CEO CAPABILITY AS A PREDICTOR OF EXCESS STOCK RETURNS

- A study of Swedish listed firms

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Abstract

This paper aims to investigate whether the capability level of a CEO can be considered as a predictor of company stock performance. We use Dr. Elliot Jaques' definition of capability, defined as the ability to handle long-term and complex working tasks. By collecting data on 35 CEOs in Swedish listed firms and then performing robust OLS regressions we test CEO capability as a predictor of stock performance. Our main findings are that having a CEO of required level of capability has a small, yet positive impact on excess stock returns. Hence stock performance can to some extent be attributed to the CEO, and therefore attracting and retaining the right person for the role is one important success factor of firms.

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1 Introduction and Study Outline

Attracting the right people is an important success factor for any organization. The ability to meet the needs of competitive markets hinges on people of the organization having the capability, skills, knowledge and confidence to handle a rapidly changing environment. However, matching roles and individuals within an organization is not an easy task. By helping people to reach their full potential through skills and personal development, any organization is likely to flourish.

The hardest position for an organization to fill is perhaps that of the Chief Executive Officer (CEO) since the ultimate operational responsibility of a firm lies with the CEO. The main task of the CEO and the board of directors are to maintain and improve the competitiveness of their firm. One of the most important characteristics a firm's management needs is the ability to understand and handle political-, economic- and technological changes more successful than its competitors. Furthermore, organizations need to ensure that internally developed solutions are attractive to the market environment.

Estimating the value of leadership and CEO talent is a central subject of research. However, these studies typically face one main problem, to separate top management effects from other firm attributes. It is widely recognized that there are multiple factors affecting firms and, hence, their performance. A majority of research within the leadership-performance field has been based on US data and has resulted in varied findings. Therefore, this paper seeks to examine the value of CEOs from a different perspective and with data on Swedish listed firms. The sample includes firms, which have been evaluated by the Swedish management consultant firm Enhancer[1]. Enhancer's business concept, and the definition of CEO capability applied in this study, is based on the findings of the Canadian Psychoanalyst Dr. Elliot Jaques (1964, 1989, 2002 & Jaques and Cason 1994). With the data from Enhancer we hope to provide new evidence on the impact of CEOs on firm performance.

This paper aims to investigate whether the capability level of a CEO can be considered a predictor of excess stock returns. The study includes 35 both current and former CEOs of Swedish corporations, all listed on the Stockholm Stock Exchange (OMXS).

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[1] The data from Enhancer contains commercially sensitive information. For integrity reasons and upon Enhancer's request, names of CEOs as well as firms included in the sample will not be published. The authors, Professor Clas Bergström and the discussants all have access to the original data sample.

1.1 Study Outline

The thesis is divided into *9 Sections*. *Section 2* includes a comprehensive description of Dr. Elliot Jaques' model and a presentation of the measure of performance applied in this study. *Section 3* includes the hypothesis on which the study is based. A discussion of the characteristics and sources of data are presented in *Section 4*. A description of the methodological approach are presented and motivated in *Section 5*. Results from our study are presented and discussed in *Section 6*. Final remarks are presented in *Section 7*. Furthermore, suggestions for further research are also to be found in *Section 7*. Finally a reference list and appendices are included in *Section 8* and *Section 9* respectively.

2 Theoretical Framework

A number of researchers have intended to estimate the value of strategic leaders, in particular CEOs, as a determinant of organizational performance. Education is one variable that has been used as a proxy for CEO ability. When analyzing the effects of CEO education on firm performance of the largest 1500 US firms Bhagat et al. (2010) found that the educational background of executives positively impact short-term operational performance, but no such effect was found in the long run. Kaplan et al. (2008) identified a wide range of characteristics of 300 CEO candidates involved in private equity transactions. From studying the characteristics of those who were selected they concluded that execution-related skills (i.e. "Proactive", "Work Ethic", "Sets High Standards") were more strongly correlated with success and performance than team-related or interpersonal skills (i.e. "Treats People with Respect," "Calm," "Flexibility," "Listening," "Open to Criticism"). Findings by Adams et al. (2006) showed that firms whose CEOs have more decision making power experience more variability in performance. CEO characteristics such as tolerance for ambiguity and need for cognition have been described as having a considerable impact on firm performance (Westerberg et al. 1995). There might not be a ultimate measure for CEO attributes. Looking from another perspective it can be useful to see what the role of a CEO requires when to determine what attributes an individual need to possess in order to become a successful leader. The Canadian psychoanalyst and organizational psychologist Dr. Elliot Jaques (1917-2003), has in a number of scientific projects, studied the relation between the characteristics of work tasks and people's capacity to take on work tasks. His discoveries shows that their exists levels of roles and levels of people and that it is desirable to match roles and individuals in order to get the right person on the right job. Since this thesis focuses on the role of the CEO we will apply the Jaquesian theory on CEOs in order to find out how individuals and CEO roles are matched, and then test if they have an impact on performance. Therefore, the Jaquesian theory will serve as the main theoretical foundation of this thesis. The next section attempts to provide a comprehensive overview of Jaques' model for efficient organizational structures and how it is applied in our study. Since we aim to test whether CEO capability (Jaquesian theory) can serve as a predictor of excess stock returns, an overview of the latter variable will also be presented.

2.1 Jaquesian Theory

According to the Jaquesian theory some people are more capable to handle "higher level of work" than others, referred to as more "highly responsible"-, "complex"-, or more "difficult" work. The

research performed by Jaques has resulted in the term Requisite Organization, which is a model for effective managerial leadership. The Requisite Organisation can be used as a tool to find the optimal organizational structure by recognizing the differences among people, particularly the differences that lead one person to become a CEO for a huge company while others will be more comfortable and able to be successful in roles of other levels. From the top to the bottom of the hierarchy, through a pattern of layers and roles, people are desirably drawn into positions that fit them optimally, implying that they are neither too simple nor too challenging.

The Requisite Organization is dependent on two major components; first, a measure of the level of work i.e. complexity of a role, named Time-Span Measurement (TSM); and secondly, an individual's potential ability to perform at a given level of work, referred to as Current Potential Capability (CPC). The true fit between a person and a working role depends on the match between the time-span of the role and the potential capabilities of the person. Below follows a detailed explanation of the two measures is presented, starting with TSM.

2.1.1 Time-span measurement

Time-span measurement (TSM) or equivalently the complexity level of a working role is determined by identifying the longest task for which someone is accountable. If a role's longest task has a one-year completion time, the TSM of that role is one year. All roles with the same task completion time are equally complex regardless of whether they are in the same department or business sector or not. The longer the time-spans of tasks the more complex the role is assumed to be since uncertainty and unpredictability increases with time.

People usually do not question that any given manager's job is more complex than the job(s) of any of his subordinates. With this in mind, it is reasonable that CEOs are likely to be held responsible for the longest task of a firm. The job description of a CEO typically contains multiple responsibilities. One CEO task might be to globalize a company. The decision of that strategic move is then one of the CEO's tasks but his longest task would likely be to execute the globalization project, which then has a 10-year completion time. In order for the CEO to successfully complete the task he is required to have a capability level that corresponds to the complexity level of the task and in this case it would be to successfully complete the 10-year task.
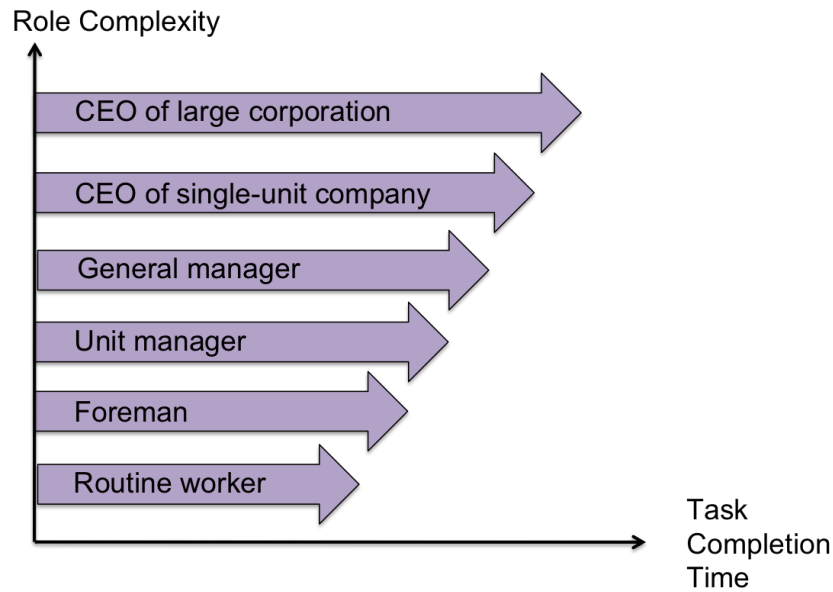
Figure 1. TSM of different roles. A CEO has longer completion time of his longest task than a routine worker and hence the position as a CEO is more complex.

Although time exists along a continuum, Jaques has uncovered specific breakpoints along that continuum, which separate different kinds of work into layers or stratums. Comparable to the process of how H_2O changes state from ice to water to steam at certain degrees, work has also been found to exist in distinguishable states, which stratify consistently at specific time-spans. Different tasks but with the same completion time are found in the same stratum. As can be seen below tasks with a five to ten year time-span are found in Stratum V.

Stratum I: At this first level most work is instruction driven and clearly defined. Roles containing tasks with a maximum time horizon of one day to three months belongs to stratum I. About 50-55 percent of the adult population have roles on this level.

Stratum II: First-line managers and specialists are to be found at the second level. Another 40 percent of the adult population have roles on this level. Roles containing tasks with a maximum time horizon of 3 months to 1 year belongs to stratum II.

Stratum III: Approximately 5 percent of the working population is capable of operating at this third level. The time-span i.e. the longest task, connected to a stratum III role is 1 to 2 years.

Stratum IV: Level four consists of general managers in product development, sales or of researchers and analysts. The time-span of a role at stratum IV level is 2 to 5 years.

Stratum V: Positions at stratum V level are business-unit heads and CEOs of smaller organizations. The time-span of a role at stratum V level is 5 to 10 years.

Stratum VI: CEOs and business-unit leaders of larger firms belong here and the time-span of a role at stratum level VI is 10 to 20 year tasks.

Stratum VII: Positions include CEOs of most Fortune 500 companies, and other leaders whose decisions might be comprehensive enough to take decades to fully implement. The time-span of a role at stratum VII level is 20 to 50 years.

Stratum VIII: CEOs of the largest companies in the world have Stratum VIII jobs. Included in this stratum are those rare people with an innate time horizon of 50 to 100 years.

For the purpose of this thesis Enhancer has used TSM when determining the level of complexity of the CEO role of each firm. Hence, the TSM of a firm or the "level of a firm" is the CEO capability level required to complete the longest task of that specific firm. TSM is determined by studying strategic documents and conducting interviews with the Chairman of the Board and the CEO of a firm. Looking at the size and the total number of employees is a way to approximate the TSM. A 30.000 employee company is obviously a more complex operation that takes longer to transform than a 100-employee company. However, small companies at an early development stage but with a sizable desired position long term can of course be at a higher level of complexity than the number of employees indicates. Factors of importance in this perspective might be the type of industry or the specific market situation. Enhancer describes the process of evaluating the TSM of one of the firms included in this study:

"This is one of the larger companies in Sweden. The company is active in several business areas in different industries and has a large global organization. The company is operating as a group and is also exploiting synergies between the different business areas, which are more complex than if the company would operate as a holding company with independent portfolio companies. Based on the data from all over the world and extensive data from Sweden the CEO role for the group is rated as level seven. This company could not be managed effectively as a level six company, because several of its business areas are managed on level six and it is not comparable with the largest companies in the world which would require a level eight operation"

Based on extensive data from Swedish companies Enhancer has concluded that very few, if any Swedish listed firm is on a lower complexity level than five. Firms below level five could be a sub

supplier to a larger company where its customer makes the strategic development. Enhancer states that they have not found any company on level eight in Sweden, but a few on level seven.

In order to reach optimum results an organization needs to find the perfect fit, meaning having the right person in the right role.

2.1.2 Capability

Work- or problem solving capability refers to the ability to use discretion and judgement in making the decisions that will enable individuals to carry out tasks or goal-directed activities (Jaques, 1964, 1989, 2002 & Jaques and Cason 1994). By organizing hierarchically, individuals with higher capability levels than others can perform at higher levels and efficiently coordinate the work of others operating on lower capability levels. This will increase overall productivity of all individuals and hence the organization as a whole.

An individual's Current Potential Capability (CPC), for work that he values and for which he has the necessary skilled knowledge and experience, is a function of Complexity of Mental Processing (CMP) alone. When the complexity of a role matches our CPC we feel that the role is comfortable challenging enough. On the other hand, when the complexity of a role is lower than the individual capability, most people will feel under-employed, frustrated and bored. Individuals placed above their appropriate stratum tend to stay put because of high compensations but they are constantly worried about their surroundings finding out that they are not qualified enough. In this thesis the "capability level of a CEO" refers to the CPC of that CEO.

Enhancer has determined the CPC of each CEO by analyzing the pattern of how he is processing information when arguing on a chosen topic. When conducting interviews Enhancer is putting the individuals into a certain state of mood, which they called engrossed mood, in order to determine their level of processing information i.e. the order of complexity they are operating on. By engaging an individual in a discussion regarding a subject he feels strongly about the capability level can be measured accurately. Jaques refers to this technique as the interview technique. In a normal test situation a CEO is interviewed regarding a specific topic, for example the market in which the firm operates. The test person's argumentation is recorded. Thereafter the interview is transcribed and analyzed by three trained evaluators. The analysis performed by the evaluators focuses on the pattern for information processing in order to determine if the way of reasoning is conceptual or symbolic. An example of a symbolic way of reasoning is when a CEO is talking about the specific

company and market and is very rich in content, but still only answers the question without placing it in its wider context. On the other hand conceptual ways of reasoning normally do not start by answering a specific question but rather setting the context for the question before providing the answer. A conceptual way of reasoning would be when a CEO describes one phenomena of one industry and comparing that with a similar phenomena in another industry. Questions are asked until the evaluator has concluded what type of information processing practiced by the CEO. Finally the evaluators compare their ratings in order to determine the current potential capability level.

Figure 2. The picture shows how individuals on different stratum levels process information.

Instead of interviewing people it is also possible to use publicly published interviews to determine a person's level of capability. The precondition is that the person is engrossed during the interview so that he is using its full capacity. TV interviews normally allows for judging, but written presentations and speeches are rarely useful unless it is obvious that the person who presents it has created the text. In the present sample Enhancer has used publically available TV interviews, in order to determine the capability levels of CEOs.

2.1.2.2 Reliability and validity

The unique quality of the Jaquesian theory is the fact that capability can be measured with great accuracy. In a control study by Jaques and Cason (1994) evidence was published verifying the validity of the measure. The first technique used in their study, the triangulation technique, intended to measure the level of the individual's role through Time-Span Measurement and then judge the level of the individual's capability in relation to that role. In order to get an objective view of individual capability, the assessment was made through double blind judgment by the individual itself, its manager, and the manager's manager. The correlation coefficient between the personal ratings and the ratings by their manager's manager was 0.96. The view of the manager in relation to the individual was 0.95 and finally the correlation coefficient between the ratings of the manager and the manager's manager was 0.94. Conclusively individuals in an organization are able to rate their own as well as others' levels of capability well, given that they have worked together for some time and know what time spans to relate to.

The interview technique, which was the other technique used in the Jaques and Cason study, focuses on the reasoning process of an individual when engaged in engrossed argument. The assessment was made through double blind judgment of the individual's reasoning process, performed by three trained evaluators. When comparing the ratings that Jaques and Cason performed individually and the correlation of previous ratings described above, the coefficient was 0.97.

Comparing the two assessment techniques revealed extremely high correlations (0.96). The high validity of the measurement techniques makes them unique within this field of behavioral science. Never before have human capability researchers found this high level of validity, comparable to studies performed within the natural science field. (Jaques, 1964, 1989 & Jaques and Cason 1994). Previous research on IQ measurement have been performed, but with correlations to work performance at rates in between 0.2 to 0.6, depending on which type of work one evaluate against (Hunter and Hunter, 1984).

2.2 Performance

Firm performance can be viewed from different perspectives, e.g. as financial performance and non-financial performance. Workflow, improvement, innovation, customer satisfaction and skills development are some indicators of non-financial performance of a firm (Kaplan and Norton, 1994). A general definition of performance is the accomplishment of a given task measured against

preset standards (Business Dictionary 2010). Examining predictors of firm performance has fascinated researchers for a long time. According to the classical Capital Asset Pricing Model, (CAPM), expected stock returns are positively and linearly related to systematic market risk. However the classic model of Sharpe (1965), Lintner (1965) and Mossin (1966) has lost ground in the previous decades since many other variables, such as firm size (Banz, 1981) and past stock returns (Jegadeesh and Titman, 1993) have been shown to have explanatory power of stock returns. To capture return patterns several multifactor models have been suggested, with the most famous being the Three-factor model including the market-, size- and value factor (Fama and French, 1993). A growing body of research has examined the influence upon firm performance of a wide range of variables, among them CEO characteristics. Even though a CEO is not the sole determinant of firm performance, the CEO role is considered as highly influential when it comes to determining whether organizational performance is a success or a failure.

Determining a firm's performance is dependent on the availability of reliable and relevant data. However, most data have flaws in some respect. In addition, taking into account that a data population includes numerous different firms, makes it complicated to find a measure that enables generalization of results applicable to all firms in the sample. There are some general potential problems with performance metrics that are important to address; first, metrics can be manipulated. Suppose a new CEO wants to show shareholders that his job has had a positive effect on firm performance. This fact could give the CEO incentives to manipulate data by for example shifting earnings across periods, controlling the level of investment or adjusting accruals. Compensation-related metrics are also possibly subject to manipulation. Secondly, metrics used are not always perfectly designed to reflect performance for a specific industry. Furthermore, a CEO is likely to have more control over internal accounting measures than external stock market returns presumably.

A true measure of economic return for a firm is elusive. In this thesis excess stock returns are used as the measures of organizational performance. Market efficiency implies that the price of a stock reflects all available information relating to the profit ability of firms, therefore stock returns are generally considered to be objective indicators of overall organizational performance in the long run. Excess stock returns are defined as a firm's daily share price development compared to the daily average performance of a relevant sector specific index.

3 Hypotheses

Even though external factors might account for most of the variation in stock returns, it is reasonable to believe that there are other variables affecting stock returns. Several researchers have intended to estimate the value of strategic leaders, in particular CEOs, as a determinant of organizational performance. CEO ability is the composition of both observable and quantifiable characteristics as well as unobservable and perhaps non-quantifiable features. The wide range of potential value adding CEO characteristics and the difficulties in identifying and quantifying them, can perhaps explain the mixed findings. The difficulties of evaluating CEO ability, makes it important to find new testable theories in order to better understand the CEO's contribution to overall firm performance. CEO capability, as measured on the Jaquesian scale could potentially be one such quantifiable measure of CEO ability which can be useful in predicting which companies will be profitable but also how to find the optimal CEO candidate for a specific CEO role of a firm. According to Jaquesian theory an organization will reach optimum results by finding the perfect fit between capability of individuals and complexity of roles, meaning having the right person in the right place. We find it reasonable to believe that some CEOs are overqualified, meaning that their level of capability is above the required level, while others do not have the capability level required in order to carry out the tasks assigned to the CEO role. Since the CEO has the ultimate responsibility of a firm, we expect CEO capability to have an impact on excess stock returns. If a CEO operates on the required level of capability for the CEO role, (five or higher), it is assumed that it will positively impact stock performance. Conversely, a CEO who operates on a lower level than required for the role, it is assumed to have a negative impact on stock returns. The following hypothesis is applied:

CEOs on a capability level equal or higher than the level of capability that the firm requires will have a positive impact on stock performance while CEOs on a capability level lower than the capability level that the firm requires will have a negative impact on stock performance.

4 Data

First this section describes the data search and selection process. Then tables of descriptive statistics present the basic features of the final sample.

4.1 Data and Sample Collection

This paper concerns CEO capability and its impact on excess stock returns. Included in the study are Swedish firms where Enhancer has applied Elliot Jaques' methodology. The final sample in the study consists of 35 CEOs of OMXS listed firms.

4.1.1. Performance

Data of daily stock prices during the period of office of each CEO was collected from Reuters EcoWin. In order to control for environmental uncertainty we have compared the average daily stock prices for each firm to industry specific sector indices collected from the Nasdaq OMX historical database. The Stockholm stock exchange has adopted the Global Industry Classification Standards (CIGS) as the official sector classification standard for all listed firms. CIGS sector indices are divided into four levels, ranging from the most general sector to the most specialized sub-industry. A firm can only belong to one grouping, which is determined by its major business activity. Our aim has been to use as sub-industry specific indices as possible. However we found that sub-industry indices (level three and four) were too narrow in terms of total number of firms included, and therefore not useful when comparing index development to stock returns. Using too narrow indices could possibly mean that a firm's performance impacts the whole indices and hence would be compared to its own firm performance. Therefore, each firm is assigned to a level three or level two index, depending on the number of firms included in each index. The difference between a firm's daily change (percentage) in stock returns and industry specific index is defined as daily excess stock return and used as the performance measure in this thesis. The data was retrieved during February 2011 and the number of trading days is 252.

4.1.2. CEO Capability

For each CEO Enhancer has provided us with two numbers; first, a number reflecting the required level of a specific CEO role (also known as the Time Span Measurement). Second, another number reflecting the individual capability level of the CEO himself. Comparing the level of the individual with the complexity level of the role makes it possible to determine whether a person is on the required level for the work role or not. According to Enhancer, level five is the general minimum

capability level of CEOs of the listed Swedish firms represented in our sample. For instance, if a firm requires a level five CEO and the CEO has a capability level of four, this would imply that the CEO is one level lower than required and thus not appropriate. It is important to address that there exist no linear relationship between capability levels of the CEOs. Hence, a CEO two capability levels above the required level is not necessarily twice as capable of handling the role as a CEO one level above the optimal level.

The total period of office for all CEOs covers a time period of 20 years and includes both former and currents CEOs. Since some of the CEOs were active back in time it could have been possible for Enhancer to look at performance in hindsight and decide whether a CEO had the accurate capability level or not. However we have developed a close collaboration with Enhancer over the past months and based on this experience we have no reason to believe that this would be the case. Enhancer's business relies to a great extent on making accurate judgments and serving their customers with high quality advices. Enhancer is currently working with large well-reputed firms and giving us manipulated data would not benefit the business of Enhancer in a long-term perspective. Therefore, we find no reasons to believe that the data on CEO capability from Enhancer is untrustworthy.

4.1.3. Control variables
A few control variables are included in the study since there are multiple factors which possibly impact stock performance. When deciding which factors that need to be controlled for, previous research has been the main source of inspiration. It is a stylized empirical fact that small stocks have higher average return than big stocks. The CAPM encounters difficulties in accounting for these well established findings (Fama and French, 1992). In response to this Fama and French formed a model including both size and Book-to-Market ratio, and found that both variables were associated with high explanatory power. Because of the predictive power, two of the most commonly used control variables are size and Book-to-Market ratio (Fama and French, 1993), hence these are the factors that are controlled for in our study.

In order to determine the size of each firm we have collected data on total market capitalization[2] from Reuters EcoWin and FactSet. Market capitalization is changing over time, so in order to get a

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[2] Market capitalization is the number of outstanding shares multiplied by the share price.

realistic number we computed the natural logarithm of the average market capitalization for the term of office of each CEO.

The book-to-market ratio[3] attempts to identify undervalued or overvalued securities by taking the book value and dividing it by market value. In basic terms, if the ratio is above one it indicates that the stock is undervalued; if it is less than one, it indicates that the stock is overvalued. Data on daily Book-to-Market ratios was collected from FactSet. The average of the daily Book-to-market ratios during the term of office of each CEO is used. The data was retrieved during February 2011.

4.2 Final sample and sample description

The final sample consists of 35 CEOs and covers a time period of 20 years (1990-2010) since it contains both current and former CEOs. All three market capitalization segments (large-, small, and mid cap) and several industry sectors are represented in the sample of OMXS listed firms.

Descriptive Statistics		
Number of CEOs		35
	Level of firm	**Level of CEO**
Average	5.43	4.74
Median	5	4
Max	7	7
Min	5	3

Table 1. Descriptive statistics on firm level and CEO capability level

As shown in Table 1 the average CEO does not have the required level of capability, since 4.74 is lower than 5.43. The highest CEO capability level in the sample is seven and the lowest level is three. When comparing capability levels with the general minimum level of five one can see that our sample consists of 17 CEOs above or equal to level five, whilst 18 CEOs are below level five.

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[3] Book-to-Market ratio compares the book value of a firm to its market value.

Descriptive Statistics	
Number of CEOs on level equal or higher than 5	17
Number of CEOs on level lower than 5	18
Total number of CEOs	**35**

Table 2. The numbers of CEOs operating on a level higher or equal to the level that the firm requires and the number of CEOs operating at a lower level.

As shown in Table 3 one can see that the average period of office for a CEO in our sample is 5 years. The average Book-to-Market ratio is 0,63964 and the average daily excess stock return is 0,00005 percent.

Descriptive Statistics	
Average daily Excess stock return (%)	0.00005
Average Book-to-Market	0.63964
Average period of office for the CEOs in our sample (days)	1304
Average period of office for the CEOs in our sample (years)	**5**

Table 3. Descriptive statistics of our final sample.

5 Methodology

The difference between the two numbers, CEO capability and firm level, will tell if the CEO is operating on the required level of capability or not. A positive difference implies that the CEO meets the criteria for that specific CEO role. Enhancer believes that the fit between capability levels of CEOs and the level of firms explains why some firms succeed while others fail. Nevertheless, how the levels (CPC and TSM) should be applied in a model is not obvious. By using the same set of numbers in three different ways, we hope to provide an as complete picture of the CEO capability variable as possible.

An interval variable is a measurement where the difference between two values is meaningful. We use the difference between the capability level of the CEO and the capability level required by the specific firm to compute the independent variable, CEO capability. A difference between a CEO capability level of seven and a firm level of six would represent the same difference as would a difference between a CEO Capability level of six and a firm level of five. Furthermore, a difference of minus two does not necessarily imply that it is twice as "bad" as a difference of minus one. Interval scales do not have a zero point and therefore it is not possible to make statements about how many times higher one score is than another. According to Enhancer the positive or negative difference is just a way of knowing if a CEO is on the required level of capability or not, rather than knowing if one CEO is twice or ten times better than another. Due to this, we expect to find a positive impact on stock performance from those cases were the difference is positive, i.e. the capability level of the CEO is equal to or above the level required by the firm.

$$(1) Excess\ stock\ return = \alpha + \beta_0 Difference + \beta_1 Ln(MarketCap) + \beta_2 BooktoMarket + \varepsilon$$

Next, we created a dummy variable separating the two clear subgroups of CEOs in our sample; CEOs on the appropriate level of capability and CEOs on the inappropriate level of capability. Since the general minimum level of CEO capability in our sample is five the first group consists of CEOs on a level equal or higher than five and the other group consists of CEOs lower than five. Dummy variables are useful because they enable us to use a single regression equation to represent multiple groups. As you can see in table 2 the sample is almost equally distributed between the two subgroups.

$$(2) Excess\ stock\ return = \alpha + \beta_0 CEOsAbove5 + \beta_1 Ln(MarketCap) + \beta_2 BooktoMarket + \varepsilon$$

However, it is still reasonable to think that there is a positive effect of having a overqualified CEO and lack of positive effects of having an unqualified CEO. Therefore we computed a relative variable by using the ratio of the CEO capability level and the level required by the firm. A ratio variable has all the properties of an interval variable and also has a true zero point. Ratios of one or higher indicates that the CEO is above the level that the firm requires and ratios below one is when the CEO is below the level required by the firm.

$$(3) Excess\ stock\ return = \propto + \beta_0 CEO/Firm + \beta_1 Ln(MarketCap) + \beta_2 BooktoMarket + \varepsilon$$

Where;

- The variable "Difference" compares the level of CEO capacity with the level of capability that the firm requires.
- "CEOsAbove5" is a dummy variable, which separates the subgroup of CEOs with a capability level on or above five from the group of CEOs with a lower level of capability. The dummy variable takes on the value one if the CEO has a capability level of five or higher.
- The variable "CEO/Firm" measures the level of CEO capability in relation to the level that the firm requires. If the CEO is on the required level of capability the number is above or equal to one and below one if the capability level of the CEO is not as high as the firm requires.
- The variable "Ln(MarketCap)" is measured as the natural logarithm of the market capitalization of each stock.
- The variable "BooktoMarket" is measured as a firm's book value compared to its market value.

The assumptions underlying our model can be found in Appendices 9.3.

The residuals from our regressions show the deviation between the sample and the estimated model. Higher values of the residuals imply a less accurate model. To correct for the problem of heteroscedasticity in our regression models, we have used robust standard errors in STATA for all our regressions. This corrects the standard errors for heteroscedasticity and is known as the "White's Heteroscedasticity-Consistent Variance and Standard errors" (Gujarati 2003, p. 417).

6 Results and Discussion

This section presents and discusses the test results from our study.

Number of obs	35
R-Squared	0.2259
Prob > F	0.0069

Variable	Coef	Robust Std. Err	t	P > | t |	[95% Conf. Interval]	
Difference	0.0004367	0.0001491	2.93	0.006	0.0001327	0.0007408
Ln(MarketCap)	4.780E-05	6.47E-05	0.74	0.465	-0.0000842	0.0001798
BooktoMarket	0.0008213	0.0002738	3.00	0.005	0.0002629	0.0013797
Constant	-0.0012347	0.001663	-0.74	0.463	-0.0046264	0.002157

Table 4. Results from model with "Difference" as the variable for CEO capability.

In Table 4 we can see that the impact on daily excess stock returns of CEO capability, when measured as the difference between level of firm and level of CEO capability, is small, but still positive and statistically significant (p-value of 0.006). The p-value tells us that 0.6 percent is the lowest value for which we can reject the hypothesis. If, other things equal, this implies that daily excess stock returns will increase by 0.04367 percent from having a CEO on the required capability level. CEOs below the required level will have a corresponding negative effect on stock returns (-0.04367). The control variable BooktoMarket variable has a positive (0.008213 percent) impact on excess stock returns. The variable is statistically significant (p-value of 0.005). The size effect accounted for by the variable Ln(MarketCap) did not generate a significant value.

Number of obs	35
R-Squared	0.1629
Prob > F	0.0188

Variable	Coef	Robust Std. Err.	t	P > t	[95% Conf. Interval]	
CEOsAbove5	0.0005564	0.0002997	1.86	0.0365	-0.0000548	0.0011677
Ln(MarketCap)	-4.750E-06	6.11E-05	-0.08	0.469	-0.0001294	0.0001199
BooktoMarket	0.0006065	0.0002355	2.58	0.0075	0.0001261	0.0010868
Constant	-0.0004992	0.00164	0.763	0.3815	-0.0038439	0.0028455

Table 5. Results from model with "CEOsOver5" as the variable for CEO capability.

In Table 5 we can see that having a CEO on the required capability level (CEOsAbove5) has a positive impact (0.0005564) on the independent variable excess stock return. The impact is relatively small, but still statistically significant (p-value of 0.0365). The p-value tells us that 3.65 percent is the lowest value for which we can reject the hypothesis, that is to say that CEOs with capability levels of five or higher will have a positive impact of 0.05564 percent on daily stock performance. Hence, other things equal, a firm with a CEO on the required capability level is expected to increase daily stock returns with 0.05564 percent. By using two subgroups one cannot distinguish the exact effects between different capability levels within each subgroup since all CEOs are treated as either above or below level five.

The regression output also shows that a high Book-to-Market ratio has a positive impact on excess stock returns of 0.06065 percent. The BooktoMarket variable is statistically significant (p-value of 0.0075) at a 95 percent level, implying that the effect of the variable adds explanatory power to the model. As in the previous regression the negative size effect is not statistically significant.

Number of obs	35						
R-Squared	0.2382						
Prob > F	0.0077						

Variable	Coef	Robust Std. Err.	t	P > | t |	[95% Conf. Interval]	
CEO/Firm	0.0025622	0.0009099	2.82	0.008	0.0007065	0.0044179
Ln(MarketCap)	3.560E-05	6.26E-05	0.57	0.574	-0.0000921	0.0001634
BooktoMarket	0.0008436	0.0002773	3.04	0.005	0.000278	0.0014093
Constant	-0.0035114	0.0021498	-1.63	0.113	-0.007896	0.0008732

Table 6. Results from model with "CEO/Firm" as the variable for CEO capability.

The third regression generates the highest R-squared value, that is to say that the model generated the highest explanatory power. The capability variable CEO/Firm captures the relationship between level of CEO and level of firm. With a beta value of 0.0025622 and a p-value of 0.008, the impact of CEO capability on daily stock returns is statistically significant even in this regression. The positive impact on daily stock returns of the CEO/Firm variable is 0.25622 percent. The size variable is insignificant (p-value of 0.574). Book-to-Market ratio adds explanatory power to the model with a coefficient of 0.08436 percent and a p-value of 0.005. The results from the third regression implies that there is incentives of having a CEO of high capability level. The higher the capability level in

relation to the firm requirement the greater the positive impact on daily excess stock return. Once again this finding is not in line with the theory that the best fit, meaning the capability level of the CEO is equal to the level of the firm, is more important than hiring the CEO with the highest level of capability.

When controlling for Book-to-Market ratio and size, we obtained significant values for Book-to-market ratio but not no significant values for the size variable. Why firm size does not generate significant values can perhaps be explained by the small sample and noisy data.

The highest generated R-squared value is 0.2382, which indicates a relatively low explanatory power of all three models. However, the expected R-squared must be taken into account when analyzing this figure. Also the potential presence of omitted variable bias can provide an explanation to a modest R-squared value. If the R-squared value is high (above 0.8) but the significance of the coefficients is low, there are reasons to suspect multicollinearity. The highest generated R-squared value of 0.2382, hence, does not indicate any multicollinearity. As can be seen in the above table, the correlation between the three variables, CEO capability, Size and Book-to-Market, is not above 0.8, which also confirms that no multicollinearity problem exists. The correlation found between our three variables that measure CEO capability is higher since they refer to the same numbers and therefore are more likely to correlate.

	Difference	CEOsAbove5	CEO/Firm	Ln(MarketCap)	Book-to-Market
Difference	1				
CEOsAbove5	0.7348	1			
CEO/Firm	0.9849	0.7899	1		
Ln(MarketCap)	-0.1103	0.2018	-0.0331	1	
Book-to-Market	-0.2893	-0.1126	-0.3169	-0.1788	1

Table 7. Correlation matrix.

When firms are perceived as having performed well, success is often attributed to the leaders of those firms, and vice versa. However, it is an open discussion whether organizational performance causes positive or negative attributions to be applied to the CEO, or if the existing CEO attributes determine the successful or unsuccessful outcome. In public opinion the CEO position is often just a reflection of the financials in a firm and the measurement of "a good CEO" is often a reflection of a firm with "good financials" and vice versa. But certainly there is more to it. Previous research has

intended to examine the relationship between CEO characteristics and overall firm performance. Bhagat et al. (2010) Adams et al. (2006) and Kaplan et al. (2008) all found that firm performance can be attributed to the leaders of those firms. Different measures of leader attributes was used but still there is no measure perceived as being an ultimate measure of CEO ability. In this study we use CEO capability, defined as the ability to handle long-term and complex tasks, in order to test whether it can serve as a predictor of stock performance or not. Our results show that CEO capability level has a positive impact on stock performance. However it is generally known that stock performance is influenced by multiple factors and that many of them are beyond CEO control.

CEOs have a high external and internal visibility and are responsible for the key strategic decisions of their firm and therefore CEOs are those who are likely to make a difference. Still, it is important to keep in mind that the work of a CEO does not necessary result in immediate success or failure. For a CEO to make an impact on stock performance it is reasonable to think that they need to be in the position for some time. Also the impact of CEO work is likely to be more immediate in smaller firms than in large firms. In a large firm decisions are more complex and adapting to a changing environment can be more difficult. Our sample includes Swedish listed firms which all could be perceived as large firms. Therefore, those CEOs might become attributed with mistakes/successes of former CEOs. Hence, separating the CEO capability effects from succession effects, rather than only looking at period of office of a CEO, might have increased the explanatory power of the model.

Reflecting on the regression results one can say that having a high level of capability is likely to positively impact the daily change in stock returns and also that the larger the difference the greater the impact on the dependent variable and vice versa. According to Jaquesian theory firms having the perfect fit, meaning that the CEO level matches the required firm level, is central for effective managerial leadership. Perfect fit is the most desirable relationship between CEO capability and firm level but still attracting an overqualified CEO is better than having an unqualified CEO since we observe a positive effect on excess stock returns of having both a perfect fit and an overqualified CEO. The relevant question from a firm perspective is probably whether the positive effects exceeds the costs, or not. For instance an overqualified CEO may expect more money and other incentives to stay but even if the CEO receives a salary which reflects his level of capability it might

still not be optimal from the CEO's perspective to have a job that does not make full use of his skills and abilities.

Even if firms are rewarded for hiring the "right" CEO, half of our sample consisted of CEOs operating at a lower capability level than the required level of the firm. This does not necessarily imply that the share of CEOs below the required capability level in our sample reflects the composition of the supply of CEOs in reality. However, there are several reasons why it is difficult to find those CEOs who will be a perfect fit for the role. The most evident explanation is perhaps that firms are unaware of CEOs' capability levels as well as their own requirements. Furthermore, the labor market for CEOs bears little resemblance to the labor market for other executives. Also, the number of open positions and the supply of people capable of running large complex organizations are limited. Another reason why firms fail to recruit a CEO qualified enough might be because directors feel pressure to fill vacant CEO positions fast to avoid media and market speculations from the image of being leaderless too long. Hence boards rush to identify new leadership candidates before evaluating previous leaders and re-evaluating the demands of the current position. There is also much risk involved in finding a new CEO, since this person will serve as the window of the firm, and be associated with the brand name perhaps even after their employment. If an organization makes the wrong choice when appointing a new CEO, it can suffer from enormous losses both from the process of removing the CEO and from lost business opportunities and reputation. If this holds there is room for improvements on the labor market in order to better match roles and individuals. The Jaquesian theory can serve as a tool for finding the perfect fit and thereby increase the overall efficiency of organizational structures in the long term perspective.

7 Final Remarks and Suggestions for Further Research

The purpose of this thesis was to investigate whether the capability level of CEOs can be considered a predictor of stock performance. This thesis is merely the first attempt to test the impact of CEO characteristics on firm performance. However, to our knowledge it is the first study using Swedish data aiming to test the impact of CEO capability on excess stock returns. By no means we can conclude that CEO capability is a predictor of stock performance. What we can say is that our results indicate that CEO Capability can serve as a predictor of stock performance and should be given more attention among researchers.

In general the small number of observations limits our analysis and the ability to draw any conclusions. Due to the small sample, it would be interesting to expand the dataset to include more observations. Furthermore, an extended dataset would make it possible to test new hypotheses including variables such as capability levels of the board of directors and former CEOs. This would perhaps generate even more significant results. Even if the CEO is on the required capability level quality, the longest task of the board members should perhaps be on the same level or higher in order to develop a challenging enough dialogue. The capability levels of the board members are therefore yet another variable which might add value to the model.

8 References

Literature

Adams, R., Almeida, H. & Ferreira, D. (2005). "Powerful CEOs and their impact on corporate performance", *Review of Financial Studies*, Vol. 18, p 1403-1432.

Banz, R.W. (1981). "The Relationship Between Return and Market Value of Common Stocks," *Journal of Financial Economics*, Vol. 9, 1981, pp. 3-18.

Bhagat, S., Bolton, B., and Subramanian, A., (2010). "CEO education, CEO turnover, and firm Performance". Working Paper, University of Colorado, CO

Borg, A (2005). "Time for the Organization", *Master thesis Stockholm School of Economics*

Carthart, M. M. (1993). "On Persistence in Mutual Fund Performance" *The Journal of Finance*, Vol. 52, No. 1. (Mar., 1997), pp. 57-82.

Craddock, K. (2009). "Requisite Organization – Annotated Bibliography", *Readings in Global Organisation Design*, Columbia University, fifth edition, part 1.

Fama, Eugene F.; French, Kenneth R. (1993). "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, 33, pp. 3–56.

Gujarati, D. N. (2003), *Basic Econometrics*, Boston: McGrawHill, p. 417.

Hunter, J.E. & Hunter, R.F. (1984). "Validity and utility of alternative predictors of job performance." *Psychological Bulletin*, 96, p 72-98.

Jaques, E. & Cason, K., (1994). "Human Capability – A Study of individual Potential and its Application." Cason Hall & Co. Publishers, Falls Church.

Jaques, E. (1964). "Time-Span Handbook: The Use of the Time-Span of Discretion to Measure the Level of Work in Employment Roles and to Arrange an Equitable Payment Structure." Heinemann, University of Michigan, IL

Jaques, E. (1989). "Requisite Organization: The CEOs Guide to Create Structure and Leadership." Cason Hall, University of Michigan, IL

Jaques, E. (2002). "Social Power and the CEO; Leadership and Trust in a Sustainable Free Enterprise System." Greenwood Publishing Group, In

Jegadeesh, N., and S. Titman (1993) "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency." *Journal of Finance*, 48, 1993

Kaplan, R. S. & Norton, D. P. (1994), "Balanced scorecard: Translating strategy into action.", *Harvard Business School Press*, Boston, MA.

Kaplan, S.N, Klebanov, M.M. & Sorensen, M. (2008), "Which CEO characteristics and abilities matter?", NBER Working Paper Series, Vol. w14195.

Lintner, J., (1965) "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets", *Review of Economics and Statistics*, 47, pp.13 – 37.

Mossin, J. (1966) "Equilibrium in a Capital Asset Market." *Econometrica*, Vol. 34, No. 4, pp. 768-783.

Sharpe, W. F., (1964), Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, *Journal of Finance* Vol. 19, pp. 425 – 442.

Westerberg, M., Singh, J. & Häckner, E. (1995) "Does the CEO matter? An empirical study of small Swedish firms operating in turbulent environments" *Scand. J. Mgrnt.* Vol. 13. No.3, pp. 251-270.

Wooldridge, J.M. (2009), "Introductory Econometrics, A Modern Approach", Michigan State University: South Western-Cengage Learning. 4th Edition, pp. 84-97.

Internet and other information sources

Reuters Ecowin

FactSet

Nasdaq OMX website
http://www.nasdaqomxnordic.com/index/ (2011-03-10)

Requisite Organization International Institute website
http://www.requisite.org/main.html, (2010-10-16).

Enhancer website
www.enhancer.se, (2011-05-08).

Business Dictionary 2010
http://www.businessdictionary.com/definition/performance.html, (2010-10-16).

9 Appendices

9.1. Illustration of CEO capability and level of capability required by firms.
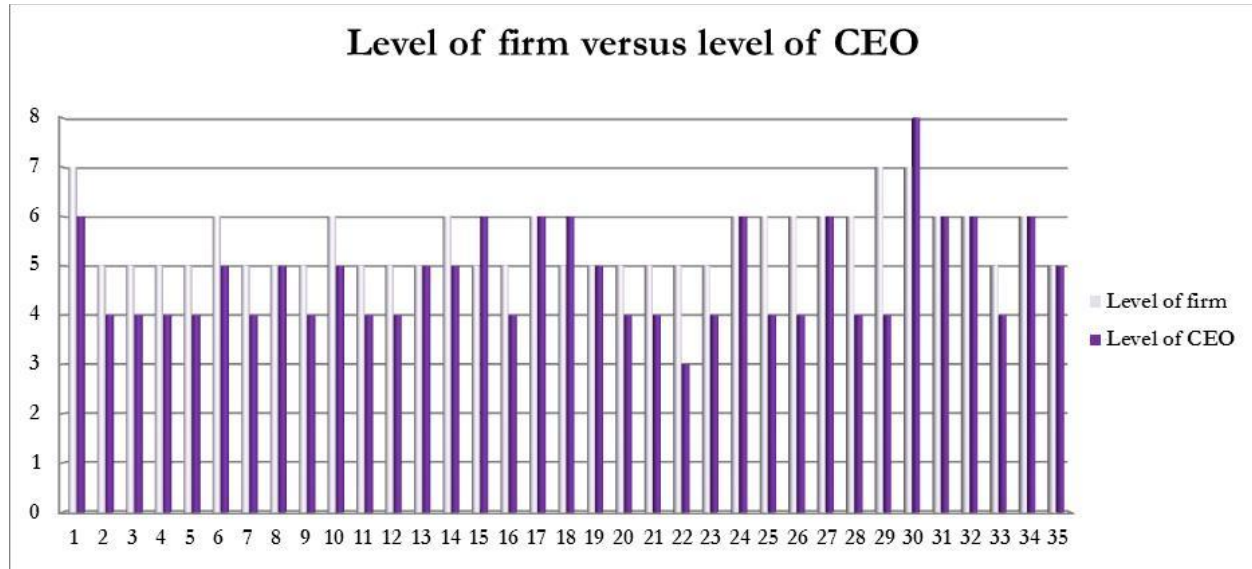
9.2. Final sample

Firm ID	Level firm	Level CEO	Difference	DummyCEOsAbove 5 (over/equal=1, under=0)	CEOsInRelatio nToFirm	Excess return (Daily average %)	Ln(MarketCap)	Book to Market
1	7	6	-1	1	0.86	-0.00038	26.46	0.2770
2	5	4	-1	0	0.80	0.00035	20.31	1.0314
3	5	4	-1	0	0.80	-0.00046	25.30	0.1309
4	5	4	-1	0	0.80	0.00029	21.73	0.3390
5	5	4	-1	0	0.80	0.00034	20.34	0.9589
6	6	5	-1	1	0.83	0.00106	23.67	0.9575
7	5	4	-1	0	0.80	-0.00017	19.63	0.9979
8	5	5	0	1	1.00	-0.00107	19.51	0.3555
9	5	4	-1	0	0.80	-0.00045	25.59	0.2424
10	6	5	-1	1	0.83	0.00070	23.50	0.5449
11	5	5	0	1	1.00	-0.00064	21.88	0.2928
12	5	4	-1	0	0.80	0.00066	21.09	0.7452
13	5	4	-1	0	0.80	0.00212	21.69	0.5922
14	6	5	-1	1	0.83	0.00003	23.88	0.8432
15	5	6	1	1	1.20	0.00034	21.52	0.3267
16	5	4	-1	0	0.80	0.00049	21.26	0.4284
17	6	6	0	1	1.00	0.00011	26.12	0.7320
18	5	6	1	1	1.20	0.00126	22.25	0.3183
19	5	5	0	1	1.00	0.00126	19.89	0.6311
20	5	4	-1	0	0.80	-0.00176	22.77	0.1918
21	5	3	-2	0	0.60	-0.00204	21.38	0.6266
22	5	3	-2	0	0.60	0.00075	20.74	2.6637
23	5	4	-1	0	0.80	-0.00001	20.84	0.2959
24	6	6	0	1	1.00	-0.00003	24.04	0.3424
25	6	4	-2	0	0.67	-0.00003	25.76	0.7444
26	6	4	-2	0	0.67	-0.00017	25.58	0.6543
27	6	6	0	1	1.00	0.00104	25.68	1.2597
28	6	4	-2	0	0.67	-0.00005	26.12	0.5798
29	7	4	-3	0	0.57	-0.00066	24.00	0.8118
30	7	7	0	1	1.00	0.00007	25.09	0.7024
31	6	6	0	1	1.00	0.00012	26.42	0.3787
32	6	6	0	1	1.00	0.00039	24.02	0.1983
33	5	4	-1	0	0.80	-0.00258	20.63	0.3828
34	6	6	0	1	1.00	-0.00004	22.01	1.3031
35	5	5	0	1	1.00	0.00091	21.39	0.5065

9.3 Assumptions

A set of assumptions underlying the model is stated below. The first assumption we make simply defines the multiple linear regression (MLR) model:

(1) $y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + u$

Where $\beta_0, \beta_1 \ldots \beta_n$ are the unknown parameters of interest and u is the unobservable random error term.

The data is a random sample of n observations and the errors are statistically independent of each other:

(2) $\{X_i; i = 1, 2, \ldots, n\}$

The model could suffer from perfect collinearity if an independent variable in our regression (1) is an exact linear combination of the other independent variables. It this is true then it cannot be estimated by OLS. Therefore, the second assumption states that there are no exact linear relationships among the independent variables:

(3) $\text{Cov}(\varepsilon_i, \varepsilon_j) \neq 0$

The error term u has an expected value of zero given any values of the independent variable:

(4) $E(u_i \mid x_1, x_2, \ldots x_n) = 0$

The error term u has the same variance given any values of the explanatory variables:

(5) $\text{Var}(u_i \mid x_1, x_2, \ldots x_n) = \sigma_u^2$

The sixth assumption states that the error term is normal distributed with zero mean and variance:

(6) $u_i \sim N(0, \sigma_u^2)$