



CEO Personality and Firm Policies

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This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible – through the approval of this thesis – for the theories and methods used, or results and conclusions drawn in this work.

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Abstract

This master thesis explores the relationship between the personality of chief executive officers (CEOs) and their chosen firm policies. I am relying on the Big Five model including its 30 facets, which has been shown to have a high out-of-sample predictive power in many areas, and is relatively stable over time. Measures of personality are estimated through linguistic features observed in quarterly earnings call transcripts, which are analyzed through IBM Watson Personality Insights. This thesis extends the work by [Gow et al. \(2016\)](#), as it further includes the 30 facets of the Big Five model and also added two new firm policies. I find that the estimated measures of personality are associated to the effective tax rate, the payout ratio, the net leverage, R&D expenses, as well as the book-to-market ratio.

Keywords: *Corporate Governance, Corporate Finance, Corporate Taxation, Capital Structure, Tax Aggressiveness*

JEL Classification: *G32, H26, J24*

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Executive Summary

This master thesis explores the relationship between the personality of chief executive officers (CEOs) and their chosen firm policies. I am relying on the Big Five model including its 30 facets, which has been shown to have a high out-of-sample predictive power in many areas, and is relatively stable over time. Measures of personality are estimated through linguistic features observed in 37,519 quarterly earnings call transcripts, which are analyzed through IBM Watson Personality Insights. These transcripts cover the years between 2009 and 2019 and contain 2,963 mostly U.S. based firms. This thesis extends the work by [Gow et al. \(2016\)](#), as it further includes the 30 facets of the Big Five model and also added two new firm policies. I find that the estimated measures of personality are associated to all five investigated firm policies. The effective tax rate is most notably related to self-consciousness, the payout ratio to self-discipline, modesty and adventurousness (opposite), the net leverage to self-discipline and orderliness, and R&D expenses to achievement striving, among others. Even though the results of the regression are significant, they are not causal. There are many econometric challenges e.g. with respect to the non-random process of how a CEO is appointed, potential interaction terms between personality traits and non-monotonic effects on firm policies. Further, the environment (e.g. corporate governance & legal system) in which a CEO operates has a mediating effect on how personality affects firm policies. Nevertheless, this study may hint that a CEO's personality may have some implications for firm policies, and that they should be considered not only by the human resources department in the hiring process, but also by the shareholders and policymakers that create rules for effective corporate governance.

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1 Introduction

Personality traits have been shown to be a robust predictor for many aspects of our life and are relatively stable over time. Some of the more influential papers include [Soldz & Vaillant \(1999\)](#), that followed 163 men over a period of 45 years (starting in 1939-1944) and analyzed their life trajectory in conjunction with their personality characteristics. Later, [Barrick & Mount \(1991\)](#) created a meta-analysis of the impact of personality on work place performance. Since then, personality has been of greater interest not only to business researchers in the field of marketing, but also human resources and organization. Surprisingly, the finance and accounting literature has often overlooked this topic, or is limited to studying only some aspects of personality, e.g. the effects of overconfidence, narcissism, risk-aversion or assertiveness, but not the more general construct of personality, e.g. the big5 by [Costa & McCrae \(1992\)](#) and [Goldberg \(1993\)](#). One notable exception is the study by [Gow et al. \(2016\)](#), that investigated how those five traits are associated with financing choices, investment choices, as well as firm operating performance. [Green et al. \(2018\)](#) note that extraversion increases investor recognition among other findings, and [Malhotra et al. \(2018\)](#) link extraversion to increased merger and acquisition behaviour and positive subsequent performance, while [Adebambo et al. \(2019\)](#) find that extraversion tends to be related to the risk profile of a company and its cost of capital.

Investigating CEO's personality traits is important, since they have the potential to strongly shape an organization, e.g. through strategic and operative decisions. Furthermore, personality has been shown to be one determinant of organizational culture, affecting employee attitudes, financial performance, reputation and analysts' stock recommendations ([O'Reilly et al. 2014](#)). Also, CEOs with e.g. higher openness to experience are likely to create a group dynamic that fosters intellectual exchange ([Peterson et al. 2003](#)), potentially increasing the likelihood of innovative outcomes.

Up to date, the literature mostly considers two types of CEOs, i.e. entrepreneurial and managerial CEOs. The entrepreneurial literature often distinguishes further between growth and necessity driven entrepreneurs. [Kerr et al. \(2018\)](#) criticise that there is still a lack of studies on CEO types, that capture the full range of heterogeneity. This study will often make reference to traits that are typical of entrepreneurial or managerial CEOs, as they covary with the big5 model ([Kerr et al. 2018](#), [Stewart & Roth 2007](#), [Collins et al. 2004](#)), which will be used extensively.

This thesis will extend the work by [Gow et al. \(2016\)](#) by adding six additional facets to each of the five traits, and further adding two new firm policies: the effective tax rate and the payout ratio. The personality traits and facets are estimated through a model by IBM Watson Personality Insights, which uses textual input and transforms it into word vectors using the GLoVe technique ([Pennington et al. 2014](#)), before feeding them into a neural net. CEO's answers dur-

ing quarterly earnings conference calls will be used as textual inputs, which are sourced from [SeekingAlpha.com](https://seekingalpha.com). The firm policies are estimated based on financial data from the same site. After regressing firm policies on personality estimates, potential reasons that may explain the findings will be provided. This study documents significant relations between all five firm policies and the big5 personality traits and facets.

The thesis is structured in four parts and includes an introduction, a literature review, an empirical study, and a summary. The current section provided a short *introduction* to the topic, and outlined motivations for its relevance. The *literature review* encompasses (1) an overview of the theoretical structure of four different personality models, (2) summarizes different methods of measuring personality in a practical setting, and (3) summarizes the literature with respect to firm policies that were found to be affected by personality. The *empirical study* includes (1) a section that deals with the collection of earnings call transcripts and the estimation of personality traits using IBM Watson; (2) analogous to the previous section, we describe the collection and estimation of firm policies; (3) then we lay out our regression approach, before (4) interpreting our results and (5) pointing out limitations of our study. The thesis concludes with a *summary*.

2 Literature Review

2.1 Modelling Personality

This section provides a short review of different personality models, to understand how the models are connected to each other, to be able to draw upon a larger body of research. The big5 model and the HEXACO are able to capture both the normal and abnormal range of personality, the MBTI only captures the normal range, while the DSM-V only covers the abnormal sphere (e.g. narcissism).

2.1.1 Big5 Model

The big5 model is known under several different names, it is often referred to as five factor model, or by the acronym of the five traits in question, OCEAN. The underlying hypothesis for the big5 model is that descriptions of personality are already encapsulated in our language. By drawing upon a large dictionary of words describing human behaviour, one can perform a factor analysis to come up with distinct, non-overlapping features. The resulting features are the five traits openness, conscientiousness, extraversion, agreeableness and neuroticism. The roots of this model are found in [Tupes & Christal \(1961\)](#), and has reached the scientific community with the work by [Costa & McCrae \(1992\)](#) and [Goldberg \(1993\)](#). The names of the 6 facets that belong to each trait can be found in table 1 in the appendix. The descriptions to the big5 traits can be found in table 5, and the descriptions to the six facets of each trait are found in table 6

to 10. The big5 model is one of the most established and used personality models in research (Almlund et al. 2011), which is why we will focus on it. Over the years, the model has received some notable criticism, among others due to its statistical rather than theoretical origins (Block 2010). There is further evidence supporting a six factor model rather than a five factor model, as presented in Ashton, Lee & Goldberg (2004) and Ashton et al. (2014). Nevertheless, the model is still a good basis for conducting further research.

2.1.2 MBTI

MBTI is an acronym for Myers-Briggs Type Indicator, the last published manual by the author is Myers (1998). This commercial test is mostly applied in the corporate world. The test is often criticised e.g. for poor test-retest validity (Hammer 1996). McCrae & Costa, P. T. (1989) further found that each dimension of the MBTI tends to correlate with one of the big5 traits (see table 2 in the appendix), raising questions whether the MBTI dimensions should really be interpreted as a dichotomy in the first place.

2.1.3 HEXACO

Ashton, Lee, Perugini, Szarota, de Vries, Di Blas, Boies & De Raad (2004) have extended the work by Costa & McCrae (1992) and Goldberg (1993), and created a 6 Factor Model named HEXACO, which is an acronym for the six traits Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience. There are four facets that belong to each factor, similar to the five factor model, that has six facets for each trait. The full list of facets can be found in the appendix, in table 3. The three factors extraversion, conscientiousness and openness from the five and six factor model share very similar descriptions. The other two factors emotionality and agreeableness both from the six factor model and neuroticism and agreeableness that are both from the big5 include slightly different descriptions. One example is that the trait neuroticism from the big5 model includes features related to emotions that are sensitive to the person's environment, while these are rather found in the trait agreeableness when it comes to the six factor model. The most apparent difference between the two models, is that the six factor model is featuring an additional factor, Honesty-Humility. This additional factor has been shown to be only weakly correlated with the big5 trait agreeableness; the correlation is mostly driven by the facets modesty and straightforwardness (Ashton & Lee 2005). De Vries & Van Kampen (2010) were able to use the HEXACO trait Honesty-Humility to predict psychopathy, egoism, pretentiousness, immorality, and machiavellianism. This link is especially useful for research in the field business, as much of the research on CEO personality and corresponding outcomes is centred around these traits.

2.1.4 DSM-V

The *Diagnostic and Statistical Manual of Mental Disorders*, or short DSM, is an official manual widely used by clinicians and is also applied in the U.S. legal system. The DSM-V is the latest edition, published in 2013 ([American Psychiatric Association 2013](#)). The DSM-V includes among others the narcissistic, antisocial and obsessive-compulsive disorder. Table 4 shows how the DSM-IV-TR, the precursor of the DSM-V, is related to the big5 model ([Clark 2007](#)). By the same token, the study by [Poropat \(2009\)](#) has shown that the big5 model can be used to predict the DSM disorders. A few years before these studies appeared, [Saulsman & Page \(2004\)](#) discussed in a meta-analysis that most attempts to predict DSM disorders with the big5 show strong correlates with negative neuroticism and agreeableness, but are poor at differentiating the disorders.

2.2 Measuring Personality

There are several factors driving big5 personality scores, that are worth noting. The big5 personality traits are subject to genetic, environmental and cultural influences. Age is also a determinant, as shown in [Donnellan & Lucas \(2008\)](#) and [McCrae et al. \(1999\)](#). The cross-cultural study by [McCrae et al. \(1999\)](#) reports a decrease in neuroticism, extraversion, and openness over time as people age, as well as an increase in agreeableness and conscientiousness. [Donnellan & Lucas \(2008\)](#) find similar results, with the exception of neuroticism, where results are inconclusive. A study by [Power & Pluess \(2015\)](#) found significant and substantial heritability with respect to the traits openness and neuroticism, but not for the remaining traits.

2.2.1 Questionnaires

The standard way to estimate personality is via *questionnaires*, those have been thoroughly developed over the years and are available for most major personality models. For the big5 personality model, there is the revised NEO personality inventory (NEO PI-3) ([McCrae et al. 2005](#)). Alternatively, there is the International Personality Item Pool² (IPIP), as proposed in [Goldberg \(1999\)](#), and later refined in [Goldberg et al. \(2006\)](#). The corresponding questionnaire for the HEXACO model is the HEXACO-PI-R (also known as HEXACO-60), developed by [Ashton & Lee \(2009\)](#), which was later followed by the more extensive HEXACO-100 ([Lee & Ashton 2018](#)), with 100 questionnaire items. For narcissism, the most commonly used scale is the Narcissistic Personality Inventory (NPI) ([Raskin & Terry 1988](#)) with 40 items. A shorter version of this test is the NPI-16 ([Ames et al. 2006](#)). The Mach IV scale measuring machiavellianism has its origins in the study by [Christie & Geis \(1970\)](#); [Panitz \(1989\)](#) has performed a factor analysis on the facets and found some psychometric issues with respect to the amount and nature of the underlying facets. Lately, [Rauthmann \(2013\)](#) has proposed a trimmed ver-

²<https://ipip.ori.org>

sion of the questionnaire, the MACH. Lastly, psychopathy is traditionally measured using the psychopathic personality inventory (PPI), the last revised version is by Lilienfeld et al. (2005). The PCL-R is a widespread alternative, the inventory was first outlined in Hare (1991) and later revised in its current form in Hare (2003).

Questionnaires can either be filled out by the individual in question (self report), or filled out by a psychologist who administers the questions and interviews the individual. The problem here is that the individual may *deceit* the administrators and purposefully give inaccurate answers. The risk is especially high, when individuals are facing a competitive environment, e.g. when the questionnaire is used for predicting academic or job performance. This problem has been thoroughly addressed in Hirsh & Peterson (2008). They proposed an alternative questionnaire, where the respondents have to choose between equally desirable answers. This alternative method proved to be robust to individuals trying to cheat on the questionnaire; it was able to predict academic performance, as opposed to the traditional questionnaire.

2.2.2 Observed Behaviour

Over the last decades, researches came up with different methods to create proxies of personality. The difficulty in researching the effects of personality, especially in the case of CEOs, stems from the fact that (1) CEOs are often too busy to answer questionnaires or thorough interviews and (2) personality is a personal subject, some CEOs are sceptical and prefer to remain opaque. Because of those reasons, researchers developed proxies that can be *observed* as an outsider.

In the *financial literature*, the following proxies have been used. Ham et al. (2018) have used signature size as a proxy for narcissism. They used two laboratory studies to validate their measure, to show that it successfully distinguishes from overconfidence. Further, they found that their measure is correlated with employee reported CEO narcissism gathered in prior studies. Hsieh et al. (2014) on the other hand have measured overconfidence “based on the CEO’s tendency to hold in-the-money stock options, as rational expected utility maximizers should exercise early to avoid overexposure to company idiosyncratic risks.”

User generated data in social media, mobile phone log data or game data also offer an avenue to estimate personality traits. Azucar et al. (2018) linked social media data (e.g. textual posts and images) to big5 personality traits, and found correlations ranging from 0.29 for agreeableness to 0.4 for extraversion. A recent study by Nguyen et al. (2020) have exploited anonymised mobile phone log data to predict big5 personality traits. One study by van Lankveld et al. (2011) has observed the behaviour of 44 game players and found relations to all traits on the big5 scale, measured by the NEO-PI-R questionnaire. Tekofsky et al. (2013) have used Battlefield game data and conducted a survey among 13,376 players with respect to the big5 IPIP personality

inventory. Age was best predicted, followed by conscientiousness and extraversion.

2.2.3 Linguistic Features

In recent times, new methods to estimate personality have emerged with the abundant availability of data, compute power and data science algorithms. The field of computational linguistics / natural language processing is offering us insights into how *linguistic features* are related to personality. This is especially relevant for research, as textual data is rather easy to obtain, e.g. through public interviews, speeches, presentations or Q&A sessions.

The study by [Schwartz et al. \(2013\)](#) is a great introduction, exploring how linguistic features from Facebook users across the entire demographic range is related to age, gender and personality. The linguistic features analyzed in this study were e.g. the total number of words used, the use of different pronouns, articles, verbs, tense, numbers, quantifiers, descriptions of perceptual processes (in this case: seeing, hearing, feeling), work, leisure, religion, fillers, and many more. An earlier study by [Fast & Funder \(2008\)](#) focussed on finding categories of words that are related to personality. Studies go back to 1999, when [Pennebaker & King](#) found weak relations between linguistic features and personality.

Another study by [Mairesse et al. \(2007\)](#) has experimented with different models to estimate personality, based on LIWC word categories ([Pennebaker & Graybeal 2001](#)) and MRC psycholinguistic features ([Coltheart 1981](#)). LIWC word categories include e.g. anger words (hate, kill, pissed), metaphysical issues (god, heaven, coffin), physical state (ache, breast, sleep), inclusive words (with, and, include), or family members (mom, brother, cousin). MRC psycholinguistic features include e.g. imagery of words (future, peace, vs. table, car), syllables per word, or frequency of use. For smaller training sets, simple models such as the naive Bayes model and regression trees performed best, for large training samples however, support vector machines and boosting algorithms yielded better results. For spoken language, extraversion was the easiest trait to predict, followed by emotional stability and conscientiousness. For written language, openness was best predicted. The LIWC categories outperformed MRC categories in almost all settings.

When it comes to features of personality that are either related to typology (e.g. MBTI) or a rather binary feature (e.g. a personality disorder), *screening the web* for individuals that have self-identified as belonging to that group is also a feasible alternative, to obtain insights into their linguistic features for prediction purposes. This has been done using Twitter data e.g. in [Plank & Hovy \(2015\)](#) with respect to the MBTI, or in [Mitchell et al. \(2015\)](#) with respect to schizophrenia.

Furthermore, *self-narratives* are also related personality traits. One such study looked at col-

lege students, describing their past and their aspirations for the future. The linguistic features co-varied with their big5 personality traits (Hirsh & Peterson 2009). Another study by Le et al. (2017) has looked at linguistic features in self-narratives of psychopathic prison inmates during the interview of PCL-R assessments to gain insights into potential markers for predicting psychopathy, and were able to explain more than 25% of the variance in PCL-R scores. Irrespective of personality, studies of self-narratives could be extended to the management and entrepreneurship literature, by collecting their speeches addressed to venture capitalists, in which they describe why they are worthy of obtaining funding. It would be interesting to see whether the linguistic features vary depending on different success metrics of the venture.

2.3 Analogy between Economic Preferences and Psychological Traits

Almlund et al. (2011) have published a whole book on the intersection of personality psychology and economics. They document considerable overlap in the following economic preferences and psychological traits, stemming from similar theoretical conceptualisations that have been tested empirically. First, the economic concept of *time preference* seems to be related to conscientiousness, extraversion, self-control and elaboration of consequences (Daly et al. 2009). *Risk aversion* tends to be related to traits such as sensation-seeking, openness, neuroticism, ambition, and agreeableness (Dohmen et al. 2010, Borghans et al. 2009). Next, the economic preference of *leisure* has conceptual similarities with the traits achievement striving, endurance, and industriousness, even though it could not be supported by empirical evidence. Economic *altruism* has theoretic links to warmth, gregariousness, tender-mindedness, and hostility (opposite), empirical relations were only documented with respect to neuroticism and agreeableness (Ashton et al. 1998). *Trust*, the willingness to make oneself vulnerable to others, was documented to correlate with measures of neuroticism, agreeableness, openness, and conscientiousness (Dohmen et al. 2008).

2.4 Effects on Firm Policies

2.4.1 R&D Intensity

Gow et al. (2016) have found that research and development intensity is related to openness. They link this finding to studies that relate openness to creativity (McCrae & Costa 1987) and to openness to change (Costa & McCrae 1988, Spreitzer et al. 1997, Judge et al. 1999). Another study noted that CEOs with higher levels of trust in their employees yield higher quality patents (Nguyen 2020).

2.4.2 Book-to-Market Ratio

The book-to-market ratio can be interpreted as a firm policy, in the way that a higher book-to-market ratio conceptually implies that the stock market expects less growth. Even though

this ratio varies significantly by industry, the literature is able to adjust for those effects. [Gow et al. \(2016\)](#) find a positive relation between the book-to-market ratio and conscientiousness, implying that conscientious CEOs are less likely to capture growth opportunities, e.g. through adaptation ([LePine et al. 2000](#)). Further, they relate it to studies that document that highly conscientious individuals are less inclined to work in innovative cultures ([O'Reilly et al. 1991](#), [Judge & Cable 1997](#), [O'Reilly et al. 2014](#)).

2.4.3 Capital Structure

The study by [Gow et al. \(2016\)](#) documents a negative impact of openness on net leverage. This finding is puzzling to them, as open individuals tend to have a higher tolerance for risk ([Judge et al. 2002](#), [Peterson et al. 2003](#), [O'Reilly et al. 2014](#)). On the flipside, they note that the choice of capital is dictated endogenously by the type of company, e.g. with respect to profitability and business risk ([Myers 2001](#)). Indeed, openness was related to higher r&d intensity, thus the business has more inherent risk.

2.4.4 Cost of Capital

[Adebambo et al. \(2019\)](#) find higher levels of extraversion to be incrementally related to higher cost of capital. Furthermore, they take on higher risks, have lower valuations and raise less equity.

2.4.5 Performance

Extraversion was found to be negatively related to return on assets (ROA) and cash flow ([Gow et al. 2016](#)). Further, their regression yielded a negative relation between openness and profitability, ROA and cash flow. They explain the negative association between extraversion and returns with the idea that extraverts consider proactive co-workers as a threat, that they prefer them to be obedient and submissive ([Anderson et al. 2001](#), [Barrick et al. 2002](#)). The second point they mention is short-lived enthusiasm in extraverts ([Judge et al. 2009](#)), which may lead to frequent and costly changes in strategy. Third, overconfidence may explain part of the reason why extraversion results in poor ROA and cash flows ([Malmendier & Tate 2005](#), [Malmendier et al. 2011](#)). On the other hand, they note that the study by [Kaplan et al. \(2012\)](#) has found no correlation between extraverted CEOs of companies owned by private equity firms and their performance. [Green et al. \(2018\)](#) find extraversion to be related to sales growth and improved investor recognition.

2.4.6 Mergers and Acquisitions

Extraversion was also shown to be related to more frequent and larger acquisitions ([Malhotra et al. 2018](#)). They also note that extraversion yields a higher post merger and acquisition per-

formance. Liu & Taffler (2011) also document that CEOs with narcissistic tendencies acquire more firms than economically rational, and that those mergers and acquisitions tend to be value destroying for the acquiring CEO, both in the short and long run. They state that corporate governance mechanisms prove to be an effective tool to ameliorate these effects.

2.4.7 Other Innate Traits related to Firm Policies

After having summarized the literature on the topic of personality characteristics and firm policies, a brief overview of other innate characteristics that have been considered by other authors will be discussed. These other CEO characteristics are indirectly related to personality.

Le & Kroll (2017) found *international experience* to be another factor to enhance firm performance, partly attributable to strategic change. It would be interesting to control for personality attributes in this study, as e.g. adventurous people may have a higher likelihood of going abroad. Garcés-Galdeano & García-Olaverri (2019) looked at *internal* versus *external experience* and *age*. They showed that young CEOs with external experience will enhance innovation and growth, whereas old CEOs with both external and internal experience tend to be more skilled at obtaining external knowledge.

Intelligence (IQ) is certainly another factor, even though it overlaps most notably with the personality dimension openness (Ashton et al. 2000). Parise & Peijnenburg (2019) compared households in the top and bottom quintiles of IQ, and find that those in the bottom quintile are ten times more likely to suffer financial distress. They provide evidence that the financial distress is mostly due to less financial knowledge and not income shocks. Whether this study may extend to ours investigating CEOs is questionable. Wai & Rindermann (2015) traced the path of CEOs and their education, and conjecture that 37.5% to 41% of CEOs of Fortune500 companies are likely in the top 1% for intelligence, based on being admitted to an elite school. Miller et al. (2015) looked at the value of an Ivy league education among CEOs, and found that the benefits are strongest, when the university has a meritocratic admission system, instead of an elitist one. This underlines the importance of human capital over social capital. In the context of this study, it shows the important role of innate characteristics attributed to the individual.

Lately, there has been an increase in research interest on the effect of *gender*. Bennouri et al. (2018) for example found evidence that female directorship may potentially increase firm performance, measured by return on assets, return on equity and book-to-market ratio. It would be interesting to control for personality in these studies, usually researchers are not able to do so because of prohibitively small sample sizes. One exception is the study by Brandt & Laiho (2013) that investigated gender and personality in the context of transformational leadership.

Physical characteristics such as voice (Mayew et al. 2013), height and attractiveness (Re et al.

2012, Wong et al. 2011), have been studied in the context of leadership emergence and pay, studies with respect to firm policies or firm performance are rather rare. One notable exception is the study by Wong et al. (2011) that documented an increase in financial performance for CEOs with dominant facial features, i.e. a wider face relative to facial height. While magnitudes may be small, physical characteristics may still be connected to our persona and the way we act.

3 Empirical Study

3.1 Estimation of Big5 Personality Traits with IBM Watson

3.1.1 IBM Watson Personality Insights – Explained

This study will use the model by IBM Watson Personality Insights³ to estimate big5 personality traits using linguistic features, relying on the newest version of the model which was last updated in 2014. The model is explained in the documentation⁴ and works as summarized in following. First, the model receives a set of written sentences as input, which are then tokenized. Then, the tokens are transformed into vectors, the direction of it conveys the meaning of the word. These word embeddings are based on the open source GloVe technique Pennington et al. (2014). Lastly, the vectors are fed into a neural network, which estimates the personality scores. The neural network was trained based on a dataset containing the self-composed tweets of thousands of Twitter users, including their personality scores which were assessed via questionnaires. The reported validity measures state that the mean absolute deviation (MAE) between the predicted and actual values are on average 0.12 for the big5 traits, 0.12 for the big5 facets, 0.11 for consumer needs and 0.11 for values. By the same token, the average correlation with the actual big5 traits (as reported by the questionnaires) is 0.31, and 0.28 for the facets of the big5. For the needs and values it is 0.22 and 0.24 respectively.

3.1.2 Collecting Earnings Call Transcripts

The quarterly earnings call transcripts for this study were scraped from SeekingAlpha.com. An alternative venue to obtain earnings call transcripts is Thomson Reuters, which was used in the related study by Gow et al. (2016). The following approach was used to scrape the data. First, all company tickers that are available on the site were collected. This can be done by using the search function, with an additional filter to focus on transcripts in a given year. For each search query it is possible to retrieve 10,000 results, which are distributed among 1,000 pages with 10 results each. The results page can be obtained e.g. via the following query⁵. Once we created a list of all available company tickers, we can find all the transcripts of a company by using the

³<https://www.ibm.com/watson/services/personality-insights/>

⁴<https://cloud.ibm.com/docs/personality-insights/science.html>

⁵<https://seekingalpha.com/search?q=2009&tab=transcripts#page=1000>

ticker via the following [query](#)⁶. After scraping the location of a transcript, e.g. as seen in the following [query](#)⁷, we can start downloading the entire content of all those pages (174,321), and then start to extract the data based on the local copies, to allow for a more dynamic coding process, while reducing the load on the server. It should be noted that scraping any online page is almost always highly discouraged by the content provider, and may turn out to be a challenging task.

Based on the local copies of the relevant webpages containing the transcripts, we need to make sure that we only have earnings call transcripts, and not transcripts of other events. This reduces our sample to 116,314 earnings call transcripts. Next, we can scrape meta information about the article, such as the date, ticker, company name, financial year, financial quarter, and industry, which is located in the header of the article. The first section of the transcript contains the names of the participants, their affiliation and their position. Usually, the participants are split into two groups, (1) company representatives and (2) outside investors, analysts, or the media. This section is useful to identify the name of the CEO, which will be used later on to identify which sentences were produced by him or her. The next section starts with the actual transcript, where the CEO or investor relations responsible welcomes the participants of the call and presents the financial results of the past quarter. Once the presentation is over, the participants are allowed to ask questions, which are answered and discussed by the CEO or other company representatives available at the conference call. This study will only assess sentences that were spoken by the CEO during the question and answer session. This is to make sure that the speaking style is as natural as possible, and has not been meticulously prepared beforehand, as e.g. the choice of words has a direct impact on personality estimates. As stated earlier, the name of the CEO is now used to identify whether the sentence is relevant. The start of the Q&A section is marked by a caption, more recent transcripts also have an html tag indicating whether the group of sentences is a question or an answer, which is helpful. Out of 116,314 earnings call transcripts, I was able to identify the name of the CEO and locate his or her sentences in the Q&A section in 93,573 cases. The remaining transcripts had the following issues, among others: (1) the CEO did not participate in the conference call, (2) the transcript only includes participants' names but not their role or title, (3) the name of the CEO in the list of conference call participants differs strongly to the one used in the Q&A section (weak deviations such as spelling errors were handled effectively), (4) different names are used in the list of conference call participants and in the Q&A section, e.g. names were written in Chinese characters first and later on in English, in other instances people used a nickname later on, (5) there are few ambiguous cases in which multiple people use the same last name (e.g. family members), but the first name is incomplete.

⁶<https://seekingalpha.com/symbol/STX/earnings/transcripts>

⁷<https://seekingalpha.com/article/4339353>

The documentation of IBM Watson Personality Insights states within which bounds the number of words submitted to the service should be to obtain optimal results. When submitted 6,000 representative words or more, results are labeled as “very strong”, 3,500-5,999 are labeled as “strong”, 1,500-3,499 as “decent”; less than 1,500 words are a “weak” basis for estimating someone’s personality. Due to this reason, this study will only consider earnings call transcripts that contain at least 1,500 words spoken by the CEO during the Q&A section. Furthermore, transcripts are only kept if at least two transcripts of a company are available in a given year, to be able to compute a median personality score, to further improve the accuracy. Lastly, transcripts are omitted if no financial ratio is available for that specific company-year observation, as estimating the personality scores is costly. The final sample size consists of 37,519 earnings call transcripts, for which a personality score was computed. This yields 11,961 median personality scores, each score representing one company in a given year.

3.1.3 Descriptive Statistics of Estimates

All personality characteristics follow a unimodal distribution and could be modelled by a log-normal distribution. A table of descriptive statistics can be found in the appendix in table 13, with the median results in table 14. The same values as in table 14 are also found in figures 1 to 8. The percentile scores of CEOs personality are relative to the broader population, i.e. relative to both CEOs and non-CEOs.

With respect to the *big5 traits*, CEOs in our sample tend to be very high in openness, high in conscientiousness, low in agreeableness and low in neuroticism. Extraversion/Introversion in CEOs is found as often as in the general population, i.e. this trait would not directly help us to separate a CEO from a non-CEO. The six facets of each trait tend to be centered around different percentiles compared to their parent trait, with the exception of neuroticism, where all six facets tend to be very low. The overall higher level structure of personality found in our sample is consistent with the one found e.g. in research related to management (Pahwa 2015) or entrepreneurship (Zhao & Seibert 2006, Kerr et al. 2018). Entrepreneurial CEOs for example are generally high in openness, high in conscientiousness, low in agreeableness, low in neuroticism, and there is no relationship with extraversion (Zhao & Seibert 2006).

CEOs in our sample tend to be especially high in *openness to experience* and intellect, with median scores ranging in the 98th and 99th percentile respectively. This is likely because of the breadth of activities they have to engage in, a constantly changing business landscape they have to adapt to, as well as unpredictable tasks and problems which are likely to be complex, as the problem would not have reached the management level otherwise. These job requirements are likely to select for those traits. Other characteristics include very high adventurousness (median score of 0.89) and liberalism (0.98), likely for the same reasons, and moderately high levels of artistic interests (0.68). Emotionality within CEOs tends to be rather low (median score of

0.22), which is classified as merely the absence of being aware of your own feelings, and knowing how to express them. We have no explanation for why it is so low, particularly because it would suggest that CEOs have low levels of emotional intelligence, which is counter-intuitive.

Scores for *conscientiousness* among CEOs (median score of 0.78) are much higher compared to the general population, as well as achievement striving (0.81). These two traits are related to wanting to do a task well. The score of conscientiousness is opposed by a low score for orderliness (0.29), probably meaning that those individuals have no difficulty in operating in an unstructured environment. High dutifulness (0.81) and self discipline (0.74) make them diligent workers. Lastly, CEOs in our sample are very cautious (0.98) and have an above average level of self-efficacy (0.65). These imply that they are deliberate and self reliant, and believe in their ability to finish a project.

The median score for *extraversion* in our sample of CEOs is 0.46, similar to the general population. An extremely high activity level (0.94) means that the individual is seeking a restless way of living. High assertiveness (0.94) is typical in individuals that are comfortable leading groups. Low levels of cheerfulness (0.23) indicate that a person is serious and has limited time for jokes. Low excitement seeking (0.05) on the other hand implies that CEOs in our sample seek stability. The average score for friendliness (0.55) and the low score for gregariousness (0.19) indicates that CEOs rather prefer to be by themselves, but if among other people, they are just as open to them as the general population.

Agreeable (0.12) individuals have a more positive view on humanity and are considered to be more friendly and tactful. The joint scores for altruism (0.77), morality (0.82), sympathy (0.95), cooperation (0.90), and trust (0.90) are well above average, suggesting that CEOs are generally kind, compassionate, take time for others, have good listening skills, and care for the well being of others more than their own. The scores for modesty (0.34) are below average, probably because CEOs need to showcase their achievements, especially in front of investors and customers.

All facets associated with *neuroticism* (0.08) tend to be way below average. They are exceptionally low in anger (0.03), anxiety (0.04), depression (0.28), and immoderation (0.13), suggesting that CEOs have very high levels of self control, are unlikely to ruminate on decisions of the past and tend to be fearless. Low levels of self consciousness (0.28) further imply that they are not afraid of rejection. Vulnerability (0.10) measures a CEOs stress tolerance, a low level implies that they are very much resistant to stress, which is important due to the high pressure they may face at times.

The remaining of this study will focus on the effects of a *relative deviation* in a CEOs' per-

sonality characteristics. This will make it easier to interpret the potential impact of differences in personality on firm policies. Therefore, CEOs' characteristics are divided into four quartiles for each trait, to study the effects of a quartile increase.

Furthermore, the *correlation* between the five different traits was computed (see table 15), as well as the correlation between the six facets on a by trait basis (see tables 16 to 20). This step is important to identify whether each personality trait measures a distinct feature, as well as to avoid multicollinearity in our regression later on. Overall, all traits and facets were found to be significantly different from each other at the 1% level, using a two sided *t*-test with robust standard errors. On the trait level, the correlation with the highest magnitude is found for the pair of agreeableness and conscientiousness (0.402), implying that CEOs in our sample tend to be more conscientious, when they are agreeable and vice versa. We are not able to draw any conclusions from this, with respect to causality. When looking at the facets of each trait, correlations are positive in well above 90% of all cases. As facets are related to the parent trait by design, this is not surprising. However, in some distinct cases, correlations may reach up to 90%, e.g. in the case of the vulnerability/anxiety pair. These large correlations are mostly found within facets belonging to the trait neuroticism. This may pose some challenges when isolating which of the six facets is responsible for the variation in choices of firm policy.

3.2 Estimation of Firm Policies

3.2.1 Collecting Financial Data

The financial data has also been scraped from [SeekingAlpha.com](https://seekingalpha.com), they offer income statements, cash flow statements and balance sheet data. The benefit of using the same platform for both transcripts and financial data is that we can simply merge the datasets based on company tickers. Income statements are available at the following [query](https://seekingalpha.com/symbol/STX/income-statement)⁸, cash flow statements [here](https://seekingalpha.com/symbol/STX/cash-flow-statement)⁹, and balance sheets [here](https://seekingalpha.com/symbol/STX/balance-sheet)¹⁰. One can simply access the pages one by one, each time using a different ticker. This study uses annual data. In total, the financials of 7,332 unique companies were obtained.

3.2.2 Computing Financial Ratios

This study will compute five financial ratios that serve as proxies of firm policies. The five ratios are (1) the effective tax rate, (2) the payout ratio, (3) the net leverage, (4) the book-to-market ratio, and (5) r&d intensity. The firm policy variables are computed based on annual balance sheets, annual income statements and annual cashflow statements. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The net leverage

⁸<https://seekingalpha.com/symbol/STX/income-statement>

⁹<https://seekingalpha.com/symbol/STX/cash-flow-statement>

¹⁰<https://seekingalpha.com/symbol/STX/balance-sheet>

was computed by dividing the net debt by the sum of net debt and total equity. For the book-to-market ratio, the book value per share was multiplied by the total number of outstanding shares on the filing date, and divided by the total equity. Finally, the relative r&d expense was computed by dividing r&d expenses by revenues. Since only observations for which a personality estimate is available were kept, the number of unique companies drops from 7,332 to 2,963.

3.2.3 Descriptive Statistics of Financial Ratios

The descriptive statistics to the financial ratios can be found in table 21, containing the number of company-year observations for each firm policy, as well as their mean, median, standard deviation, and the 5th, 25th, 75th and 95th percentile. The median effective tax rate in our sample is 27.6%, the median payout ratio is 39.36%, the net leverage is 40%, the book-to-market value is close to 1, and the median r&d intensity is 9.1%. The distribution of the financial ratios is also visualized in figures 9 to 11.

3.3 Regression Design

The following section describes the empirical setup. This study will rely on the *linear regression model*, regressing the firm policies on personality scores. The overly simplistic choice of performing a linear regression makes it easier to compare our results to other studies, on the other hand it does not offer us causal insights. Furthermore, when studying the effects of CEO personality without controlling for e.g. the non-random hiring process and business environment, the results are likely biased. Finding a correlation still offers us some weak evidence, that there may be some effects at play that are worth analyzing more thoroughly in later studies. Also, in some instances, especially in the case of machine learning, finding relationships between several factors is a useful insight, as causality is not always as important as the ability to somehow predict a phenomenon. This philosophy is in stark contrast with economic research, which aims at establishing causal links between different factors.

The *firm policies* we are going to analyze are the effective tax rate, the payout ratio, net leverage, book-to-market ratio, and r&d intensity. The use of ratios normalizes the financial variables and makes them comparable from one firm to the other. In total, there are 2,963 companies in our sample, covering the period of 2009 to 2019. The number of company-year observations for each firm policy can be seen in table 21, they range from 3,995 to 10,483. It also contains descriptive statistics such as the mean, standard deviation, median, and the respective quartiles among others. The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The net leverage was computed by dividing the net debt by the sum of net debt and total equity. Further, the book-to-market ratio

was obtained by multiplying the book value per share by the total number of outstanding shares on the filing date, and dividing the result by the total equity. Finally, the relative r&d expense was computed by dividing r&d expenses by revenues. All financial ratios are winsorized at the 5th and 95th percentile. This step is important to remove some heavy outliers, which are either caused by potential inaccuracies from the provider, or may reflect abnormal events e.g. when a firm is about to be bought or liquidated, which we do not want to include in our analysis, as they distort our results. Here it may be interesting for later studies to look at growth rates of financial measures (e.g. EBIT, operating expenses, etc.) instead of financial ratios; this study will not cover it as it is outside the scope of this thesis.

The *big5 personality scores* were computed based on textual data using earnings call transcripts, through IBM Watson Personality Insights. The full sample contains 116,314 earnings call transcripts, however, the final sample of values that are actually being used at least once in a regression is reduced to 37,519. This is because of the following combined reasons: (1) we only process earnings call transcripts in which the CEO produced at least 1,500 words during the questions and answers section, to obtain accurate enough personality estimates; (2) we require at least two earnings call transcripts per year, to be able to compute a median score for each year, to further reduce the variance in our estimates; (3) we require at least one financial ratio / firm policy for the given earnings call transcripts, to send the textual data to IBM. This is to ensure that we do not estimate personality scores which we will not end up using, as using the service is costly. Next, we compute the median personality score for each year, based on the 37,519 quarterly earnings call transcripts, which results in 11,961 annual personality scores. The personality scores were encoded with integers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. This makes it easier to interpret the magnitude of the impact of each trait and facet on a given firm policy.

Last, we include two types of dummy variables in our regression, to control for industry and year *fixed effects*. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://seekingalpha.com). The number of companies in our final sample that belong to each sector can be seen in table 22. How the observations are distributed among the different years can be seen in table 23.

3.4 Interpretation of Results

The way personality potentially affects firm policies and financial ratios can be grouped into two distinct categories. In the following, we will define them as (a) direct effects and (b) indirect effects.

Direct effects include all direct consequences that can be attributed to a CEO pursuing certain

activities. One example would be a CEO that is relatively high on the dimensions imagination and adventurousness, that is likely inclined to desire higher r&d expenditures.

Indirect effects include the consequences that can be attributed to how other people perceive the CEO. One example could be a CEO that is notorious for displaying high levels of immoderation, low levels of self-discipline in combination with hedonistic values. Outside investors are unlikely to be willing to provide further capital to increase the financial leverage of such a company, given the presumably higher risk of default.

Oftentimes, these two effects are active concurrently, either cancelling each other out or amplifying the effect. In the case of self-discipline for example, outside investors might be more willing to provide higher financial leverage, since they expect the CEO to spend the capital on projects as agreed on, thus the indirect effect might be positive. The direct effect could be negative, as a less self-disciplined CEO is likely to give up and switch projects more easily and will require new capital for each new attempted project. In the case of raising capital, the indirect effect is likely to dominate, as investors have the freedom to choose whether to invest or not, and CEOs are bound to those restrictions. On the other hand, the effective tax rate is likely to be mainly driven by direct effects, depending on the CEOs preference for tax aggressiveness.

In the following, we will discuss the highly significant coefficients obtained for each firm policy, each time starting with the largest coefficient in absolute terms. We will focus on the interpretation of the results when regressing firm policies on big5 traits and facets, including industry and year fixed effects, as it tends to be the most robust specification.

The year fixed effect is important, as the language of the CEO may change during certain years, e.g. due to economic shocks affecting multiple industries, potentially affecting the personality estimates as well as the financial ratios. During our sample-period of 2009 to 2019, there were no major shocks, however, 2009 was close to the late stages of the 2007 financial crisis. The industry fixed effect is also extremely important, mainly because the financial ratios can greatly differ between different industries.

3.4.1 Effective Tax Rate

The median effective tax rate in our sample is 27.6%, with a standard deviation of 11% (see table 21 and figure 9). Prior research has shown that the *public perception* and public knowledge of how tax aggressive a company is, plays an important role when the company decides its level of tax aggressiveness. Companies that get negative press coverage relating to tax issues see a decline in stock price, this effect is particularly pronounced for companies in the retail sector as shown in Hanlon & Slemrod (2009), suggesting a consumer backlash. A study by Kanagaretnam et al. (2018) has also shown in a cross-country study that media independence

is related to lower levels of tax aggressiveness, even after controlling for country-specific tax system characteristics. Further, the importance of media independence increases when the legal environment is weaker and information on how companies act is less transparent. Similar results were found in a study by [Allen et al. \(2016\)](#), which analyzed the effect of analyst coverage on tax aggressiveness, suggesting that higher analyst coverage constrains the possibilities of adopting a more tax aggressive strategy. This suggests that companies do face an important trade-off: pursuing a tax aggressive strategy to increase short term profits at the risk of being caught and facing large penalties that materialize in the stock price, or pursuing a tax compliant tax strategy. This choice can either be driven by (a) industry standards, as the effective tax rate can be an important variable for increasing competitiveness, or (b) a personal one, depending on the preferences of the CEO, the board or the shareholders.

Concerning point (a), [Zeng \(2016\)](#) has shown that the effective tax rate is an important component for *product-differentiation*, especially for CSR compliant firms. These firms avoid aggressive tax strategies, as it would substantially hurt their brand and eliminate the justification in the eyes of the consumer to charge a markup on their products. Extending upon those ideas, companies that are not directly visible to the consumer, may use aggressive tax planning as a way to gain a competitive edge with respect to the price they offer their product. However, it is possible to statistically control for those industry driven effects.

Concerning point (b), [Steijvers & Niskanen \(2014\)](#) have analyzed tax aggressiveness in private family firms from an *agency perspective* using Finnish survey data. They show that private family firms are less tax aggressive compared to private nonfamily firms. Within the subset of family firms, companies are more tax aggressive when the CEO owns less shares in the company. This may highlight two things: private nonfamily firms may either be more sophisticated with respect to tax planning, or it may actually be an agency problem, in which it is the CEO's choice to engage in risky short term aggressive tax planning, because of a misaligned incentive structure.

The following highly significant coefficients were taken from table [25](#) and [26](#) and can be interpreted as follows. A coefficient of 0.01 implies a one percent increase in the effective tax rate for each interquartile increase in the personality trait or facet.

Self-consciousness (0.0219) is the coefficient having the largest magnitude. Self-conscious CEOs are sensitive about what others might be thinking of them, this includes the public perception of both the CEO and the company they run and are identified with, but also other members of the board and shareholders. Given the harsh criticism companies receive from the public when paying low taxes, self-conscious CEOs may probably opt for a less tax aggressive approach.

Depression (0.0129) measures whether a person often thinks about what makes them unhappy. One hypothesis is that such a CEO is overwhelmed with spending additional time on developing a sophisticated tax strategy.

Assertiveness (0.0126) is the “tendency to speak up and take charge of situations”. How this may affect the effective tax rate is rather unclear.

Cheerfulness (0.0123) measures how joyful a person is. How this may affect the effective tax rate is also rather unclear.

Friendliness (0.0109) measures how easily you make friends and whether you feel comfortable around other people. One hypothesis could be that people who want to stay on good terms with the public choose to pay higher taxes.

Gregariousness (0.0108) measures whether a person enjoys the company of other people. Again, one could hypothesize that gregarious people choose a less tax aggressive approach, to maintain their acquaintances.

Immoderation (0.0104) measures how easily a person is tempted by their desires. One may hypothesize an opposite effect, as it may be tempting to reduce the effective tax rate in the short run to improve short term profits, with the risk of getting caught and facing lasting reputational damage and a reduction in share price.

Cautiousness (0.0098) measures how deliberate a person acts. This variable alone is difficult to interpret, as it may interact with other variables, depending on the CEOs personal discount rate or incentive structures. If they place a high importance on the future, they may deliberately refrain from engaging in risky short-term behaviour; in reverse if they place a low importance on the future, they may deliberately engage in risky short-term behaviour. The incentive structure may also induce the CEO to engage in short-term risky behaviour, e.g. if his tenure is limited or his shares in the company are low. A positive coefficient would suggest that the incentive structure and the discount rate of the CEO are aligned with those of the shareholders, as deliberate individuals choose a higher tax rate.

Morality (0.0088) measures whether the CEO thinks that it is wrong to take advantage of others to get ahead. A positive coefficient in this case would be appropriate, as an aggressive tax strategy is hurtful to the society in general, and may give a competitive advantage over other companies not pursuing such a strategy.

Dutifulness (0.0087) measures how serious a CEO takes his obligations. Considering a CEO's broader goal is to serve both shareholders, customers and employees, a positive coefficient implies that he meets these goals from the standpoint of not engaging in an aggressive tax strategy.

Openness (0.0074) is the extent to which a person enjoys experiencing new activities. This is rather unclear how it may affect the effective tax rate.

Neuroticism (-0.0045) is the extent to which a person's emotions are dependent on his events in his environment. This coefficient is also rather difficult to explain.

3.4.2 Payout Ratio

The payout ratio may be related to entrepreneurial activity, in the sense that they retain a higher proportion of their earnings to finance further growth, as retaining earnings is cheaper than raising debt, and even cheaper than raising equity. This preference for internal rather than external funding is described in the pecking order theory. Usually, the dividend itself is constant over time, increasing or decreasing it has large signaling effects on how the firm will perform in the future. Therefore, choosing a higher dividend and thus a higher payout ratio reduces the financial flexibility of future years. Our study suggests that a higher payout ratio is favoured by CEOs with traits in the following categories: (1) self-discipline and modesty lead to higher payout ratios, (2) adventurousness, imagination and openness lead to lower payout ratios. Other statistically significant traits include altruism, assertiveness, dutifulness, sympathy, extraversion, excitement-seeking, cautiousness, and neuroticism. In the following, we look at them in greater detail.

Self-discipline (0.1090). A higher level of self discipline may lead to a higher payout ratio, as announcing and carrying out a higher payout ratio over the foreseeable future restricts the financial freedom of the CEO and the company.

Modesty (0.0677) may influence the payout ratio through avoiding wasteful spending, e.g. on prestigious objects such as planes or buildings, or playing golf at expensive locations, among others.

Adventurousness (-0.0618) is a trait rather common in entrepreneurs, which prefer to retain financial resources to finance potential growth opportunities in the present and future.

Altruism (-0.0581). No plausible hypothesis.

Assertiveness (-0.0551) No plausible hypothesis.

Dutifulness (-0.0499) No plausible hypothesis.

Imagination (-0.0494) is also related to entrepreneurial activity, and thus has a negative impact on the payout ratio.

Sympathy (0.0486) No plausible hypothesis.

Extraversion (0.0485) No plausible hypothesis.

Excitement-seeking (0.0453) We would rather expect a negative relationship, as individuals high in this trait may prefer to try out new businesses, which requires additional funding means.

Cautiousness (-0.0414). A negative coefficient suggests that cautious individuals prefer to maintain a greater degree of financial flexibility by choosing a lower payout ratio.

Openness (-0.0398) is related to entrepreneurial activity, so a negative coefficient is expected, to finance potential growth opportunities.

Neuroticism (-0.0364). Individuals high in neuroticism dislike risk and uncertainty (Niszczoła 2014), which is probably why they also prefer to maintain greater financial flexibility. Neuroticism also heightens the awareness of potential threats (Nettle 2006), which may also be a contributing factor.

3.4.3 Net Leverage

One of the main reasons to increase financial leverage is to obtain tax benefits. Another often cited argument in favour of leverage is that it restricts and disciplines corporate spending. On the flipside, bankruptcy costs and the debt-overhang problem arise (Myers 2001).

In general, start-ups have very low leverage, as they usually do not have profits from which they could deduct interest expenses coming from the debt. However, in some rare cases, start-ups may still prefer to raise debt, to avoid dilution when raising equity.

The financial literature on capital structure has analyzed the optimal financial leverage under varying conditions. Consultants in conjunction with the financial department of a firm spend a great amount of time on finding that optimal mix between debt and equity, it may appear counter-intuitive that the personality of a CEO may have an impact on that mix. However, the personality of a CEO reflects e.g. his stance on entrepreneurial activities Kerr et al. (2018), which in turn affects financing choices.

Self-discipline (0.0258) is related to carrying things out as previously planned and communicated, which is a trait every investor can wish for, as the capital allocated by the CEO is unlikely to be wasted or spent for other purposes. Investors may tolerate higher levels of finan-

cial leverage in such a case.

Orderliness (0.0201). Similar to self-discipline, orderly individuals have a high need for structure in their life. The CEO is likely to have created a neat structure as to how he or she is going to allocate the new capital. This is also a trait investors are keen on seeing in a CEO. Furthermore, orderliness is typically negatively associated with entrepreneurship, as entrepreneurial activity requires a disproportionately higher level of flexibility and adaptation to the market compared to established firms. This channel may amplify the magnitude of the impact of orderliness on financial leverage.

Gregariousness (0.0201). We may only hypothesize that gregarious individuals have a larger network of potential credit suppliers, and thus have an easier time borrowing money. When in financial distress, a larger support network is also helpful. [Green et al. \(2018\)](#) find that extraverted CEOs in general improve investor recognition measured by analyst coverage, number of conference presentations, number of media articles, and the number of media words in the Wall Street Journal during a year.

Liberalism (0.0197). We do not have a plausible enough hypothesis that may explain the positive association. In fact, we would rather argue in favour of a negative relation between liberalism and net leverage, as liberalism is likely to be more common among entrepreneurs than managers.

Self-consciousness (0.0168) individuals are sensitive about what others might be thinking of them. Here we also do not have a plausible explanation about the positive association with net leverage.

Anxiety (0.0161). This effect is counter-intuitive, as anxious individuals are expected to be more likely to avoid risk, and would thus tend to have a lower financial leverage.

Neuroticism (-0.0157). Individuals with high neuroticism typically dislike uncertainty ([Hirsh & Inzlicht 2008](#)), as further evidenced in a study with respect to investment choices ([Niszczoła 2014](#)). This may potentially explain why neuroticism is negatively related to net financial leverage, as the bankruptcy risk increases. The company is subject to greater uncertainty.

Trust (-0.0149). We hypothesize that individuals that do not trust other people very easily prefer to remain independent, e.g. through holding less debt. Having higher levels of debt increases the likelihood of coming close to financial distress, which requires an individual to raise emergency funding, which may either be not available or at unfavourable terms.

Imagination (-0.0142) is related to creativity and is a trait that may be indicative of an entrepreneurial person. Therefore, we observe a negative coefficient.

Excitement-seeking (0.0125). Here we may have two effects at play. On the one side we may have a direct effect meaning that the CEO seeks higher leverage, as he or she is comfortable with more leverage and less stability. On the other side, the indirect effect is that outside investors are expected to be less likely to provide capital to a CEO that does not exude stability. In this case, the direct effect dominates.

Morality (0.0121). Similar to the hypothesis above with respect to gregariousness, individuals with higher levels of morality may have a larger support network.

Sympathy (0.0114) may also be related to a larger support network.

Adventurousness (-0.0114) can be placed in the category of entrepreneurial CEOs, which may explain the negative relation between net leverage and adventurousness.

Openness (-0.0106). This finding is consistent with the study by [Gow et al. \(2016\)](#), they also document a negative relation between openness and leverage. Openness is a typical trait among entrepreneurs ([Kerr et al. 2018](#)).

Conscientiousness (-0.0098). This study and the study by [Gow et al. \(2016\)](#) found that conscientiousness is negatively related with growth (via the book-to-market ratio) and r&d intensity. Given those findings, it is counter-intuitive to find a negative relation between conscientiousness and net leverage, as conscientious CEOs are less focused on growth, meaning that there is more potential to offset profits via tax deductible interest payments on debt.

Immoderation (0.0092). A tendency towards low self-control is likely to have the same impact as the facet excitement-seeking. This may include a higher willingness by the CEO to further increase the leverage, and a lower willingness by investors to provide capital. The overall effect here is positive, suggesting that it was rather easy for CEOs to raise capital within the 2009-2019 time period, if our hypothesis holds.

3.4.4 Book-to-Market Ratio

The book-to-market ratio is an indicator that can be interpreted as whether the public believes a firm has great prospects and growth opportunities or not, as it relates the share price to the book value of the company. However, the book-to-market ratio may vary significantly by industry, even within an industry, especially in more recent times as companies can become asset light in our digital age. The present value of growth opportunities (PVGO) does not represent

a firm policy itself, it rather reflects the public's opinion, as the ratio's variation is largely determined by the share price. Almost all 35 coefficients in our sample are significantly related to the book-to-market ratio, with the exception of emotionality, imagination, conscientiousness, activity level and trust. This suggests that the market is already consciously or unconsciously pricing a CEO's personality. Since almost all coefficients are significant, I have only selected the top five coefficients by their magnitude. Furthermore, it is difficult to figure out the underlying reasons for each coefficient, this would require us to take a closer look at e.g. the set of companies with a more self-conscious CEO. The top five characteristics are: *Self-consciousness* (0.0511), *Depression* (0.0283), *Assertiveness* (0.0270), *Gregariousness* (0.0266) and *Immoderation* (0.0239).

As a comparison, the study by [Gow et al. \(2016\)](#) only found conscientiousness to be positively related to the book-to-market ratio (i.e. the stock market expects less growth). This is consistent with our study. As stated in their paper, conscientiousness is likely associated with less growth, and thus leads to a higher book-to-market ratio.

3.4.5 R&D Intensity

This section is about the relationship between research and development expenditure and CEO personality. Interestingly, the findings closely match empirical and theoretical findings in the entrepreneurship literature. More importantly, we find three broad areas that are related to a higher share of r&d expenditures. The categories are related to (1) a high need for achievement and self-efficacy, (2) high levels of imagination and adventurousness, (3) marginally lower levels of cheerfulness and friendliness, and marginally higher anger; all three categories are related to entrepreneurial activity ([Kerr et al. 2018](#)). Other statistically significant traits include intellect, conscientiousness, dutifulness, assertiveness, altruism, immoderation and agreeableness.

Achievement striving (0.0365) is arguably important in any business context, also for r&d projects. Within r&d projects it may be especially important, as goals are harder to reach and require more sustained effort compared to other tasks. Interestingly, this finding is strongly supported by the literature on entrepreneurship, the meta-study by [Collins et al. \(2004\)](#) concluded that achievement motivation is positively related to both entrepreneurial activity and entrepreneurial performance. Even better, the meta-analysis by [Stewart & Roth \(2007\)](#) compared achievement motivation between entrepreneurs and CEOs, and also concluded that entrepreneurs score higher on this dimension. [Kerr et al. \(2018\)](#) write that it is often hypothesized that people with high achievement motivation prefer entrepreneurial environments, as the success or failure is more attributable to the individual rather than the organization.

Cheerfulness (-0.0344). Here we do not have any plausible explanation. The negative coefficient would imply that innovative CEOs are rather serious and not very joyful.

Friendliness (-0.0329). Same as with cheerfulness, friendliness does not seem to be a trait associated with innovative CEOs.

Imagination (0.0277). The ability to imagine how a goal might come to fruition, envisioning the future, or having a new business idea are certainly factors that may increase a CEO's desire to have more R&D expenses.

Intellect (-0.0267). A negative coefficient is surprising here, as intellectual people are more likely to engage in intellectual discussions and are considered more creative and innovative, from a theoretical point of view (Oleynick et al. 2017). Therefore, we would rather expect intellectual CEOs to spend a higher share on research and development, and not less. Further, almost all our personality estimates with respect to intellect are within the 99th percentile, which makes it potentially more difficult to accurately split CEOs into four quartiles. This ambiguity means that we should be careful when interpreting this coefficient.

Conscientiousness (0.0250) is a person's tendency to act in an organized or thoughtful way. Previous studies usually found a slight negative relationship between conscientiousness and entrepreneurship (Kerr et al. 2018), as opposed to our result.

Dutifulness (-0.0244) is the tendency to take rules and obligations seriously, even when they are inconvenient. Innovativeness may require disregarding rules and obligations at times, to bring about change.

Self-efficacy (0.0246) measures whether a person believes they have the potential to succeed. This is incredibly important, if the CEO does not exude belief in the R&D project, his/her employees are probably also going to doubt the feasibility. Furthermore, the literature hypothesizes that self-efficacy is especially useful in uncertain environments, i.e. in the case of developing new ventures (Kerr et al. 2018).

Anger (0.0215) describes how much it takes until a person gets angry. In general, levels of anger are very low in our sample, with a median score of 2.6%. Even though they all tend to score extremely low in this trait, a slight increase seems to be positively related to R&D activity.

Excitement-seeking (-0.0195). Individual low in this facet seek stability. A negative relation between excitement-seeking and R&D intensity is rather counter intuitive, we do not have a plausible explanation for this. We should keep in mind though that the scores for excitement seeking are generally very low for all CEOs in our sample (median of 4.7%).

Assertiveness (-0.0191). This would imply that CEOs engaging more in r&d rather prefer to listen than to speak, especially in group settings. This may appear counter intuitive, as it is important for these CEOs to do effective marketing for their ventures.

Altruism (0.0157) may be a good way to promote the development of a new product, and may resonate with some individuals even if the expected financial gains are negative.

Immoderation (0.0154) is related to low self control. We may only hypothesize that immoderation is another reason that explains the creation of a new venture. The reasons for starting a new venture are often puzzling, as on average they underperform the general market. Naturally, immoderation may not be the only factor that has the potential to explain the persistence of low expected returns, as non-pecuniary reasons such as “identity fulfilment” have also been shown to play a role (Xu & Ruef 2004, Kerr et al. 2018).

Adventurousness (0.0130), similar to openness and imagination, is part of the creative domain, and thus may support company growth through research and development.

Agreeableness (0.0118) is a person’s tendency to be compassionate and cooperative towards others. Most studies found a slight negative relation between agreeableness and entrepreneurial activity, even though the literature is still inconclusive about the sign (Kerr et al. 2018).

Openness is absent in this list, even though it was an important factor in the study by Gow et al. (2016). Another study focussing on the emergence of entrepreneurship found incrementally more entrepreneurial activity the more open the individual (Antoncic et al. 2015). There are two potential reasons why openness did not show up here. (1) The variation with respect to the trait openness is too small in our sample, reducing the likelihood that the CEOs were attributed to the correct quartile. (2) The effect may actually be driven by the related facet imagination, and not openness. Since both are closely linked (correlation of 0.36), openness has a high chance to become significant, when the facet imagination is not included. This would explain why openness was an important factor for choices related to r&d intensity in other studies, but not in ours.

3.5 Research Limitations

3.5.1 Limitations related to this study

The sample of companies that was used in this study is tilted towards large caps, mostly because of the 1500 word cut-off, which may bias the results along the way. Typically, companies with a larger cap receive more coverage, get more questions, and thus the CEO is more likely to meet the criteria of speaking 1,500 words during the Q&A section, which are necessary to obtain

meaningful results.

Furthermore, we did not use inductive reasoning to choose our dependant variables. Therefore, it is very likely that we included variables that are not related to the independent variable from a theoretical point of view, even though they end up being statistically significant in our regression. The problem that two dependant variables describe the same phenomenon and thus likely loose their statistical significance is mitigated in large parts due to the nature of the big5 model and its facets, as each facet of the model was obtained through thorough factor analysis.

Lastly, the sample consists mostly of U.S. firms, the results may not apply to other nations.

3.5.2 Limitations related to the broader field of research

Personality alone can lead to different outcomes under different *environments*, one example of an environment are regulatory regimes. [Banerjee et al. \(2015\)](#) use the Sarbanes-Oxley Act and changes to the NYSE/NASDAQ listing rules, which collectively strengthen board independence, as a natural experiment. In the period after the adoption of the rules, they find that companies with overconfident CEOs, which were previously non compliant, reduced their investment and risk exposure, increased dividends, improved post-acquisition performance, and had better operating performance and market value. For firms with overconfident CEOs that were already compliant before the introduction of the new rule, no changes were found.

The selection process of appointing a CEO is not a *random assignment*. In most cases, a CEO is selected from a small pool of managers who made their way through the corporate hierarchy, that is then presented to a selection committee, with thorough selection criteria. Otherwise, a CEO could have been appointed as he is the founder or owner of the company, or he might be politically associated to one of the major owners. A study by [Goel & Thakor \(2008\)](#) has shown that overconfident managers are more likely to be promoted to the role of CEO. Extraverted individuals are also more likely to become CEO, furthermore they have a longer tenure on average and less job turnover, serve on more outside boards, have directorships at larger firms, and have a 6 to 9 % higher salary ([Green et al. 2018](#)). As long as the appointment of a CEO is not random, it will remain a challenging task to statistically isolate the effects of personality on firm policies, as certain personalities may be hired for each different stage a company is currently in, or a certain type of personality may have never been presented to a selection committee.

Also, personality traits have been shown to have *non-monotonic* outcomes in some cases. [Goel & Thakor \(2008\)](#) show that moderate levels of overconfidence are beneficial to the firm value when found in risk averse CEOs, but only up to a certain point, when they start to overinvest.

Furthermore, personality traits can *interact* with each other as the previously explained rela-

tionship found in [Goel & Thakor \(2008\)](#) does not hold for risk seeking CEOs.

Lastly, the interpretation of the coefficients may suffer *confirmation bias*, which is why our results should be interpreted as mere hypotheses that pave the way for future studies.

4 Summary

In this master thesis we started by outlining different *personality models* and their mutual relationships, to be able to discuss their implications for firm policies. We mainly rely on the big5 personality model ([Costa & McCrae 1992](#), [Goldberg 1993](#)), given its wide acceptance and use within the research community. An alternative model that would have been appropriate is the HEXACO model ([Ashton, Lee, Perugini, Szarota, de Vries, Di Blas, Boies & De Raad 2004](#)). It is very similar, but it offers one additional trait Honesty-Humility, which is especially interesting for researchers in economics, as this trait correlates with the often studied dark-triad.

Next, we investigated ways to *measure personality*. Traditionally, questionnaires have been thoroughly developed and used to estimate personality traits. In most cases, however, it is not possible to use questionnaires to assess the personality of CEOs, as they are time consuming to complete. To overcome this issue, researchers developed tools to infer personality based on their actions that are visible to the public, e.g. by using signature size or financial decisions whether to exercise stock options. More recently, researchers were able to develop tools that estimate personality traits based on linguistic features. One example of how to measure big5 personality traits is outlined in [Mairesse et al. \(2007\)](#), by using the LIWC word categories ([Pennebaker & Graybeal 2001](#)). In this study however, we prefer to use a tool provided by IBM Watson called Personality Insights. The main advantage is that their model produces higher accuracies and further offers insights into the six facets that belong to each trait, which have not been analyzed to the same extent yet as in our study. On the downside, deep learning models are known to be intransparent in the way they produce results. Also, the API is rather expensive to use.

Up to date, the literature was able to find correlations between big5 personality traits and r&d intensity, the book-to-market ratio, capital structure, cost of capital, performance, and merger and acquisitions. *Openness* was mostly related to higher r&d expenditure, lower book-to-market ratios (i.e. more growth), lower net leverage due to business risk, and lower performance (i.e. profitability, ROA, and cash flow) ([Gow et al. 2016](#)). These findings can be linked to other studies indicating that open individuals are more creative ([McCrae & Costa 1987](#)) and open to change ([Costa & McCrae 1988](#), [Spreitzer et al. 1997](#), [Judge et al. 1999](#)). *Conscientiousness* on the other hand was related to higher book-to-market ratios (i.e. less growth) ([Gow et al. 2016](#)), likely due to being less attracted to innovative cultures ([O'Reilly et al. 1991](#), [Judge & Cable](#)

1997, O'Reilly et al. 2014). *Extraversion* has been well documented to predict leadership emergence (Green et al. 2018). With respect to firm policies, extraversion tends to incrementally increase the cost of capital as they take on greater risks, and their firm valuations are lower (Adebambo et al. 2019). Extraversion also tends to be negatively related to firm performance, measured by ROA and cash flows (Gow et al. 2016), they hypothesize that it may be due to e.g. short-lived enthusiasm (Judge et al. 2009) or their preference for obedient and submissive employees (Anderson et al. 2001, Barrick et al. 2002). On the other hand, Green et al. (2018) note that they increase sales and improve investor recognition. Furthermore, extraversion is also related to more frequent merger and acquisitions and increases the performance of those deals. However, if the CEO exhibits narcissistic traits, the greater number of merger and acquisitions tends to be value destroying. *Agreeableness* and *neuroticism* were mostly unrelated to firm policies.

After summarizing the literature with respect to previous findings on this topic, we start with our empirical analysis. First, we describe how we scraped 116,314 earnings call transcripts and financial data for 7,332 companies from [SeekingAlpha.com](https://seekingalpha.com), covering the period between 2009 and 2019. Next, we extract the sentences that were spoken by the CEO during the question and answer session, as the ad-hoc responses are more indicative of CEOs underlying personality traits. We only keep those earnings call transcripts for which (1) we have at least 1,500 words spoken by the CEO, to assure that we have enough linguistic features; (2) transcripts for which we have at least two transcripts within a year, to be able to compute a median personality score to reduce the variance in our results; (3) we only keep transcripts for which at least one firm policy or financial ratio is available. This reduces our sample to 37,519 earnings call transcripts and 2,963 companies. We encode personality by integers ranging from one to four, where one represents the lowest quartile of personality scores and four the highest quartile. Furthermore, we winsorize the firm policies at the 5th and 95th percentile. Then we regress our firm policies on those quartiles, while controlling for industry- and year fixed effects.

The five firm policies we analyzed are the effective tax rate, the payout ratio, the net leverage, r&d intensity, and the book-to-market ratio. For each of these firm policies, we found a large amount of traits and facets that were statistically significantly related to them. However, we were not able to show causality, but we offered some hypotheses, linking those findings to the current literature in financial economics, entrepreneurship and management, as well as psychology. For brevity, we will only discuss significant traits with the highest magnitude. First off, our regression yields a positive association between the *effective tax rate* and self-consciousness. Self-conscious individuals care about what others think of them. Given the large backlashes from both the media (Kanagaretnam et al. 2018) and consumers (Hanlon & Slemrod 2009) in case of tax aggressive strategies, we hypothesize that self-conscious individuals may prefer to pay moderately higher taxes to maintain their reputation. Next, the *payout*

ratio was most strongly related to self-discipline, modesty and adventurousness (opposite). We hypothesize that these three traits may relate to less self imposed spending on prestigious objects such as planes or buildings, a lower need to explore new ventures, and a better ability to cope with less financial resources, which in turn increases the ability to pay out a higher proportion to the share holders. The *net leverage* is positively related to self-discipline and orderliness. Both these traits in excess can lead to rigidity, and are thus not related to innovative cultures. As a consequence, these kind of businesses are able to take on higher levels of financial leverage. The *book-to-market ratio* on the other hand was statistically significantly related to almost all traits and facets. We have no plausible explanation for the top three coefficients, which are self-consciousness, depression and assertiveness. The last firm policy we analyzed was the *r&d intensity*. Here, the first trait on the list is achievement striving, which is an extensively analyzed trait in the entrepreneurship literature. It predicts both entrepreneurial emergence and performance (Collins et al. 2004, Stewart & Roth 2007, Kerr et al. 2018), which may explain the higher r&d intensity.

In the last section, we discuss econometric problems related to this study and this field of research in general. The main problem with these studies is the non-random process of how a CEO is appointed, which makes it difficult to draw causal conclusions and biases the results. Furthermore, we discuss how e.g. a CEO's personality traits lead to different outcomes under different environments, e.g. with respect to corporate governance. Further statistical challenges may emerge from a non-monotonic impact of personality traits on firm policies, as well as interaction terms between personality traits. Nevertheless, this study may hint that a CEO's personality should be considered not only by the human resources department in the hiring process, but also by the shareholders and policymakers to set up rules for effective corporate governance.

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6 Appendix

6.1 Tables

6.1.1 Comparison of Personality Models

Table 1: Big5 Traits & Facets

Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Adventurousness	Achievement striving	Activity level	Altruism	Anger
Artistic interests	Cautiousness	Assertiveness	Cooperation	Anxiety
Emotionality	Dutifulness	Cheerfulness	Modesty	Depression
Imagination	Orderliness	Excitement-seeking	Morality	Immoderation
Intellect	Self-discipline	Friendliness	Sympathy	Self-consciousness
Liberalism	Self-efficacy	Gregariousness	Trust	Vulnerability

Description: The column header of this table lists the five traits of the big5 personality model (openness, conscientiousness, extraversion, agreeableness and neuroticism), which was substantially revised and developed by [Goldberg \(1993\)](#). The original manual for practitioners can be found in [Costa & McCrae \(1992\)](#). The six items in each column are the six facets that belong to the trait, i.e. the facets adventurousness and artistic interests belong to the trait openness.

Table 2: Correlations between Big5 Traits & MBTI

	Extraversion	Openness	Agreeableness	Conscientiousness	Neuroticism
E-I	-0.74	0.03	-0.03	0.08	0.16
S-N	0.10	0.72	0.04	-0.15	-0.06
T-F	0.19	0.02	0.44	-0.15	0.06
J-P	0.15	0.30	-0.06	-0.49	0.11

Description: This table is taken from [McCrae & Costa, P. T. \(1989\)](#) and can also be found on Wikipedia¹¹. It shows how the MBTI model is related to the big5 personality model. The pair E-I stands for Extraversion vs. Introversion, S-N for Sensing vs. Intuition, T-F for Thinking vs. Feeling, and J-P for Judging vs. Perceiving. As can be seen from the correlations on the diagonal, both models share some similarities. However, MBTI is considered a typology, meaning that the model classifies people into 16 distinct types (e.g. ESTJ, ENTP, ISFP, etc.), whereas the big5 is comparing people to the general population for each individual trait/facet on a percentile scale.

¹¹https://en.wikipedia.org/wiki/Myers%E2%80%93Briggs_Type_Indicator

Table 3: HEXACO Factors & Facets

Honesty-Humility (H)	Emotionality (E)	Extraversion (X)	Agreeableness (A)	Conscientiousness (C)	Openness (O)
Sincerity	Fearfulness	Social Self-Esteem	Forgivingness	Organization	Aesthetic Appreciation
Fairness	Anxiety	Social Boldness	Gentleness	Diligence	Inquisitiveness
Greed Avoidance	Dependence	Sociability	Flexibility	Perfectionism	Creativity
Modesty	Sentimentality	Liveliness	Patience	Prudence	Unconventionality

Description: This table shows the six HEXACO factors by Ashton, Lee, Perugini, Szarota, de Vries, Di Blas, Boies & De Raad (2004) as well as their corresponding four facets. The major difference to the big5 model stems from the factor Honesty-Humility, which contains the facets sincerity, fairness, greed avoidance and modesty.

Table 4: Selection of DSM-IV-TR from the Perspective of the Five-Factor Model

Big5 Factor	Schizoid	Schizotypal	Antisocial	Narcissistic	Obsessive-Compulsive
Openness					
Adventurousness	Low	–	High	High	Low
Artistic Interests	–	–	–	–	–
Emotionality	Low	–	–	Low	Low
Imagination	–	High	–	–	–
Intellect	–	High	–	–	Low
Liberalism	High	–	–	–	Low
Conscientiousness					
Achievement striving	–	–	–	–	High
Cautiousness	–	–	Low	–	High
Dutifulness	–	–	Low	–	High
Orderliness	–	Low	–	–	–
Self-discipline	–	–	Low	–	High
Self-efficacy	–	–	–	–	High
Extraversion					
Activity level	Low	–	High	–	–
Assertiveness	–	–	High	High	–
Cheerfulness	Low	Low	–	–	–
Excitement-seeking	Low	–	High	High	Low
Friendliness	Low	Low	–	Low	–
Gregariousness	Low	Low	–	–	–
Agreeableness					
Altruism	–	–	Low	Low	–
Cooperation	–	–	Low	Low	–
Modesty	–	–	Low	Low	–
Morality	–	–	Low	Low	–
Sympathy	–	–	Low	Low	–
Trust	–	–	Low	Low	–
Neuroticism					
Anger	–	–	High	High	–
Anxiety	–	High	Low	–	High
Depression	–	–	–	–	–
Immoderation	–	–	High	–	Low
Self-consciousness	–	High	Low	Low	–
Vulnerability	–	–	Low	–	–

Description: This table relates a selection of DSM-IV personality disorders to the big5 personality model. This tabular representation can be found on Wikipedia¹². The review by Clark (2007) provides a good summary of previous research on the possibility of expressing personality disorders through the means of the big5 personality model. Another study by Poropat (2009) has tested the predictive power of big5 personality traits in assessing personality disorders, with significant results, especially with respect to the prediction of borderline, avoidant, and dependent personality disorder.

¹²https://en.wikipedia.org/wiki/Personality_disorder

6.1.2 Description of Big5 Variables

Table 5: Description of the Big5 Traits

Big5 Trait	Description
Openness	is the extent to which a person is open to experiencing different activities.
Conscientiousness	is a person's tendency to act in an organized or thoughtful way.
Extraversion	is a person's tendency to seek stimulation in the company of others.
Agreeableness	is a person's tendency to be compassionate and cooperative toward others.
Neuroticism	also referred to as Neuroticism or Natural reactions, is the extent to which a person's emotions are sensitive to the person's environment.

Description: This table contains descriptions of the big5 traits. It is part of the documentation found on the website of IBM Watson Personality Insights.¹³

¹³<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-models>

Table 6: Description of the Six Facets of the Trait Openness

Description of low value	Facet	Description of high value
You enjoy familiar routines and prefer not to deviate from them.	Adventurousness	You are eager to experience new things.
You are less concerned with artistic or creative activities than most people.	Artistic interests	You enjoy beauty and seek out creative experiences.
You do not frequently think about or openly express your emotions.	Emotionality	You are aware of your feelings and how to express them.
You prefer facts over fantasy.	Imagination	You have a wild imagination.
You prefer dealing with the world as it is, rarely considering abstract ideas.	Intellect	You are open to and intrigued by new ideas and love to explore them.
You prefer following with tradition to maintain a sense of stability.	Liberalism	You prefer to challenge authority and traditional values to help bring about change.

Description: This table contains descriptions to the facets of the trait openness. It is part of the documentation found on the website of IBM Watson Personality Insights.¹⁴

¹⁴<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-openness>

Table 7: Description of the Six Facets of the Trait Conscientiousness

Description of low value	Facet	Description of high value
You are content with your level of accomplishment and do not feel the need to set ambitious goals.	Achievement-striving	You set high goals for yourself and work hard to achieve them.
You would rather take action immediately than spend time deliberating making a decision.	Cautiousness	You carefully think through decisions before making them.
You do what you want, disregarding rules and obligations.	Dutifulness	You take rules and obligations seriously, even when they are inconvenient.
You do not make a lot of time for organization in your daily life.	Orderliness	You feel a strong need for structure in your life.
You have a hard time sticking with difficult tasks for a long period of time.	Self-discipline	You can tackle and stick with tough tasks.
You frequently doubt your ability to achieve your goals.	Self-efficacy	You feel you have the ability to succeed in the tasks you set out to do.

Description: This table contains descriptions to the facets of the trait conscientiousness. It is part of the documentation found on the website of IBM Watson Personality Insights.¹⁵

¹⁵<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-conscientiousness>

Table 8: Description of the Six Facets of the Trait Extraversion

Description of low value	Facet	Description of high value
You appreciate a relaxed pace in life.	Activity level	You enjoy a fast-paced, busy schedule with many activities.
You prefer to listen than to talk, especially in group settings.	Assertiveness	You tend to speak up and take charge of situations, and you are comfortable leading groups.
You are generally serious and do not joke much.	Cheerfulness	You are a joyful person and share that joy with the world.
You prefer activities that are quiet, calm, and safe.	Excitement-seeking	You are excited by taking risks and feel bored without lots of action going on.
You are a private person and do not let many people in.	Friendliness	You make friends easily and feel comfortable around other people.
You have a strong desire to have time to yourself.	Gregariousness	You enjoy being in the company of others.

Description: This table contains descriptions to the facets of the trait extraversion. It is part of the documentation found on the website of IBM Watson Personality Insights.¹⁶

¹⁶<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-extraversion>

Table 9: Description of the Six Facets of the Trait Agreeableness

Description of low value	Facet	Description of high value
You are more concerned with taking care of yourself than taking time for others.	Altruism	You feel fulfilled when helping others and will go out of your way to do so.
You do not shy away from contradicting others.	Cooperation	You are easy to please and try to avoid confrontation.
You hold yourself in high regard and are satisfied with who you are.	Modesty	You are uncomfortable being the center of attention.
You are comfortable using every trick in the book to get what you want.	Morality	You think it is wrong to take advantage of others to get ahead.
You think people should generally rely more on themselves than on others.	Sympathy	You feel what others feel and are compassionate toward them.
You are wary of other people's intentions and do not trust easily.	Trust	You believe the best of others and trust people easily.

Description: This table contains descriptions to the facets of the trait agreeableness. It is part of the documentation found on the website of IBM Watson Personality Insights.¹⁷

¹⁷<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-agreeableness>

Table 10: Description of the Six Facets of the Trait Neuroticism

Description of low value	Facet	Description of high value
It takes a lot to get you angry.	Anger	You have a fiery temper, especially when things do not go your way.
You tend to feel calm and self-assured.	Anxiety	You tend to worry about things that might happen.
You are generally comfortable with yourself as you are.	Depression	You think quite often about the things you are unhappy about.
You have control over your desires, which are not particularly intense.	Immoderation	You feel your desires strongly and are easily tempted by them.
You are hard to embarrass and are self-confident most of the time.	Self-consciousness	You are sensitive about what others might be thinking of you.
You handle unexpected events calmly and effectively.	Vulnerability	You are easily overwhelmed in stressful situations.

Description: This table contains descriptions to the facets of the trait neuroticism. It is part of the documentation found on the website of IBM Watson Personality Insights.¹⁸

¹⁸<https://cloud.ibm.com/docs/personality-insights?topic=personality-insights-emotionalRange>

6.1.3 Descriptive Statistics

Table 11: Descriptive Statistics of Big5 Personality Traits (Total)

	Obs.	Mean	Std.Dev.	5th	25th	50th	75th	95th
Openness	37519	0.9744	0.0225	0.9312	0.9670	0.9807	0.9893	0.9957
Conscientiousness	37519	0.7625	0.1324	0.5095	0.6843	0.7853	0.8640	0.9363
Extraversion	37519	0.4635	0.1833	0.1669	0.3265	0.4599	0.5982	0.7707
Agreeableness	37519	0.1418	0.1064	0.0231	0.0631	0.1149	0.1926	0.3551
Neuroticism	37519	0.1064	0.0912	0.0119	0.0412	0.0807	0.1450	0.2865

Description: This table contains descriptive statistics of our sample. The values for the big5 personality traits were computed based on quarterly earnings call transcripts of 7,332 companies between the years of 2009 and 2019. In total, 116,314 earnings call transcripts were scraped from [SeekingAlpha.com](https://www.seekingalpha.com). From each transcript, only the parts from the Q&A section where the CEO was talking were kept. After the preprocessing, only transcripts containing more than 1,500 words spoken by the CEO in the Q&A section were kept, otherwise the personality estimates are too noisy. Furthermore, we require at least two earnings call transcripts per year to keep the observation, to be able to compute a median personality score. For those remaining transcripts, the personality scores were computed by IBM Watson Personality Insights¹⁹, if at least one financial ratio was available for that company-year combination. This yields a sample size of 37,519. Table 13 on the following page contains the corresponding facets.

Table 12: Descriptive Statistics of Big5 Personality Traits (Median)

	Obs.	Mean	Std.Dev.	5th	25th	50th	75th	95th
Openness	11961	0.9753	0.0191	0.9386	0.9684	0.9803	0.9880	0.9947
Conscientiousness	11961	0.7652	0.1150	0.5490	0.6968	0.7817	0.8518	0.9225
Extraversion	11961	0.4647	0.1696	0.1883	0.3409	0.4626	0.5881	0.7481
Agreeableness	11961	0.1400	0.0947	0.0290	0.0697	0.1180	0.1871	0.3237
Neuroticism	11961	0.1036	0.0778	0.0172	0.0487	0.0842	0.1379	0.2527

Description: This table contains the median big5 traits computed on an annual basis, using the values as computed in table 11. Table 14 on the following pages contains the corresponding facets.

¹⁹<https://www.ibm.com/watson/services/personality-insights/>

Table 13: Descriptive Statistics of Big5 Personality Traits & Facets (Total)

	Obs.	Mean	Std.Dev.	5th	25th	50th	75th	95th
Openness	37519	0.9744	0.0225	0.9312	0.9670	0.9807	0.9893	0.9957
Adventurousness	37519	0.8686	0.0941	0.6829	0.8233	0.8914	0.9377	0.9760
Artistic Interests	37519	0.6711	0.1346	0.4284	0.5842	0.6839	0.7705	0.8684
Emotionality	37519	0.2392	0.1249	0.0718	0.1450	0.2199	0.3127	0.4726
Imagination	37519	0.1284	0.0929	0.0241	0.0610	0.1055	0.1723	0.3099
Intellect	37519	0.9945	0.0064	0.9830	0.9932	0.9965	0.9982	0.9993
Liberalism	37519	0.9729	0.0290	0.9198	0.9648	0.9817	0.9912	0.9974
Conscientiousness	37519	0.7625	0.1324	0.5095	0.6843	0.7853	0.8640	0.9363
Achievement Striving	37519	0.8010	0.0927	0.6287	0.7474	0.8151	0.8696	0.9260
Cautiousness	37519	0.9806	0.0180	0.9461	0.9749	0.9857	0.9924	0.9973
Dutifulness	37519	0.8028	0.0782	0.6612	0.7554	0.8117	0.8599	0.9143
Orderliness	37519	0.2976	0.1061	0.1423	0.2206	0.2867	0.3636	0.4895
Self Discipline	37519	0.7261	0.1360	0.4684	0.6450	0.7478	0.8293	0.9094
Self Efficacy	37519	0.6352	0.1425	0.3771	0.5435	0.6492	0.7424	0.8444
Extraversion	37519	0.4635	0.1833	0.1669	0.3265	0.4599	0.5982	0.7707
Activity Level	37519	0.9165	0.0747	0.7653	0.8871	0.9386	0.9692	0.9900
Assertiveness	37519	0.9232	0.0603	0.8048	0.8974	0.9397	0.9662	0.9862
Cheerfulness	37519	0.2471	0.1419	0.0532	0.1387	0.2264	0.3336	0.5145
Excitement Seeking	37519	0.0556	0.0397	0.0116	0.0273	0.0458	0.0734	0.1322
Friendliness	37519	0.5408	0.1971	0.2001	0.3963	0.5525	0.6924	0.8459
Gregariousness	37519	0.2139	0.1418	0.0288	0.1038	0.1892	0.2983	0.4847
Agreeableness	37519	0.1418	0.1064	0.0231	0.0631	0.1149	0.1926	0.3551
Altruism	37519	0.7528	0.1118	0.5468	0.6845	0.7670	0.8354	0.9104
Cooperation	37519	0.8906	0.0605	0.7769	0.8582	0.9016	0.9345	0.9678
Modesty	37519	0.3483	0.1564	0.1190	0.2290	0.3335	0.4514	0.6319
Morality	37519	0.7963	0.1360	0.5297	0.7192	0.8257	0.9017	0.9644
Sympathy	37519	0.9285	0.0646	0.8049	0.9072	0.9475	0.9710	0.9891
Trust	37519	0.8831	0.0828	0.7197	0.8433	0.9027	0.9440	0.9778
Neuroticism	37519	0.1064	0.0912	0.0119	0.0412	0.0807	0.1450	0.2865
Anger	37519	0.0347	0.0351	0.0052	0.0136	0.0250	0.0436	0.0956
Anxiety	37519	0.0534	0.0472	0.0103	0.0239	0.0407	0.0667	0.1378
Depression	37519	0.2917	0.1307	0.1106	0.1952	0.2729	0.3684	0.5368
Immoderation	37519	0.1507	0.0933	0.0370	0.0807	0.1305	0.2002	0.3326
Self Consciousness	37519	0.3060	0.1657	0.0872	0.1799	0.2784	0.4040	0.6241
Vulnerability	37519	0.1130	0.0700	0.0328	0.0638	0.0972	0.1440	0.2471

Table 14: Descriptive Statistics of Big5 Personality Traits (Median)

	Obs.	Mean	Std.Dev.	5th	25th	50th	75th	95th
Openness	11961	0.9753	0.0191	0.9386	0.9684	0.9803	0.9880	0.9947
Adventurousness	11961	0.8713	0.0833	0.7089	0.8292	0.8903	0.9323	0.9698
Artistic Interests	11961	0.6729	0.1187	0.4614	0.5965	0.6833	0.7585	0.8498
Emotionality	11961	0.2381	0.1131	0.0830	0.1533	0.2223	0.3046	0.4477
Imagination	11961	0.1265	0.0815	0.0305	0.0673	0.1085	0.1665	0.2805
Intellect	11961	0.9947	0.0055	0.9847	0.9934	0.9963	0.9980	0.9992
Liberalism	11961	0.9743	0.0240	0.9297	0.9663	0.9812	0.9900	0.9966
Conscientiousness	11961	0.7652	0.1150	0.5490	0.6968	0.7817	0.8518	0.9225
Achievement Striving	11961	0.8030	0.0823	0.6485	0.7560	0.8149	0.8627	0.9169
Cautiousness	11961	0.9812	0.0150	0.9524	0.9756	0.9852	0.9914	0.9965
Dutifulness	11961	0.8030	0.0674	0.6847	0.7617	0.8096	0.8511	0.9016
Orderliness	11961	0.2944	0.0925	0.1582	0.2280	0.2852	0.3524	0.4609
Self Discipline	11961	0.7278	0.1184	0.5092	0.6569	0.7446	0.8157	0.8927
Self Efficacy	11961	0.6363	0.1288	0.4043	0.5525	0.6482	0.7322	0.8272
Extraversion	11961	0.4647	0.1696	0.1883	0.3409	0.4626	0.5881	0.7481
Activity Level	11961	0.9191	0.0661	0.7873	0.8914	0.9376	0.9662	0.9879
Assertiveness	11961	0.9247	0.0536	0.8206	0.9007	0.9379	0.9632	0.9834
Cheerfulness	11961	0.2458	0.1292	0.0619	0.1481	0.2306	0.3276	0.4849
Excitement Seeking	11961	0.0544	0.0340	0.0143	0.0298	0.0468	0.0712	0.1200
Friendliness	11961	0.5412	0.1807	0.2282	0.4125	0.5524	0.6769	0.8205
Gregariousness	11961	0.2112	0.1298	0.0344	0.1123	0.1915	0.2904	0.4557
Agreeableness	11961	0.1400	0.0947	0.0290	0.0697	0.1180	0.1871	0.3237
Altruism	11961	0.7553	0.0995	0.5739	0.6941	0.7673	0.8273	0.8973
Cooperation	11961	0.8924	0.0528	0.7950	0.8635	0.9004	0.9304	0.9626
Modesty	11961	0.3469	0.1421	0.1367	0.2394	0.3352	0.4405	0.6036
Morality	11961	0.7979	0.1214	0.5618	0.7266	0.8214	0.8909	0.9541
Sympathy	11961	0.9308	0.0562	0.8227	0.9112	0.9464	0.9680	0.9860
Trust	11961	0.8862	0.0746	0.7405	0.8494	0.9024	0.9406	0.9745
Neuroticism	11961	0.1036	0.0778	0.0172	0.0487	0.0842	0.1379	0.2527
Anger	11961	0.0337	0.0311	0.0065	0.0152	0.0256	0.0420	0.0856
Anxiety	11961	0.0527	0.0431	0.0126	0.0265	0.0416	0.0649	0.1294
Depression	11961	0.2915	0.1180	0.1261	0.2067	0.2760	0.3594	0.5113
Immoderation	11961	0.1483	0.0815	0.0442	0.0881	0.1334	0.1925	0.3028
Self Consciousness	11961	0.3058	0.1546	0.1031	0.1910	0.2801	0.3943	0.6077
Vulnerability	11961	0.1126	0.0633	0.0391	0.0691	0.0992	0.1407	0.2334

Table 15: Correlations between Big5 Traits & *t*-statistics

	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness
Agreeableness	1.000				
Conscientiousness	0.402***	1.000			
Extraversion	0.064***	0.083***	1.000		
Neuroticism	-0.191***	-0.252***	-0.287***	1.000	
Openness	-0.117***	-0.150***	0.099***	0.051***	1.000

Description: This table indicates the Pearson correlations between big5 traits. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 16: Correlations between Openness Trait & Facets including *t*-statistics

	Openness	Adventurousness	Artistic Interests	Emotionality	Imagination	Intellect	Liberalism
Openness	1.000						
Adventurousness	-0.048***	1.000					
Artistic Interests	0.455***	0.302***	1.000				
Emotionality	0.226***	-0.130***	0.527***	1.000			
Imagination	0.360***	-0.033***	0.449***	0.246***	1.000		
Intellect	0.482***	0.047***	0.445***	0.147***	0.353***	1.000	
Liberalism	0.558***	0.041***	0.460***	0.174***	0.464***	0.510***	1.000

Description: This table indicates the Pearson correlations between the six facets belonging to the big5 trait openness. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 17: Correlations between Conscientiousness Trait & Facets including *t*-statistics

	Conscientiousness	Achievement Striving	Cautiousness	Dutifulness	Orderliness	Self Discipline	Self Efficacy
Conscientiousness	1.000						
Achievement Striving	0.582***	1.000					
Cautiousness	0.401***	0.207***	1.000				
Dutifulness	0.475***	0.346***	0.624***	1.000			
Orderliness	0.389***	0.294***	0.336***	0.236***	1.000		
Self Discipline	0.718***	0.696***	0.436***	0.515***	0.623***	1.000	
Self Efficacy	0.266***	0.667***	-0.168***	-0.020***	0.286***	0.476***	1.000

Description: This table indicates the Pearson correlations between the six facets belonging to the big5 trait conscientiousness. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

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Table 18: Correlations between Extraversion Trait & Facets including *t*-statistics

	Extraversion	Activity Level	Assertiveness	Cheerfulness	Excitement Seeking	Friendliness	Gregariousness
Extraversion	1.000						
Activity Level	0.602***	1.000					
Assertiveness	0.600***	0.794***	1.000				
Cheerfulness	0.517***	0.487***	0.493***	1.000			
Excitement Seeking	0.296***	0.277***	0.299***	0.203***	1.000		
Friendliness	0.553***	0.617***	0.663***	0.853***	0.229***	1.000	
Gregariousness	0.571***	0.468***	0.549***	0.839***	0.291***	0.858***	1.000

Description: This table indicates the Pearson correlations between the six facets belonging to the big5 trait extraversion. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 19: Correlations between Agreeableness Trait & Facets including *t*-statistics

	Agreeableness	Altruism	Cooperation	Modesty	Morality	Sympathy	Trust
Agreeableness	1.000						
Altruism	0.500***	1.000					
Cooperation	0.432***	0.424***	1.000				
Modesty	0.479***	0.175***	0.446***	1.000			
Morality	0.627***	0.355***	0.615***	0.710***	1.000		
Sympathy	0.439***	0.750***	0.343***	0.199***	0.390***	1.000	
Trust	-0.082***	0.457***	0.274***	-0.373***	-0.252***	0.202***	1.000

Description: This table indicates the Pearson correlations between the six facets belonging to the big5 trait agreeableness. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 20: Correlations between Neuroticism Trait & Facets including *t*-statistics

	Neuroticism	Anger	Anxiety	Depression	Immoderation	Self Consciousness	Vulnerability
Neuroticism	1.000						
Anger	0.383***	1.000					
Anxiety	0.443***	0.832***	1.000				
Depression	0.392***	0.678***	0.766***	1.000			
Immoderation	0.142***	0.140***	0.306***	0.429***	1.000		
Self Consciousness	0.407***	0.661***	0.774***	0.837***	0.425***	1.000	
Vulnerability	0.425***	0.723***	0.898***	0.804***	0.455***	0.862***	1.000

Description: This table indicates the Pearson correlations between the six facets belonging to the big5 trait neuroticism. The *t*-statistics were computed based on robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 21: Descriptive Statistics of Financial Ratios

	Obs.	Mean	Std.Dev.	5th	25th	50th	75th	95th
Effective Tax Rate	7369	0.4818	11.3571	0.0270	0.1920	0.2760	0.3580	0.5460
Payout Ratio	5408	3.0652	43.6655	0.0655	0.2253	0.3936	0.7257	2.9570
Net Leverage	6919	0.4110	0.2202	0.0678	0.2426	0.4076	0.5567	0.7944
Book-to-Market	10483	0.9478	0.5718	0.7467	0.9799	0.9993	1.0005	1.0102
R&D Intensity	3995	2.1247	45.8200	0.0070	0.0314	0.0910	0.1833	0.8632

Description: This table contains descriptive statistics of the financial ratios used in the regressions. The financial ratios were computed based on annual data from balance sheets, income statements and cash-flow statements of 2,963 companies, mostly U.S. based, between the years of 2009 and 2019. One observation is counted per company-year tuple. The data was scraped from [SeekingAlpha.com](https://www.seekingalpha.com), from the financials subpage of each company. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The other ratios were computed as follows: $\text{Net Leverage} = \frac{\text{Net Debt}}{\text{Net Debt} + \text{Total Equity}}$, $\text{Book-to-Market} = \frac{\text{Book value per share}}{\text{Total Equity} / \text{Total shares outstanding on filing date}}$, $\text{R\&D Intensity} = \frac{\text{R\&D Expenses}}{\text{Revenues}}$. Figure 9 to 11 provide a visual representation of how the data is distributed. Only values for which a corresponding median personality score is present were kept in this table.

Table 22: Descriptive Statistics of Industry Distribution

Industry	Obs.	Industry	Obs.
Technology	552	Industrial	314
Services	548	Consumer	276
Financial	447	Utilities	58
Healthcare	422	Conglomerates	11
Basic Materials	335		

Description: This table contains descriptive statistics of the 9 industries present in the regressions. One observation corresponds to one company that was used at least once in a regression. In total, the sample used in the regressions contains 2,963 distinct companies.

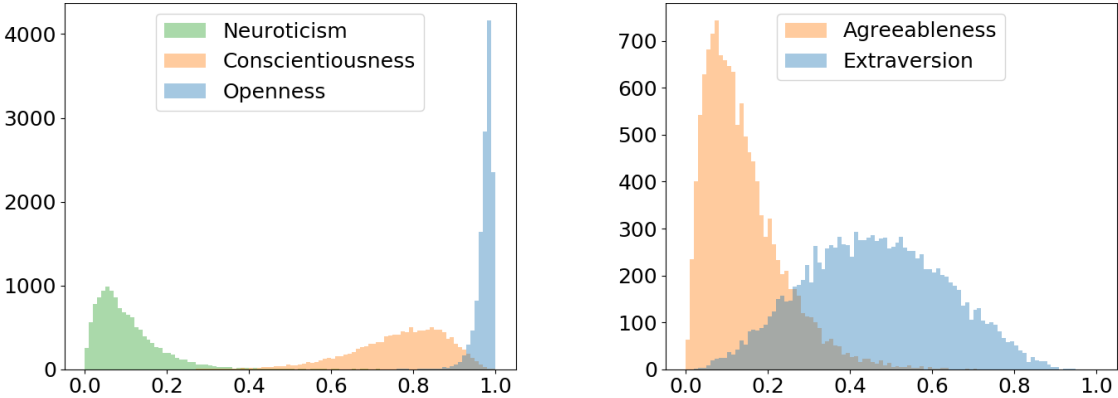
Table 23: Descriptive Statistics of Year Distribution

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Obs.	387	491	509	761	1231	1375	1578	1527	1438	1555	1109

Description: This table contains descriptive statistics about the frequency each year appears in the dataset. One observation corresponds to one company-year datapoint that was used at least once in a regression.

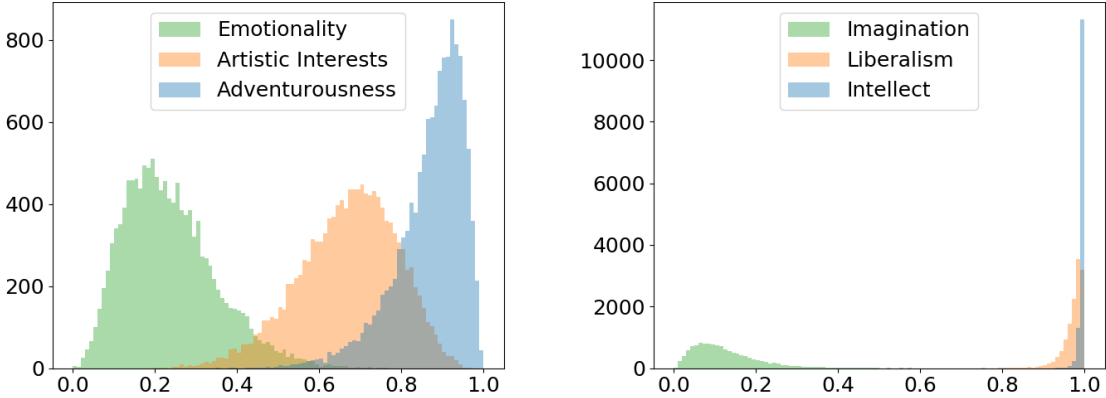
6.2 Figures of Descriptive Statistics

Figure 1: Big5 Traits



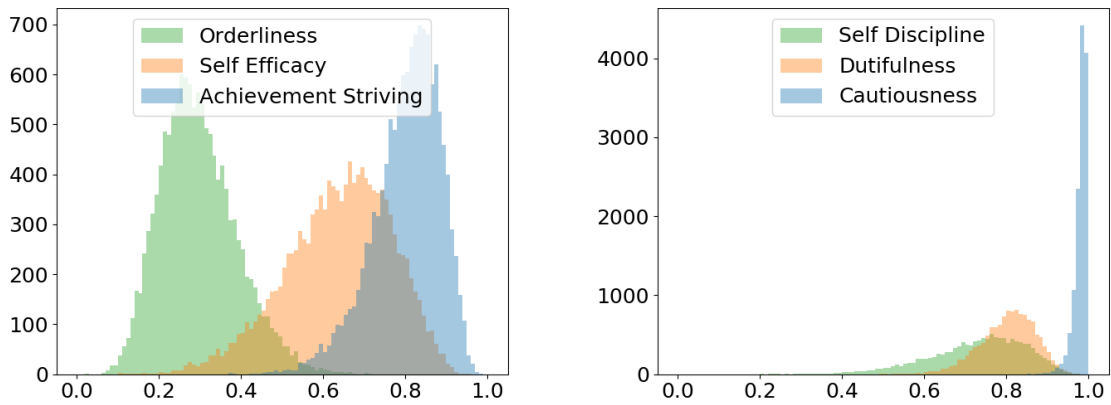
Description: This histogram contains the big5 traits, with a bin width of 1%. The left part of the figure contains the traits neuroticism, conscientiousness and openness; the right part contains the traits agreeableness and extraversion. Each trait has 11,961 observations.

Figure 2: Facets of the Trait Openness



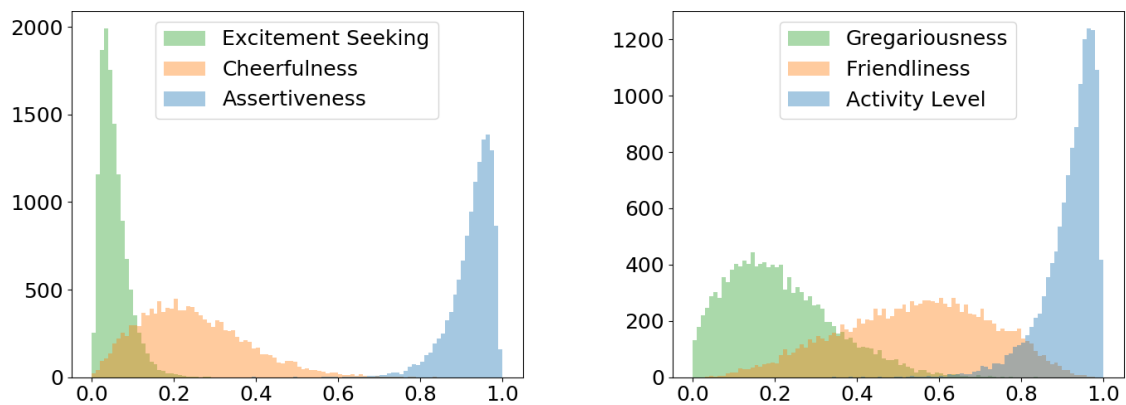
Description: This histogram contains the facets of the big5 trait openness, with a bin width of 1%. The left part of the figure contains the facets emotionality, artistic interests and adventurousness; the right part contains the facets imagination, liberalism and intellect. Each facet has 11,961 observations.

Figure 3: Facets of the Trait Conscientiousness



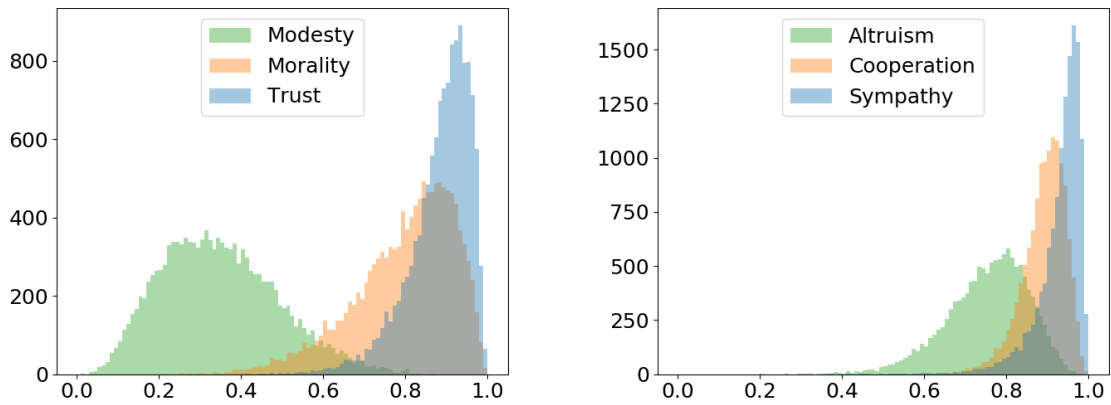
Description: This histogram contains the facets of the big5 trait conscientiousness, with a bin width of 1%. The left part of the figure contains the facets orderliness, self efficacy and achievement striving; the right part contains the facets self discipline, dutifulness and cautiousness. Each facet has 11,961 observations.

Figure 4: Facets of the Trait Extraversion



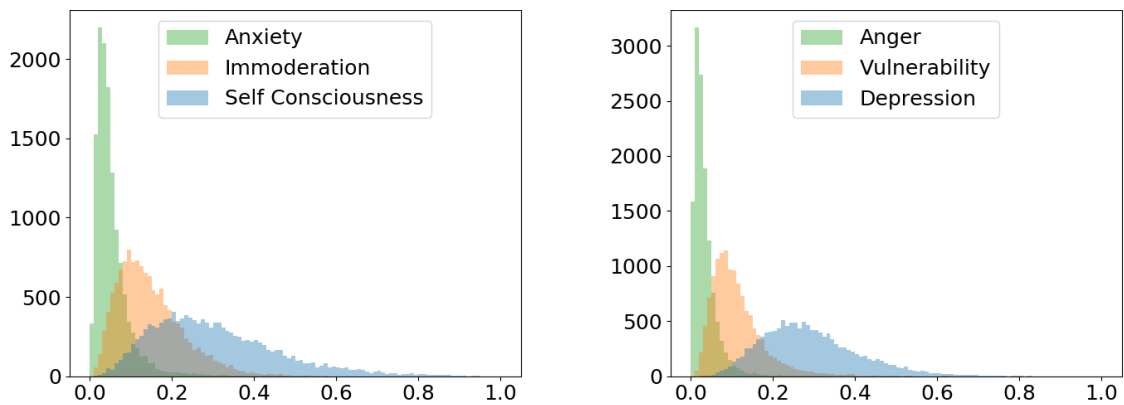
Description: This histogram contains the facets of the big5 trait extraversion, with a bin width of 1%. The left part of the figure contains the facets excitement seeking, cheerfulness and assertiveness; the right part contains the facets gregariousness, friendliness and activity level. Each facet has 11,961 observations.

Figure 5: Facets of the Trait Agreeableness



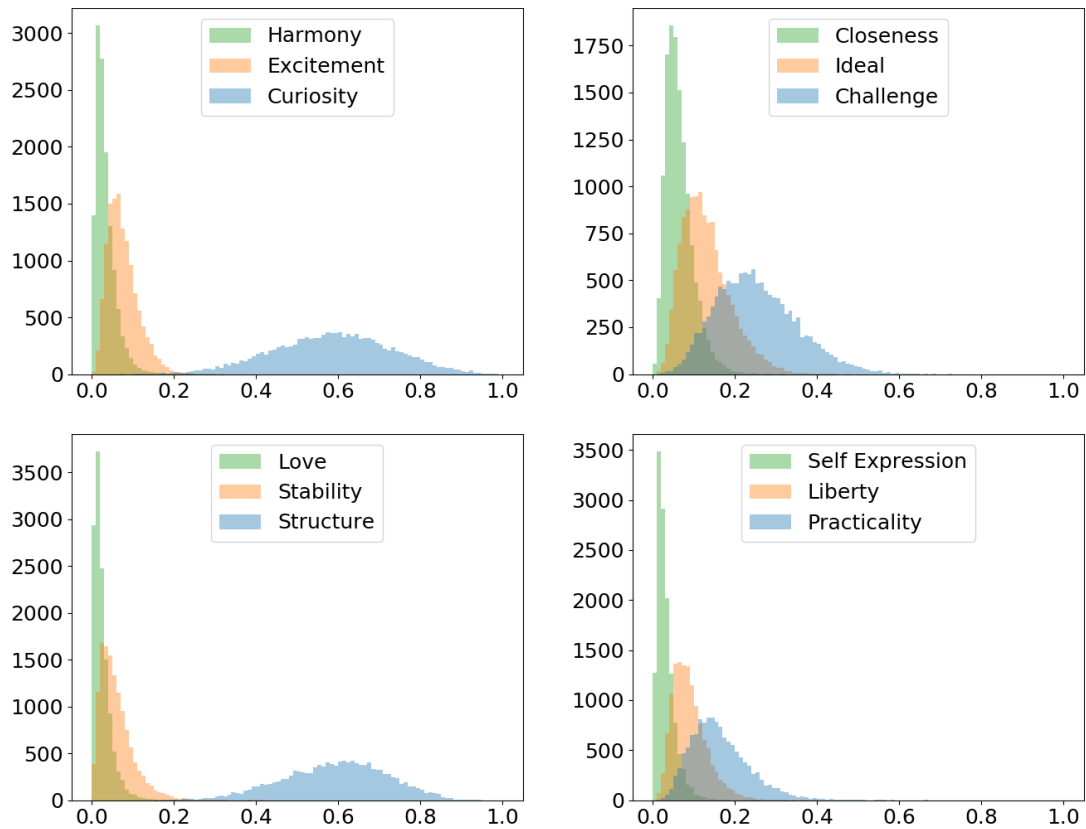
Description: This histogram contains the facets of the big5 trait agreeableness, with a bin width of 1%. The left part of the figure contains the facets modesty, morality and trust; the right part contains the facets altruism, cooperation and sympathy. Each facet has 11,961 observations.

Figure 6: Facets of the Trait Neuroticism



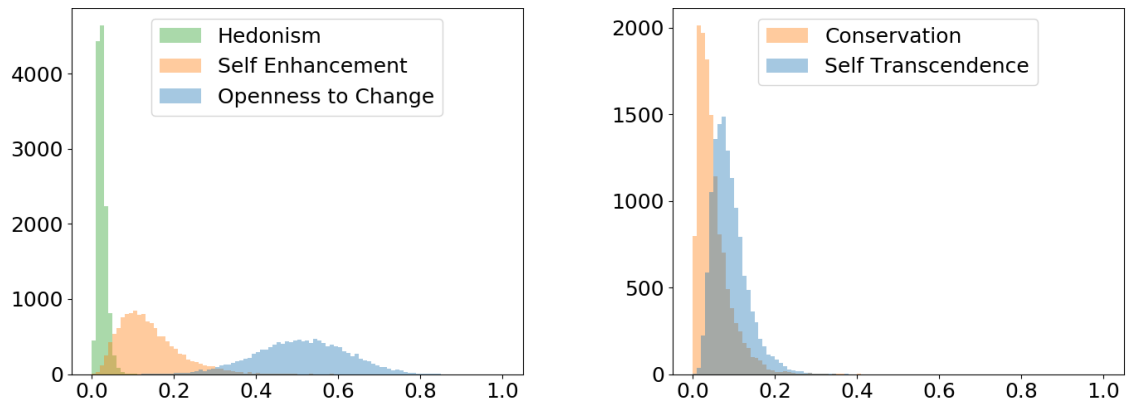
Description: This histogram contains the facets of the big5 trait neuroticism, with a bin width of 1%. The left part of the figure contains the facets anxiety, immoderation and self consciousness; the right part contains the facets anger, vulnerability and depression. Each facet has 11,961 observations.

Figure 7: Consumer Needs



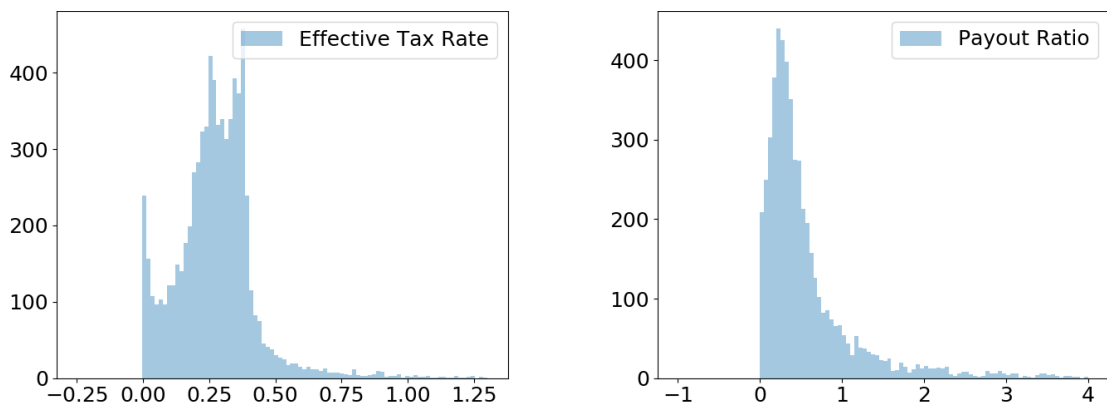
Description: This histogram contains all twelve consumer needs, with a bin width of 1%. The upper-left part of the figure contains the consumer needs harmony, excitement and curiosity; the upper-right part contains the consumer needs closeness, ideal and challenge; the lower-left part contains the consumer needs love, stability and structure; the lower-right part contains the consumer needs self expression, liberty and practicality. Each consumer need has 11,961 observations.

Figure 8: Values



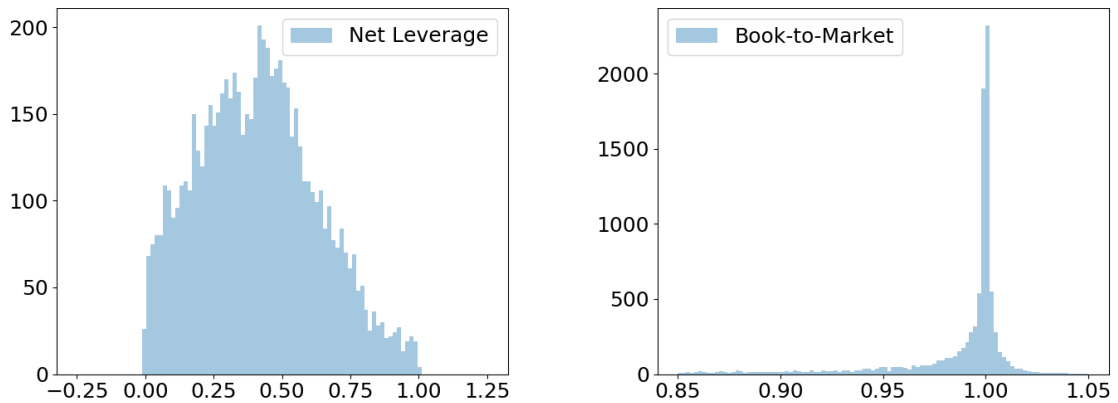
Description: This histogram contains the five values hedonism, self enhancement, openness to change, conservation and self transcendence, with a bin width of 1%. Each value has 11,961 observations.

Figure 9: Effective Tax Rate & Payout Ratio



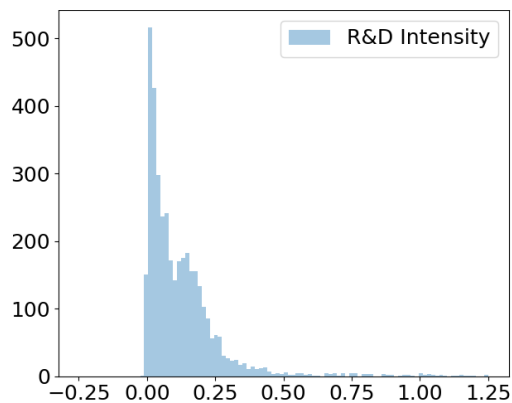
Description: This histogram contains the effective tax rate and the payout ratio. The effective tax rate has 7,369 company-year observations, the payout ratio has 5,408 company-year observations. The observations are mostly of U.S. based companies and cover the period of 2009 to 2019.

Figure 10: Net Leverage Ratio & Book-to-Market Ratio



Description: This histogram contains the net leverage and the book-to-market ratio. The net leverage ratio has 6,919 company-year observations, the book-to-market ratio has 10,483 company-year observations. The observations are mostly of U.S. based companies and cover the period of 2009 to 2019.

Figure 11: R&D Intensity



Description: This histogram contains the r&d intensity. The r&d intensity has 3,995 company-year observations. The observations are mostly of U.S. based companies and cover the period of 2009 to 2019.

6.3 Regression Results

6.3.1 Big5 & Financial Ratios

Table 24: Firm Policies & Big5 Personality Traits

	Effective Tax Rate		Payout Ratio		Net Leverage		Book-to-Market		R&D Intensity	
Openness	0.0115*** (0.0014)	0.0117*** (0.0014)	0.0266*** (0.0081)	0.0164** (0.0079)	0.0060** (0.0023)	0.0025 (0.0023)	0.0347*** (0.0014)	0.0305*** (0.0013)	0.0247*** (0.0026)	0.0146*** (0.0024)
Conscientiousness	0.0227*** (0.0015)	0.0189*** (0.0015)	-0.0111 (0.0095)	0.0203** (0.0093)	0.0141*** (0.0025)	0.0128*** (0.0025)	0.0435*** (0.0016)	0.0397*** (0.0015)	0.0297*** (0.0030)	0.0264*** (0.0030)
Extraversion	0.0110*** (0.0014)	0.0090*** (0.0014)	0.0279*** (0.0085)	0.0122 (0.0085)	0.0200*** (0.0024)	0.0127*** (0.0024)	0.0352*** (0.0015)	0.0234*** (0.0013)	-0.0266*** (0.0028)	-0.0240*** (0.0026)
Agreeableness	0.0118*** (0.0015)	0.0129*** (0.0015)	0.0544*** (0.0094)	0.0124 (0.0094)	0.0151*** (0.0025)	0.0077*** (0.0026)	0.0284*** (0.0015)	0.0252*** (0.0014)	-0.0026 (0.0031)	-0.0113*** (0.0029)
Neuroticism	0.0168*** (0.0013)	0.0130*** (0.0014)	-0.0206*** (0.0079)	0.0296*** (0.0077)	0.0058** (0.0023)	0.0089*** (0.0023)	0.0597*** (0.0018)	0.0563*** (0.0017)	0.0165*** (0.0025)	0.0097*** (0.0023)
Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.811	0.818	0.451	0.499	0.782	0.793	0.979	0.982	0.420	0.493
Obs.	7369	7325	5408	5371	6919	6869	10483	10422	3995	3983

Description: This table reports the results of regressing firm policy variables on the big5 traits. The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The other ratios were computed as follows: $\text{Net Leverage} = \frac{\text{Net Debt}}{\text{Net Debt} + \text{Total Equity}}$, $\text{Book-to-Market} = \frac{\text{Book value per share}}{\text{Total Equity} / \text{Total shares outstanding on filing date}}$, $\text{R\&D Intensity} = \frac{\text{R\&D Expenses}}{\text{Revenues}}$. All financial ratios are winsorized at the 5th and 95th percentile. The big5 scores correspond to the median scores computed based on quarterly earnings call transcripts of the same year as the financial ratio. At least two big5 scores are required for each year to compute the median score. The personality scores were encoded with numbers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://seekingalpha.com). The values in parentheses denote the robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 25: Firm Policies & Big5 Personality Traits

	Effective Tax Rate		Payout Ratio		Net Leverage	
Openness	0.0082*** (0.0019)	0.0074*** (0.0019)	-0.0339*** (0.0121)	-0.0398*** (0.0118)	-0.0110*** (0.0034)	-0.0106*** (0.0034)
Adventurousness	0.0018 (0.0021)	-0.0015 (0.0021)	-0.0914*** (0.0142)	-0.0618*** (0.0141)	-0.0102*** (0.0035)	-0.0114*** (0.0013)
Artistic Interests	-0.0041* (0.0023)	-0.0052** (0.0023)	0.0392*** (0.0148)	0.0365** (0.0144)	0.0015 (0.0039)	0.0006 (0.0039)
Emotionality	-0.0033 (0.0025)	-0.0048** (0.0024)	-0.0156 (0.0160)	-0.0019 (0.0157)	0.0019 (0.0042)	0.0034 (0.0042)
Imagination	-0.0004 (0.0027)	0.0020 (0.0027)	-0.0580*** (0.0172)	-0.0494*** (0.0168)	-0.0148*** (0.0044)	-0.0142*** (0.0044)
Intellect	-0.0026 (0.0021)	0.0002 (0.0021)	-0.0017 (0.0130)	-0.0155 (0.0127)	0.0004 (0.0036)	0.0017 (0.0036)
Liberalism	-0.0033 (0.0024)	-0.0002 (0.0025)	0.0583*** (0.0158)	0.0385** (0.0158)	0.0268*** (0.0041)	0.0197*** (0.0041)
Conscientiousness	0.0052** (0.0022)	0.0046** (0.0021)	-0.0364** (0.0142)	-0.0275* (0.0141)	-0.0049 (0.0036)	-0.0098*** (0.0036)
Achievement Striving	-0.0008 (0.0027)	-0.0021 (0.0027)	0.0017 (0.0177)	0.0274 (0.0173)	-0.0138*** (0.0048)	-0.0091* (0.0048)
Cautiousness	0.0116*** (0.0025)	0.0098*** (0.0025)	-0.0549*** (0.0161)	-0.0414*** (0.0158)	0.0048 (0.0042)	0.0049 (0.0042)
Dutifulness	0.0094*** (0.0023)	0.0087*** (0.0023)	-0.0521*** (0.0145)	-0.0499*** (0.0142)	0.0019 (0.0039)	-0.0027 (0.0038)
Orderliness	0.0025 (0.0021)	-0.0009 (0.0021)	-0.0040 (0.0134)	0.0149 (0.0134)	0.0201*** (0.0036)	0.0201*** (0.0036)
Self-discipline	-0.0014 (0.0030)	0.0024 (0.0030)	0.1422*** (0.0192)	0.1090*** (0.0190)	0.0274*** (0.0050)	0.0258*** (0.0050)
Self-efficacy	-0.0009 (0.0028)	-0.0020 (0.0028)	0.0493*** (0.0183)	0.0372** (0.0183)	0.0087* (0.0047)	0.0118** (0.0047)
Extraversion	0.0038* (0.0022)	0.0045** (0.0022)	0.0629*** (0.0138)	0.0485*** (0.0138)	0.0143*** (0.0037)	0.0084** (0.0038)
Activity Level	-0.0002 (0.0032)	0.0001 (0.0031)	0.0626*** (0.0209)	0.0506** (0.0204)	0.0040 (0.0054)	0.0046 (0.0054)
Assertiveness	0.0078*** (0.0029)	0.0126*** (0.0029)	-0.0398** (0.0190)	-0.0551*** (0.0191)	0.0102** (0.0048)	0.0054 (0.0048)
Cheerfulness	0.0122*** (0.0029)	0.0123*** (0.0029)	-0.0327* (0.0185)	-0.0289 (0.0186)	-0.0088* (0.0048)	-0.0066 (0.0048)
Excitement-seeking	0.0018 (0.0027)	0.0023 (0.0026)	0.0609*** (0.0175)	0.0453*** (0.0173)	0.0149*** (0.0045)	0.0125*** (0.0044)
Friendliness	0.0119*** (0.0033)	0.0109*** (0.0032)	0.0089 (0.0212)	0.0229 (0.0209)	0.0050 (0.0055)	0.0072 (0.0054)
Gregariousness	0.0074** (0.0031)	0.0108*** (0.0030)	-0.0000 (0.0202)	-0.0253 (0.0199)	0.0237*** (0.0052)	0.0201*** (0.0052)
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	Effective Tax Rate		Payout Ratio		Net Leverage	

Agreeableness	0.0000 (0.0023)	0.0043* (0.0023)	0.0169 (0.0149)	-0.0139 (0.0148)	-0.0038 (0.0039)	-0.0033 (0.0039)
Altruism	-0.0009 (0.0027)	-0.0018 (0.0026)	-0.0638*** (0.0167)	-0.0581*** (0.0164)	-0.0012 (0.0045)	-0.0023 (0.0045)
Cooperation	-0.0036 (0.0027)	-0.0054** (0.0027)	-0.0061 (0.0175)	0.0231 (0.0172)	-0.0090** (0.0045)	-0.0089** (0.0045)
Modesty	-0.0016 (0.0026)	-0.0027 (0.0026)	0.0617*** (0.0169)	0.0677*** (0.0165)	0.0000 (0.0044)	0.0016 (0.0043)
Morality	0.0060** (0.0028)	0.0088*** (0.0028)	0.0398** (0.0182)	0.0173 (0.0177)	0.0172*** (0.0046)	0.0121*** (0.0046)
Sympathy	-0.0045** (0.0022)	-0.0048** (0.0022)	0.0675*** (0.0140)	0.0486*** (0.0140)	0.0093** (0.0039)	0.0114*** (0.0039)
Trust	0.0030 (0.0025)	0.0010 (0.0025)	-0.0600*** (0.0163)	-0.0220 (0.0161)	-0.0187*** (0.0043)	-0.0149*** (0.0043)
Neuroticism	0.0005 (0.0016)	-0.0045*** (0.0016)	-0.0754*** (0.0099)	-0.0364*** (0.0097)	-0.0179*** (0.0027)	-0.0157*** (0.0027)
Anger	0.0021 (0.0025)	0.0039 (0.0024)	0.0053 (0.0161)	-0.0046 (0.0158)	-0.0069* (0.0040)	-0.0065 (0.0040)
Anxiety	-0.0027 (0.0033)	-0.0043 (0.0033)	0.0436** (0.0194)	0.0486** (0.0191)	0.0190*** (0.0055)	0.0161*** (0.0055)
Depression	0.0128*** (0.0029)	0.0129*** (0.0029)	0.0404** (0.0184)	0.0436** (0.0184)	0.0066 (0.0049)	0.0078 (0.0049)
Immoderation	0.0156*** (0.0020)	0.0104*** (0.0020)	0.0090 (0.0131)	0.0242* (0.0132)	0.0101*** (0.0035)	0.0092*** (0.0035)
Self-consciousness	0.0178*** (0.0033)	0.0219*** (0.0033)	0.0197 (0.0219)	0.0125 (0.0216)	0.0162*** (0.0056)	0.0168*** (0.0055)
Vulnerability	0.0014 (0.0032)	0.0054* (0.0031)	0.0226 (0.0197)	0.0086 (0.0194)	0.0059 (0.0054)	0.0052 (0.0054)
Industry FE	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.829	0.835	0.497	0.523	0.800	0.807
Obs.	7369	7325	5408	5371	6919	6869

Description: This table reports the results of regressing firm policy variables on the big5 traits. The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The net leverage was computed as follows: $\text{Net Leverage} = \frac{\text{Net Debt}}{\text{Net Debt} + \text{Total Equity}}$. All financial ratios are winsorized at the 5th and 95th percentile. The big5 scores correspond to the median scores computed based on quarterly earnings call transcripts of the same year as the financial ratio. At least two big5 scores are required for each year to compute the median score. The personality scores were encoded with numbers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://seekingalpha.com). The values in parentheses denote the robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 26: Firm Policies & Big5 Personality Traits

	Book-to-Market		R&D Intensity	
Openness	0.0064*** (0.0010)	0.0076*** (0.0010)	-0.0063* (0.0036)	-0.0043 (0.0035)
Adventurousness	0.0111*** (0.0012)	0.0089*** (0.0012)	0.0139*** (0.0039)	0.0130*** (0.0039)
Artistic Interests	-0.0080*** (0.0012)	-0.0064*** (0.0012)	-0.0070* (0.0041)	-0.0054 (0.0040)
Emotionality	-0.0035*** (0.0013)	-0.0028** (0.0013)	-0.0017 (0.0044)	-0.0016 (0.0044)
Imagination	0.0036*** (0.0014)	0.0001 (0.0014)	0.0327*** (0.0049)	0.0277*** (0.0050)
Intellect	0.0054*** (0.0011)	0.0080*** (0.0011)	-0.0286*** (0.0039)	-0.0267*** (0.0039)
Liberalism	0.0088*** (0.0013)	0.0063*** (0.0013)	0.0054 (0.0047)	0.0038 (0.0047)
Conscientiousness	0.0037*** (0.0012)	0.0016 (0.0012)	0.0259*** (0.0041)	0.0250*** (0.0041)
Achievement Striving	-0.0094*** (0.0015)	-0.0090*** (0.0014)	0.0392*** (0.0053)	0.0365*** (0.0053)
Cautiousness	0.0183*** (0.0012)	0.0178*** (0.0012)	-0.0024 (0.0045)	-0.0019 (0.0044)
Dutifulness	0.0110*** (0.0012)	0.0097*** (0.0012)	-0.0264*** (0.0041)	-0.0244*** (0.0041)
Orderliness	0.0159*** (0.0011)	0.0178*** (0.0011)	-0.0004 (0.0037)	0.0030 (0.0038)
Self-discipline	0.0217*** (0.0016)	0.0203*** (0.0016)	0.0092* (0.0055)	0.0056 (0.0055)
Self-efficacy	0.0045*** (0.0014)	0.0093*** (0.0014)	0.0196*** (0.0054)	0.0246*** (0.0054)
Extraversion	0.0148*** (0.0012)	0.0112*** (0.0012)	-0.0067 (0.0041)	-0.0078* (0.0041)
Activity Level	-0.0009 (0.0017)	-0.0005 (0.0017)	-0.0022 (0.0061)	-0.0024 (0.0061)
Assertiveness	0.0315*** (0.0016)	0.0270*** (0.0015)	-0.0129** (0.0057)	-0.0191*** (0.0058)
Cheerfulness	0.0083*** (0.0016)	0.0113*** (0.0016)	-0.0396*** (0.0057)	-0.0344*** (0.0058)
Excitement-seeking	0.0112*** (0.0014)	0.0115*** (0.0013)	-0.0215*** (0.0047)	-0.0195*** (0.0047)
Friendliness	0.0226*** (0.0018)	0.0231*** (0.0018)	-0.0355*** (0.0061)	-0.0329*** (0.0061)
Gregariousness	0.0283*** (0.0017)	0.0266*** (0.0016)	0.0138** (0.0057)	0.0125** (0.0056)

	Book-to-Market		R&D Intensity	

Agreeableness	0.0089*** (0.0012)	0.0073*** (0.0012)	0.0157*** (0.0045)	0.0118*** (0.0045)
Altruism	-0.0107*** (0.0014)	-0.0109*** (0.0014)	0.0207*** (0.0048)	0.0157*** (0.0048)
Cooperation	0.0131*** (0.0014)	0.0109*** (0.0013)	0.0082* (0.0044)	0.0055 (0.0044)
Modesty	0.0079*** (0.0014)	0.0085*** (0.0014)	0.0053 (0.0049)	0.0066 (0.0049)
Morality	0.0070*** (0.0015)	0.0043*** (0.0014)	-0.0056 (0.0052)	-0.0106** (0.0052)
Sympathy	-0.0089*** (0.0012)	-0.0041*** (0.0012)	-0.0128*** (0.0043)	-0.0051 (0.0043)
Trust	-0.0008 (0.0014)	-0.0038*** (0.0014)	-0.0034 (0.0049)	-0.0068 (0.0048)
Neuroticism	0.0042*** (0.0008)	0.0050*** (0.0008)	0.0007 (0.0029)	0.0037 (0.0029)
Anger	0.0158*** (0.0013)	0.0148*** (0.0012)	0.0257*** (0.0047)	0.0215*** (0.0047)
Anxiety	-0.0085*** (0.0017)	-0.0102*** (0.0017)	-0.0113* (0.0062)	-0.0116* (0.0062)
Depression	0.0304*** (0.0016)	0.0283*** (0.0015)	-0.0032 (0.0054)	-0.0047 (0.0055)
Immoderation	0.0224*** (0.0011)	0.0239*** (0.0011)	0.0119*** (0.0038)	0.0154*** (0.0038)
Self-consciousness	0.0533*** (0.0018)	0.0511*** (0.0018)	0.0142** (0.0062)	0.0089 (0.0063)
Vulnerability	0.0240*** (0.0017)	0.0223*** (0.0017)	0.0097 (0.0063)	0.0031 (0.0063)
Industry FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R ²	0.993	0.994	0.568	0.579
Obs.	10483	10422	3995	3983

Description: This table reports the results of regressing firm policy variables on the big5 traits. The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The two financial ratios were computed as follows: Book-to-Market = $\frac{\text{Book value per share}}{\text{Total Equity} / \text{Total shares outstanding on filing date}}$, R&D Intensity = $\frac{\text{R\&D Expenses}}{\text{Revenues}}$. All financial ratios are winsorized at the 5th and 95th percentile. The big5 scores correspond to the median scores computed based on quarterly earnings call transcripts of the same year as the financial ratio. At least two big5 scores are required for each year to compute the median score. The personality scores were encoded with numbers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://seekingalpha.com). The values in parentheses denote the robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

6.3.2 Consumer Needs & Financial Ratios

Table 27: Firm Policies & Consumer Needs

	Effective Tax Rate		Payout Ratio		Net Leverage	
Structure	0.0156*** (0.0019)	0.0123*** (0.0018)	-0.0029 (0.0118)	0.0058 (0.0117)	0.0028 (0.0031)	0.0009 (0.0031)
Stability	0.0059* (0.0021)	0.0041* (0.0021)	0.0670*** (0.0137)	0.0634*** (0.0132)	0.0133*** (0.0035)	0.0130*** (0.0034)
Self Expression	-0.0036* (0.0021)	-0.0014 (0.0020)	0.1001*** (0.0125)	0.0749*** (0.0122)	0.0050 (0.0034)	0.0027 (0.0033)
Practicality	0.0121*** (0.0022)	0.0142*** (0.0021)	0.0516*** (0.0130)	0.0299** (0.0129)	0.0087** (0.0037)	0.0075** (0.0036)
Love	0.0047** (0.0019)	0.0011 (0.0018)	0.0009 (0.0109)	-0.0065 (0.0107)	0.0098*** (0.0031)	0.0027 (0.0031)
Liberty	-0.0144*** (0.0025)	-0.0217*** (0.0025)	-0.1440*** (0.0156)	-0.0943*** (0.0156)	-0.0099** (0.0042)	-0.0103** (0.0042)
Ideal	0.0026 (0.0021)	0.0021 (0.0020)	0.0253** (0.0126)	0.0108 (0.0123)	0.0133*** (0.0035)	0.0084** (0.0034)
Harmony	0.0019 (0.0022)	0.0051** (0.0022)	-0.0639*** (0.0143)	-0.0407*** (0.0141)	-0.0067* (0.0035)	0.0002 (0.0035)
Excitement	0.0019 (0.0021)	0.0096*** (0.0021)	0.1048*** (0.0131)	0.0685*** (0.0129)	0.0239*** (0.0034)	0.0265*** (0.0034)
Curiosity	0.0061*** (0.0018)	0.0087*** (0.0018)	-0.0173* (0.0105)	-0.0145 (0.0104)	-0.0089*** (0.0030)	-0.0070** (0.0030)
Closeness	0.0136*** (0.0022)	0.0122*** (0.0022)	0.0244* (0.0134)	-0.0122 (0.0135)	0.0167*** (0.0036)	0.0061* (0.0036)
Challenge	0.0080*** (0.0020)	0.0078*** (0.0020)	-0.0402*** (0.0122)	-0.0300** (0.0120)	-0.0164*** (0.0034)	-0.0118*** (0.0033)
Industry FE	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.803	0.818	0.467	0.507	0.782	0.795
Obs.	7369	7325	5408	5371	6919	6869

Description: This table reports the results of regressing firm policy variables on consumer needs. This alternative specification was produced by IBM Watson Personality Insights as a side product. We do not go into details here, as the interpretation of these results is not the main focus of this study.

The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The effective tax rate and the payout ratio were taken as stated in the annual income statement. The net leverage was computed as follows: $\text{Net Leverage} = \frac{\text{Net Debt}}{\text{Net Debt} + \text{Total Equity}}$. All financial ratios are winsorized at the 5th and 95th percentile. The scores for consumer needs correspond to the median scores computed based on quarterly earnings call transcripts of the same year as the financial ratio. At least two consumer need scores are required for each year to compute the median score. The consumer need scores were encoded with numbers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://www.seekingalpha.com). The values in parentheses denote the robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 28: Firm Policies & Consumer Needs

	Book-to-Market		R&D Intensity	
Structure	0.0182*** (0.0019)	0.0099*** (0.0017)	0.0141*** (0.0033)	0.0108*** (0.0033)
Stability	0.0168*** (0.0021)	0.0175*** (0.0019)	0.0069* (0.0040)	0.0071* (0.0039)
Self Expression	-0.0067*** (0.0020)	-0.0045** (0.0018)	0.0448*** (0.0037)	0.0354*** (0.0036)
Practicality	0.0461*** (0.0024)	0.0408*** (0.0021)	0.0142*** (0.0038)	0.0117*** (0.0038)
Love	0.0103*** (0.0017)	0.0009 (0.0016)	-0.0180*** (0.0037)	-0.0208*** (0.0036)
Liberty	-0.0326*** (0.0025)	-0.0419*** (0.0025)	-0.0358*** (0.0052)	-0.0228*** (0.0049)
Ideal	0.0137*** (0.0020)	0.0072*** (0.0018)	0.0128*** (0.0038)	0.0072* (0.0037)
Harmony	-0.0081*** (0.0020)	0.0091*** (0.0019)	-0.0440*** (0.0040)	-0.0330*** (0.0041)
Excitement	0.0200*** (0.0021)	0.0319*** (0.0020)	-0.0103*** (0.0036)	-0.0077** (0.0035)
Curiosity	0.0350*** (0.0020)	0.0352*** (0.0018)	0.0378*** (0.0033)	0.0266*** (0.0032)
Closeness	0.0391*** (0.0024)	0.0228*** (0.0021)	0.0156*** (0.0042)	0.0068* (0.0040)
Challenge	-0.0026 (0.0020)	0.0003 (0.0018)	0.0201*** (0.0041)	0.0161*** (0.0039)
Industry FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R ²	0.974	0.979	0.489	0.526
Obs.	10483	10422	3995	3983

Description: This table reports the results of regressing firm policy variables on consumer needs. This alternative specification was produced by IBM Watson Personality Insights as a side product. We do not go into details here, as the interpretation of these results is not the main focus of this study.

The firm policy variables were computed based on annual balance sheets, annual income statements and annual cashflow statements. The two financial ratios were computed as follows: Book-to-Market = $\frac{\text{Book value per share}}{\text{Total Equity} / \text{Total shares outstanding on filing date}}$, R&D Intensity = $\frac{\text{R\&D Expenses}}{\text{Revenues}}$. All financial ratios are winsorized at the 5th and 95th percentile. The scores for consumer needs correspond to the median scores computed based on quarterly earnings call transcripts of the same year as the financial ratio. At least two consumer need scores are required for each year to compute the median score. The consumer need scores were encoded with numbers from 1 to 4, where 1 represents the bottom quartile and 4 the top quartile. Industry fixed effects are based on 9 industry categories provided by [SeekingAlpha.com](https://seekingalpha.com). The values in parentheses denote the robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.