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CEO COMPENSATION VOLATILITY OVER THE BUSINESS CYCLE

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Abstract

This paper analyzes the differences in compensation volatility between the CEOs of publicly traded companies and US employees over the business cycle for the period from 2000 to 2009. Using data from the Current Population Survey for employees and Capital IQ for CEO compensation, we use statistical analysis to compare the impact of business cycle changes on pay levels. The findings of this paper show that CEO pay levels face greater volatility. Business cycle measures such as change in GDP and unemployment are found to have a statistically significant impact on CEO compensation, but little impact on average employee wages. Recession years, such as 2001 and 2007, also were found to have greater impacts on CEO pay levels compared to average employee wages. This difference is likely the result of the structure of modern CEO pay packages that include stock and options. These pay packages are intended to align CEO and shareholder interests, but reflect market fluctuations as a result. While CEOs earn more in absolute terms, they face a greater relative impact from changes in the economy.

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1.0 Introduction

Executive compensation has grown quickly in recent decades, and has become a hotly debated issue. The increase in compensation has brought with it a great deal of criticism from the average employee, and also extensive research into its causes by scholars. An equally as debated topic is the cyclicality of the real wage for average employees, referring to it as pro-cyclical or countercyclical. While there is an outcry to reign in the increases of CEO compensation, it also raises the question of how vulnerable their pay is to the business cycle. If executives are appropriately compensated for their performance, no matter how much that compensation is, their pay should change more dramatically over the course of the business cycle when compared to the real wage of average employees.

The reason for the increase in executive pay levels is disputed. On one end of the spectrum, some believe that the high level of CEO compensation is the result of an intensely competitive market for talent and is therefore justifiable. On the other end of the spectrum, it is argued to be the result of executives using managerial power to extract rents from their firms. Early research linking executive compensation to firm size or performance alone proved to be inconclusive or incorrect due to multicollinearity (Murphy, 2002). As CEO compensation structure has changed over time, pay levels have more closely mirrored firm expansion in recent decades.

The financial crisis of 2008 created a great deal of scrutiny for executive compensation and the process that determines their pay. The sentiments were similar following the technology bubble crash of 2001. While there is ongoing debate about the legitimacy of CEO compensation levels, it raises questions as to how those pay levels react to changes in the business cycle. Specifically, is CEO pay subject to greater variability, in comparison to the average real wage,

when it comes to changes in GDP or unemployment?

The goal of this paper is to examine the changes in CEO compensation over the life of business cycles, compared to the changes of average employee wages during the same time period. The last decade includes two major business cycle fluctuations and serves as a legitimate testing ground for this hypothesis. Data for CEO compensation was collected from publicly traded companies using Capital IQ, an online database. Average employee compensation was found using the Current Population Survey, conducted by the Bureau of Labor Statistics. The changes in compensation were compared using STATA, a tool for linear regression analysis.

The results of this analysis found greater volatility over the business cycle for CEO pay levels when compared to average employee wages. A rise in unemployment coincided with a greater negative change in CEO earnings. While there was little change for average employee wages for each year of the decade, CEO compensation changed dramatically by year. Executives also had higher increases in pay levels during the middle of the decade, consistent with the growing economy of the time. These results show the volatility of CEO pay levels over the course of a business cycle.

The paper is organized the following way. Section 2 includes a literature review on related historical research. Section 3 describes the methods used for this research. Section 4 includes the findings and discussion of the results. Section 5 is a conclusion of these findings and possibilities for future studies.

2.0 Literature Review

2.1 The Growth in CEO Pay

There has been a tremendous amount of research into the rapid growth of CEO compensation that has taken place over the last three decades. The changes have been drastic in comparison to average employee wages. Data from Frydman and Saks (2010) is the most long-term look at the growth of executive compensation, running from 1936-2005. The data shows that compensation went mostly unchanged from the end of World War II to the mid-1970's. This is surprising because firm sizes grew quite dramatically over that same period. Boschen and Smith (1995) also found similar results of a relatively flat growth over the same period in the chemical, aerospace, and electronics industries. While there is no conclusive reason for the increase, the data shows unanimously that CEO compensation changed most dramatically beginning in the 1980's (Frydman and Jenter, 2010).

The data from Frydman and Saks for the period of 1936-2005 found a steep change starting in the 1980's. The median level of compensation, adjusted for inflation, has seen the greatest growth from 1990-2000. According to the research, the growth rate reached more than 10% by the end of the decade and reached a median peak of $7.2 million in 2001 for CEO's of S&P 500 companies. The same comprehensive data also revealed that average, instead of median, compensation grew more rapidly, which implies top-end compensation became increasingly skewed. The research also found that pay increases were steeper for large-cap companies, in comparison to small-cap and mid-cap companies.

The research on CEO compensation can largely be divided into two periods, post World War II to 1979 and 1980 to the present. According to the results of Frydman and Saks (2010), the second era saw CEO pay expand at roughly the same rate as the firms. This contrasts to the

previous era, where firms had explosive growth and CEO compensation stayed relatively the same. These results have also been verified in other cross sectional studies such as Jensen and Murphy (1990), Hall and Liebman (1998), Murphy (1999), and Bebchuk and Grinstein (2005). The growth of CEO compensation has slowed in the last decade due mainly to both the technology crash and financial crisis (Frydman and Jenter 2010).

2.2 CEO Compensation Structure

Pay practices differ greatly across most firms, but today's CEO compensation is made up of largely five different parts. Most packages for a CEO include salary, annual bonus, long-term incentive plan payouts, restricted options, and restricted stock. Included with this yearly compensation are also various benefits such as pension plans, insurance, and severance payments for the case of departures (Frydman and Jenter 2010).

The most common change in compensation structure has been the introduction of various pay for performance measures that have been included over time. The first multi-year performance plans began to appear in the 1960s. They were paid out over several years and consisted of mostly cash and stock. However, rapid change did not occur until the 1980s and 1990s when stock options became the largest component of top CEO's compensation. According to Frydman and Saks (2010), options accounted for 20% of CEO pay for S&P 500 firms in 1992, but this rose to 49% in 2000. An important point of emphasis is that the increased use of options did not come at the expense of any other part of the compensation package as base salaries grew over the same period. The results of small-cap and mid-cap companies also found similar results with increased use of options in compensation packages.

According to two studies these changes were possibly the result of tax policies that made

pay for performance compensation more appealing (Murphy, 2002; Hall and Murphy, 2003). Another reason could be accounting rules that downplayed the cost of option-based compensation. Lastly, the change in compensation structure using options also coincides with the growing popularity of aligning CEO and shareholder interests. This would provide a better incentive for CEOs to establish more long-term objectives due to their ownership stake in the company, as opposed to searching for short-term rewards.

2.3 Drivers of CEO Compensation

There is no universally accepted reason among scholars to explain the sudden and drastic increase in CEO compensation. It is up to the board of directors, who represent the shareholders of a publicly traded company, to set the compensation for the CEO. Many scholars argue for two opposite points of view, although extensive research can be found anywhere in between. On one side, it is believed that CEOs are using their managerial power to extract rents from the company (Fama, 1980; Fama and Jensen, 1983; Jensen, 1993; Hall and Murphy, 2003, Bebchuk and Fried 2004). On the other end, many believe the increase in CEO pay is the direct result of a fair market, paying competitively for executive level talent (Rosen, 1990; Himmlberg and Hubbard, 2000; Hubbard, 2005; Gabaix and Landier, 2008). Both arguments are sound, and form a complete picture on the current state of executive compensation.

2.3.1 Managerial Power Theory

The idea behind a CEO with managerial power, extracting rents, is that of the principle agent problem. The belief is that CEOs may be self interested, and concerned only for their own short-term benefit. This would lead to decisions that negatively impact the longstanding stability

of a company. It is exceedingly difficult for shareholders to perfectly monitor executive actions. Many shareholders also lack the expertise necessary for judging whether or not a CEO's decisions are the best course of action, leading to a situation with imperfect information. This problem has existed since the separation of ownership and control (Berle and Means, 1932). It sets up a situation where managers will pursue actions for themselves at the expense of the company and its owners. Research conducted by Jensen & Meckling (1976), Jensen (1986), Morck et al. (1990), and Bertrand & Mullainathan (2001), show how damaging this problem can be for the well being of a company. This is important to CEO compensation because the structure of the CEO pay can provide a solution to the principle-agent problem by aligning executive and shareholder interests (Jensen and meckling, 1976). By including an ownership stake in the form of options, a CEO has incentives to do what is best for its shareholders. The inclusion of options into the compensation package has also raised CEO pay levels considerably, contributing to inefficiency in the compensation market. At the same time, the addition of stock options, perquisites, pensions and severance packages are not as easily measurable (Bebchuk and Fried, 2004).

The resulting drop in CEO following the implement of the Sarbanes-Oxley Act provided further proof on managerial power over the board of directors. One requirement of the act, which was strongly correlated with a drop in compensation levels, was that a majority of the board members for a given firm had to be independent. The result was a significant relative decrease in the amount of compensation coming from stocks and bonus. Firms that did not regulate strictly before Sarbanes-Oxley saw a dramatic decrease in compensation levels following its enactment (Chhaochharia and Grinstein, 2009). Before these new rules were in place, the CEO had some level of control over the placement of new board members. They would use this power to create

situations that were advantageous for them.

Rent extraction is able to exist in the free market because there is a high cost to replace CEOs. There is also an equilibrium point for CEO compensation under these circumstances because too much rent extraction will result in one being fired (Kuhen and Zwiebel, 2009). Weak corporate governance, which leads to rent extraction and higher compensation, can coexist in a market with strong governance. The higher pay levels created by these companies creates a negative externality on strongly governed companies by raising the market price for competitive CEO compensation (Acharya and Volpin, 2010; Dicks, 2010). The extracting of rents in one company will result in raising the compensation level necessary to attract talent for another.

Evidence for the rent extraction theory is based on both systematic and anecdotal evidence. One example is the use of "Stealth" compensation, or camouflaged earnings in the form of perks, pensions, and severance pay that are essentially hidden from shareholders. If contracts with CEOs were optimal and fair then hiding these types of pay would be unnecessary, so they instead suggest a form of rent extraction (Bebchuk and Fried, 2004; Kuhnen and Zwiebel, 2009). A similar example is the practice of CEOs hedging the risk of their personal holdings of the company's equity. On average, CEOs were found to use these transactions to reduce their ownership by 25%. These actions are hardly disclosed and diminish the alignment of CEO and shareholder interests (Bettis et al., 2010). CEO compensation also rises following events that are the result of luck, but inversely is not hurt for unlucky situations. The benefits achieved from these lucky events are entirely out of the control of the executive yet they are given credit for them in the form of compensation. An example of a lucky event would be an improving overall economy. These anomalies suggest rent extraction on the part of the executive (Bertrand and Mullainathan, 2001; Garvey and Milbourn, 2006).

2.3.2 Efficient Market Theory

An alternative to the managerial power hypothesis, CEO compensation is argued to be the result of efficient fair markets with scarce managerial talent. One belief is that the growth of CEO pay levels is a direct result of the increase in firm sizes and scale effects. The reason is that larger firms demand higher talent levels from their CEO and thus must pay more for that position. The result is larger firms offering higher pay levels in an efficient market for executive talent (Rosen, 1981; Rosen, 1982). Firms are also willing to pay more for incremental talent on the part of the CEO. Due to the scale of operations under control, this incremental talent can lead to larger increases in firm value, therefore justifying the higher compensation package (Himmelberg and Hubbard, 2000). Research has been expanded upon this idea even further to find a multiplicative effect on firm output by managerial talent. Under this assumption, the six-fold increase in CEO pay from 1980 to 2003 can be fully explained by six-fold increase of market capitalization by large companies over the same time frame (Gabaix and Landier, 2008).

CEO effort also has an effect on firm value due to the overall increase in technology and firm characteristics, thus leading to an increase in incentives and pay. There is an inelastic amount of individuals capable of running large complex companies. A shock to aggregate demand for these CEO's raises the value of the firm as well as the marginal value of services provided by the CEO to the firm. The result in a market with equilibrium is an increase in overall incentives and pay packages. In some cases, compensation goes above a firm's relative performance evaluation (Himmelberg and Hubbard, 2000; Baker & Hall, 2004).

Growth in technology allows CEOs to translate increased effort into increased output and increased consistency across business units. This data driven decision-making approach by CEOs further widens the gap between executive compensation and average workers (Baker and Hall,

2004). When a CEO makes a decision that affects the entire firm, such as data driven decisions, compensation for the CEO should be linked to the proportional change in value and not the absolute value (Brynjolfsonn et al., 2010). The result is an increase in CEO compensation, but not necessarily an increase in overall firm productivity. The growth in technology driven decisions have made executive actions more important due to their multiplicative ability. This increase in the role of decision making for CEOs could also contribute to the increase in compensation levels in a fair market.

Empirical evidence also supports theories for competitive CEO pay markets. This includes positive reactions by the stock market to announcements of long-term compensation plans or performance linked pay plans for CEOs (Morgan and Poulson, 2001). CEOs with higher ability, measured by performance, were found to have higher compensation levels on average (Graham et al., 2009). In the study, the firms that hired CEOs with larger compensation packages also saw an increase in firm performance. The theoretical explanation is that managers with higher abilities and greater social capital can leverage their skills to help their company. Finally, deregulation of industries, which leads to greater competition, was found to increase CEO pay levels (Cunat and Guadalupe, 2009). An example of this was the deregulation of the financials industry in the 1990's. These deregulations lowered barriers to entry and allowed for more firms to enter into the market. This increased the demand for CEO talent, thus leading to an overall increase in CEO incentives and pay levels.

2.4 CEO Compensation Effects on Firm Value

If high executive pay levels and performance incentives coincided with overall better firm value then there would be little concern over how compensation was determined. However,

there is a great deal of difficulty in measuring the effects of CEO compensation on the value of a firm. Both CEO pay and companies have observable and unobservable parts that are not easily quantified. CEOs face a plethora of different processes for determining compensation packages that have numerous parts. This creates debate for any study that tries to correlate compensation with measures of firm performance. Many studies measure firm value as Tobin's Q, a ratio that compares the value of the company's stock to the company's equity book value. Using Tobin's Q and executive incentives have still resulted in mixed outcomes (Frydman and Jenter, 2010).

One influential study found that firm value increased when executives held between 0% and 5% of the company's equity, decreased if they held between 5% and 25%, and incased slightly again if they held more than 25% of the equity (Morck et al., 1988). This result implies that ownership incentives initially have positive outcomes but as ownership increases management becomes entrenched in their position and take actions that are adverse to shareholders (Frydman and Jenter, 2010). Other related studies have looked at specific aspects of the compensation package to measure the effect, such as stock and options separately, however there were mixed results. Some found stocks positively associated and options negatively associated, while others found no relation at all. Due to the endogenous nature of executive pay and the unobservable aspects, it remains one of the main challenges to executive pay research today (Frydman and Jenter, 2010).

2.5 Average Employee Wages and the Business Cycle

The average employee's compensation changes over the course of a business cycle. However, similar to the mixed empirical results of CEO compensation studies, there are a large number of conflicting hypotheses and inconclusive empirical studies on the cyclicality of real

wages. There are models for both pro-cyclical and countercyclical real wages. Early models of the 1960s and 1970s argued for the case of sticky wages, in which case real wages were slow to adjust to changes in the market due to stickiness or expectations and thus were countercyclical. Alternatively, models that emphasize technology shocks accommodate pro-cyclical real wages. This holds true for any model that includes cyclical shifts in the labor demand schedule (Abraham and Haltiwanger, 1995). While employee wages certainly move over the business cycle, it is difficult to examine its cyclicality.

These empirical results are inconclusive due to a number of reasons such as shifts in both labor supply and labor demand. Companies also have a number of adjustment margins at their disposal such as changing prices, wages, employment, capacity utilization, and inventory levels. There are also long-term relationships that exist between firms and employees that reduce the effect of changes in real wages (Abraham and Haltiwanger, 1995). These differences create variability in the results of any study ranging from proving pro-cyclical to countercyclical or no significant findings.

The time period used in each study also made a major difference on whether any research saw pro-cyclical or countercyclical wages. The periods of 1948-1971 and 1948-1977 found wages to be countercyclical using time series techniques. However the period of 1966-1980 found wages to be pro-cyclical (Sumner and Silver, 1989). The differences in results could also be due to how each study went about constructing the real wage or how to measure the cyclical indicator. The Producer Price Index, when used as a deflator, has resulted in countercyclical responses, in comparison to other deflators that find pro-cyclical responses (Messina et al., 2009). The industry chosen also has an effect on the result of cyclicality. Industries that see a greater amount of changes over the course of a business cycle usually have a pro-cyclical real

wage (Abraham and Haltiwanger, 1995).

While these differences have made it difficult to reach a historical conclusion on real wages and the business cycle, wages have been mostly pro-cyclical from 1970 to 2009 (Abraham and Haltiwanger, 1995; Messina et al., 2009). The recession that took place in 1970 resulted in a shock that shifted the labor demand schedule, thus creating a pro-cyclical real wage reaction (Abraham and Haltiwanger, 1995). For the overall economy, supply shocks lead to pro-cyclical results and demand shocks lead to countercyclical responses. This is due to an increase in labor demand during supply shocks, which precede a change in the business cycle. These changes in supply and demand could be due to any one of a large number of reasons (Messina et al., 2009).

There are also differences in the effect of the business cycle on people with different levels of wages. Individuals that earn above average wages were found to be more likely to lose their job during a downturn in the economy such as a recession. Individuals that earn below average wages and have characteristics of less education and less experience are also more likely to be laid off during a recession. The result is a situation where on average the highest and lowest earners are let go during an economic downturn (Keane et al., 1988). This means individuals in the average pay bracket are more likely to keep their jobs and wages are more likely to stay consistent. While the results of the study found a pro-cyclical connection to the real wage and business cycles, the changes are done in a fashion that would minimize a great fluctuation in real wage levels.

3.0 Methodology

The process for this research was completed in multiple steps that included collecting and analyzing data from two main sources. The data for both CEO and average employee compensation were collected in an Excel format and then transferred into STATA for statistical analysis. Using STATA, CEO compensation was compared to business cycle measures such as unemployment and GDP. Data was then collected on average employee compensation over the same period using the Current Population Survey. After analyzing average employee compensation using same measures of business cycles, the results of both were evaluated against each other.

3.1 CEO Compensation DATA

The data on CEO compensation was collected using Capital IQ, a Standard and Poor's research tool. Capital IQ is a web and Excel-based research product that combines information on companies, markets, and people worldwide with tools for fundamental analysis. The information is pulled directly from the filings of publicly traded companies. The website is a paid-for subscription based service. The data was collected using the "Screening and Analytics" tool, and downloaded into an excel file.

Using the screening tool on the website, the following steps were taken to obtain the desired information for this research. First, a "person screen" was selected from the list of options on the screening main page. Selecting the person screen option takes the user to a page listing all types of criteria. The following criteria were selected to obtain the correct data.

- Company Details
    - Company type
        - Public Company
    - Industry Classifications

        - Select all ten (Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Healthcare, Financials, Information Technology, Telecommunication Services, and Utilities)
    - Geographic Locations
        - United States and Canada
            - United States
    - Company Statistics
        - Number of employees
            - Greater than 0 employees
- Compensation/Ownership
    - Total Annual Compensation- Fiscal year
        - Greater than 0
- Employment Board
    - Professional Job Functions
        - Chief Executive Officer
- Person Details
    - Ages
        - Greater than 0 years of age
- Financial Information
    - Financial Statements
        - Key Financials
            - Total Revenue for fiscal year
                - Greater or equal to 0
            - EBITDA for fiscal year
                - Greater than -50 million

Selecting the above criteria filters out all companies not suitable for this research. The screening process had to be run 10 times to get each year of the decade from 2000 to 2009. The information that had to be changed for each year included total compensation, number of employees, age, revenue, and earnings. Each year was downloaded from the website into an Excel format.

Each separate Excel file, containing one year of information, was then compiled into a single Excel file so that it could be transferred to STATA. After this was completed, the measures for business cycles were added to the Excel file. Unemployment and GDP were used as the estimators for business cycles over the course of the decade. The unemployment and change in unemployment rates were found using the Bureau of Labor Statistics website. The annual

change in GDP were found using the Bureau of Economic Analysis website. This data was added to the Excel file corresponding to the appropriate year.

The final change made to the CEO compensation data before being put in STATA was adjusting for inflation. The amounts given by Capital IQ were nominal in value for each year and had to be adjusted to a real value. To correct this problem, the CPI-U, provided by the Bureau of Labor Statistics, was used to adjust for inflation. To inflate a past dollar value, multiply the past dollar value by the ratio of the present CPI-U to the past year CPI-U. This is done for each year so that every value is in today's current dollar values.

3.2 Current Population Survey Data

The next step was collecting data on average employee compensation over the same time period. These values were found using the Current Population Survey (CPS), put together by the U.S. Census Bureau. An application called DataFerret was downloaded to assist in capturing only the information necessary for this research from the CPS. The DataFerret program is set up as a two-step system, selecting the desired data and downloading it in an acceptable format. Under the Step1 tab is a list of all databases made available. Selecting the Current Population Survey folder opens a list of other folders. Choosing the Basic folder lists the CPS for every month it has been conducted. The month of June was selected for each year from 2000 to 2009 to gather the necessary information.

- Step1
  - Current Population Survey
    - Basic
      - June (2000-2009)

Each month contains all of the information collected by the U.S. Census Bureau, however, very little of this data is necessary for the research. To filter out only a portion of the

data, click on June for each year of the decade and select "View Variables." This creates a list of topics from which only "Demographic Variables," "Earnings Variables," and "Industry & Occupation Variables," are selected. After searching, a list of all variables under those topics appears. The following shows a file path to this point as well as each variable that is selected for every year.

- June (2000-2009)
  - View variables
    - Demographic Variables
      - Highest level of school completed (PEEDUCA)
      - Sex (PESEX)
      - Age (PRTAGE)
      - Race of respondent (PTDTRACE)
    - Earnings Variables
      - Weekly earnings (PTERNWA)
    - Industry & Occupation Variables
      - (Main Job) Industry, major group (PRMJIND1)

After these variables have been chosen, the Step2 tab in the DataFerret program puts this data into an Excel file to be downloaded. Similar to the CEO data, the CPS results were compiled into a single excel file to be transferred into STATA. To fit all ten years worth of observations into a single worksheet, each individual that did not report their weekly earnings or had no earnings was eliminated. Also added to the worksheet was the same business cycle measures used for the CEO compensation data. The final change made to the CPS data was adjusting for inflation, by using the CPI-U.

3.3 Analysis of Compensation Using STATA

The analytical software used for this research was STATA. Each year of data output from Capital IQ was compiled into a single excel file so that the information could be transferred to the STATA program. The data from the Excel file was copied and pasted into the data editor of

the STATA program. A similar procedure was followed for both sets of data so that results could be compared.

For the CEO compensation data, dummy variables were generated for years of the decade, industries, age squared, age cubed, and business cycle measures. There is multicollinearity between the years of the decade and the measures for business cycles. For this reason, two types of models were run in the regression, one using years of the decade, and the others using each measure for business cycles, and all other variables. In each model the natural log of the adjusted compensation was used as the regressed variable. The result was a total of four models for CEO compensation alone.

Similar to the CEO data, the CPS data was downloaded into STATA using the data editor. For the CPS data, dummy variables were generated for race, industries, education, gender, business cycles, and years. The same steps were taken with this data as the CEO regressions. Two types of regression models were run, with one including all variables and years, and the other including all variables and each business cycle measure. Variables were also generated for the natural log of compensation and for age squared and cubed, in both the CEO and CPS STATA files. As in the CEO compensation models, the natural log of the adjusted wage was used as the regressed variable. There are also a total of four CPS models as a result of these procedures.

The following models were run in STATA for CEO compensation. The constant includes the industry Utilities and the year of 2009.

1. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Revenue + β_5Earnings + β_6Employees + β_7GDP change + β_8Consumer Discretionary + β_9Consumer Staples + β_{10}Energy + β_{11}Financials + β_{12}Healthcare + β_{13}Industrials + β_{14}Information Technology + β_{15}Materials + β_{16}Telecomm Services

2. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Revenue + β_5Earnings + β_6Employees + β_7Unemployment + β_8Consumer Discretionary + β_9Consumer Staples + β_{10}Energy + β_{11}Financials + β_{12}Healthcare + β_{13}Industrials + β_{14}Information Technology + β_{15}Materials + β_{16}Telecomm Services

3. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Revenue + β_5Earnings + β_6Employees + β_7Unemployment Change + β_8Consumer Discretionary + β_9Consumer Staples + β_{10}Energy + β_{11}Financials + β_{12}Healthcare + β_{13}Industrials + β_{14}Information Technology + β_{15}Materials + β_{16}Telecomm Services

4. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Revenue + β_5Earnings + β_6Employees + β_7Consumer Discretionary + β_8Consumer Staples + β_9Energy + β_{10}Financials + β_{11}Healthcare + β_{12}Industrials + β_{13}Information Technology + β_{14}Materials + β_{15}Telecomm Services + β_{16}2000 + β_{17}2001 + β_{18}2002 + β_{19}2003 + β_{20}2004 + β_{21}2005 + β_{22}2006 + β_{23}2007 + $\beta_2$2008

The following include the models run for average employee wages. The constant term includes females, Caucasian, Agriculture, some high school education, and the year 2009.

5. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Male + β_5Black + β_6American Indian + β_7Asian + β_8GDP Change + β_9Construction + β_{10}Manufacturing + β_{11}Retail + β_{12}Transportation + β_{13}Info Technology + β_{14}Finance + β_{15}Business Services + β_{16}Hospitality and Leisure + β_{17}Public Admin + β_1GED + β_2Associate Deg + β_0Undergrad + β_1Masters + β_2Doctorate

6. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Male + β_5Black + β_6American Indian + β_7Asian + β_8Unemployment + β_9Construction + β_{10}Manufacturing + β_{11}Retail + β_{12}Transportation + β_{13}Info Technology + β_{14}Finance + β_{15}Business Services + β_{16}Hospitality and Leisure + β_{17}Public Admin + β_1GED + β_2Associate Deg + β_0Undergrad + β_1Masters + β_2Doctorate

7. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Male + β_5Black + β_6American Indian + β_7Asian + β_8Unemployment Change + β_9Construction + β_{10}Manufacturing + β_{11}Retail + β_{12}Transportation + β_{13}Info Technology + β_{14}Finance + β_{15}Business Services + β_{16}Hospitality and Leisure + β_{17}Public Admin + β_{18}GED + β_{19}Associate Deg + β_{20}Undergrad + β_{21}Masters + β_{22}Doctorate

8. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Male + β_5Black + β_6American Indian + β_7Asian + β_8Construction + β_9Manufacturing + β_{10}Retail + β_{11}Transportation + β_{12}Info Technology + β_{13}Finance + β_{14}Business Services + β_{15}Hospitality and Leisure + β_{16}Public Admin + β_{17}GED + β_{18}Associate Deg + β_{19}Undergrad + β_{20}Masters + β_{21}Doctorate + β_{22}2000 + β_{23}2001 + β_{24}2002 + β_{25}2003 + β_{26}2004 + β_{27}2005 + β_{28}2006 + β_{29}2007 + β_{30}2008

A Chow test was also constructed to determine if industry creates a statistically significant difference in wages for both CEOs and average employees. The first model is the restricted model used for CEO compensation. The second model is the restricted model used for average employee compensation.

1. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + β_4Revenue + β_5Employees + β_6Earnings + $\beta_7$2001 + $\beta_8$2002 + $\beta_9$2003 + β_{10}2004 + β_{11}2005 + β_{12}2006 + β_{13}2007 + β_{14}2008 + β_{15}2009

2. Ln wage = β_0 + β_1Age + β_2Age squared + β_3Age cubed + $\beta_4$male + β_5Black + β_6American Indian + β_7Asian + $\beta_8$2001 + $\beta_9$2002 + β_{10}2003 + β_{11}2004 + β_{12}2005 + β_{13}2006 + β_{14}2007 + β_{15}2008 + β_{16}2009

The restricted model is then run for each industry alone, for both CEO and average employees, to obtain the unrestricted models. These results are used to construct the Chow test.

$$\frac{[SSR(restricted) - SSR(unrestricted)] / r}{SSR(unrestricted) / n - (\#\ of\ industries * k)}$$

These results were then compared to the F table to determine probability.

4.0 Findings and Discussion

4.1 CEO Compensation Model Analysis

The results of our models found a number of variables that had statistically significant affects on CEO compensation levels. As seen in the results in table 1 of the appendix, the age and company earnings of the CEOs created the strongest affects on pay levels. The company's revenue, industry, and number of employees also had statistically significant impacts. Each measure of the business cycle, including change in GDP, unemployment, and change in unemployment, all passed a 95% significance test. The results by year are statistically significant and mimicked fluctuations of the business cycles for the decade of 2000-2009. The overall finding of CEO compensation was a change in pay levels over the business cycle that was statistically more significant than average employee wages.

Age was strongly correlated with a higher compensation level for CEO's, as seen in every model in table 1. As a variable, age and age squared both passed a 95% test of significance. Age had a coefficient of 0.49 and age squared had a coefficient of -0.007. The result of age shows the value of experience in the CEO labor market. CEOs that are older should have more experience and are thus compensated more for this reason. The negative result of age squared shows that as CEOs become older in age the increase in pay becomes smaller, as would be expected. As an individual approaches retirement their yearly increase in compensation is likely smaller than their year over year increases of the past.

Company statistics such as revenue, earnings, and number of employees also created differences in compensation levels. Higher revenue had an impact on increasing CEO pay, passing a 95% significance level (Table 1). A CEO that runs a company with high earnings will get paid more for that success. However, according to the models, earnings were more important.

Higher company earnings had a t-score of 32.91, and a coefficient of 0.001. This means for every addition $1 million dollars a company made in earnings, CEOs made an extra 0.1% in compensation. This is because revenue is not equal across all industries. A business could bring in high revenue but have low profit margins, whereas a company in a different line of business could have lower revenues with higher profit margins. The result is that earnings are more closely linked to a higher CEO pay level, as they are more important than revenue alone. Earnings are more comparable across industries than revenue because it includes expenses. Due to multicollinearity, the number of employees is closely related to the amount of revenue a company earns. For this reason the number of employees had a less significant impact on compensation levels with a small coefficient, and a t-score in all models of -1.75, which passes a 90% test of significance.

There are also differences across industries for CEO pay levels, according to the results in table 1. The base industry used for this analysis was utilities. In comparison to the utilities industry consumer discretionary, which includes companies selling non-essential products and services such as luxury items, passed a 90% significance test with a coefficient of 0.07, meaning CEOs earn close to 7% more on average. Energy, financials, healthcare, Industrials, information technology, and telecommunication services all passed a 95% significance test for differences in comparison with CEOs of Utilities. Each of theses industries have coefficients that show lower compensation in comparison, anywhere from -14% to -49% (Table 1). CEOs from the consumer staples and materials industries have insignificant t-scores, meaning their CEOs earn close to those of utilities. These differences could be the result of industry performance, as well as industry specific compensation characteristics. Each industry also requires different skill sets that could impact the overall demand of CEO talent. If executive pay is in market equilibrium then

industries with higher necessary skill sets will demand higher pay levels.

Each measure of the business cycle also proved to be significant in relation to CEO pay levels, with each passing a 95% level of significance (Table 1). In model 1 of the table, a positive change in GDP had a positive change in CEO compensation, with a coefficient of 0.02. This means, as the overall economy grows, CEO pay levels grow with it. As mentioned in the literature review, CEOs benefit from positive situations that are out of their control, such as a growing economy. In model 2, an increase in unemployment shows that it negatively impacts CEO compensation. The coefficient for unemployment is -0.01. Similar to how CEOs benefit from an expanding economy, a weaker one hurts their pay level. As businesses contract and lay-off individuals, CEOs feel the impact through lower overall wages. The change in unemployment, used in model 3, also verifies these findings, with a coefficient of -0.04 (Table 1). These findings show that CEO compensation is not impervious to changes in the business cycle. Instead, pay levels fluctuation greatly due to their changes.

CEO compensation is linked with many measures of the business cycle because of the structure of executive pay packages. As mentioned in the literature review, several pay packages include stock and options. When the business cycle is on the rise then the market is doing well and unemployment is falling. This results in higher stock prices and thus higher profits for the options CEOs received in their pay packages. Conversely, the opposite applies if the market is falling and unemployment is rising.

The year variables used in model 4 also show the changes of CEO pay levels over the business cycle. Six years of the decade had a result that was statistically significant in comparison to the base year of 2009. The years 2002 to 2006 all passed a 95% significance test, and had CEO pay levels that were between 6% and 18% higher than 2009 (Table 1). The year of

2008 had a result that was 90% significant in difference and 6% lower in comparison to 2009 (Table 1). By matching the results of each year to the broader economy, these results show the volatility CEO compensation faces over the course of business cycles. The National Bureau of Economic Research determines when the United States is in an official recession. The decade of 2000 to 2009 included two recessions according to their results. These recessions started in March of 2001, caused by the technology bubble, and December of 2007, caused by the financial crisis. These dates correspond directly with the comparatively lower CEO compensation findings of model 4 for the beginning and end of the decade. Many of the coefficients for the year variables were positive, reflecting higher earnings, because the base year of 2009 in this model follows the recession of 2007. The comparatively lower compensation of 2009 against each year variable reflects the slow recovery of wages as a result of the recession. The middle of the decade, 2002 to 2006, had comparatively higher compensation levels that correspond directly with the expanding economy of that time (NBER). These findings show a clear change in compensation levels over a full business cycle.

4.2 Average Employee Compensation Model Analysis

The CPS data for average employee compensation, used for the models in table 2, showed several variables that created differences across wage levels. Similar to the CEO models, age was a strong determinate of wages. Other characteristics such as ethnicity, education, and the industry one worked in also found statistically significant differences in pay. Beside these individual characteristics, the overall business cycle changes created a less volatile impact in comparison to the results from the CEO analysis.

Age proved to be a strong determinate of wage levels, with a coefficient of 0.097 for each

model. The variable for age squared found a negative coefficient of -0.0013 (Table 2). These two combined show that as an individual gets older they gain experience and their average wage increases. The negative coefficient of the age squared variable shows that as individuals get older each incremental increase in wages begin to decline. This is the same result that was found in the CEO models. Gender also contributed to wage differences, with male wages having a statistically significant greater difference than female wages. The male coefficient of 0.32 finds that male respondents have a 32% higher wage on average (Table 2). This gender gap is due to a number of reasons including male dominated industries.

Different Ethnicities also resulted in comparatively different wages. Black respondents had a statistically significant negative difference of -9.1% in comparison to Caucasian respondents (Table 2). The Current Population Survey combines American Indian, Aleut, and Eskimo into a single category. This group also has statistically significant lower wages by -9.7% in comparison to Caucasian respondents. A person of Asian or Pacific Islander decent had a non-significant difference of -1.1%, by comparison.

Although there are differences in the number of industries used by the Current Population Survey, like the CEO data, the industry variable made a difference in wages. The results of each industry in the models of table 2 are in comparison to the agriculture industry, as it is in the constant. Each industry, except hospitality and leisure, had a 95% statistically significant difference in wages compared to the agriculture industry (Table 2). Hospitality and leisure employees earned the lowest wages by industry. Retail and business service industry employees had 11% and 19% higher wages than employees in agriculture. Those working in construction, manufacturing, transportation, information technology, finance, and public administration all had between 32% and 41% higher wages in comparison to agriculture (Table 2). According to these

results, individuals working in the finance industry made the most amount of money on average.

Not surprisingly, education created major differences in wages for the respondents in the survey. Each additional level of education resulted in higher overall earnings for the individual. Every level of education, from a high school degree to a doctorate, earned a person more money than the level that preceded it. Compared to a respondent with little to no high school education, a person with a high school degree earned 28% more (Table 2). This continues for each degree, and shows that higher education earns a person a larger compensation.

The same business cycle measures used previously were applied to these models as well. However, the findings for employee wages were different than the findings from the CEO analysis. As mentioned in the literature review, average employee wages do change over the course of the business cycle. However, it is debated to be pro-cyclical and countercyclical by different research results. The models in table 2 suggest that the change is less volatile than the change in CEO compensation. The change in GDP, unemployment, and change in unemployment variables all resulted in non-statistically significant results. As these business cycle measures changed, wages stayed relatively consistent. This is contradicting to the findings from the CEO models where compensation fluctuates considerably.

A further example of relatively consistent wage levels for average employees is the results from the year variables of model 4 in table 2. Comparing each year of the decade to 2009, only one year, 2007, had a statistically significant difference in wages. As mentioned previously, the NBER found December 2007 to be the start of the recession caused by the financial crisis (NBER). The wages of 2007 were higher than 2009 as shown by the positive coefficient of 0.04 (Table 2). This likely is a result of average employee wages being countercyclical to the recession, and feeling its impact in 2009. The lack of statistically significant differences shows

the relative consistency of wages throughout the business cycle. This result matches the non-statistically significant findings for the measures of business cycle variables. There was little response in real wage to two recessions and economic growth in the middle of the decade. The wages of average employees are more rigid in nature as they do not include the same amount of stock and options found in CEO compensation.

4.3 Comparing CEO and Average Employee Results

These models find that CEO compensation is more volatile over the business cycle in comparison to average employee wages. This is verified through the differences in both the business cycle measures as well as the year variables. The measures of business cycle had a stronger impact on CEO wages. The recession years of 2001 and 2007 also correspond to the changes found in the year variables of table 1, model 4, for CEOs. The difference is likely due to the way in which CEO pay packages are structured, using stock and options that more closely mimic the market and economy.

In figure 1, a normalized wage comparison between CEO and employee wages graphically shows this difference of volatility in action. The Two recessions of 2001 and 2007 clearly create a stronger impact on overall CEO pay levels. In comparison over the same period, average employee wages show a rather flat wage line. Figure 2 shows the median CEO compensation levels changing over the years of 2001 to 2009. The decreases in compensation levels are visible for 2001 and 2007 in this graph. The changes in median CEO compensation reflect how the business cycle movements impact more than just the top percentage of executive earners. The changes in median CEO compensation also mimic the change in median company revenue and earnings (Figure 3, Figure 4). The same changes are also found for average CEO

compensation and average revenue and earnings (Figure 5, Figure 6, Figure 7). As the economy changes over the business cycle, revenues and earnings rise and fall. These changes mimic the rise and fall in pay levels of the CEO, and explain why they are statistically significant in the models.

A Chow test analysis of both CEO and average employee compensation finds a similar result of statistically significant differences across industries. In both sets of data, the resulting Chow Test value passed a 95% significant test, meaning not all industries are equal in their impact on wages (Table 4). Different industries react differently to business cycles. The recession that began in 2007, although impacting everyone, started in the finance industry. As a result, a greater impact on wages occurred in finance compared to others. Business cycles can also impact each industry differently for both CEOs and average employees. While the average employee results show that finance employees make more in wages, the CEO analysis found that finance executives made less than many other executives. This is likely a result of the base year for the models being 2009, after the financial crisis. The average employee wages remained relatively stable, while the impact on CEO compensation was much greater for finance. The differences between the restricted and unrestricted models of the Chow test show the necessity of analyzing each industry separately of one another.

5.0 Conclusion

Many Americans lost their jobs in the last decade as a result of the technology bubble and financial crisis. This has lead to a great deal of frustration over compensation for the executives that manage these businesses, as well as interest in comparing their wage volatility. This paper found a result of higher volatility for CEO compensation when compared to average worker wages over the business cycle. While average employee wages are cyclical, CEO wages can be expected to move more dramatically.

Research has shown that the typical modern day CEO pay packages began to take shape starting in the 1980s. Pay levels have increased in value as a result of the inclusion of stocks and options. The goal of adding ownership to CEO compensation was to align executive and shareholder interests. Since 1980, the growth of executive pay has matched the growth in firm value over the same time period. This is something that never occurred prior to 1980. However, this increase has not been without volatility over the business cycle.

In the results of this paper, for the period of 2000 to 2009, we found statistically significant impacts on CEO compensation for both year and business cycle measures. The two recessions of the decade both negatively impacted CEO pay more significantly than average employee wages. CEOs also had greater compensation growth than average employees during the middle of the decade. The business cycle measures of change in unemployment, unemployment, and change in GDP found statistically significant impacts for CEOs but not for average employee wages. These results show the greater volatility that CEOs face in their pay level, and the comparatively stable wages of average employees. The reason for this volatility is likely the structure of CEO pay packages, which include parts that react to market changes, such as stock and options.

The Chow test results also show the differences across industries for CEOs and average employees. The industry an individual works in impacts the level of pay they will likely receive. Each industry can also react differently to business cycle changes, such as the financial crisis. We found that the finance industry had higher earnings for average employees in the model, but lower CEO earnings, likely a result of the base year being after the 2007 financial recession.

Further research on this topic should include analyzing the differences across industries. Specifically, do certain industries experience greater wage volatility over the business cycle? Also, are there differences in certain industries between average employees and CEOs in terms of their reaction to business cycle changes? Finally, is the current model of CEO compensation sustainable and successful enough for the future, or should compensation be changed again to reflect the stability of average employee wages?

6.0 Appendix

Table 1:

Regression with Natural Log of CEO Compensation				
Adjusted R-Squared	0.1136	0.1123	0.1133	0.1151
# of Observations	36841	36841	36841	36841
Variables	Model 1	Model 2	Model 3	Model 4
General				
Age	0.4880516 **	0.4895277 **	0.4883139 **	0.4855834 **
	(14.68)	(14.68)	(14.65)	(14.58)
Age Squared	-0.0071681 **	-0.0071999 **	-0.0071761 **	-0.007128 **
	(-12.20)	(-12.24)	(-12.21)	(-12.14)
Age Cubed	0.0000327 **	0.0000328 **	0.0000327 **	0.0000324 **
	(9.63)	(9.67)	(9.64)	(9.57)
Revenue	0.0000107 **	0.0000106 **	0.0000107 **	0.0000107 **
	(11.17)	(11.08)	(11.14)	(11.17)
Earnings	0.0001086 **	0.0001089 **	0.0001086 **	0.001088 **
	(17.13)	(17.16)	(17.13)	(17.17)
Employees	-8.94E-08 *	-8.82E-08 *	-8.97E-08 *	-9.12E-08 *
	(-1.76)	(-1.74)	(-1.75)	(-1.80)
Business Cycle Measures				
Change in GDP	0.0207749 **	NA	NA	NA
	(7.81)			
Unemployment	NA	-0.0124663 **	NA	NA
		(-2.66)		
Change in Unemployment	NA	NA	-0.0399876 **	NA
			(-7.17)	
Industries				
Consumer Discretionary	0.0698096 *	0.069464 *	0.0691366 *	0.0697952 *
	(1.91)	(1.92)	(1.91)	(1.93)
Consumer Staples	0.0428093	0.0427747	0.0429906	0.0439206
	(0.95)	(0.95)	(0.96)	(0.98)
Energy	-0.2989641 **	-0.2987799 **	-0.2987777 **	-0.2980972 **
	(-6.82)	(-6.81)	(-6.82)	(-6.81)
Financials	-0.1415269 **	-0.1407836 **	-0.1411096 **	-0.1402638 **
	(-3.80)	(-3.78)	(-3.79)	(-3.77)
Healthcare	-0.3639965 **	-0.3642068 **	-0.3642686 **	-0.3631702 **
	(-9.89)	(-9.89)	(-9.90)	(-9.88)
Industrials	-0.1778068 **	-0.1773859 **	-0.1776498 **	-0.1771637 **
	(-4.87)	(-4.85)	(-4.86)	(-4.85)
Information Technology	-0.4943993 **	-0.495028 **	-0.4946943 **	-0.4937021 **
	(-13.85)	(-13.86)	(-13.86)	(-13.84)
Matertials	-0.0107386	-0.0107262	-0.0104787	-0.0093405
	(-0.25)	(-0.25)	(-0.24)	(-0.22)
Telecomm Services	-0.2520539 **	-0.2524369 **	-0.2519911 **	-0.2544503 **
	(-3.87)	(-3.87)	(-3.86)	(-3.91)
Year				
2000	NA	NA	NA	0.0395444
				(1.36)
2001	NA	NA	NA	0.0393851
				(1.36)
2002	NA	NA	NA	0.0610923 **
				(2.12)
2003	NA	NA	NA	0.1022402 **
				(3.59)
2004	NA	NA	NA	0.1808006 **
				(6.35)
2005	NA	NA	NA	0.1847149 **
				(6.44)
2006	NA	NA	NA	0.1005476 **
				(3.53)
2007	NA	NA	NA	0.0312965
				(1.09)
2008	NA	NA	NA	-0.0550087 *
				(-1.89)

Source: Capital IQ
Note: * = Pass 90% significance test, ** = Pass 95% significance test

Table 2:

Regression with Natural Log of Average Employee Compensaton				
Adjusted R-Squared	0.3759	0.3759	0.3759	0.3762
# of Observations	65262	65262	65262	65262
Variables	Model 1	Model 2	Model 3	Model 4
General				
Age	0.0975861 **	0.097602 **	0.0975858 **	0.0976373 **
	(23.95)	(23.96)	(23.95)	(23.95)
Age Squared	-0.0013102 **	-0.0013103 **	-0.0013102 **	-0.0013114 **
	(-13.85)	(-13.85)	(-13.85)	(-13.85)
Age Cubed	3.43E-06 **	3.43E-06 **	3.43E-06 **	3.43E-06 **
	(4.92)	(4.92)	(4.92)	(4.93)
Male	0.3246286 **	0.3246346 **	0.3246245 **	0.3246025 **
	(70.25)	(70.25)	(70.25)	(70.26)
Race				
Black	-0.090749 **	-0.0906708 **	-0.0907026 **	-0.0909107 **
	(-11.71)	(-11.70)	(-11.70)	(-11.73)
American Indian	-0.0970983 **	-0.096888 **	-0.0969821 **	-0.0963029 **
	(-4.10)	(-4.09)	(-4.09)	(-4.06)
Asian	-0.0113431	-0.0112829	-0.0112809	-0.0116145
	(-0.99)	(-0.99)	(-0.99)	(-1.02)
Business Cycle Mea				
Change in GDP	-0.0002955	NA	NA	NA
	(-0.33)			
Unemployment	NA	-0.0018254	NA	NA
		(-1.17)		
Change in Unemployment	NA	NA	-0.0003235	NA
			(-0.17)	
Industries				
Construction	0.3888362 **	0.3891279 **	0.3888467 **	0.3881231 **
	(16.20)	(16.21)	(16.20)	(16.17)
Manufacturing	0.3660769 **	0.3662361 **	0.3660613 **	0.365844 **
	(15.72)	(15.73)	(15.72)	(15.71)
Retail	0.1143545 **	0.114605 **	0.1143991 **	0.1142022 **
	(4.93)	(4.94)	(4.93)	(4.92)
Transportation	0.3704663 **	0.3707271 **	0.3705497 **	0.3702098 **
	(15.32)	(15.33)	(15.32)	(15.31)
Info Technology	0.3509113 **	0.3518576 **	0.3509972 **	0.3494461 **
	(12.66)	(12.69)	(12.66)	(12.57)
Finance	0.4055877 **	0.4059001 **	0.4056148 **	0.4053358 **
	(16.88)	(16.89)	(16.88)	(16.86)
Business Services	0.1861952 **	0.1866457 **	0.1862764 **	0.1859717 **
	(8.11)	(8.13)	(8.11)	(8.10)
Hospitality and Lesiure	-0.0317587	-0.0306925	-0.0316126	-0.0322807
	(-1.30)	(-1.26)	(-1.30)	(-1.32)
Public Administration	0.3690416 **	0.3694169 **	0.3691127 **	0.3681273 **
	(15.13)	(15.15)	(15.13)	(15.15)
Year				
2000	NA	NA	NA	0.0033716
				(0.35)
2001	NA	NA	NA	0.0032561
				(0.33)
2002	NA	NA	NA	0.0016206
				(0.17)
2003	NA	NA	NA	0.0099654
				(1.03)
2004	NA	NA	NA	-0.0058398
				(-0.60)
2005	NA	NA	NA	-0.0118225
				(-1.22)
2006	NA	NA	NA	-0.0003123
				(-0.03)
2007	NA	NA	NA	0.0408531 **
				(4.24)
2008	NA	NA	NA	0.006262
				(0.64)
Education				
GED	0.2761358 **	0.276347 **	0.2761937 **	0.2759491 **
	(33.50)	(33.53)	(33.51)	(33.47)
Associate Degree	0.4334624 **	0.4336228 **	0.4335096 **	0.4329957 **
	(41.36)	(41.38)	(41.37)	(41.30)
Undergraduate Degree	0.7180358 **	0.7184464 **	0.7181563 **	0.71781 **
	(77.86)	77.90	(77.89)	77.79
Masters Degree	0.9632455 **	0.9636769 **	0.9633582 **	0.962747 **
	(90.56)	(90.59)	(90.58)	(90.45)
Doctorate Degree	1.095768 **	1.096081 **	1.09585 **	1.095852 **
	(53.38)	(53.39)	(53.38)	(53.38)

Source: U.S. Census Bureau.
Note: * = Pass 90% significance test, ** = Pass 95% significance test

Table 3:

CEO Compensation Comparative Statistics

	Year	CEO Compensation	Age	Numer of Employees	Company Revenue in millions	Company Earnings in millions
Median	2000	$516,713	52	1000	$218.31	$16.08
	2001	$523,285	53	1023	$229.75	$13.05
	2002	$545,443	53	1041	$221.45	$13.70
	2003	$566,709	54	1075	$238.80	$14.81
	2004	$628,069	54	1158.5	$283.51	$21.76
	2005	$640,471	55	1189.5	$307.04	$25.46
	2006	$632,752	55	1200	$333.47	$28.66
	2007	$626,802	56	1247	$359.94	$33.71
	2008	$583,749	57	1345.5	$395.29	$33.22
	2009	$620,599	57	1400	$385.67	$30.70

	Year	CEO Compensation	Age	Numer of Employees	Company Revenue in millions	Company Earnings in millions
Average	2000	$902,187	52	9784	2,418.73	$379.85
	2001	$894,451	53	10570	2,504.14	$363.87
	2002	$952,438	53	14765	2,573.48	$360.88
	2003	$1,028,545	54	14633	2,660.36	$385.93
	2004	$1,145,541	54	10966	3,035.52	$455.05
	2005	$1,168,896	55	10831	3,202.61	$468.04
	2006	$1,202,256	56	10680	3,458.82	$510.65
	2007	$1,147,194	56	10848	3,628.69	$525.68
	2008	$1,030,954	57	10782	3,624.96	$515.90
	2009	$1,088,346	58	10941	3,461.24	$478.71

Source: Capital IQ

Table 4:

CEO Compensation Chow Test for Industry

$$\frac{[53840.830 - 66295.18] / 135}{66295.18 / 36841 - 150}$$

F = -51.05 or P-Value = 0.000

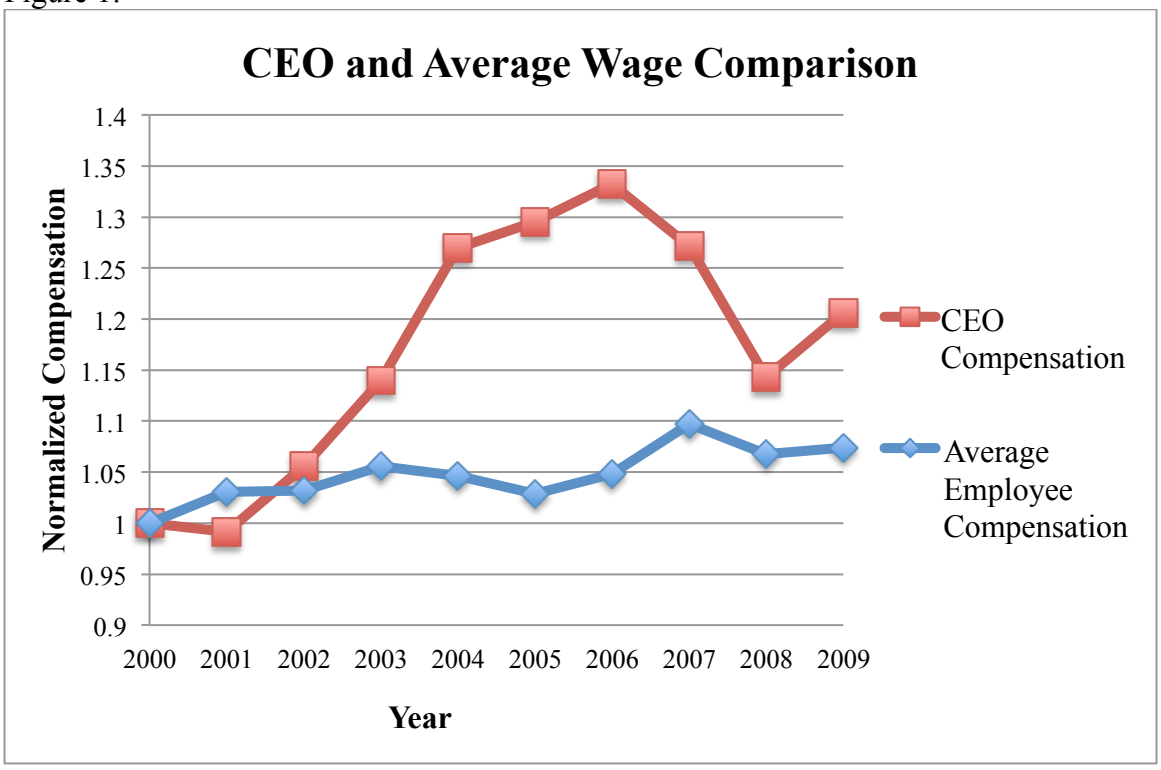
Average Employee Compensation Chow Test for Industry

$$\frac{[25553.35 - 24244.24] / 150}{24244.24 / 65262 - 165}$$

F = 23.43 or P-Value = 0.000

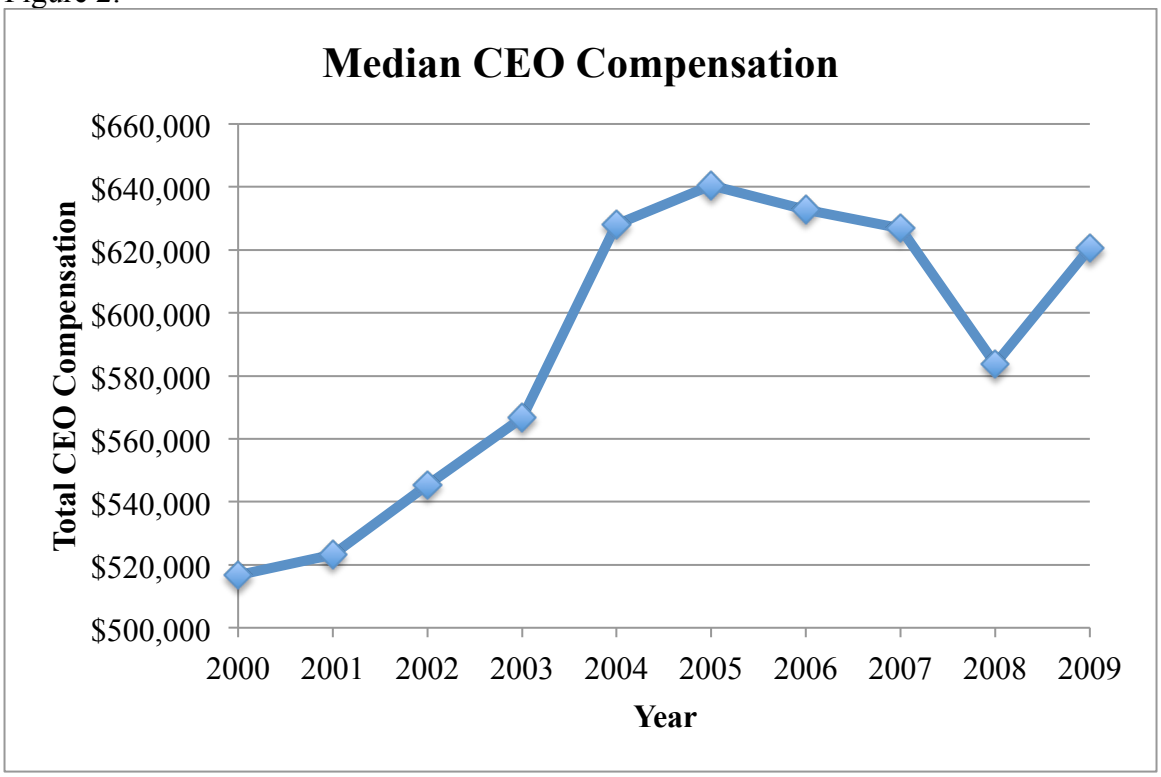
Source: Capital IQ and U.S. Census Bureau

Figure 1:



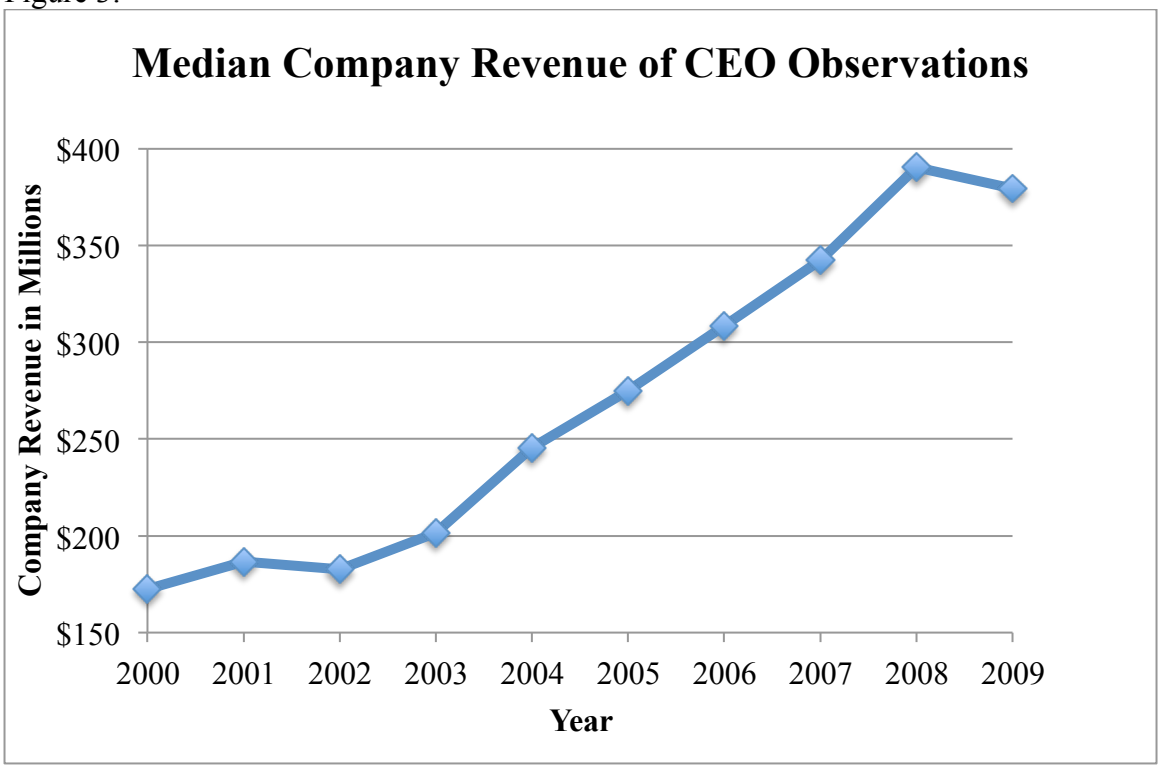
Source: Capital IQ and US Bureau of Labor Statistics

Figure 2:



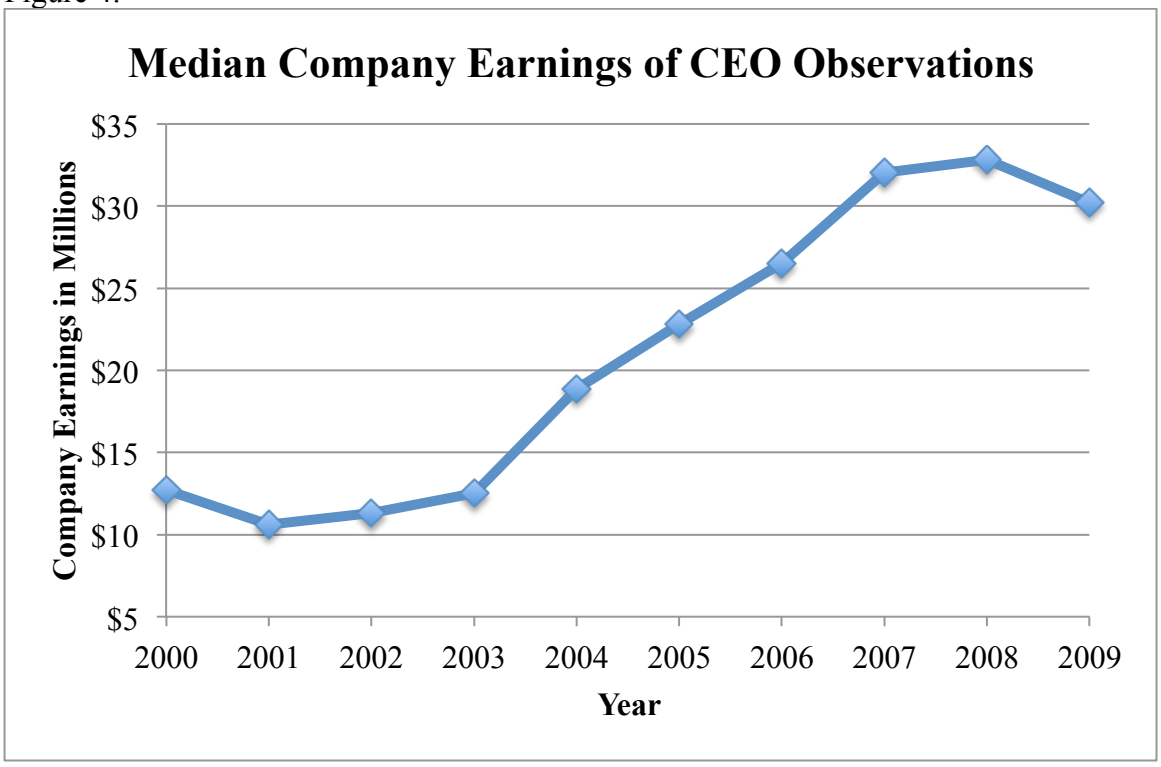
Source: Capital IQ

Figure 3:



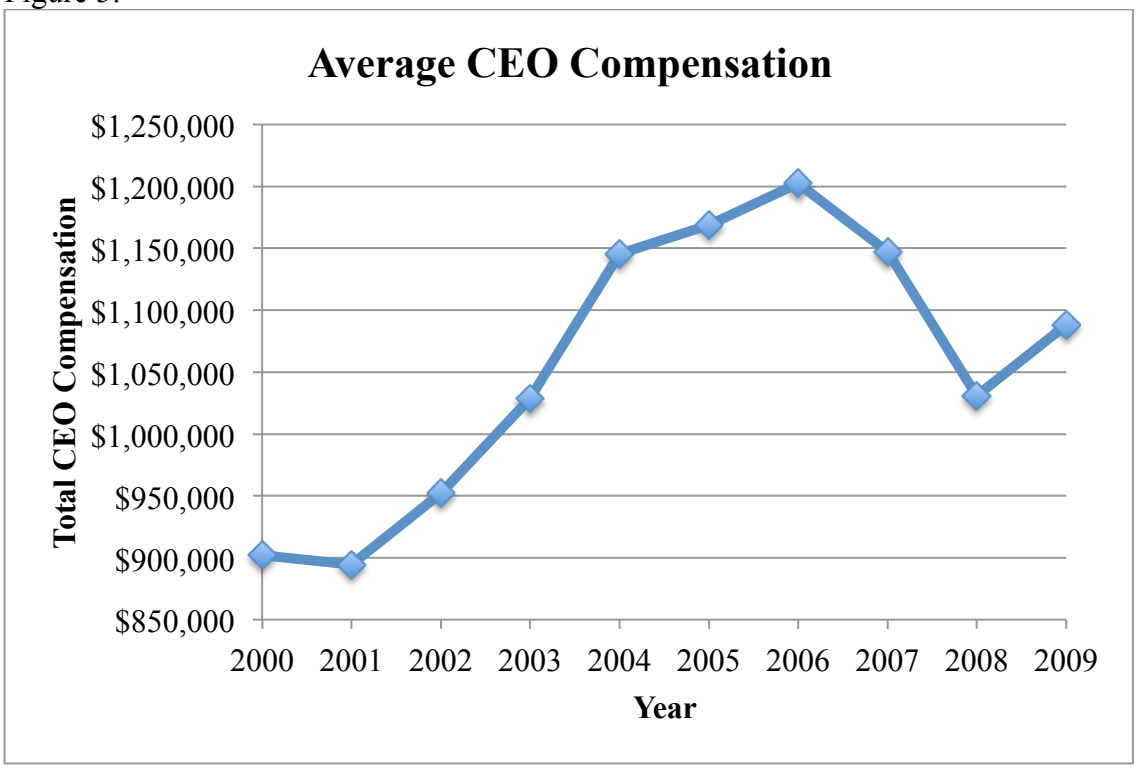
Source: Capital IQ

Figure 4:



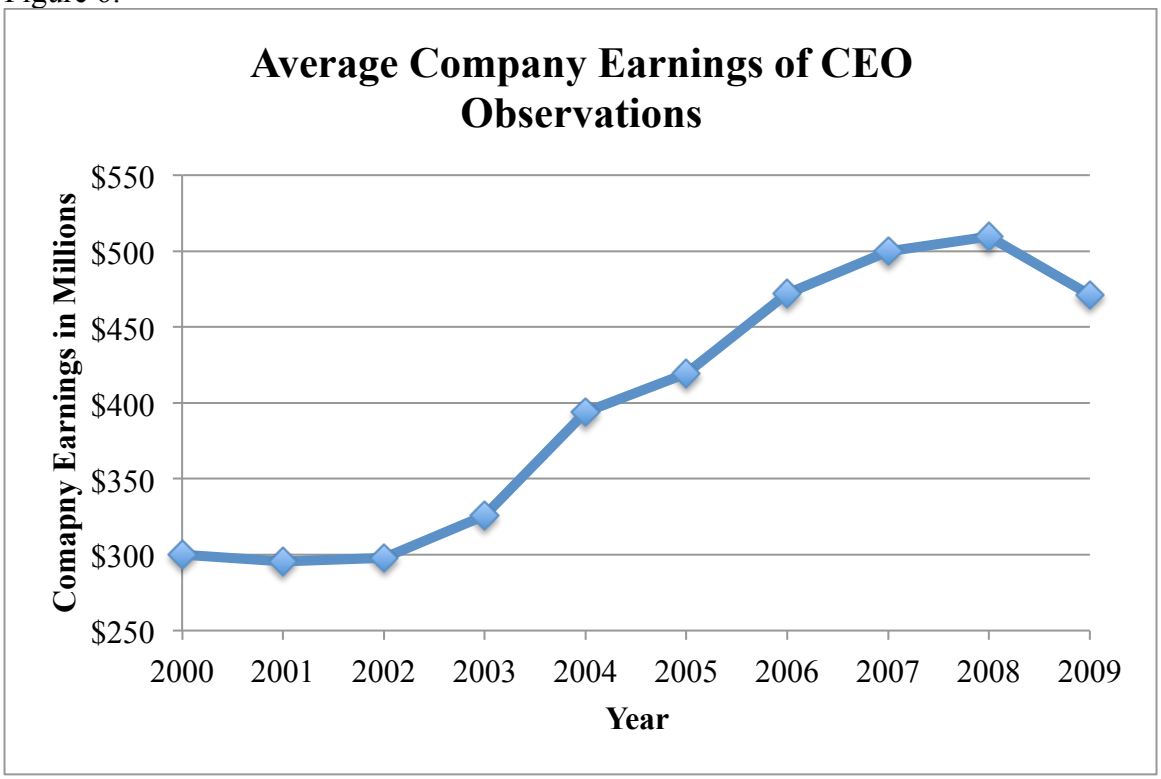
Source: Capital IQ

Figure 5:



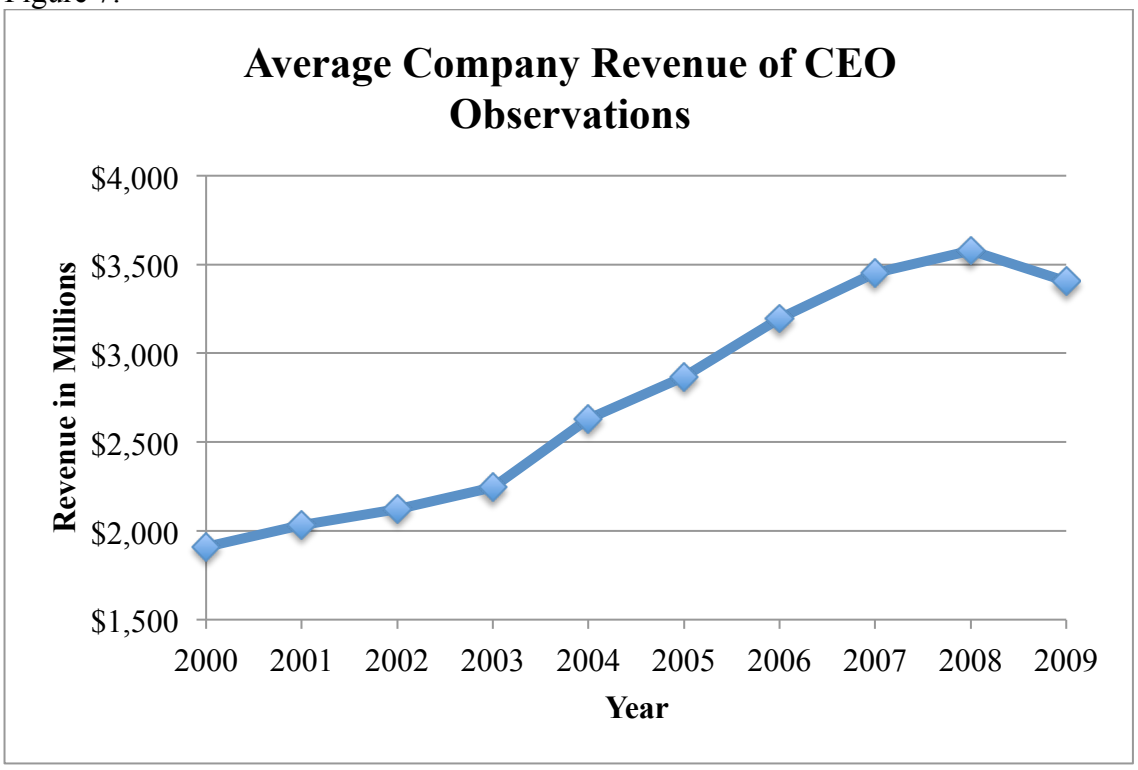
Source: Capital IQ

Figure 6:



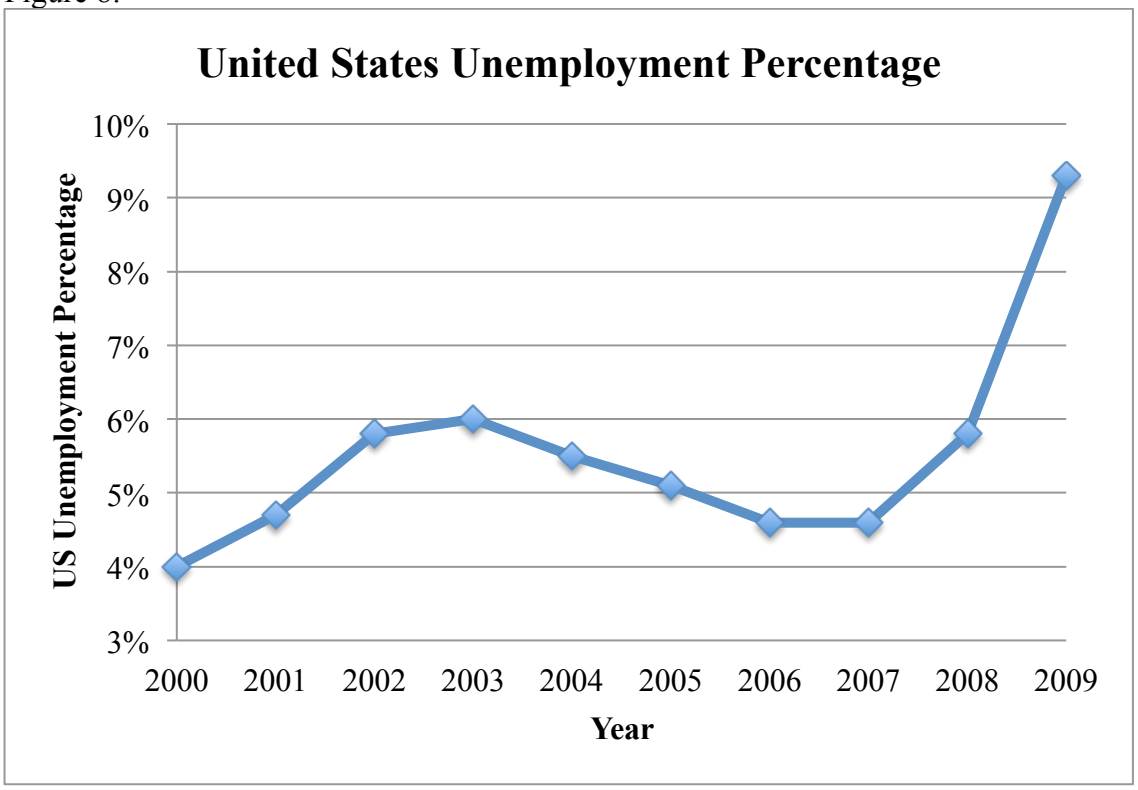
Source: Capital IQ

Figure 7:



Source: Capital IQ

Figure 8:



Source: Bureau of Labor Statistics

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