the likelihood that the observed effect is attributable to chance. Within the context of a compensation review, statistical significance addresses whether an observed difference in hourly rates, for example, between whites and non-whites within the same similarly situated employee grouping is attributable to chance.

An observed outcome is said to be statistically significant if the probability (or likelihood) of that outcome is “sufficiently rare” such that it is unlikely to occur due to chance. The commonly accepted definition of “sufficiently rare” among social scientists is five percent ($p = 0.05$); this is equivalent to approximately two units of standard deviation.

This definition has also been adopted by courts. In *Hazelwood School District v. US*, the Supreme Court held that “a disparity of at least two or three standard deviations” is statistically significant.

There is one important point to keep in mind regarding statistical significance. Even if a disparity in compensation exists between, for example, men and women within the same employee grouping, no adverse inference should be drawn unless that difference is statistically significant. From a statistical perspective, a difference that is

not statistically significant is not different from zero. One cannot infer that an observed differential between the compensation of men and women within the same employee grouping is attributable to anything other than chance if that differential is not statistically significant.

Practical Significance

Statistical significance addresses the question of whether an observed disparity is “sufficiently rare”. Practical significance addresses the question of whether an observed disparity is “big enough to matter”. Statistical significance does not consider the practical implications of an analysis. Practical significance focuses on this issue.

Unlike statistical significance, there are no generally accepted guidelines for determining whether an observed disparity is big enough to matter; the determination is based on the judgment, experience and expertise of the person reviewing the results. It should be noted that in the same decision establishing the legal threshold of statistical significance, the Supreme Court also stated that gross statistical disparities could, by themselves, constitute prima facie proof of a pattern or practice of discrimination.

Thinking about whether the size of an observed difference is big enough to matter – irrespective of statistical significance – is a critical part of managing risk associated with your compensation decisions. You don’t want to be in the position of having a \$5.00 per hour difference in the wage rates of men and women in the same similarly situated employee grouping and ignore it because the units of standard deviation are only 1.75, not 2.00. It is critical to consider whether the observed difference is big enough to matter, and if it is, to take appropriate corrective action.

Sample Size

When evaluating the results of a statistical analysis, it is important to consider the sample size, or number of employees being studied in each grouping. As mentioned in

a previous section, the employee groupings should be “large enough” that meaningful statistical analysis can be performed, but the definition of “large enough” is somewhat subjective.

In the case of a compensation review, the sample size refers to the number of individuals being studied within each grouping of similarly situated employees. A smaller sample size (i.e., a smaller number of individuals in the grouping) means less information about the underlying process. On the other hand, a larger sample size means more information about the underlying process.

The sample size and the amount of information can directly influence the outcome of a statistical analysis. Consider the following example. If we flip a coin once and get a head, are you comfortable concluding that the coin is biased toward heads? Probably not – you do not have enough information to make that determination based on one flip. But if we were to flip the same coin one hundred times and got one hundred heads, then you would probably be comfortable concluding that the coin is biased. You now have one hundred times more information than you had before. You know that even though getting one hundred heads in one hundred heads is theoretically possible, it’s highly unlikely. You also know that getting one head in one flip is not that unlikely; you would expect it to happen fifty percent of the time. You wouldn’t statistically conclude that the coin is biased based on one head in one flip. You would conclude, however, that the coin is biased based on one hundred heads in one hundred flips.

The same holds true for a compensation analysis. If our grouping of similarly situated employees contained only one male and one female, we couldn’t conclude that there is – or isn’t – a gender bias in compensation. There simply is not enough information. When an analysis involves a small sample size, it is not unusual to see a statistically insignificant result. This is because there is not enough information and the statistical test lacks power. You might, for example, select five individuals from a given similarly situated employee grouping, and find a statistically insignificant earnings

differential by gender. However, if you studied all fifty individuals in that similarly situated employee grouping, you have more information about the compensation process. The test has more power, and it's possible that the difference in compensation by gender now would be statistically significant.

If an analysis involves a small sample size, it is not uncommon to get an insignificant result simply because there is not enough information and the test lacks power. When evaluating the results of a statistical analysis, it is important to ask how the results would change if there were more observations and the sample size was larger. From a risk management perspective, it is inappropriate to take comfort in a statistically insignificant result based on a very small sample size. It is important to evaluate what impact the sample size is having on the results, and how those results would change if the sample size was increased.

Goodness of Fit

The purpose of a statistical model is to examine the relationship between variables. A statistical model of compensation examines the relationship between compensation and the factors that determine compensation.

An ideal statistical model is a mathematical representation of the decision-making process. With respect to compensation, an ideal model would include all of the factors that determine an individual's compensation. If time in grade, for example, is an important determinant of compensation, then the model should include time in grade. If the model does not include time in grade, then it is not going to a good job of describing the compensation process. Similarly, the model should not include factors unrelated to compensation.

It is important to keep in mind that statistical models can do a poor job of describing the underlying process, but still generate results that appear to be reliable. For example, assume that your internal process sets compensation for a particular job

based on seniority, years of prior relevant work experience, having a particular certification, and the number of patents held. Further assume that you're interested in assessing whether a difference in compensation by gender exists. If you were to build a model that contained only compensation and gender, and excluded all of the determinants of compensation, the model would not accurately describe how compensation is determined. But the model would still generate results. In fact, it may produce a result showing a statistically significant disparity in the earnings of men and women. A properly specified model that "fit" the decision-making process and included seniority, years of prior relevant work experience, the certification, number of patents held and gender may indicate that there is no disparity in compensation by gender.

If you did not know that the first model containing only compensation and gender did a poor job of describing the compensation process and didn't "fit", you may infer that there was a gender equity issue and begin adjusting the compensation of men and women in this job title unnecessarily, perhaps creating additional equity problems along the way.

Understanding how well the compensation model "fits" is critical. There are several statistical tools that can be used to assess the goodness of fit of a model. These techniques range from very simple to very complex. One of the simplest tools is the Adjusted R Squared statistic. This statistic indicates how well variations in the dependent variable (in this case compensation) are explained by variations in the independent variables (in our example, seniority, years of prior relevant work experience, etc.).

Part of evaluating the results of any statistical analysis is understanding how well the model fits the actual decision-making process. Ensure that the model fits before taking any action based on the results generated by that model.

8. FOLLOW UP INVESTIGATIONS

If the results of the multiple regression analysis indicate a disparity that is statistically or practically significant, follow up is required. The exact type of follow up will depend on what factors determine compensation, who made the compensation decision, and how that decision was made.

Typically, follow up includes reviewing personnel files, reviewing performance rating information, and discussions with managers, supervisors and human resources personnel. Follow up may be coordinated jointly through an organization's legal department and outside counsel. It is not uncommon for outside consultants to become involved in follow up efforts.

There are various methods of follow-up, such as review of personnel files, review of performance ratings, and discussions with managers and human resources personnel. This follow-up may be conducted jointly with an organization's legal department and/or outside counsel. It is not uncommon for outside consultants to also become involved.

The kind of follow up depends on the type of employment decision you're studying, and how that decision is made. Typically, follow up includes reviewing personnel files, reviewing performance rating information, discussions with managers and supervisors and discussions with employees themselves.

Follow-up is important, because it can identify things you may have left out of the model. When talking to a manager about a gender pay disparity for a particular employee grouping, you might learn that some of the employees in that grouping were red-circled. The red-circling may be the reason for what would appear to be a disparity. You would then want to incorporate red-circling into your statistical model, and re-estimate to see how the gender pay disparity changed.

Follow-up can help you identify special circumstances affecting one of the employees in the grouping – in statistics we call a person like this an outlier. Outliers have the potential to dramatically impact the results of an analysis. Follow up can help you identify who is an outlier – and WHY they're an outlier. You can then account for that outlier in your model.

Follow-up may also reveal that your model includes everything it should include, there are no special circumstances or outliers, and there is no explanation for an observed disparity.

Follow up determines what you do next – whether you go back and reconsider your model, or whether corrective action should be taken.

9. MODIFICATIONS TO COMPENSATION

Depending on what you find during your follow-up investigations, adjustments or modifications to compensation may be warranted. It is highly recommended that before making adjustments to individuals' compensation rates, those adjustments are fully discussed with counsel and any outside consultants involved in the review process before they are implemented. What may appear to be a minor change can have wide-sweeping implications for the compensation structure of the entire organization. It is important to understand the ramifications of the proposed adjustments before implementing them.

Determining the size or amount of the required adjustment can be a complex calculation. The details of this calculation are beyond the scope of this paper. The essential idea behind the calculation is that the size or amount of the adjustment should be sufficient so that any unexplained disparity between the individual's compensation and those of her comparators is eliminated, but not so large that unexplained disparities

where her compensation is greater than her comparators is created. Making adjustments to compensation is a delicate balancing act, and overcorrection can create new sets of problems.

It has been my experience that when adjustments to individuals' compensation is required, organizations take one of two approaches. Some organizations propose changes to bring compensation into parity – that is, they fully correct any shortfalls for any individuals and create true internal pay equity. Other organizations choose to propose adjustments that are just sufficient to eliminate the statistical significance of the unexplained disparity, but do not completely eliminate the unexplained difference. The logic here appears to be remedying the statistical significance, rather than remedying the underlying problem.

While remedying only the statistical significance of the unexplained disparity can be less expensive in terms of total payroll dollars, it is a disingenuous approach and can be extremely dangerous from a risk management perspective. In the event that your compensation practices are subject to claims of discrimination, an organization would be presented in a very bad light if it was discovered that this approach had been taken in the past.

10. REVISION AND RE-ESTIMATION OF THE MODEL

After any missing explanatory factors have been identified through follow-up investigations and any proposed modifications to individuals' compensation have been made, the model should be re-estimated. The purpose of this re-estimation is to assess the effect of the additional explanatory factors on the performance of the model and the estimated protected effects, as well as the effect of any proposed modifications to compensation.

It is critical that any proposed changes are “tested” via re-estimation of the compensation model prior to implementing those changes. It is important to assess whether the proposed changes have adequately remedied the unexplained disparities and have not created any other unexplained disparities in the process. The idea of testing the proposed changes is to avoid the situation of making multiple rounds of adjustments to individuals’ compensation.

Model revision and re-estimation is an iterative process. The process continues until the final specification of the compensation model resembles the actual decision-making process as closely as possible, and the effects of any required adjustments to individuals’ compensation have been fully tested.

CONCLUSION

The compensation review is a valuable tool that can help employers manage their risk of compensation-related litigation and regulatory investigation. But it can also provide a deeper understanding of the organization’s compensation practices. It can provide an empirical test of whether the organization’s compensation policies and practices are actually being followed. Use this tool to take control of your compensation practices, learn what story your compensation data will tell, and be proactive in managing your risk of compensation-related litigation and regulatory investigation.