Economic Cycles and Value Investing

Master Thesis

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Table of Contents

Table of Figures

Table of Tables

Executive Summary

I. Area of Research

The focus of this master thesis lies on the field of value investing in the context of a country's business cycle. Value investing has been a popular area of research in the past and also in the present due to the phenomenon called the value premium. The value premium was first identified by Fama and French (1992) and refers to the outperformance of value stocks over growth stocks. Different studies have shown that value-investing portfolios historically achieve higher risk-adjusted returns than growth-investing portfolios. The spread between value and growth portfolio returns add up to several percentage points annually. Most of these studies focus on the stock markets in the United States; however, there are also several academic papers that investigate the value premium in an international context. For instance, Fama and French (1998) showed that the value premium also persists on an international level. The researchers found that value stocks outperform growth stocks in twelve out of thirteen countries by an average return difference of 7.68 percent per year. Therefore, the overall consensus within academic research is that on average value investment strategies outperform growth investing strategies (Chan and Lakonishok (2004)). However, questions regarding the compatibility of the value premium with standard models of finance, such as the capital asset pricing model, and lack of explanations for the existence of the value premium proved to be the main focus of academic research in the last few years. While some researchers suggest the value outperformance is due to behavioral biases from investors, other researchers believe that value stocks are riskier and therefore, require a higher risk premium. Consequently, there is still disagreement within academia regarding the value premium, which makes value investing a relevant topic today.

The goal of this thesis is to look at this investment style from the point of view of business cycles – an area that has not been extensively researched yet. There are few studies that examined the performance of value investing in the context of the business cycle, and most of them are solely focused on the U.S. market. Nevertheless, economic cycles are a highly important topic since they are inherent to a country's economic development. As a result, business cycles are constantly influencing the well-being of an economy, which undoubtedly has an impact on the stock markets. It is also a fact that different economies vary in their economic conditions. Hence, countries around the world are at different stages in the business cycle at the same time. One generally differentiates between four characterizing stages of the business cycle – recovery, expansion, slowdown, and downturn. As a result, insights about the dependencies and interconnections between the business cycle and value portfolio returns could be of great benefit for value investors that are active on a global level.

The lack of research in this area of value investing as well as the ambiguity towards the question of how business cycles relate to stock markets makes this a highly relevant topic. By examining the value premium in an international context and in relation to the business cycle, this master thesis wants to fill this gap in academic research. Furthermore, findings to the question of how economic cycles influence value stock returns could provide essential advantages for investors and portfolio managers.

II. Objective of Thesis

The main goal of this thesis is to investigate value and growth investing and their relationship to business cycles in a global context. To achieve that objective, the thesis is first going to discuss relevant previous research in the field of value investing. Theoretical results concerning the value premium and business cycles are going to be discussed and summarized to achieve an up-to-date overview of the topic. The objective of this theory section is to provide a theoretical foundation for this thesis' own research. Subsequently, the main part of the thesis is dedicated to finding new insights regarding value investing and the business cycle. By performing quantitative analysis, the researcher wants to create a better understanding of the interdependencies between business cycles and returns of value portfolios. There are three main areas that are analyzed in this thesis.

First, the focus lies on evaluating the performance of value strategies versus growth strategies in a multitude of countries. The researcher analyses the performance of different value and growth portfolios over a 40 year time period for a sample of nineteen countries. The results aim to provide additional and updated evidence for the existence of the value premium in a global context. The performance spread is measured in annual mean returns and by applying the risk-adjusted return measure of the Sharpe ratio. Furthermore, the performance of value and growth is also evaluated in relation to the capital asset pricing model. Since the latest data is used, the findings of this analysis include recent events that had a huge impact on stock markets and economies worldwide, such as the financial crisis of 2008.

Second, going a step further, the thesis seeks to understand how the performance of value and growth portfolios differ throughout the business cycle. In a large-scale study that includes the same time period and number of countries as in the first step, the researcher aims to find the average returns of different value and growth investing portfolios for the different phases of the business cycle. This analysis follows the approach of Kwag and Whi (2006) who performed a similar study for the U.S. market. The findings aim to show distinctive differences in the performance of value and growth portfolios for all four stages of the business cycle.

Third, the thesis wants to identify quantifiable relationships between changes in economic indicators and value investing returns. Because not every country is at the same stage in the business cycle, certain countries exhibit more favorable conditions for value investing than others at given times. As a result, the correlations between economic variables and value returns are going to be used to investigate the outcome of an active strategy of overweighting- and underweighting of country's value portfolios within a global portfolio to take advantage of differences in business cycles. The outcome of this final analysis hopes to answer the question of if economic business cycle data can be used to a value investors advantage.

III. Research Method

The thesis is split into seven chapters and each chapter examines a different area. Chapters one and two provide an introduction into the topic of value investing and discuss the theoretical foundations of value investing and business cycles research. These two chapters mark the theory section and are based on some of the famous research papers in the field of value investing including the contributions of Fama and French (1992, 1993, 1995, 1998, 2007), Lakonishok, Shleifer and Vishny (1994), and Zhang (2005). Chapter 3 presents the data used in the analysis. The thesis includes time-series return data for value and growth portfolios of nineteen countries for the time period of 1975 until 2014. The examined countries are all part of the EAFE-region plus the United States and Canada. Value and growth portfolios are formed according to four popular sorting methods that use ratios of fundamentals-to-price. These sorting methods are the book-to-market, earnings-to-price, cash flow-to-price, and dividend-to-price ratios. The pre-constructed portfolio returns are obtained from the Kenneth R. French database. In addition, the analysis requires a set of economic indicators that are connected to the business cycle. Hence, the thesis uses numerous economic variables, including a country-specific composite leading indicator (CLI), a business confidence indicator (BCI), a consumer confidence indicator (CCI), the gross domestic product growth (GDP), and industrial production growth to predict value returns. The time-series data for the economic indicators are provided by the OECD.

Chapter four presents the methodology, which is going to be applied in chapter five where the analysis is performed. By applying statistical methods, the researcher evaluates the performance of value and growth portfolios in different stages of the business cycles. The significance of the results are evaluated by means of t-tests. Furthermore, an essential part of the analysis is based on regression analysis performed to find correlations between the economic indicators and value returns. Lastly, a return prediction-model is used to make portfolio-weighting decisions for the global value portfolio. This global active value portfolio tries to outperform a global balanced value portfolio by actively reassigning country-portfolio weights every month. The entire analysis was performed in Microsoft Excel. Finally, the goals of chapter six and seven are to present and summarize the obtained findings of the thesis and to create a link to results of previous academic research.

Apart from the theoretical basics presented in the beginning, a substantial part of the thesis is concerned with a quantitative analysis of value investing in the light of business cycles. As a result, the content of the thesis includes several tables and graphs that illustrate the research procedure and summarize key results.

IV. Results

The outcomes of this thesis' analysis cannot refute the initial guiding hypothesis, which states the following: *Value strategies tend to outperform growth strategies throughout all phases of the business cycle. Furthermore, a country's economic condition and stage in the business cycle has a direct influence on the performance of the value investing portfolio in that country. Since different countries are located at different stages of the business cycle, one can increase the performance of a global value portfolio by over-and underweighting the different country-value-portfolios.* Even more, the obtained results provide strong evidence that the propositions made in the hypothesis are true. As a result, several key findings were discovered by the analysis performed in this thesis. The results are summarized in the same order as the aforementioned objectives.

First, the positive difference in mean returns between value and growth portfolios, specified by four different sorting-ratios, occurs in sixteen of the nineteen countries that were analyzed. The only countries that did not show a distinctive value premium over the research period were Finland, Italy, and New Zealand. Nevertheless, most countries showed a clear outperformance of value portfolios with an average annual value premium of three to four percentage points compared to growth portfolios. Consequently, the value premium persists when a global balanced value portfolio is formed from the individual country portfolios. In addition, international value portfolios also outperform international growth portfolios by applying a risk-adjusted measure of return – the Sharpe ratio. The average Sharpe ratio of all country's value portfolios in the sample ranges from 0.38 to 0.43, while the comparable growth portfolios achieve ratios between 0.27 and 0.31. Furthermore, when comparing the different portfolios to the overall market by means of a CAPM-analysis, the thesis finds significant positive alphas for value portfolios in the majority of countries. In contrast, growth portfolios often show negative alphas. In conclusion, the thesis finds updated evidence that the value premium is a global phenomenon and occurs in a wide range of countries.

Second, an additional analysis shows that value portfolios outperform growth portfolios with respect to mean return and risk-adjusted return in the majority of researched countries throughout all stages of the business cycle. Therefore, on average, value portfolios perform better than growth portfolios in all four phases of the economic cycle, which indicates that the value premium is robust towards all economic conditions. Striking differences in the returns and Sharpe-ratios between the four economic stages – slowdown, downturn, recovery, and expansion – indicate that the performance of value and growth portfolios is influenced to a great degree by changes in the business cycle. The recovery and expansion phase show the absolute highest risk-adjusted returns for both investing styles, while the slowdown and downturn stages naturally exhibit low or negative returns that are also reflected in low Sharpe ratios. However, the relative advantage of value investing is the biggest in the recovery phase (for both B/M and CE/P sorting). The difference in the average annualized returns of the recovery phase are as high as 8 (B/M) to 9.8 (CE/P) percentage points. In contrast downturn, expansion, and slowdown only show differences of 0.35 to 4.4 percentage points between value and growth. Nevertheless, the relative advantage of value versus growth is the second most distinctive in the slowdown (B/M) or the downturn (CE/P) period.

It is also advantageous to be invested in value stocks during these phases, because value portfolios often manage to still achieve positive mean returns, while growth stocks suffer losses. Thus, value portfolios seem to do better in economic bad times, where the price of risk is high. To sum up, the value premium persists throughout the business cycle. While value and growth portfolios perform equally well during expansion phases, the relative advantage of value is the most distinguished during economic bad times and the following recovery phase, where value portfolios achieve better risk-adjusted returns than growth portfolios.

Third, a regression model was created that includes several economic indicators as the explanatory variables, which are to describe and predict the business cycle, and the value returns as the dependent variable. The outcome of the multiple regression analysis provides a set of country-specific correlations between economic indicators and value returns. Qualitative economic indicators – specifically the CLI and the CCI – proved to be the most significant indicators in predicting value returns. These indicators, which are designed to capture the mood and confidence of consumers and businesses within a country regarding the economic situation, showed significant relationships to value returns in a majority of countries. Surprisingly, classical measures of the business cycle such as GDP and industrial production did not prove to be helpful in predicting value returns. Finally, the results of the regression analysis were used together with economic data to predict future value returns. Subsequently, the country-weights of a global value portfolio were adjusted according to the respective predicted value-returns. This actively-managed global value portfolio generated a higher performance on an absolute and risk-adjusted scale than a global balanced value portfolio. The global active value portfolios managed to outperform the global balanced value portfolios very distinctively by an up to 8 percentage points difference in annual returns for the in-sample-, and an up to 6.7 percentage points difference for the out-of-sample analysis. The analysis was also performed with a time lag of one, three, six, and twelve months. Even though the relative outperformance relative to the balanced portfolio decreased after a time-lag was introduced, the active value portfolios still outperformed the balanced value portfolio in all cases.

In conclusion, it was shown that the outcomes an active strategy of overweighting- and underweighting of countries to take advantage of differences in business cycles is profitable in in-sample as well as out-of-sample tests. The created global active value portfolios generated higher returns than the balanced global value portfolio, while also reducing the risk and increasing the number of months with positive returns. Since the portfolios that incorporated a time-lag also provide positive results, the outcomes of this thesis are not only valuable from an academic-, but also from a practical point of view. Consequently, the main goal of this thesis was achieved successfully and further insights into the relationship of value investing and economic business cycles were discovered.

1. Introduction

Value investing, an investing strategy focused on buying undervalued stocks, is one of the most fascinating topics in the world of finance. Several studies and individual examples show that in the long-term, value investing is performing better than growth investing strategies and the market overall. Famous proponents of value investing such as Warren Buffet and Benjamin Graham, who both accumulated a vast amount of wealth and count towards the most successful investors of all time, made the value investing philosophy more popular with the public. The example of Berkshire Hathaway, the company managed by Warren Buffet, demonstrates the enormous potential of the value investing approach. Since the present management took over Berkshire Hathaway in 1965, the company increased its per-share book value at an astonishing rate of 19.45% compounded annually. Moreover, the per-share market value grew at 21.6% annually, compared to an annual growth of 9.9% of the S&P 500. As a result, Warren Buffet managed to beat the market not only in terms of annual returns, but he also outperformed the market in 39 out of 50 years (Berkshire Hathaway (2015)). It is also remarkable that value investing proved to be successful in times when the markets and the economy were performing badly. For instance, Warren Buffet's value investments during the financial crisis in 2008 yielded a payoff of $10 billion five years later, which corresponds to a return of almost 40% (Das (2013)). Despite its indisputable success, the explanations within academic research concerning why value investing performs better than growth investing differ greatly. Some researchers suggest the value outperformance is due to behavioral biases from investors, while others suggest that value stocks are riskier and therefore require a higher risk premium. For that reason, value investing is still a highly debated topic even today.

As shown by the financial crisis in 2008, stock markets are tightly related to underlying economic movements and the business cycle of countries. A country's economic development and stock market performance depends on the stage of the business cycle of that country. One often separates the business cycle into four different stages - recovery, expansion, slowdown, and downturn. The Warren Buffet example showed that value investing seems to be able to not only perform well in economic good times, but also profit from market downturns, which enables value investors to buy "cheaper" stocks of undervalued companies. The relationship of value investing to recessions and expansion periods is also represented in the following famous quote of Warren Buffet: "*Be fearful when others are greedy, and be greedy when others are fearful*" (Buffet (2008, p. 33)). However, there are also other views, which state that value investing performs worse than growth investing during recessions. For instance, the Wall Street Journal writes that "contrary to popular belief, value strategies often do poorly during recessions, especially relative to growth strategies" (Gongloff (2009)). Despite the fact that business cycles are inherent to economic growth and are of big importance for businesses and investors alike, there is only little academic research available regarding business cycles and value investing. Hence, this master thesis wants to attempt to fill this void by looking at the value investing style from the dynamic point of view of business cycles. The ongoing academic debate about the value premium plus the presented gap in research, makes value investing and business cycles a highly relevant topic.

Business cycles are subject to a specific country and are determined by many underlying factors of economic development. Since every country varies by its economic conditions, different economies follow their unique business cycle and are at different stages within that cycle. Therefore, to get an accurate and extensive picture of how value investing and business cycles are connected, one needs to look at a sample of multiple countries. As a result, this thesis is going to investigate value and growth investing and their relationship to business cycles in a global context. The main focus lies on evaluating the performance of value strategies in context of the business cycle in a multitude of countries, finding relationships between economic indicators and value investing performance, and answering the question if value investors can take advantage of business cycles in a global investment portfolio.

To answer the different research questions of this thesis, I state the following hypothesis that is going to guide my analysis: *Value strategies tend to outperform growth strategies throughout all phases of the business cycle. Furthermore, a country's economic condition and stage in the business cycle has a direct influence on the performance of the value investing portfolio in that country. Since different countries are located at different stages of the business cycle, one can increase the performance of a global value portfolio by over-and underweighting the different country-value-portfolios.*

The hypothesis will be evaluated at the end of the thesis. Subsequently, I am going to present the structure of this thesis and describe how I will proceed to answer the research questions. First, I am going to introduce the theoretical basis of academic research in the field of value investing. This chapter is mainly concerned with giving deeper insights into value investing, showing evidence for the value premium from previous studies, and pointing out different explanations for the existence of the value premium. In addition, this chapter will also provide a theoretical discussion regarding business cycles and how they relate to stock market investments, specifically value investments.

Second, the data section will introduce the data sample that is going to be used for the later analysis. The data consists of stock market return data for value and growth portfolios for a sample of 19 countries, plus a variety of country-specific economic indicators that are related to the business cycle. For instance, this includes GDP data and a country-specific leading economic indicator provided by the OECD. In addition, this section will already contain a discussion of descriptive statistics of the data. Specifically, I am going to inquire if the value premium also exists in an international context.

Third, I am going to present a detailed outline of the methodology that will be used in the analysis part. This includes explanations regarding the variable selection, the model set-up, and the regression analysis.

Fourth, the data analysis to answer the research questions is going to be performed in this chapter. I will mainly focus on evaluating the performance of growth- and value-strategies during the four stages of the business cycle for the 19 countries in the sample, as well as investigating the relationship and correlations between economic indicator variables and value returns. These results will be used to construct an actively managed global value portfolio, which rebalances its country weights on a monthly basis.

Fifth, I am going to provide a summary and a discussion of the analytical results. The outcomes of this thesis will be compared to previous studies and their results. I will also address the limitations of the thesis and some of the assumptions that were made. Finally, the research questions will be answered and the outcomes of my analysis will help to validate my initial hypothesis.

The last chapter includes a conclusion of the main results of this master thesis. The findings of my research will be looked at in the context of other academic research in value investing. Lastly, I am going to address some unanswered issues that could be potential topics for additional research in the future.

Regarding the methodology, this thesis uses a wide number of academic papers and studies that are concerned with value investing and business cycles. Many of these papers count as standard reference work for the area of value investing. An essential part of the thesis is made up of quantitative analysis performed by the author. The analysis uses reliable data from trusted databases and is completely performed in Microsoft Excel. Statistical methods that are used include t-tests, regression analysis, and a return prediction-model that is used to make portfolio-weighting decisions. The statistical analysis is limited to the return data and the economic indicators for the 19 countries selected.

2. Theory of Value Investing and Business Cycles

The focus of this chapter is to give an overview on the theoretical foundations of value investing, as well as to provide an introduction to business cycles and how they relate to stock markets. The upcoming chapter 2.1 is completely devoted to the topic of value investing and the famous value premium. A short introduction to the historical background of value investing is given and the most important results of academic research in the field of value investing are explained.

2.1. Value Investing and the Value Premium

The first section of this theoretical part gives an introduction into the history of value investing and presents some famous value investors.

2.1.1. Historic Background of Value Investing

The concept of value investing was first developed by the two finance professors Benjamin Graham and David Dodd at Columbia Business School in the 1920s. The professors are the authors of two books that set the cornerstone for the value-investing approach and influenced many investors and their investing philosophy. These books are called "Security Analysis" and "The Intelligent Investor". In the early 20th century, many investing decisions were based on speculation and insider information. It was not until Graham and Dodd, who were the first to develop a method to base investment decisions on a rational basis, that a new way of investing was created. They believed that the true value of a stock could be determined through research. They also promoted defensive investments, which are investments that can be acquired below their book value (Columbia Business School (2015)). Benjamin Graham promoted a number of different investing principles, which can be summarized in the following three recommendations.

First, he recommends to always invest with a margin of safety. The margin of safety is defined as buying a stock that is undervalued, i.e. at a significant discount to its intrinsic value. This principle does not only provide high-return opportunities, but it also minimizes the downside risk of an investment. Second, Graham advocates to expect volatility and to profit from it. He shows that stocks are a volatile investment and they suffer from potentially big movements in asset prices. Hence, he proposes to use the mood swings of the market to the investor's advantage and use economic downturns to find great undervalued investments. Third, he states the importance of knowing what type of investor someone is. He distinguishes between two types of investors – active and passive. On one hand, the active investor-type requires a lot of work and research to find suitable undervalued investments. On the other hand, the passive investor-type is content with simply "owning" the market, i.e. investing in a market index (Myers (2015)).

Value investing has since gained a lot of attention, because investors following the value investing philosophy were able to generate extraordinarily high returns. Besides Graham, some of the world's most successful investors, such as Warren Buffet or Seth Klarman, follow the value investing approach. As previously mentioned, Warren Buffet managed to achieve a compounded annual gain of 21.6% on the market value of his investment company – Berkshire Hathaway – for the whole period of 1965 to 2014. In comparison, the S&P 500 (including dividends) managed to

generate a compound annual gain of 9.9% over the same time period (Berkshire Hathaway (2015)).

The abnormally high returns of value investments naturally caught the interest of academic researchers in the field of finance. Value stocks are often compared to growth stocks, which are companies whose earnings are expected to grow at an above-average rate. Researchers were first interested in proving that there are extraordinary returns for value stocks; second, they wanted to find explanations regarding the question why this value premium exists. Furthermore, popular models that explain expected returns of securities, such as the CAPM, fail to completely explain the cross-section of average stock returns. Consequently, the phenomenon of the higher returns of value stocks is not accounted for in the CAPM, which led researchers to come up with newer models that took value returns into consideration. The most famous model is the three-factor-model designed by Eugene Fama and Kenneth French.

The next chapter is going to present results from previous research regarding the value premium, and it will introduce the three-factor model.

2.1.2. The Value Premium and the Three-Factor-Model

Academic interest in value-and growth investing surged after the release of the famous academic papers of Fama and French (1992) and Lakonishok, Shleifer and Vishny (1994), which examined the value premium in a study of the U.S. stock market. However, their work is also based on earlier studies that covered stock market anomalies. For example, it was already shown by Basu (1977) that stock portfolios with high earnings-to-price (E/P) ratios tend to have higher average returns than portfolios with low E/P-ratios. As will be shown in the next chapter, high E/P-portfolios are considered value investments, while low E/P-portfolios are regarded as growth investments. In another study, Chan, Hamao and Lakonishok (1991) investigated the Japanese market and showed that over the course of 1971 to 1988, high book-to-market equity (B/M) investing strategies had a significant positive impact on expected returns. Thus, all these different studies have shown that growth stocks earn lower average returns than value stocks. This type of "value premium" is characterized as a high spread in expected return between value and growth strategies, even though their spread in unconditional market beta is low (Zhang (2005)). The academic community has largely come to an agreement that on average, value investment strategies outperform growth investment strategies (Chan and Lakonishok (2004)). Consecutively, I am going to briefly introduce the two aforementioned studies that quantify the value premium.

First, in their famous paper - "The Cross-Section of Expected Stock Returns" - Fama and French (1992) compare different portfolios that were formed on size and book-to-market equity. High B/M-portfolios are generally seen as value portfolios, while low B/M-portfolios are regarded as growth portfolios. This initial comparison that was conducted on the U.S. stock market for data between 1963 and 1990, yielded that returns typically increase strongly with B/M. The average monthly return of the highest B/M-decile portfolio (value) amounts to 1.63%, whereas the lowest B/M-decile portfolio (growth) returns 0.64%. This results in a difference in returns of 0.99% per month between value and growth investing. Simultaneously, systematic risk does not seem to be

responsible for the difference in return, since the market betas of the portfolios are of similar size (Fama and French (1992)).

Second, Chan and Lakonishok (2004) provide updated evidence on growth versus value investing by analyzing U.S. data from 1979 to 2002. They performed a separate study for large-cap and small-cap firms. The value premium amounts to 10.4 percentage points difference in returns for the large-cap portfolios, and to 18.8 percentage points difference for the small-cap portfolios. Additionally, they showed that the value-growth spread was positive in 70 percent, respectively 76 percent of all months.

Next, I am summarizing the results of the above-mentioned three-factor-model. The fundamentals for the three-factor model were developed by Fama and French (1992). As explained before, several empirical findings contradict the traditional CAPM-model. Hence, the beta (β) of the CAPM does not seem to help explain the cross-section of average stock returns. These findings include the size effect, the positive relation between leverage and average return, and the just mentioned value premium based on B/M- and E/P-sorting. Hence, in the CAPM average returns on value stocks are too high given their beta estimates, and vice versa for growth stocks. As a result, the final three-factor model expands on the CAPM so that it adds a size and a value factor, in addition to the traditional market risk factor (beta). These three factors adjusts the model for the outperformance tendency of value- and small stocks. It also seems that the roles of leverage and E/P in average stock returns are absorbed by the combination of the size and B/M-effect (Fama and French (1992)). According to Fama and French (1993), the three-factor-model can be formally written out as follows:

$$r = R_f + \beta_3 (K_m - R_f) + b_s \times SMB + b_v \times HML + \alpha \text{ ,where:} \quad (1)$$

r is the expected return of the portfolio, R_f is the risk-free-rate, K_m is the return of the market portfolio, β_3 is analogous to the traditional beta, SMB stands for "**S**mall (market capitalization) **M**inus **B**ig", and HML stands for "**H**igh (book-to-market-ratio) **M**inus **L**ow". The b_s and b_v coefficients can be estimated by linear regression after SMB and HML are defined.

To sum up, the three-factor-model is an important result to describe stock returns in regards to value investing. Fama and French (1992) also state that size and B/M must proxy for risk, if asset pricing is rational, to explain the value premium. However, there is disagreement in academic research about the underlying reasons for this value premium. These different explanations will be discussed shortly. Before I get to that, the next chapter provides an overview of the different sorting-ratios for value and growth.

2.1.3. Value- and Growth Sorting-Ratios

As discussed before, Fama and French (1992) found that size and book-to market equity capture the cross-sectional variation in average stock returns. They observed that stocks with a high B/M-ratio tend to do better than the market overall. The B/M ratio is a financial ratio that compares a firm's book value to its current market value. Firms with a high B/M are customarily called value stocks, contrasted with low B/M firms that are called growth stocks. Low B/M are typically companies with high average returns on capital, whereas high B/M is typical of firms that are relatively

distressed and have low earnings on book equity (Fama and French (1995)). The B/M ratio established itself as a prominent sorting method to classify value and growth stocks in academic research. It is widely used in the field of value investing by researchers such as Fama and French (1992), Lakonishok, Shleifer and Vishny (1994), Zhang (2005), and Lettau and Wachter (2007) to form value and growth portfolios.

Although the B/M is the most popular indicator of value and growth orientation of a portfolio, it is by no means a perfect measure. Chan and Lakonishok (2004) use the market conditions from the middle of 2002 to give the following demonstration: "…a stock such as AOL-Time Warner would generally be classified as a "cheap" stock in terms of the book-to-market ratio. By many other yardsticks, such as earnings or dividends relative to price, however, the stock would look less attractive from the value standpoint. This disparity suggests that other measures might also serve as the bases for investment strategies" (p. 72). As a result, three additional sorting ratios are used in academic research and in this thesis. These ratios are earnings-to-price (E/P), cash earnings-to-price (CE/P), and dividend yield-to-price (D/P).

The E/P-figure includes the ratio of a stock's earnings before interest and taxes (EBIT) to its price, or sometimes as well the ratio of a stock's earnings before interest, taxes, depreciation, and amortization (EBITDA) to its price (Graham and Dodd (2008)). In essence, the E/P-ratio tells an investor how many dollars of a company's earnings you receive for one dollar invested. Stocks with low E/P's includes not only stocks that are expected to be growth stocks, e.g. have higher expected earnings in the future, but also stocks that have high prices but are in temporary trouble concerning their earnings. In contrast, companies with a high E/P-ratio might be undervalued or the company has exceptionally high earnings compared to its past results (Chan and Lakonishok (2004)).

The CE/P-ratio uses the cash flow of a company and divides it by its market price. Chan, Hamao, and Lakonishok (1991) were some of the first to show that a high ratio of cash flow to price also predicts higher returns. A high CE/P-ratio may indicate that a firm is undervalued, hence these kind of stocks are often regarded as value stocks, whereas low CE/P stocks are classified as growth stocks. Furthermore, Chan and Lakonishok (2004) state that an investment strategy using the CE/P-ratio generates relatively larger return spreads than portfolios formed on the B/M-ratio.

This leaves the D/P-ratio, which is a ratio that describes how much a company pays out in dividends each year relative to the company's share price. The D/P ratio was prominently used by Fama and French (1988) to forecast returns on the value- and equal-weighted portfolios of the NYSE. Dividend yields were able to explain more than 25% of the variances of two- to four-year returns. A high D/P-ratio is used to sort for value stocks since value stocks pay out more dividends than growth stocks and have lower market prices. Smith and Watts (1992) showed that firms with more growth options have lower leverage and lower dividend yields. In contrast, firms with high B/M (value firms) are more likely to pay out dividends. Therefore, D/P is another ratio used to distinguish between value and growth stocks.

This part gave an overview of the different sorting methods used in academic research to distinguish between value and growth portfolios. The next chapter will further investigate the topic of value investing and specifically focus on the debate concerning the different explanations for the value premium.

2.1.4. Explanations for the Existence of the Value Premium

The previous section showed that there is overwhelming evidence supporting the existence of the value premium. For this reason, most academic research currently focuses on the reasons for the superior performance of value stocks: Two different views have emerged that propose different explanations for the value premium. The rationalist view consists of proponents of efficient markets, such as Fama and French (1992, 1993, 1998) and Zhang (2005), who state that the value premium exists because value stocks bear more risk. The other view is called the irrational view, which is represented by researchers such as Lakonishok, Shleifer and Vishny (1994) and Chan and Lakonishok (2004). They argue against market efficiency and rational pricing, but instead propose that systematic errors made by investors and agency problems faced by institutional investors prevent the value premium from disappearing (Athanassakos (2009)). In the following section, I am going to discuss these two contradicting views.

As mentioned before, the rationalist view generally explains the value premium by the excess risk that value stocks face because of their higher cost of capital and greater business risk. Fama and French (1995) state that "if stocks are priced rationally, systematic differences in average returns are due to differences in risk. Thus, with rational pricing, size (ME, stock price times shares outstanding) and BE/ME must proxy for sensitivity to common risk factors in returns" (p. 131). They also find that B/M is related to persistent properties of earnings. As a result, high B/M (value) stocks are equivalent to low earnings on book equity. This is confirmed in their study, which showed that value stocks are less profitable than growth stocks for four years before and a minimum of five years after portfolio formation. Fama and French (1995) conclude that high B/M-firms are typically relatively distressed and face bigger business risk than low B/M-firms. This is confirmed by Xing and Zhang (2005) who show that "growth firms have on average higher growth rates of earnings, net income, dividends, sales, and investment than value firms". Consistent with Fama and French (1995), they also find that the profitability of growth firms is on average 24%, which is much higher compared to value firms that show a profitability of only 8%. Furthermore, growth firms invest faster than value firms (Xing and Zhang (2005)). In addition, Fama and French (2007) mention that value companies don't invest a lot of capital in their own company, which results in low- to negative growth in book equity. Instead, they are more likely to restructure their business and try to increase profitability. On the other hand, growth firms invest heavily into their business, which shows in high growth rates of book equity. To sum up, according to the rational view, growth firms exhibit properties such as high average returns on capital and sustained strong profitability around portfolio formation, which makes them less risky than value stocks. In contrast, the value premium is a compensation for the risk of value stocks that is not captured by the CAPM.

Zhang (2005) adds another explanation why value stocks are riskier than growth stocks. He distinguishes between value and growth stocks as follows: Due to the high book-to-market ratio, value stocks already own a lot of assets that they use to run their business and to create market value. In contrast, growth stocks are expanding businesses that invest heavily into their future growth. These growth opportunities are what mainly determines the market value of growth firms. Zhang (2005) provides evidence in his paper, that costly reversibility and countercyclical price of risk cause assets in place to be harder to reduce. Costly reversibility represents the fact that firms

face higher costs in cutting capital than in expanding capital. Since value firms are burdened with more unproductive capital in economic bad times, they are forced to reduce their capital, which comes at high costs. This dilemma is summarized by the term - countercyclical price of risk - , which means that in bad times the price of risk is the highest. As a result, the value premium is a compensation for the fact that value stocks are riskier than growth stocks, especially in bad times when the price of risk is high.

After the rationalist view was just discussed in detail, the irrational view will be presented in the following paragraph. Advocates of the irrational view argue that the value premium is due to investor irrationality rather than a compensation for higher risk. Lakonishok, Shleifer and Vishny (1994) find that the growth rates of earnings of high- and low-B/M stocks become more similar in the years after portfolio formation. They represent the opinion that the market does not understand this convergence of earnings growth. Hence, they argue that the market extrapolates the small pre-formation earnings growth of high B/M-stocks and the strong earnings growth of low B/M-stocks. "Low-BE/ME stocks then have low average returns because future earnings growth is weaker than the market expects, and high-BE/ME stocks have high average returns because earnings growth is stronger than expected. In short, LSV hypothesize that the higher average returns of high-book-to-market stocks simply correct irrational pricing" (Fama and French (1995, p. 142)).

In essence, they argue that size and B/M-equity effects are due to investor overreaction. Hence, they are not a compensation for higher risk bearing. In their opinion, investors systematically overreact to recent corporate news and unrealistically expect high or low growth to carry over into the future. As a result, value stocks are underpriced and growth stocks are overpriced. The difference in valuation ratios can be regarded as proxies for these errors regarding investor expectation. Thus, value investing does nothing more than to exploit the suboptimal behavior of market participants. Subsequently, value investing is not fundamentally riskier than growth investing (Lakonishok, Shleifer and Vishny (1994)).

Lettau and Wachter (2007) propose a similar view. They point out that value stocks are not necessarily riskier than growth stocks in the traditional sense. They write the following: "Value stocks have large positive alphas relative to the CAPM, while growth stocks have negative alphas. Moreover, value stocks do not have higher standard deviations or higher betas than growth stocks. Thus any story that explains the value premium needs to take into account the fact that value stocks do not appear to be riskier than growth stocks according to traditional measures of risk. These empirical results not only hold when value is defined by the book-to-market ratio, they hold when value is defined according to the earnings-to-price or cash-flow-to-price ratios" (Lettau and Wachter (2007, p. 7). However, they still favor a risk-based explanation for the value puzzle. They differentiate between firms whose cash flows are weighted more to the future – growth stocks – and firms whose cash flows are weighted more to the present – value stocks. Their proposed resolution states that the performance of short-horizon equity, such as value stocks, varies more with fluctuations in cash flows, which is the kind of fluctuation that investors fear the most. On the other hand, the performance of long-horizon equity, i.e. growth stocks, varies mainly with fluctuations in discount rates. According to the researchers, discount rates are independent of cash flows and investors do not fear changes in discount rates in regard to growth stocks. In conclusion,

Lettau and Wachter (2007) agree that value stocks are not riskier than growth stocks by traditional measures of risk. However, they are perceived as riskier by investors because of their different characteristics regarding cash flows.

In conclusion, both views have convincing arguments and it seems that it is difficult to find a conclusive answer for the existence of the value premium. This chapter provided an overview of the debate regarding the value premium, highlighted several explanations, and illustrated that there is still disagreement within academic research. However, I will leave it at that and focus now on the topic of business cycles.

2.2. Theoretical Foundations of Business Cycles

This chapter presents an introduction to business cycles and how they relate to stock market returns. Generally, business cycles are seen as the short-term fluctuations in aggregate economic activity around its long-term growth path (Berkeley (2015)). Typically, one distinguishes between four different phases of the business cycle. Several names for the four phases exist, such as expansion, peak, contraction, and trough. However, in this thesis I am going to use these four analogical terms: *Recovery, Expansion, Slowdown, and Downturn.* Business cycles are often measured by fluctuations in macroeconomic variables, such as gross domestic product (GDP). Burns and Mitchell (1946) wrote in a famous publication for the National Bureau of Economic Research (NBER) that business cycles are cyclical components of no less than six quarters in duration. In addition, they found that U.S. business cycles typically last fewer than 32 quarters (eight years). The four phases repeat themselves over time, but the business cycle does not follow a regular or predictable cycle. Since business cycles are influenced by innumerable factors that shape economic productivity of an economy, they are almost impossible to predict (Burns and Mitchell (1946)). It should also be noted that business cycles should not be confused with seasonality of business, which are two completely different concepts.

I am now quickly introducing the four different phases of the business cycle. The *recovery*-phase starts when an economy "troughs" out and starts to get better. It is normally characterized by increasing growth levels, decreasing unemployment, and rising prices.

The *expansion*-period shows a period of sustained economic growth that comes with increased consumer confidence. Favorable consumer confidence paired with low unemployment leads to high level of business activity and production. Since the economy is running at almost fully capacity during expansion and prices are increasing even more, this period is often accompanied by inflation.

The *slowdown*-stage marks the end of the expansion period. It distinguishes itself by a decrease in consumer spending, which is followed by a reduction in production by businesses.

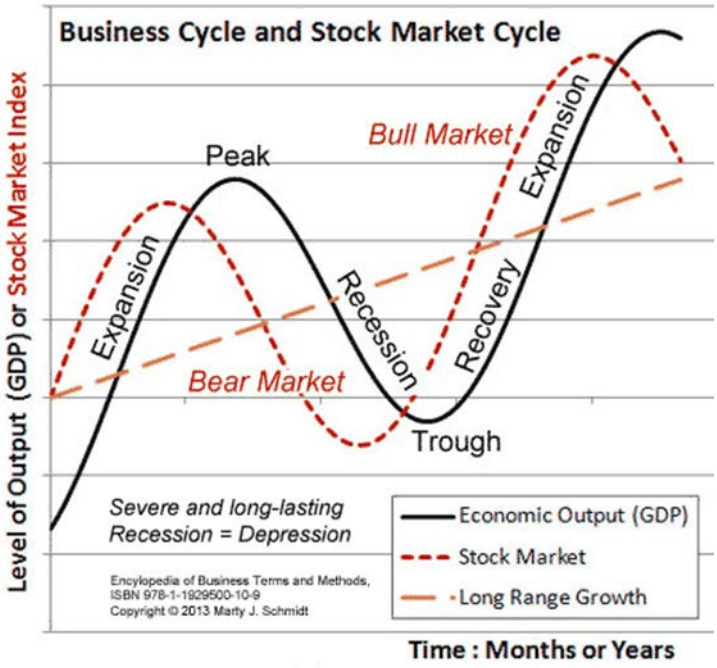
The *downturn*-phase is the fourth and final phase of the business cycle. It is characterized by reduced economic activity due to low levels of consumer spending and industrial production. Furthermore, employment is diminishing, which further increases the negative effects of this stage. From a business and consumer perspective, this is the worst stage of the business cycle. Downturn phases can also turn into recessions or even worse, into a depression.

A recession is often defined as a period of two consecutive quarters that show a decline in real GDP (Berkeley (2015)). However, the NBER (2015) defines a recession as follows: "a recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales." Other research, such as from Kose, Otrok and Whiteman (2003), provides evidence that the business cycle of a country is also influenced by macroeconomic fluctuations in other countries. As a result, next to the domestic business cycle, an international business cycle or a world business cycle also exists. This is also a property that should be kept in mind when dealing with business cycles.

Next, let's briefly regard the stock market in relation to the business cycle. There is the general notion that stock prices reflect rational anticipations of future economic events. Hence, the stock market movement is often regarded as a leading indicator to the business cycle (Schwert (1989)). In his study, Schwert (1989) also shows that stock volatility is higher on average during recessions. This fact reinforces the belief that the stock market is an important business-cycle indicator.

A graphical illustration of the interrelation between the business cycle and the stock market is shown in figure 1 below.

Figure 1: Business Cycle and Stock Market Cycle (Business Encyclopedia (2015))



The stock market is a leading indicator for the economic business cycle - according to the aforementioned studies. However, there are also other academic papers, which state that the business cycle can have an influence on the stock market and vice versa. Balvers, Cosimano and McDonald (1990) show in their empirical study that stock returns are a predictable function of aggregate output. Hence, they indicate that future stock returns can be predicted on the basis of rational forecasts of economic output. In addition, MSI Barra (2010) explains that certain supply-side models assume that GDP-growth of an economy eventually flows to the shareholders of this country's stock market. This thought process follows three steps. First, economic growth transforms

into corporate profit growth. Second, the aggregate earnings growth of the company translates into earnings-per-share-growth. Third, the higher earnings-per-share-growth translates into higher stock prices. Another study by Zhu and Zhu (2014) demonstrate a direct link between economic fundamentals and stock market return predictability in Europe. They find that a European business cycle indictor (ELEI), published by the OECD, can strongly predict European stock returns and generate utility gains. The CLI, a country-specific leading economic indicator published by the OECD, shows similar properties. Still, the ELEI seems to have higher predictive power than the CLI (Zhu and Zhu (2014)). To sum up, these results claim that economic growth and movements in the business cycle have an influence on stock market returns. Moreover, this implies that certain economic indicators could potentially be used to forecast stock market returns.

In contrast, Vu (2015) shows that the causality also works the other way around. He finds that stock market volatility strongly predicts the economic output growth of the upcoming one or two quarters. This is especially true in times of a financial crisis, but also in non-crisis periods with high stock market volatility. Vu (2015) used a sample of 27 countries that he analyzed over the course of 40 years, which makes the results also valid across countries. It seems that the performance of stock markets also has the power to influence business cycles.

The different studies, presented in this chapter, show that there is no common consensus about interdependencies between the economic business cycle and stock market returns. The analysis part of this thesis might bring additional insights into this matter. The topic of how business cycles and stock returns relate to each other will be brought up again in chapter 3.4., where I will introduce the economic indicators used in the analysis. Chapter 2.3 will present some results from previous research regarding business cycles and value investing.

2.3. Business Cycles and Value Investing

Compared to other areas of research in the field of value investing, such as the value puzzle, there is not much research that examines value investing in the light of business cycles. Business cycles and recessions are sometimes mentioned in relation to explanations for the value premium. However, there are almost no papers that specifically focus on the topic of value investing and business cycles. Nevertheless, I am going to present a current overview of the state of research regarding business cycles and value investing.

One of the only direct studies of business cycles and value investing is the paper of Kwag and Whi (2006). Their paper focuses on the U.S. stock market between 1954 and 2002 and aims to measure the performance of value investing in the context of business cycles. The top 20% of stocks with high values for the four-sorting ratios (B/M, E/P, CE/P, D/P) are selected to create the value portfolios. The selection of the growth portfolios is performed in an identical way for the bottom 20% of stocks with low values for the sorting-ratios. The value-weighted portfolio returns are analyzed by using three risk-adjusted portfolio performance measures. They include the Sharpe ratio, the Treynor ratio, and the information ratio. To account for the business cycle, the researchers use the official periods for contraction and expansion in the U.S., provided by the NBER. The researchers find that the performance of value portfolios is superior to that of growth portfolios in both stages of the business cycle. However, it seems that the relative advantage of

value is bigger during the contraction phase than during the expansion phase. The analysis shows that the mean difference between value and growth are greater during contraction. So, from an investor perspective it makes more sense to move into value stocks during an economic downturn than during an upturn. On an absolute scale, the three risk-adjusted performance measures are all performing better during an expansion period than during a phase of contraction. Since expansion periods are synonymous to a positive outlook on the economy, this result sounds reasonable (Kwag and Whi (2006)). In summary, this research has shown that the superior performance of value versus growth is robust for expansion and contraction periods of the business cycle. The relative advantage of value investing seems to be even bigger during periods of contraction.

As mentioned before, business cycles also appear in several studies that examine the value premium. For instance, when Lakonishok, Shleifer and Vishny (1994) inquire if value stocks are fundamentally riskier than growth stocks, they also "look at the frequency of superior (and inferior) performance of value strategies, as well as at their performance in bad states of the world, such as extreme down markets and economic recessions" (p. 1543). Their logic states that value stocks are only riskier than growth stocks if two conditions hold: First, value must underperform growth in some states of the world, i.e. during the complete business cycle. Second, those states of the world are on average periods of contraction and downturn, where the marginal utility of wealth is high. Their tests show that value strategies consistently did better than growth strategies over a long time-horizon. Value outperformed growth in 17 out of 22 years of their study. In addition, the researchers also examined the performance of value portfolios in extreme down markets. Since value strategies yielded better returns in the majority of recessions that Lakonishok, Shleifer and Vishny (1994) examined, the researchers conclude that value portfolios do not perform more poorly during recessions than growth portfolios. In an additional analysis, they compare the performance of value and growth-portfolios during the worst months of the stock market. The monthly returns of the research time-period are split into the four stages of the business cycle to capture the whole picture. According to their results, value portfolios performed at least as well as the growth portfolios in each of the four states and substantially better in most states of the cycle. The results showed that value does significantly better than growth especially in negative periods when the market was declining. It is also surprising that value performs better than growth in the stage where the market does the best. Value and growth yielded the most similar returns in the period with generally positive market returns, which is analogous to the recovery stage of the business cycle. Finally, Lakonishok, Shleifer and Vishny (1994) describe value stocks to have higher up-market betas and lower down-market betas than growth stocks in regard to economic conditions. Therefore,, the results of this paper match the outcomes of the study of Kwag and Whi (2006). Value portfolios seem to perform better than growth portfolios throughout the complete business cycle and do especially better in economic bad times.

The fact that the value premium is so distinct during economic bad times might be connected to the results of Zhang (2005). Even though he also argues that value is riskier than growth during down markets, he bases it on different arguments – costly reversibility and countercyclical price of risk. In economic bad times, value firms are burdened with more unproductive capital, therefore, they tend to cut more capital than growth firms. As a result, assets in place are riskier than growth options, especially during bad times when the price of risk is high. Consequently, value

firms must offer higher returns to compensate for that additional risk. This is confirmed by Chen, Petkova and Zhang (2008) who also expect the value premium to be countercyclical. Hence, the value premium is more pronounced during economic downturns than during upswings. They reach the same conclusion that value is riskier than growth in bad times, when the price of risk is high.

Xing and Zhang (2005) also find that value companies are more strongly affected by negative business cycle shocks than growth companies. The reason for that is that the fundamentals of growth firms respond mildly to negative shocks, whereas value firms often have a negative and rapid response. Additionally, value firms seem to have less real flexibility in smoothing negative aggregate shocks than growth firms. Hence, they conclude that economic fundamentals are crucial determinants of the cross section of stock returns (Xing and Zhang (2005)). In another paper, Gulen, Xing and Zhang (2011) also examine how the value premium relates to business cycles. They measure the economic conditions using short-term interest rates and default spreads. They find evidence that recessions, which come with high short-term interest rates and high default spreads, heavily affect value stocks while growth stocks are only minimally affected. In contrast, in expansion periods the expected excess returns of both value and growth portfolios have insignificant loadings on the default spread and the short-term interest rates. Due to these asymmetries between different states of the business cycle, the value premium shows strong cyclical variations. Therefore, the value premium spikes up during recessions, but declines gradually during expansion periods. The researchers also find similar time variations in the Sharpe ratio and the volatility of the value-minus-growth portfolio. Moreover, the paper finds that "value firms have higher ratios of fixed assets to total assets, higher frequency of disinvestment, higher financial leverage, and higher operating leverage than growth firms" (Gulen, Xing and Zhang (2011, p. 3)). As a result, value companies are less flexible than growth companies when they have to adjust to worsening economic conditions, which results in higher cost of equity for firms with less real flexibility (Gulen, Xing and Zhang (2011)).

To sum up, value investments seem to do better than growth investments in all four stages of the business cycle. This is especially distinctive during economic bad times, when the relative of advantage of value versus growth is the biggest. Characteristics of value firms during bad times, such as high unproductive capital, disinvestment, high leverage, and less flexibility, cause this countercyclical value premium.

This chapter marks the end of the theory section of this thesis. In the next section, I am going to introduce the data set and provide some descriptive statistics.

3. Data and Descriptive Statistics

After covering the theoretical foundations of value investing and its relationship to the business cycle in the previous section, the thesis now shifts to the quantitative and analytical section. In this chapter, the data set used for the later analysis is going to be introduced and discussed. As mentioned earlier, the focus of the thesis is to shed more light on the relationship of value portfolios and economic indicators in a global context. In the following chapters, I want to build up a better understanding of the effect of business cycles on returns of value and growth portfolios. The quantitative part of this thesis aims to achieve three results:

First, the thesis analyzes the return data for the country-portfolios in the sample to find evidence of the value premium on a global scale. This approach closely follows the one used by Fama and French (1992) and Fama and French (1998) but uses the latest data available, looks at a longer time-horizon, and performs the analysis for a wider sample of countries.

Second, I use economic data to characterize the stage of the business cycle for each country in every month for the entire time-period selected. Using the business cycle data, the impact of each stage of the business cycle on the returns of market, value-, and growth portfolios is analyzed for every country. The approach follows the one used in the aforementioned paper by Kwag and Whi (2006), who analyzed the impact of expansion- and contraction periods of the business cycle on value and growth portfolios in the United States.

Third, the final part of the thesis wants to investigate the outcome of an active strategy of over-weighting- and underweighting of countries-value portfolios to take advantage of differences in the business cycles. This will be achieved through a regression analysis that incorporates value returns and economic variables. The results will be used to build a model that rebalances a global value portfolio monthly according to the prediction of the business cycle data.

After this short introduction to the analytical part, the focus in this chapter lies on the data sample. The data sample will be presented, and the explanations of why and how the data sample was selected will be addressed. In the first step, the countries and the time periods observed are introduced.

3.1. Countries- and Time Period-Selection

To answer the research question of this thesis regarding the relationship between value investing and business cycles, it would be advantageous to have a broad sample of countries from different parts of the world. A diverse selection of countries also helps to minimize potential interdependencies between countries that are economically closely linked. Furthermore, since I am looking at business cycles and stock market returns, I am dealing with time-series data. Thus, the time period selected for the analysis should include a fairly long time horizon to allow the data to include several completed business cycles. The time-span analyzed should also include recent data to take into consideration the global financial crisis of 2008 and the dot-com bubble of 2000.

Kenneth R. French publishes U.S. - as well as international-research returns for value and growth portfolios on his website. These portfolio returns will be used later for the analysis. Countries are selected on the basis that they are also covered in the Kenneth R. French database. Next to the

United States and Canada, the French database includes countries from the EAFE (Europe, Australasia, and Far East) region. For the purpose of this research, 19 out of the 22 countries in the database were chosen: *Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, UK, and USA*. The three remaining countries, Hong Kong, Malaysia, and Singapore, were not chosen because no economic data was available for them from OECD.

Regarding the time period analyzed, the selected time frame spans from 1975 to 2014. This time period covers 40 years and should therefore include several full business cycles. A few countries in the sample differ in their data availability and only have return data available from a later date onwards. This will be taken into consideration in the analysis and also highlighted again in the next chapters. In a next step, the country weighting in the global portfolio will be discussed further.

3.2. Country Weighting

After selecting the countries that are included in the sample, I also assign each country a respective weighting to construct a global portfolio. The global portfolio includes the weighted results from each individual country portfolio to present the numbers in a more compact form. Additionally, the global portfolio is going to be used as a reference to analyze mean differences in return for value and growth portfolios on a global scale. This global country portfolio can either be constructed out of the individual country's market-, growth-, or value-portfolios. However, the global value portfolio is the portfolio with the most relevance for the further analysis. Hence, this global value portfolio is also labeled as a *global balanced portfolio* to act as a benchmark to be compared with the *global active portfolio*. This active portfolio is the monthly rebalanced value portfolio, which will be constructed using business cycle data for over- and underweighting decision-making.

Regarding the country-weighting method, three different options were considered. First, using the MSCI EAFE weights seemed like a reasonable choice since this data was used by Fama and French (1998). Unfortunately, the MSCI EAFE index weight is not publicly available or was discontinued. In addition, the MSCI EAFE weighting does not include the U.S., which would have meant picking an arbitrary weighting for the U.S. returns. For these reasons, the MSCI EAFE option was discarded.

Second, an economic indicator such as each country's GDP level was considered as a weighting factor. The problem with GDP numbers is that they are only available on a quarterly basis. However, a monthly weighting is needed to facilitate the monthly rebalancing of the global portfolio in the upcoming analysis of this thesis. It is also problematic that with the GDP-weighting some economically powerful countries such as the U.S. or Japan would have a much higher weight assigned than smaller countries such as New Zealand or Switzerland. For the analysis, a weighting method is needed that assigns countries weights in a similar scale without having an over-proportionally represented country. This is necessary to avoid that the stock market performance of a big country is responsible for a sizable portion, e.g. 30%, of the whole stock market movement of the global portfolio. Such a weighing method would diminish the impact of smaller countries

stock market returns and would also make proportional over- and underweighting of these countries less meaningful.

This leaves us with the third option, the OECD share price index, which fulfills all the requirements mentioned above. The OECD share price index shows the monthly price level of all stock exchanges from the countries in the sample. The index uses the arithmetic average of the closing daily values of national stock exchanges to construct the monthly share price index. Since the price level represents the performance of the stock market, countries with a well performing stock market have a slightly higher weighting and vice versa. The OECD ensures that the data are internationally comparable across all countries presented. Moreover, the data doesn't take into account the size of the stock exchanges, but only looks at the price level and its development (OECD (2015a)). As a result, the country-weight of most countries is in the range of five to seven percent, which fits the requirements. Consequently, the OECD share price index is chosen to determine the countries weights in the global portfolio. The OECD weightings are slightly changing every month. Subsequently, even the global balanced portfolio changes its weights minimally each month over the sample period. A summary of the country weights can be found in table 1 in chapter 3.3.[1]

3.3. Stock Market Returns & Evidence for the Value Premium

Within this chapter I am going to introduce the sources and applications of the stock return data. I will also provide evidence on the value premium measured by the return and the Sharpe ratio. Additionally, the value premium will also be examined in relation to the CAPM. Chapter 3.3.1. will start with presenting the stock return data.

3.3.1. Stock Market Return Data

The stock market return data is obtained from the Kenneth R. French database, as already mentioned before. The thesis studies returns of market, value, and growth portfolios for all 19 countries selected. French created the U.S. portfolios by using all firms listed on the NYSE, AMEX, and NASDAQ. He obtained the data from CRSP and COMPUSTAT. The other country portfolios were created by using the raw data from Morgan Stanley Capital International (MSCI) for 1975 to 2006 and from Bloomberg for 2007 to 2014. The return data are monthly and include the dividend yield (French (2015)).

MSCI data are used because the MSCI database has an advantage compared to some other international databases. Some of these databases are subject to the survivorship bias because they often include only currently traded firms. In the MSCI database, historical data for firms that no longer exist are still included and newly added firms are not backfilled with historical data. Therefore, the data is relatively free of the survivorship bias. On the other hand, MSCI data often includes only a subset of the firms in any market. This implies that most of the firms in the sample are large and account for the majority of a country's stock market capitalization and performance

[1] A list of the monthly OECD country weights can be found in appendix 1.

(Fama and French (1998)). It is also pointed out by Fama and French (1998) that this does not allow for tests for a size effect in international returns. Consequently, I won't make the size effect part of my analysis.

The value and growth portfolios for each country are formed by using four valuation ratios: book-to-market (B/M); earnings-to-price (E/P); cash earnings-to-price (CE/P); and dividend yield-to-price (D/P). The portfolios were formed at the end of December in each year by sorting on one of the four ratios and then computing the value-weighted returns for the following 12 months. The separation into value and growth portfolios uses the top and bottom 30% of each ratio. Therefore, the value portfolios (High) include all the firms in the top 30% of a ratio, and the growth portfolios (Low) contain the bottom 30% of firms. For instance, for the B/M-sorting of Australia, the 30% of firms in Australia with the highest B/M-ratio are classified as value firms, while the 30% of firms with the lowest B/M-ratio are classified as growth firms (French (2015)). The middle 40% are neither value nor growth firms and therefore not included in these two portfolios. For the portfolio formation it is not required that a firm has data for all four ratios to be included, it is sufficient when the firm has data for the specific ratio that is constructed. This provides me with portfolios that have more observations included than in the case where firms need to have data on all four ratios to be taken into consideration. Next to the value and growth portfolio one should not forget the market return. A country's market return is made up of the value-weighted returns of all firms with B/M-data. The number of firms in the market portfolio corresponds to all firms with B/M data. An illustrative example of the U.S.-return dataset is listed in appendix 2. The returns are provided for the market, value, and growth portfolios for all four sorting-ratios.

As a remark regarding the portfolio returns, all return data in this thesis are calculated as *excess returns*. Hence, the risk-free interest rate is deducted from the nominal portfolio return to attain the excess return. I use the U.S. one month Treasury bill rate (T-Bill) as the risk-free rate. The U.S. T-Bill rate is widely used as the risk-free rate in academic research; for instance, Fama and French (1993) use the one month T-Bill rate as a proxy for the risk-free rate. Furthermore, the U.S. T-Bill rate is of such importance to the worldwide economy that it is fair to make the abstraction and use it as the risk-free rate for every country in the sample. Hence, I make the simplifying assumption that the U.S. risk-free rate applies to all countries in my sample.

Table 1 provides an overview of all the countries in the sample. The table design follows the style used by Fama and French (1992). The "Data period returns"-line shows the available time period for return data for the respective countries. As mentioned, most countries have return data available for the full observation period from 1975 to 2014. Other countries such as Austria or Denmark were included in the sample starting from the year their return data became available. Panel A gives an overview of the number of firms in each country sample. The U.S. has a higher number of firms because of the aforementioned differences in the databases used to obtain the data. Panel B presents a summary of the OECD country weights that were discussed in chapter 3.2. It can be seen that most countries have a weighting of around five to seven percent, especially in the last 10 years. The OECD weights will be used to construct the global portfolio, which includes each country's monthly returns and weights them with the appropriate OECD weighting for the specific country and month.

Table 1: Characteristics of Country Samples

Characteristics of Country Samples

Panel A shows the number of firms for each country in the Morgan Stanley Capital International (MSCI) database plus the US at the beginning of 1975, 1985, 1995, 2005, 2014, and the average number of firms for all years.

Panel B shows the OECD country weights used to form the global balanced portfolio in 5 year increments, as well as the average across the whole time period. The data for firms and country weights is monthly, but was depicted in this way to give an overview of the data and show the scale of the numbers.

	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Ireland	Italy	Japan	Netherlands	New Zealand	Norway	Spain	Sweden	Switzerland	UK	US
Dataperiod Returns	1975 - 2014	1987-2014	1975-2014	1977-2014	1989-2014	1988-2014	1975-2014	1975-2014	1991 - 2014	1975-2014	1975-2014	1975-2014	1988-2014	1975-2014	1975-2014	1975-2014	1975-2014	1975-2014	1975-2014
Panel A: Number of Firms in each country (e.g. 1985 means: I used the earliest data available from 1985 until 1995)																			
1975	74		36	84			109	99		72	191	41		14	28	37	45	179	3731
1985	72	13	26	80	31	31	85	86		61	249	36	23	13	21	34	53	161	4448
1995	90	33	39	129	32	25	126	130	23	140	528	47	16	30	62	54	91	227	6013
2005	94	20	31	141	29	39	116	110	21	88	668	52	18	32	64	71	75	241	4330
2014	1607	87	142	934	155	123	687	773	50	261	2516	125	119	189	140	457	298	1304	3387
Average	362	44	55	273	72	58	224	240	33	130	812	63	45	58	64	122	108	424	4485
Panel B: OECD Share Price Index Country Weights (%)																			
1975	4,45%		8,02%				6,19%	12,36%		6,00%	29,22%	10,04%		2,54%	2,41%	1,49%	9,34%	2,65%	5,29%
1980	6,96%		7,08%	8,73%			5,94%	8,48%		4,03%	28,81%	5,93%		2,70%	2,40%	1,00%	7,71%	5,07%	5,15%
1985	5,01%		5,80%	6,09%			5,50%	8,36%		6,74%	31,44%	7,40%		2,68%	2,23%	2,20%	5,29%	6,90%	4,36%
1990	3,62%	6,17%	4,79%	3,07%	2,87%	2,28%	4,60%	5,38%		6,62%	31,13%	3,76%	9,05%	1,86%	2,69%	2,31%	2,73%	4,33%	2,74%
1995	4,10%	4,58%	4,67%	3,48%	2,83%	2,84%	4,71%	5,50%	6,64%	6,49%	17,51%	5,50%	9,53%	2,23%	2,73%	2,89%	4,10%	5,79%	3,88%
2000	3,05%	2,35%	4,50%	3,21%	2,80%	9,52%	6,18%	6,24%	7,76%	7,65%	8,58%	7,95%	4,74%	1,97%	4,19%	4,63%	4,97%	5,45%	4,26%
2005	4,53%	5,11%	5,52%	3,90%	3,93%	4,67%	5,09%	4,23%	11,35%	7,34%	6,68%	5,17%	7,04%	3,08%	4,62%	3,64%	4,47%	4,57%	5,05%
2010	5,44%	5,22%	5,15%	5,05%	4,69%	5,00%	5,38%	5,04%	5,45%	5,66%	5,51%	5,25%	5,46%	5,21%	5,93%	4,86%	5,29%	5,17%	5,25%
2015	4,59%	3,50%	5,62%	4,71%	7,06%	4,57%	4,89%	5,78%	7,12%	3,92%	6,16%	4,96%	6,01%	5,85%	3,76%	5,82%	5,12%	4,75%	5,81%
Average	4,65%	4,48%	5,67%	4,78%	3,98%	4,32%	5,18%	6,62%	7,82%	6,34%	17,72%	6,03%	7,01%	3,03%	3,52%	3,10%	5,30%	5,36%	4,74%

3.3.2. Updated Results on the Value Premium

As shown in chapter 2.1.2., previous academic literature proved in their research that portfolios of stocks with high ratios of fundamentals to price have higher future returns compared to stock portfolios with low ratios of fundamentals to price. This section has the goal of refreshing this evidence with the latest data available and expanding it on an international level by running statistical tests on value and growth portfolios formed on B/M, E/P, CE/P, and D/P. It will be shown that in all sorting cases a value premium exists regarding differences in expected returns between value and growth portfolios. This value premium does not only exist in the U.S., but also appears in the vast majority of stock markets of the 18 other countries. Furthermore, it seems that value portfolios also allow for higher risk-adjusted returns since their Sharpe ratios exceed the ones of growth portfolios.

In the first step, I calculated the differences between value and growth portfolios for all countries in the sample. Each country has four value and four growth portfolios that were formed by using the four different ratios – B/M, E/P, CE/P, and D/P. This is shown in table 2, which summarizes the excess return of each country's market-, value-, and growth-portfolio for the sample time period. In addition, the second row of each country's value and growth portfolio lists the standard deviation of the annual excess returns. The second row of the high-minus-low portfolios depicts the t-statistic of a two-tailed t-test, with the null hypothesis that the High-minus-Low annual returns equal zero and the alternative hypothesis that the High-minus-Low annual returns are unequal to zero. An example of the annual excess return dataset, which was used to create the table, is provided in appendix 3.

The table design follows the approach of Fama and French (1998), but uses a wider country sample and uses newer data. This table was compiled to give an overview and compare the annual mean returns of the different portfolios in every country. Furthermore, table 2 should also serve as an updated proof of the value premium in international returns. It can be seen that higher returns in value versus growth portfolios are also the norm for other countries. Therefore, the value premium does not only occur in the U.S., which generally is the main subject in research covering the value premium. When portfolios are formed on B/M and E/P, 16 out of 19 countries show a positive value-minus-growth premium, whereas the C/P- and D/P-sorting results show that 17 out of 19 countries have a positive value premium. Many value premiums are higher than four percent a year, which is quite substantial. This gives further and updated proof for the results of Fama and French (1998) that the value premium is a global phenomenon and not the result of data mining.

It is interesting to note that the mean return of value portfolios across all countries lies between 12.04% and 12.97%, depending on the sorting method. This stands in contrast to the growth portfolios which have average returns between 7.62% and 9.01%. Hence, the value premium lies between 3.02% and 5.29% on average. It is surprising that the CE/P value premium is the highest with 5.29% and the B/M the lowest with 3.02% among the four calculated value premiums. The value and growth return numbers compare to a 9.43% mean return for the market. This implies that on average the growth portfolios underperform the market in terms of excess returns.

Table 2: Annual Excess Returns for Market-, Value-, and Growth-Portfolios

Annual Dollar Returns in Excess of U.S. T-Bill Rate for Market, Value, and Growth Portfolios: 1975-2014

Value and growth portfolios are formed on book-to-market equity (B/M), earnings/price (E/P), cashflow-earnings/price (CE/P), and dividend/price (D/P). Value (high) and growth (low) portfolios are denoted by a leading H or L; the difference between value and growth portfolios is denoted with H-L. The first row for each country is the average annual excess return calculated from the portfolio's monthly returns. The second is the standard deviation of the annual excess returns (in parentheses) or the t-statistic testing whether H-L is different from zero {in brackets}. **Bold t-statistic** are significant on a significance level of 0.05. The table was created in the style of Fama and French ((1992)).

	Market	HB/M	LB/M	H-LB/M	HE/P	LE/P	H-LE/P	HCE/P	LCE/P	H-LCE/P	HD/P	LD/P	H-LD/P
Australia	9,62	13,68	7,21	6,47	14,96	6,05	8,91	15,82	5,28	10,54	14,74	7,93	6,81
	(26,68)	(30,08)	(27,59)	**{2,22}**	(28,23)	(26,99)	**{2,59}**	(29,70)	(26,60)	**{3,40}**	(28,62)	(28,61)	**{2,26}**
Austria	8,88	14,28	6,73	7,55	16,51	5,41	11,10	23,15	5,83	16,08	14,98	4,26	10,72
	(32,99)	(39,36)	(39,25)	{1,40}	(40,90)	(35,87)	**{2,03}**	(42,24)	(34,84)	**{2,97}**	(34,72)	(40,46)	**{2,21}**
Belgium	11,15	13,89	10,91	2,99	13,60	11,71	1,89	16,00	10,84	5,16	13,43	11,33	2,10
	(27,39)	(29,45)	(27,41)	{1,15}	(31,19)	(26,45)	{0,81}	(28,42)	(25,51)	**{2,07}**	(30,62)	(29,03)	{0,82}
Canada	7,44	8,39	5,35	3,04	10,89	5,18	5,70	10,14	4,50	5,64	11,63	7,78	3,85
	(21,85)	(27,03)	(25,25)	{1,04}	(22,14)	(28,41)	{1,33}	(21,01)	(27,03)	{1,67}	(21,67)	(28,46)	{1,06}
Denmark	10,38	13,50	12,44	1,06	10,21	8,76	1,46	14,55	14,34	0,21	13,06	8,28	4,78
	(22,88)	(32,80)	(24,63)	{0,23}	(32,15)	(26,30)	{0,30}	(30,92)	(30,80)	{0,04}	(31,03)	(26,34)	{0,86}
Finland	11,74	12,91	16,69	-3,78	14,94	17,60	-2,67	11,74	18,49	-6,75	12,04	14,54	-2,49
	(38,90)	(31,27)	(56,74)	-{0,35}	(32,81)	(60,61)	-{0,25}	(29,65)	(58,76)	-{0,66}	(34,41)	(54,89)	-{0,26}
France	9,81	14,03	8,62	5,41	13,50	8,08	5,42	14,54	8,14	6,40	13,46	6,29	7,17
	(27,97)	(33,38)	(27,89)	**{1,76}**	(30,53)	(29,41)	**{1,99}**	(32,54)	(28,35)	**{2,77}**	(26,85)	(28,34)	**{2,85}**
Germany	8,93	13,31	8,32	4,98	9,09	8,52	0,57	13,57	5,52	8,05	10,86	8,26	2,60
	(28,35)	(29,12)	(29,83)	**{2,60}**	(25,53)	(31,33)	{0,21}	(27,11)	(26,20)	**{4,26}**	(25,90)	(30,21)	{0,91}
Ireland	9,70	12,24	9,69	2,55	9,80	8,76	1,04	15,82	8,63	7,19	13,68	11,24	2,44
	(28,53)	(35,73)	(32,26)	{0,29}	(29,58)	(29,76)	{0,19}	(39,73)	(29,34)	{0,93}	(35,28)	(24,38)	{0,40}
Italy	7,51	6,15	9,46	-3,32	8,11	8,89	-0,78	9,16	3,57	5,59	9,11	8,88	0,23
	(35,83)	(34,61)	(39,97)	-{0,83}	(34,86)	(44,42)	-{0,18}	(36,80)	(33,73)	{1,40}	(31,99)	(46,17)	{0,05}
Japan	6,79	13,66	2,41	11,25	10,28	2,40	7,89	11,59	2,54	9,05	10,64	3,31	7,33
	(28,17)	(29,67)	(28,95)	**{4,39}**	(25,58)	(28,05)	**{4,32}**	(30,21)	(28,25)	**{3,87}**	(29,53)	(30,28)	**{2,05}**
Netherlands	10,45	12,62	10,34	2,28	12,00	7,22	4,78	8,26	10,01	-1,75	11,66	7,01	4,65
	(22,06)	(32,62)	(21,04)	{0,64}	(23,63)	(24,40)	{1,53}	(29,58)	(23,86)	-{0,53}	(22,85)	(28,65)	{1,35}
New Zealand	5,80	-0,16	7,54	-7,69	6,20	6,72	-0,52	7,08	6,39	0,69	5,03	7,40	-2,37
	(26,59)	(30,53)	(30,05)	-{1,39}	(30,29)	(23,54)	-{0,17}	(32,56)	(24,38)	{0,17}	(33,30)	(28,49)	-{0,62}
Norway	11,48	16,50	9,84	6,66	13,29	12,15	1,15	11,51	0,56	10,95	12,35	5,50	6,86
	(39,96)	(56,91)	(44,67)	{0,79}	(39,93)	(51,11)	{0,16}	(39,60)	(23,87)	**{2,48}**	(36,05)	(38,24)	{1,41}
Spain	7,56	9,37	6,99	2,39	13,22	5,40	7,82	9,44	5,48	3,97	9,95	6,18	3,77
	(31,08)	(35,77)	(37,32)	{0,53}	(41,07)	(32,48)	**{1,86}**	(35,99)	(34,49)	{0,73}	(28,47)	(35,83)	{0,99}
Sweden	12,50	18,99	11,16	7,83	18,62	11,66	6,96	16,51	9,18	7,33	18,31	8,87	9,44
	(28,62)	(37,27)	(30,40)	**{1,77}**	(36,37)	(28,17)	{1,61}	(31,24)	(29,32)	**{1,88}**	(30,99)	(30,75)	**{2,85}**
Switzerland	9,21	10,38	9,09	1,30	9,77	8,90	0,87	9,81	7,75	2,06	11,16	8,14	3,02
	(23,37)	(28,59)	(23,99)	{0,48}	(26,88)	(25,13)	{0,33}	(30,45)	(23,91)	{0,62}	(27,46)	(24,88)	{1,16}
UK	11,30	12,95	10,27	2,68	14,61	9,86	4,74	15,48	9,59	5,89	12,91	9,78	3,13
	(25,61)	(28,44)	(24,45)	{1,06}	(28,19)	(25,48)	**{2,31}**	(29,84)	(25,32)	**{2,26}**	(27,41)	(26,03)	{1,26}
US	8,90	11,99	8,23	3,76	12,71	7,88	4,83	12,29	8,09	4,19	10,32	8,29	2,04
	(17,08)	(17,91)	(18,08)	{1,66}	(17,90)	(18,31)	**{2,12}**	(16,75)	(18,22)	**{2,14}**	(15,23)	(19,43)	{0,85}
Mean	9,43	12,04	9,01	3,02	12,23	8,48	3,75	12,97	7,62	5,29	12,07	8,07	4,00
	(28,10)	(32,66)	(31,04)	(1,02)	(30,41)	(31,38)	(1,22)	(31,28)	(29,09)	(1,71)	(29,07)	(31,55)	(1,18)

It should also be taken into consideration that the standard deviations are overall quite high and amount to around 30% per year. This highlights the high volatility of the individual country portfolio returns. However, it is also apparent that the higher returns of value portfolios come at the cost of higher standard deviations compared to the market or growth portfolios. The High-minus-Low returns are statistically significant in five to seven countries according to the t-tests. However, when the t-tests are performed on monthly instead of annual return data, additional countries show a significant value premium. For instance, the U.S. H-LB/M-return is also significant when a monthly t-test is performed. Because table 2 focuses on the annual figures, I don't include the monthly t-statistics.

Regarding the B/M-sorting on a country level, Sweden has the highest average value portfolio return with 18.99%, while Finland has the highest growth portfolio return with 16.69%. The lowest return with the B/M sorting is achieved by New Zealand with a -0.16% value return and by Japan with a 2.41% growth return. Interestingly, Sweden is also the country that has the highest value portfolio returns with the E/P and D/P sorting, plus it has the second highest value portfolio return with the CE/P sorting. On the flipside, the same is true for New Zealand which has the lowest value returns among all four sorting ratios. When looking at the growth portfolios, we obtain the same picture with Finland as the country with the highest average growth portfolio returns, and Japan with the lowest average growth portfolio returns for all four ratios. It seems that Sweden's stock market has a history of exceptionally high returns with regards to value stocks. In contrast, New Zealand looks like a bad place for value investing. On the other hand, Finland's past growth stock returns seem to outperform the growth portfolio returns of other countries. Finally, Japan has low growth portfolio returns, but they are paired with relatively high value portfolio returns, which makes Japan the country that exhibits one of the highest value premiums.

These country-specific outcomes are very interesting and could be further analyzed in future research that focuses on a particular country, such as Sweden or Japan. Nevertheless, the focus of this thesis is on a global level. Therefore, the main takeaway of table 2 is the fact that the value premium exists on a global scale among all four sorting ratios.

After I provided an overview of the individual country's portfolio returns, I am going to do the same for the global portfolio. Table 3 follows the same structure as table 2, but covers the global market-, value-, and growth-portfolios that were created by using the OECD-weighted country portfolios. Details of the calculations can be found in the table information section. Not surprisingly, the value premium also persists in the global value and growth portfolios.

The average returns of the global value portfolios in table 3 are 2.84 to 5.16 percentage points per year higher than the average returns of the global market portfolio. Furthermore, the average returns of the global value portfolios are even 4.07 to 6.31 percentage points higher than the average returns of the corresponding global growth portfolios.

Table 3: Annual Excess Returns for Global Market, Value, and Growth Portfolios

Annual Dollar Returns for Global Market, Value, and Growth Portfolios: 1975-2014 (OECD Country Weighting)

The data consists of value and growth portfolios in each country that were created by the Kenneth R. French database using four valuation ratios: book-to-market (B/M); earnings-price (E/P); cash earnings to price (CE/P); and dividend yield (D/P). I included the dataperiod from 1975 to 2014 (except for the few countries mentioned specifically).Value (high) and growth (low) portfolios are denoted by a leading H or L; the difference between value and growth portfolios is denoted with H-L. The global portfolio includes the 19 countries in sample. The individual countries return data are weighted according to the OECD Share price index weighting of January each year. Therefore, portfolios are newly weighted each year. Market stands for the global portfolios market return. The mean is a portfolio's average (linear) annual rate of return, Std. is the standard deviation of these annual returns, St. Error is the standard error of the mean, t(Mn) is the ratio of the average return to its standard error. This approach is consistent with the approach of Fama and Frencch (1998).

	Market	HB/M	LB/M	H-LB/M	HE/P	LE/P	H-LE/P	HCE/P	LCE/P	H-LCE/P	HD/P	LD/P	H-LD/P
Panel A: Annual Value-Weight Dollar Returns in Excess of T-Bill Rate													
Mean	9,00	11,90	7,83	4,07	11,84	7,26	4,58	12,52	6,20	6,31	12,13	7,14	4,99
Std.	21,64	23,84	21,91	10,70	22,00	21,68	9,47	22,90	20,66	9,43	22,48	21,96	8,93
St. Error	3,42	3,77	3,46	1,69	3,48	3,43	1,50	3,62	3,27	1,49	3,55	3,47	1,41
t(Mn)	2,63	3,16	2,26	2,41	3,40	2,12	3,06	3,46	1,90	4,24	3,41	2,06	3,53
Panel B: Annual Value-Weight Dollar Returns in Excess of Dollar Return on Local Market													
Mean		2,90	-1,17		2,84	-1,74		3,52	-2,79		3,13	-1,86	
Std.		7,18	4,05		5,99	4,09		6,26	4,96		5,70	3,94	
St. Error		1,14	0,64		0,95	0,65		0,99	0,78		0,90	0,62	
t(Mn)		2,56	-1,83		3,00	-2,69		3,56	-3,57		3,48	-2,98	

The global portfolio shows the same properties as table 2, with the CE/P value premium being the highest with 6.31% and the B/M being the lowest with 4.07% among the four calculated value premiums. I found the following results regarding the significance of these global portfolios. The B/M spread between value and growth portfolios is 2.41 standard errors away from zero, while the value premium for E/P, CE/P, and D/P are more than three standard errors away from zero. These results show that the value premium is significant on the 5% level. This provides evidence that the value premium is also present in a global portfolio that is made up of several international country portfolios.

To get a better picture of dependencies and co-movements of international returns, table 4 provides the correlations of excess returns between the different country portfolios. Panel A shows the correlations of excess market returns of the different countries, while Panel B focuses on the correlations of the value-minus-growth portfolio with the B/M-sorting. The correlations of the excess market returns of the 19 countries are all positive, which is not too surprising since the international stock markets move on average more or less in the same direction. The average correlation is 0.51. In Panel B, the value-minus-growth portfolio returns have smaller correlations in general, which makes sense since they are just a subset of the total market portfolio. The average correlation is 0.13, but only eight out of 170 correlations are negative. The global portfolios have higher correlations in Panel A and B, which can be explained with the fact that the global portfolios were constructed from the country portfolios.

Table 4: Correlations of Country Market- and B/M-Value-minus-Growth Returns: 1975 - 2014

Panel A: Correlations of Excess Market Returns, Mkt - Rf

	AUS	*A*	*BE*	*CAN*	*DEN*	*FIN*	*FR*	*GER*	*IRE*	*IT*	*JP*	*NL*	*NZ*	*NO*	*SP*	*SWE*	*SWI*	*UK*	*US*	*GLOB*
Australia	1,00																			
Austria	0,44	1,00																		
Belgium	0,47	0,55	1,00																	
Canada	0,65	0,45	0,48	1,00																
Denmark	0,41	0,63	0,56	0,50	1,00															
Finland	0,41	0,44	0,38	0,47	0,54	1,00														
France	0,51	0,49	0,73	0,53	0,51	0,45	1,00													
Germany	0,49	0,60	0,73	0,52	0,61	0,51	0,74	1,00												
Ireland	0,41	0,53	0,49	0,44	0,64	0,52	0,45	0,49	1,00											
Italy	0,41	0,46	0,55	0,46	0,50	0,46	0,62	0,58	0,41	1,00										
Japan	0,38	0,27	0,42	0,36	0,32	0,32	0,45	0,39	0,29	0,39	1,00									
Netherlands	0,56	0,58	0,78	0,63	0,63	0,50	0,73	0,81	0,55	0,58	0,45	1,00								
New Zealand	0,54	0,50	0,36	0,44	0,45	0,45	0,36	0,40	0,43	0,34	0,34	0,45	1,00							
Norway	0,57	0,52	0,61	0,61	0,55	0,46	0,59	0,58	0,47	0,45	0,33	0,66	0,43	1,00						
Spain	0,48	0,50	0,58	0,48	0,53	0,46	0,61	0,60	0,47	0,60	0,42	0,61	0,42	0,48	1,00					
Sweden	0,56	0,48	0,56	0,55	0,60	0,60	0,58	0,65	0,48	0,54	0,43	0,67	0,49	0,59	0,59	1,00				
Switzerland	0,52	0,51	0,71	0,52	0,52	0,39	0,68	0,74	0,44	0,50	0,47	0,77	0,41	0,57	0,52	0,59	1,00			
UK	0,58	0,42	0,63	0,55	0,45	0,38	0,64	0,59	0,41	0,51	0,42	0,71	0,36	0,57	0,51	0,55	0,65	1,00		
US	0,56	0,37	0,54	0,75	0,47	0,48	0,60	0,59	0,48	0,44	0,36	0,69	0,38	0,57	0,49	0,60	0,58	0,60	1,00	
Global Portfolio	0,69	0,62	0,79	0,69	0,67	0,61	0,81	0,82	0,61	0,72	0,69	0,87	0,57	0,70	0,72	0,76	0,79	0,76	0,71	1,00

Panel B: Correlations of Book-to-Market Value-Growth Returns, H-LB/M

	AUS	*A*	*BE*	*CAN*	*DEN*	*FIN*	*FR*	*GER*	*IRE*	*IT*	*JP*	*NL*	*NZ*	*NO*	*SP*	*SWE*	*SWI*	*UK*	*US*	*GLOB*
Australia	1,00																			
Austria	0,09	1,00																		
Belgium	0,11	0,23	1,00																	
Canada	0,16	0,02	0,12	1,00																
Denmark	0,02	0,05	0,08	0,10	1,00															
Finland	0,15	0,02	0,09	0,26	0,06	1,00														
France	0,11	0,24	0,19	0,22	0,15	0,23	1,00													
Germany	0,09	0,22	0,10	0,16	-0,02	0,14	0,27	1,00												
Ireland	0,18	0,25	0,34	0,04	0,12	0,17	0,20	0,13	1,00											
Italy	0,04	0,15	0,19	0,20	0,04	0,16	0,30	0,12	0,17	1,00										
Japan	0,01	0,03	0,05	0,18	0,13	0,18	0,15	-0,01	0,11	0,16	1,00									
Netherlands	0,03	0,19	0,21	0,02	0,10	-0,07	0,35	0,15	0,23	0,14	0,13	1,00								
New Zealand	0,01	0,06	0,02	0,05	-0,03	0,07	0,08	0,00	0,06	0,05	0,10	0,03	1,00							
Norway	0,10	0,10	0,14	0,18	0,05	0,07	0,11	0,08	0,12	0,14	0,16	0,15	0,05	1,00						
Spain	0,05	0,12	0,15	0,10	0,05	0,10	0,08	0,12	0,11	0,09	0,07	0,05	-0,03	0,08	1,00					
Sweden	0,11	0,12	0,11	0,24	0,17	0,30	0,38	0,32	0,12	0,16	0,18	0,14	0,03	0,15	0,15	1,00				
Switzerland	0,10	0,28	0,24	0,06	0,03	-0,01	0,32	0,17	0,18	0,21	0,05	0,26	0,04	0,19	0,08	0,09	1,00			
UK	0,19	0,21	0,25	0,20	0,12	0,05	0,37	0,18	0,19	0,15	0,10	0,33	-0,02	0,17	0,12	0,18	0,28	1,00		
US	0,18	0,15	0,23	0,22	0,13	0,24	0,28	0,30	0,19	0,10	0,11	0,09	0,09	0,12	0,16	0,31	0,18	0,28	1,00	
Global Portfolio	0,26	0,37	0,43	0,37	0,22	0,40	0,55	0,35	0,55	0,43	0,55	0,45	0,27	0,34	0,26	0,45	0,40	0,44	0,43	1,00

The previous results showed that the value portfolios in a majority of countries showed higher returns than growth portfolios, but also had higher standard deviations. Therefore, knowing the mean excess return and the standard deviation for every country's market-, value-, and growth-portfolio, I am able to calculate the Sharpe ratio for each portfolio. The Sharpe ratio is a widely used measure to calculate risk-adjusted returns. The method was first introduced by William F. Sharpe in 1966 and is used to calculate a value that reflects the average return in excess of the risk-free rate per unit of volatility or risk. The excess return is divided by the standard deviation of a portfolio. The greater the value of the Sharpe ratio, the higher is the risk-adjusted return (Sharpe (1994)).

Table 5: Sharpe Ratio for Market, Value, and Growth Portfolios: 1975 - 2014

Sharpe Ratio for Market, Value, and Growth Portfolios: 1975-2014

The ratio is calculated from mean annual dollar returns in excess of T-Bill rate. The data is from the Kenneth R. French database and spans the 1975-2014 period (except for the few countries mentioned specifically). The Sharpe ratio is calculated as = (Mean portfolio return − Risk-free rate)/Standard deviation of excess portfolio return.

	Market	Value HB/M	Growth LB/M	Value HE/P	Growth LE/P	Value HCE/P	Growth LCE/P	Value HD/P	Growth LD/P
Australia	0,36	0,45	0,26	0,53	0,22	0,53	0,20	0,52	0,28
Austria	0,27	0,36	0,17	0,40	0,15	0,55	0,17	0,43	0,11
Belgium	0,41	0,47	0,40	0,44	0,44	0,56	0,42	0,44	0,39
Canada	0,34	0,31	0,21	0,49	0,18	0,48	0,17	0,54	0,27
Denmark	0,45	0,41	0,51	0,32	0,33	0,47	0,47	0,42	0,31
Finland	0,30	0,41	0,29	0,46	0,29	0,40	0,31	0,35	0,26
France	0,35	0,42	0,31	0,44	0,27	0,45	0,29	0,50	0,22
Germany	0,32	0,46	0,33	0,36	0,27	0,50	0,21	0,42	0,27
Ireland	0,340	0,343	0,30	0,33	0,29	0,40	0,29	0,39	0,46
Italy	0,21	0,18	0,24	0,23	0,20	0,25	0,11	0,28	0,19
Japan	0,24	0,46	0,08	0,40	0,09	0,38	0,09	0,36	0,11
Netherlands	0,47	0,39	0,49	0,51	0,30	0,28	0,42	0,51	0,24
New Zealand	0,218	-0,01	0,25	0,20	0,29	0,217	0,26	0,15	0,26
Norway	0,29	0,29	0,22	0,33	0,24	0,29	0,02	0,34	0,14
Spain	0,24	0,26	0,19	0,32	0,17	0,26	0,16	0,35	0,17
Sweden	0,44	0,51	0,37	0,51	0,41	0,53	0,31	0,59	0,29
Switzerland	0,39	0,36	0,38	0,36	0,35	0,32	0,32	0,41	0,33
UK	0,44	0,46	0,42	0,52	0,39	0,52	0,38	0,47	0,38
US	0,52	0,67	0,46	0,71	0,43	0,73	0,44	0,68	0,43
Mean	**0,35**	**0,38**	**0,31**	**0,41**	**0,28**	**0,43**	**0,27**	**0,43**	**0,27**
Global Portfolio	**0,42**	**0,50**	**0,36**	**0,54**	**0,33**	**0,55**	**0,30**	**0,54**	**0,33**

It can be observed from the calculations in table 5 that value portfolios tend to have a higher Sharpe ratio than growth portfolios. This indicates that value portfolios have higher risk-adjusted returns and therefore, are able to achieve higher returns per unit of standard deviation than growth portfolios. This is true for almost every country in the sample apart from some minor exceptions such as New Zealand. It is striking that the U.S. has the highest Sharpe ratio among the four sorting methods. One explanation could be that, the U.S. has a substantially bigger number of firms in the portfolios compared to the other countries, which leads to lower standard deviations. The lower standard deviations in turn cause the higher Sharpe Ratios. The average Sharpe ratio is between 0.38 and 0.43 for value portfolios and between 0.27 and 0.31 for growth portfolios. The global portfolio manages to achieve even higher Sharpe ratios, which are between 0.50 and 0.55 for value portfolios and 0.30 and 0.36 for growth portfolios. These numbers should also be observed in relation to the Sharpe ratios of each country's overall stock market. The majority of

value portfolios in each country achieve a higher Sharpe ratio than the respective market portfolio. For example, the B/M-value portfolio has a higher Sharpe ratio than the market portfolio in 13 out of the 19 countries. The same is true for the E/P, CE/P, and D/P-value portfolios with 15/19, 16/19, and 17/19 countries value portfolios outperforming the country specific market in terms of Sharpe ratio. In contrast, growth portfolio's generally have lower Sharpe ratios than the market portfolio.

Previous research done by Lettau and Wachter (2007) already showed that value portfolios have higher Sharpe ratios than growth portfolios by using U.S. data. Supplementing this research, it has been shown here that value portfolios have higher Sharpe ratios than growth portfolio not only in the U.S., but also in 18 other countries that are in the sample of this thesis. To summarize, this analysis provides evidence that value-portfolios outperform growth-portfolios in terms of absolute excess return and risk-adjusted return in an international context.

3.3.3. The Value Premium and the CAPM – Statistical Evidence

In this final step of analyzing the value premium, I am examining the performance of value and growth portfolios relative to the capital asset pricing model (CAPM). It was already shown by Fama and French (1992) that value stocks outperform and growth stocks underperform relative to the CAPM. The goal of this analysis was to find updated evidence for the alphas, betas, and their respective standard errors for value and growth portfolios of all types of sorting. My results show that the value portfolios higher expected return cannot be attributed to the market beta. The analysis follows the approach used by Lettau and Wachter (2007). The results of the calculations are summarized in Table 6 and 7 below.

The CAPM, one of the most famous models in asset pricing, is used to estimate the cost of capital for firms and to evaluate the performance of portfolios. Fama and French (2004) describe the CAPM as follows: "The CAPM says that the expected value of an asset's excess return (the asset's return minus the risk-free interest rate, $R_{it} - R_{ft}$) is completely explained by its expected CAPM risk premium (its beta times the expected value of $R_{Mt} - R_{ft}$). This implies [that in the CAPM] the 'Jensen's alpha', the intercept term in the time-series regression, is zero for each asset." As discussed earlier, it was shown by Fama and French (1992) and Fama and French (1993) that the size and value effect cannot be explained by the CAPM. This results in the phenomenon that small stocks and value stocks achieve higher returns in reality than predicted in the CAPM, which implies positive alphas for these kind of stocks. The CAPM that includes the alpha is normally written as follows:

$$\text{CAPM: } R^i_t - R^f_t = \alpha_{i+} \beta_i (R^m_t - R^f_t) + \varepsilon_{it} \qquad (2)$$

Table 6 and 7 show alphas, standard errors on alphas, betas, standard errors on betas, and R-squared statistics for each country and each measure of value. I performed an OSL regression with the monthly value portfolio excess returns as the dependent variable y, and the excess market

return (Mkt-Rf) as the explanatory variable x.[2] The alpha is the intercept in the regression output multiplied by 12 to annualize the monthly data from the regression output. Beta is represented as the slope from this regression. The corresponding standard errors and R-squared were also listed. Additionally, the number of star signs shows the statistical significance of the alphas and betas.

The size of alpha of value portfolio varies by country and sorting method. However, between 16 to 18 countries show positive alphas in their value portfolios over the research period. Furthermore, the average alpha for the high-minus-low portfolio lies between 2.5% and 5.01%. The alphas for the portfolios that are long the value portfolio and short the growth portfolio are statistically significant for 6/19 countries with the B/M-sorting, 9/19 countries with the E/P-sorting, 12/19 countries with the CE/P-sorting, and 9/19 with the D/P-sorting. The U.S. results regarding alphas are highly significant across all sorting variables, which confirms the results from Lettau and Wachter (2007). Australia, Japan, and Sweden show the same high level of significance in their alphas for all types of sorting. The significance of value and growth portfolios of individual countries can be checked in the tables. Most value and growth portfolios show significant alphas and betas. In addition, the R-squared values range on average from 70% to 82%.

Tables 6 and 7 confirm the results of previous research that value stocks have high alphas relative to the CAPM. Overall, alphas are positive for value portfolios and negative for growth portfolios, which is consistent for all sorting variables. However, this property is also accompanied by higher standard errors of alphas for value portfolios than growth portfolios. The tables also show that betas are very similar between value and growth portfolios and are close to one. On an average level, value portfolios seem to have slightly higher betas, except for the D/P sorting. Nevertheless, a number of countries including the U.S. show lower betas for value and higher betas for growth portfolios. Once again, a result that confirms the findings of Lettau and Wachter (2007). Hence, it can be concluded that international value portfolios have significant positive alphas relative to the CAPM, and show betas close to one.

To sum up, this section analyzed the value premium in 19 countries for the specified research period of 1975 to 2014. The data analysis showed that value portfolios exhibit higher expected excess returns and higher Sharpe ratios than growth portfolios, while showing similar levels of standard deviations. In addition, value stocks have positive alphas and growth stocks have negative alphas relative to the CAPM. Betas are close to one and on comparable levels for both value and growth portfolios. These empirical results hold for all four definitions of value – B/M, E/P, CE/P, and D/P – and could be found in most of the 19 countries that were included in the analysis. Therefore, the classical findings regarding the value premium, which were mostly obtained from U.S. data, seem to be also true in an international context for a wide number of countries.

[2] All regression analysis performed in this thesis use a significance level of 0.05.

Table 6: Performance of Growth and Value Portfolios relative to the CAPM

		HB/M	LB/M	H-LB/M	HE/P	LE/P	H-LE/P	HCE/P	LCE/P	H-LCE/P	HD/P	LD/P	H-LD/P
Australia	αi (% per year)	3,65 **	-2,52 **	6,17 ***	5,28 ***	-3,28 ***	8,55 ***	5,64 ***	-3,48 **	9,12 ***	5,17 ***	-1,82	6,99 ***
	SE of αi	1,53	1,05	2,21	1,45	1,26	2,40	1,68	1,35	2,47	1,47	1,33	2,54
	βi	0,92 ***	1,06 ***	-0,14 ***	0,9 ***	1,07 ***	-0,17 ***	0,93 ***	1,05 ***	-0,13 ***	0,87 ***	1,1 ***	-0,23 ***
	SE of βi	0,02	0,01	0,03	0,02	0,02	0,03	0,02	0,02	0,03	0,02	0,02	0,03
	Rsquared	0,84	0,93	0,05	0,84	0,91	0,07	0,81	0,90	0,03	0,83	0,91	0,10
Austria	αi (% per year)	3,10	-2,32	5,42	5,31 **	-3,14 *	8,45 **	10,19 ***	-2,31	12,49 ***	5,84 ***	-5,42 **	11,26 ***
	SE of αi	2,46	1,90	3,91	2,33	1,87	3,60	2,86	2,23	3,81	2,02	2,35	3,76
	βi	1,12 ***	0,93 ***	0,18 ***	1,07 ***	0,96 ***	0,11 **	0,99 ***	0,88 ***	0,11 **	0,94 ***	1,03 ***	-0,08 *
	SE of βi	0,03	0,02	0,05	0,03	0,02	0,04	0,03	0,03	0,05	0,02	0,03	0,05
	Rsquared	0,81	0,83	0,04	0,81	0,85	0,02	0,71	0,76	0,01	0,82	0,80	0,01
Belgium	αi (% per year)	2,69	0,53	2,16	0,90	1,69	-0,80	5,32 **	0,76 *	4,55 *	1,38	0,50	0,88
	SE of αi	2,01	1,08	2,68	1,86	1,32	2,53	2,25	1,43	2,84	1,40	1,53	2,48
	βi	1,05 ***	0,95 ***	0,1 **	1,1 ***	0,9 ***	0,2 ***	0,97 ***	0,95 ***	0,02	1,03 ***	0,96 ***	0,07 *
	SE of βi	0,03	0,02	0,04	0,03	0,02	0,04	0,03	0,02	0,04	0,02	0,02	0,04
	Rsquared	0,73	0,88	0,01	0,77	0,82	0,06	0,65	0,81	0,00	0,84	0,79	0,01
Canada	αi (% per year)	0,83	-2,56 **	3,39	4,01 ***	-3,18 **	7,18 ***	3,43 **	-3,55 **	6,99 ***	4,83 ***	-0,66 *	5,5 **
	SE of αi	1,70	1,22	2,62	1,55	1,43	2,72	1,38	1,51	2,55	1,26	1,55	2,51
	βi	0,94 ***	1,1 ***	-0,17 ***	0,88 ***	1,11 ***	-0,23 ***	0,89 ***	1,1 ***	-0,21 ***	0,83 ***	1,14 ***	-0,3 ***
	SE of βi	0,03	0,02	0,04	0,02	0,02	0,04	0,02	0,02	0,04	0,02	0,02	0,04
	Rsquared	0,75	0,89	0,04	0,77	0,86	0,07	0,81	0,84	0,06	0,82	0,84	0,13
Denmark	αi (% per year)	1,33	1,99	-0,67	-0,74	-1,74	1,00	3,09	2,84	0,26	1,66	-2,37	4,03
	SE of αi	2,63	1,78	3,89	3,02	1,97	4,21	3,33	2,60	4,58	2,80	2,24	4,29
	βi	1,01 ***	1,02 ***	-0,01	0,99 ***	1 ***	-0,01	1,03 ***	1,01 ***	0,02	0,98 ***	1,08 ***	-0,10
	SE of βi	0,04	0,03	0,06	0,04	0,03	0,06	0,05	0,04	0,07	0,04	0,03	0,06
	Rsquared	0,69	0,83	0,00	0,62	0,80	0,00	0,59	0,70	0,00	0,65	0,78	0,00
Finland	αi (% per year)	5,43	1,11	4,33	6,52 *	0,61	5,91	4,76	2,73	2,03	4,33	-0,76	5,09
	SE of αi	3,97	2,21	5,61	3,72	2,77	5,26	3,89	2,27	5,48	3,75	2,38	5,50
	βi	0,65 ***	1,11 ***	-0,46 ***	0,65 ***	1,06 ***	-0,41 ***	0,64 ***	1,14 ***	-0,5 ***	0,64 ***	1,13 ***	-0,49 ***
	SE of βi	0,04	0,02	0,05	0,04	0,03	0,05	0,04	0,02	0,05	0,04	0,02	0,05
	Rsquared	0,47	0,89	0,18	0,50	0,83	0,16	0,47	0,89	0,21	0,49	0,88	0,20
France	αi (% per year)	2,73	-0,81	3,54	2,93 **	-1,49	4,42 **	3,49 **	-1,34	4,84 **	4,33 ***	-3,31 ***	7,64 ***
	SE of αi	1,68	1,04	2,50	1,40	1,06	2,18	1,70	1,14	2,42	1,54	1,09	2,35
	βi	1,1 ***	0,95 ***	0,15 ***	1,08 ***	0,97 ***	0,11 ***	1,09 ***	0,97 ***	0,12 ***	0,97 ***	1,01 ***	-0,04
	SE of βi	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03
	Rsquared	0,85	0,92	0,05	0,89	0,92	0,03	0,84	0,90	0,03	0,84	0,92	0,00
Germany	αi (% per year)	3,96 ***	-0,70	4,65 **	0,56	-0,64	1,20	5,08 ***	-2,61 *	7,69 ***	2,62 **	-0,66	3,28
	SE of αi	1,41	1,20	2,16	1,29	1,27	2,29	1,57	1,38	2,41	1,29	1,41	2,26
	βi	1,02 ***	1 ***	0,02	1,01 ***	1 ***	0,02	0,93 ***	0,94 ***	-0,01	0,96 ***	1,01 ***	-0,05
	SE of βi	0,02	0,02	0,03	0,02	0,02	0,03	0,02	0,02	0,03	0,02	0,02	0,03
	Rsquared	0,86	0,89	0,00	0,87	0,88	0,00	0,80	0,84	0,00	0,86	0,85	0,00
Ireland	αi (% per year)	3,02	0,68	2,34	0,53	0,84	-0,31	7,66	0,63	7,03	5,30	5,21	0,09
	SE of αi	5,26	3,65	7,43	5,21	3,20	5,93	6,29	3,43	7,31	7,20	3,24	8,18
	βi	1,09 ***	0,89 ***	0,19 **	1,08 ***	0,73 ***	0,35 ***	1,07 ***	0,72 ***	0,35 ***	1,23 ***	0,59 ***	0,64 ***
	SE of βi	0,07	0,04	0,09	0,09	0,04	0,10	0,07	0,04	0,09	0,09	0,04	0,10
	Rsquared	0,51	0,60	0,01	0,51	0,56	0,07	0,42	0,52	0,05	0,42	0,45	0,13
Italy	αi (% per year)	-0,73	1,38	-2,11	1,20	-0,32	1,52	2,01	-3,55 *	5,56 *	2,48	-0,66	3,14
	SE of αi	2,01	1,16	2,87	1,89	1,38	2,84	2,07	1,83	3,00	1,68	1,31	2,53
	βi	1,06 ***	0,95 ***	0,11 ***	1,04 ***	0,96 ***	0,07 **	1 ***	0,91 ***	0,09 ***	0,99 ***	1,02 ***	-0,02
	SE of βi	0,02	0,02	0,03	0,02	0,01	0,03	0,02	0,02	0,03	0,02	0,01	0,03
	Rsquared	0,82	0,92	0,02	0,83	0,89	0,01	0,80	0,80	0,01	0,85	0,91	0,00

Significance Level
***p<0.1** **p<0.05,** ***p<0.01.**

Table 6 - continued: Performance of Growth and Value Portfolios relative to the CAPM

Japan	αi (% per year)	6,68 ***	-4,17 ***	10,85 ***	4,21 ***	-4,25 ***	8,46 ***	4,69 ***	-3,71 ***	8,4 ***	3,97 **	-3,49 ***	7,47 ***
	SE of αi	1,77	0,87	2,49	1,34	1,00	2,12	1,45	1,24	2,10	1,56	1,06	2,46
	βi	0,96 ***	1,02 ***	-0,06 *	0,9 ***	1,04 ***	-0,15 ***	0,94 ***	0,95 ***	-0,01	0,94 ***	1,01 ***	-0,06 *
	SE of βi	0,02	0,02	0,03	0,02	0,01	0,03	0,02	0,02	0,03	0,02	0,01	0,03
	Rsquared	0,76	0,94	0,01	0,83	0,92	0,05	0,82	0,87	0,00	0,80	0,91	0,01
Netherlands	αi (% per year)	0,19	1,87	-1,68	1,15	-2,89 *	4,04	-2,80	0,22	-3,02	1,44	-4 **	5,45 *
	SE of αi	2,38	1,26	3,01	1,94	1,52	2,88	2,89	1,46	3,46	1,98	1,74	2,97
	βi	1,11 ***	0,81 ***	0,3 ***	1,13 ***	0,95 ***	0,19 ***	1,15 ***	0,9 ***	0,24 ***	1,05 ***	1,01 ***	0,04
	SE of βi	0,04	0,02	0,05	0,03	0,03	0,04	0,04	0,02	0,05	0,03	0,03	0,04
	Rsquared	0,69	0,81	0,09	0,77	0,80	0,04	0,61	0,79	0,05	0,74	0,77	0,00
New Zealand	αi (% per year)	-6,59 *	1,28	-7,87 *	1,02	2,07	-1,05	1,34	1,60	-0,26	-1,67	1,97	-3,64
	SE of αi	3,91	1,64	4,75	3,08	1,81	3,76	3,07	1,85	4,02	2,32	2,62	3,86
	βi	1,02 ***	1 ***	0,02	1,08 ***	0,92 ***	0,16 ***	1,15 ***	0,88 ***	0,27 ***	1,05 ***	0,98 ***	0,07
	SE of βi	0,04	0,02	0,05	0,03	0,03	0,05	0,04	0,02	0,05	0,03	0,03	0,05
	Rsquared	0,55	0,87	0,00	0,69	0,83	0,03	0,72	0,81	0,07	0,79	0,72	0,00
Norway	αi (% per year)	1,80	-1,92	3,73	3,25	-0,64	3,89	2,93	-5,45	8,37 *	3,18 **	-4,41	7,59 *
	SE of αi	3,20	1,53	3,97	3,03	2,14	4,12	3,13	2,87	3,79	2,55	2,78	4,04
	βi	0,92 ***	1,03 ***	-0,11 **	0,92 ***	1,02 ***	-0,1 **	0,76 ***	0,74 ***	0,03 ***	0,81	0,99 ***	-0,18 ***
	SE of βi	0,03	0,03	0,04	0,03	0,03	0,04	0,03	0,03	0,04	0,03	0,03	0,04
	Rsquared	0,59	0,89	0,01	0,62	0,80	0,01	0,51	0,53	0,00	0,64	0,69	0,03
Spain	αi (% per year)	1,18	-0,96	2,14	4,64 **	-1,89	6,53 **	1,49	-1,88	3,37	3,25 *	-1,62	4,87
	SE of αi	2,72	1,55	3,58	1,86	1,64	2,92	2,70	2,34	3,70	1,91	1,93	3,18
	βi	0,94 ***	0,99 ***	-0,05	0,99 ***	0,94 ***	0,04	0,97 ***	0,91 ***	0,06	0,92 ***	0,94 ***	-0,02
	SE of βi	0,03	0,03	0,05	0,02	0,02	0,04	0,03	0,03	0,05	0,02	0,02	0,04
	Rsquared	0,63	0,85	0,00	0,80	0,82	0,00	0,64	0,68	0,00	0,77	0,77	0,00
Sweden	αi (% per year)	4,46 **	-1,01	5,48 *	5,18 ***	0,17	5,01 *	3,69 *	-2,52	6,21 *	5,21 ***	-3,37 **	8,58 ***
	SE of αi	2,24	1,29	3,21	1,91	1,41	2,91	2,10	1,54	3,20	1,87	1,62	3,13
	βi	1,02 ***	0,98 ***	0,04	0,96 ***	0,98 ***	-0,02	0,99 ***	1,01 ***	-0,02	0,95 ***	1 ***	-0,05
	SE of βi	0,03	0,02	0,04	0,02	0,02	0,04	0,03	0,02	0,04	0,02	0,02	0,04
	Rsquared	0,75	0,89	0,00	0,79	0,88	0,00	0,76	0,86	0,00	0,79	0,85	0,00
Switzerland	αi (% per year)	-0,01	0,07	-0,08	-0,08	-0,60	0,53	0,12	-1,33	1,45	1,36	-1,33	2,69
	SE of αi	1,79	0,96	2,38	1,58	1,26	2,33	1,98	1,38	2,58	1,59	1,24	2,41
	βi	1,11 ***	0,97 ***	0,14 ***	1,03 ***	1 ***	0,03	0,94 ***	0,99 ***	-0,05	1,06 ***	1,04 ***	0,01
	SE of βi	0,03	0,02	0,04	0,03	0,02	0,04	0,03	0,02	0,04	0,03	0,02	0,04
	Rsquared	0,75	0,89	0,02	0,77	0,83	0,00	0,65	0,81	0,00	0,78	0,85	0,00
UK	αi (% per year)	1,12	-0,46	1,58	2,84 **	-1,37	4,21 **	3,42 **	-1,50	4,93 **	1,84	-1,75 *	3,59
	SE of αi	1,43	0,89	2,06	1,28	0,87	1,95	1,42	0,98	2,12	1,46	1,02	2,20
	βi	1,04 ***	0,97 ***	0,07 ***	1,01 ***	1 ***	0,01	1,01 ***	0,99 ***	0,02	0,96 ***	1,04 ***	-0,08 ***
	SE of βi	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03
	Rsquared	0,86	0,93	0,01	0,88	0,94	0,00	0,86	0,92	0,00	0,84	0,93	0,01
USA	αi (% per year)	3,34 ***	-0,80	4,14 **	4,01 ***	-1,32 **	5,33 ***	4,11 ***	-1,07 *	5,18 ***	3,53 ***	-1,44 *	4,97 ***
	SE of αi	1,23	0,57	1,67	1,11	0,63	1,55	1,11	0,63	1,56	1,26	0,79	1,69
	βi	0,93 ***	1,03 ***	-0,1 ***	0,92 ***	1,05 ***	-0,13 ***	0,87 ***	1,05 ***	-0,18 ***	0,72 ***	1,11 ***	-0,38 ***
	SE of βi	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03	0,02	0,01	0,03
	Rsquared	0,78	0,95	0,02	0,81	0,95	0,04	0,79	0,94	0,07	0,67	0,92	0,24
Mean	αi (% per year)	2,01	-0,49	**2,50**	2,77	-1,12	**3,90**	3,67	-1,34	**5,01**	3,16	-1,55	**4,71**
	SE of αi	2,39	1,41	3,31	2,15	1,57	3,08	2,47	1,76	3,34	2,15	1,75	3,28
	βi	1,00	0,99	0,01	0,99	0,98	0,00	0,96	0,95	0,01	0,94	1,01	-0,07
	SE of βi	0,03	0,02	0,04	0,03	0,02	0,04	0,03	0,02	0,04	0,03	0,02	0,04
	Rsquared	0,72	0,87	0,03	0,76	0,85	0,03	0,70	0,80	0,03	0,75	0,82	0,05

Significance Level
***p<0.1** **p<0.05,** ***p<0.01.**

3.4. Economic Indicators & Summary Statistics

For the analysis of value investing performance relative to the business cycle, one also needs relevant economic data for the countries in the sample. Since I introduced the portfolio return data in chapter 3.3., I am now going to introduce the economic data. There are a wide range of possible economic indicators and key figures available to quantify the economic performance and state of countries. Nevertheless, there are a handful of indicators which are regarded as crucial in determining the current state of a country within the business cycle. The gross domestic product (GDP) is the most common type of economic data used in business cycle analysis. It is a common rule of thumb to define a recession as a period of two consecutive quarters of negative real GDP-growth (Shiskin (1974)). GDP provides information about the performance and size of an economy by counting all the output produced within the borders of a country. Generally, positive GDP growth is seen as a good sign for an economy, which implies higher production levels and less unemployment. Real GDP is an inflation adjusted measure of GDP to enable better comparison and to analyze if a positive GDP growth originates from a country's higher production or from a simple increase in prices (Callen (2008)). This GDP-definition of a recession is used by many analysts and is also the official measure used by most European countries. For instance, the Swiss national bank defines a recession as "a phase in the business cycle in which gross domestic product (GDP) declines for at least two quarters in succession" (SNB (2015)).

As discussed earlier in chapter 2.2, there are different interpretations about the relationship of the business cycle and the stock market. There seems to be disagreement in research about the relationship of GDP growth and equity returns. On one hand, studies such as Ritter (2005) and MSCI Barra (2010) find that cross-country correlation of real stock returns and GDP growth per capita is negative, which implies that economic growth is not advantageous for equity investors. On the other hand, O'Neill, Stupnytska, and Wrisdale (2011) prove there is a positive link between GDP growth and equity returns by taking into account forward-looking expectations. Vu (2015) also find that stock market volatility can predict future GDP-growth for the following one or two quarters for a sample of 27 countries. Be as it may, the takeaway is that GDP growth is a highly important economic factor that should definitely be included in a business cycle analysis.

However, the IMF also points out that the pure focus on GDP data in business cycle analysis has its drawbacks since it is a quite narrow definition. They recommend focusing on a wider set of measures of economic activity (Claessens and Kose (2013)). For instance, a wider approach is applied by the U.S. National Bureau of Economic Research (NBER), which uses real GDP, real income, employment, industrial production, and wholesale-retail sales as economic indicators (NBER (2015)).

Studies that primarily focused on the U.S. markets, such as Kwag and Whi (2006), simply used the NBER data if they were concerned with classifying the stages of the business cycle.

3.4.1. OECD Economic Data

Since this thesis needs the economic data for a broad range of EAFE countries, I decided to use the OECD Stat database provided by the Organization for Economic Co-Operation and Development (OECD) to obtain the economic figures. The OECD Stat database has already previously been used in academic research that concerns itself with economic data in an international context. For instance, Vu (2015) used GDP and industrial production data from OECD, as well as a dummy for recession, in his study to find responses in a country's economic output to variation in a country's stock market volatility. In addition, the OECD Stat database was also used in the paper of Zhu and Zhu (2014) that concerns itself with the predictability of European stock returns by an European business cycle indicator. The OECD gives access to data of a variety of topics such as industry and services, finance, economic projections, monthly economic indicators, national accounts etc. Furthermore, the majority of the data is available for all countries in the sample for the whole research time period of 1975 to 2014. Another advantage of the OECD database is the free access plus the availability of monthly data. Other databases such as the World Bank only provided annual data, which is of no use for my analysis.

Taking into account previous research, I selected a broad range of economic indicators that could be related to the business cycle and have an impact on equity portfolio returns. The indicators were downloaded for the time period of 1974 (to allow for a time lag-analysis later) until 2014. Afterwards, the different economic figures for each country were formatted and collected in a single Excel file. The list of economic indicators considered includes the following:

OECD Composite Leading Indicator (CLI), Industrial Production, GDP Ratio to trend index, quarterly GDP growth rate, GDP Nominal, OECD Business Confidence Index (BCI), OECD Consumer Confidence Index (CCI), Export growth, Import growth, Consumer Prices Growth (CPI), Consumer Opinion Survey, and Unemployment Rate.

Apart from the GDP growth rate, each of these indicators has monthly data available. Since the GDP growth rate is only available on a quarterly basis, the quarterly results were used for all three months of the appropriate quarter. This approach was used, because the primary interest lies in the effect of an announcement of GDP growth on the stock returns on a monthly basis. Therefore, the timing is the most relevant factor. By using this "trick" consistently throughout the analysis, this should not cause any complications. Hence, this enables the researcher to get the GDP growth rate data also on a monthly level. Appendix 4 includes an excerpt of the GDP growth rate dataset for illustration purposes. Next, a short introduction to each of the economic variables is given.

3.4.2. Explanation of Economic Indicators

The CLI was developed by the OECD in the 1970's to provide early signals of turning points of economic activity in countries. The OECD describes the CLI as follows: "The composite leading indicator is a times series, formed by aggregating a variety of component indicators which show a reasonably consistent relationship with a reference series (e.g. industrial production IIP up to March 2012 and since then the reference series is GDP) at turning points. The OECD CLI is designed to provide qualitative information on short-term economic movements, especially at the turning points, rather than quantitative measures. Therefore, the main message of CLI movements

over time is the increase or decrease, rather than the amplitude of the changes. The OECD's headline indicator is the amplitude adjusted CLI. In practice, turning points in the de-trended reference series have been found about 4 to 8 months (on average) after the signals of turning points had been detected in the headline CLI" (OECD (2015b)).[3]

Industrial production measures the output level of industrial companies in a certain economy. It includes different sectors such as mining, manufacturing, and public utilities e.g. energy and water. Due to their sensitivity to changes in economic factors such as interest rates and consumer demand, industrial production is also often used in the context of the business cycle and to forecast future economic performance (OECD (2015c)).

The importance of GDP was already explained before. I will focus on a monthly ratio-to-trend index of GDP (GDP R) calculated by OECD. Since 2012, the OECD is able to generate monthly estimates of GDP based on the quarterly data by using a range of methods (OECD (2012)). The GDP R index is also used for applications such as the OECD business cycle clock, which will be discussed later. Furthermore, the official quarterly GDP growth rate is also included in the data sample, as well as the nominal GDP data. The nominal GDP (GDP N) is given in current prices without adjustment for inflation. Both GDP R and GDP N are provided as an index, which will be used to calculate the growth rates compared to the previous month.

The BCI is an indicator compiled by the OECD that uses the assessment of corporations of their production, order and stock, as well as their current position and expectations of the future. These opinions are collected and compared to a "normal" state, which results in a qualitative index on the economic conditions of a country based on the assessment of businesses (OECD (2015d).

Similar to the BCI is the CCI, which is created by applying the same method. The difference is that the CCI is based on the economic situation of households and their plans for major purchases. As a result, the CCI is a qualitative index of the economic condition of households in a certain country.

Export- and import growth are self-explanatory and can provide further information about the economic state of a country. They are also part of OECD's key short-term economic indicators and therefore were also considered.

The Consumer price index is basically a measure of inflation. The index is created by measuring the change of prices of a basket of goods and services that fits the purchase behavior of a typical group of households. The inflation is measured as a growth rate and as an index (OECD (2015e)).

The consumer opinion survey indicator is another indicator to capture the consumers' current assessment of the economic situation. The indicator hopes to collect findings regarding consumer confidence, the expected economic situation, and price expectations. One of the main characteristic of this survey is that the questions are tendency-driven and don't require exact numbers in their answers (OECD (2015f)).

[3] Further information concerning the formation of the CLI can be found in OECD (2012).

Finally, the unemployment rate summarizes the number of unemployed people as a percentage of the labor force. Growth of unemployment rates can also give certain insights into the economic situation of a country. It is also a part of OECD's key short-term economic indicators (OECD (2015g)).

This paragraph provided a short explanation of all the economic factors that are considered for the later analysis in this thesis. Many of the data series were already adjusted for seasonality by the source provider, i.e. the individual countries. In different cases, the OECD used the X-12 Reg-ARIMA method to include the seasonal adjustments. The mentioned indices are fluctuating around a value of 100.

The next sub-chapter provides an overview of these economic indicators.

3.4.3. Summary Statistics of Economic Indicators

The economic indicators that were introduced before are summarized in a compact form in table 7 below. Since the economic index numbers in most countries are fluctuating in an area of 95 to 105, depending on the state of the economy, it is not a surprise that the mean numbers are very close to 100 as well. The growth in percentage points corresponds to the respective index. Since the indices are not fluctuating on a big scale, the growth rates are relatively low in absolute terms. In addition, the data is monthly, which also accounts for the low numbers to some extent. Another point worth noting is that for a few countries there was no data available regarding certain economic indicators. These cases are marked as N/A. The procedure regarding the economic variables will be explained later in the methodology section in chapter 4.

Table 7: Monthly Means of Economic Indicators

Summary Statistics: Monthly Means of Economic Indicators

		AUS	*A*	*BE*	*CAN*	*DEN*	*FIN*	*FR*	*GER*	*IRE*	*IT*	*JP*	*NL*	*NZ*	*NO*	*SP*	*SWE*	*SWI*	*UK*	*US*
CLI	Index	99,96	99,96	100,01	99,87	100,03	99,98	99,96	100,09	99,98	100,01	100,08	99,95	99,99	99,98	99,97	99,93	99,94	100,09	99,84
	Growth in %	0,008	0,003	0,008	0,007	0,009	0,009	0,005	0,006	0,004	0,008	0,010	0,005	0,011	0,001	0,009	-0,001	0,007	0,011	0,010
Industrial Production	Growth in %	0,183	0,269	0,186	0,152	0,206	0,232	0,060	0,156	0,650	0,075	0,149	0,146	0,623	0,278	0,089	0,134	0,157	0,058	0,197
BCI	Index	99,89	100,00	99,99	N/A	100,03	100,03	100,00	99,85	100,00	99,90	100,00	99,82	99,87	100,01	99,69	99,99	99,72	99,98	99,76
	Growth in %	0,010	0,001	0,000	N/A	-0,012	0,014	-0,002	0,009	0,012	0,008	0,005	0,006	0,011	-0,003	0,003	0,008	0,005	0,002	0,010
CCI	Index	100,01	100,01	99,96	100,00	100,03	99,99	99,91	99,99	99,99	100,03	100,01	99,99	99,99	N/A	99,97	99,99	100,03	100,01	99,85
	Growth in %	0,000	-0,001	0,001	0,000	0,009	0,000	-0,003	0,003	0,013	0,008	-0,004	0,002	0,010	N/A	0,002	0,011	0,007	0,008	0,009
GDP Ratio to Trend	Index	99,98	99,95	99,95	99,99	99,96	99,95	99,95	99,94	100,00	99,94	99,93	99,97	99,96	100,02	99,95	100,00	99,85	99,95	99,96
	Growth in %	0,002	0,001	0,000	0,002	0,008	-0,005	0,001	0,004	0,003	0,003	0,004	0,005	-0,005	0,003	0,001	-0,003	0,001	0,003	0,007
GDP Nominal	Index	99,97	99,94	99,93	99,98	99,95	99,95	99,92	99,94	99,99	99,94	99,93	99,96	99,97	100,01	99,94	99,99	99,87	99,94	99,96
	Growth in %	0,003	0,001	0,001	0,002	0,007	-0,003	0,002	0,003	0,002	0,003	0,004	0,005	-0,003	0,003	0,001	-0,002	0,001	0,003	0,006
GDP - Quarterly	Growth in %	0,779	0,531	0,476	0,648	0,424	0,535	0,479	0,469	1,025	0,372	0,574	0,527	0,604	0,705	0,538	0,494	0,412	0,572	0,695
Export	Growth in %	0,873	0,669	0,633	0,675	0,665	0,976	0,578	0,526	1,056	0,981	0,373	0,580	1,077	1,165	1,377	0,770	0,471	1,124	0,622
Import	Growth in %	0,936	0,672	0,575	0,677	0,741	0,903	0,604	0,536	0,839	0,922	0,458	0,565	1,060	1,006	1,201	0,714	0,417	0,980	0,723
Consumer Prices	Growth in %	N/A	0,243	0,270	0,315	0,330	0,349	0,325	0,198	0,408	0,500	0,135	0,231	N/A	0,358	0,533	0,354	0,155	0,415	0,316
Consumer Opinion Survey	Index	1,86	-2,54	-10,12	105,32	2,73	8,63	-16,26	-7,31	-15,89	-17,38	42,74	-2,94	N/A	N/A	-14,02	9,94	N/A	-9,50	118,16
Unemployment Rate	Level	N/A	6,97	4,70	8,42	8,36	6,16	9,24	9,98	7,94	11,02	9,22	3,34	6,06	4,18	16,64	6,15	N/A	7,54	6,53
	Growth in %	N/A	0,024	0,183	-0,033	0,056	-0,027	0,226	0,067	-0,021	-0,031	0,169	0,232	-0,059	-0,038	0,051	0,357	N/A	-0,157	-0,015

In chapter 3.5, I will create a link between the economic data and the business cycle to show how the two areas are connected.

3.5. Economic Data and Business Cycles

In this chapter, I am going to present how the economic data relates to the business cycle by introducing the OECD business cycle clock and by creating graphical charts of the business cycle.

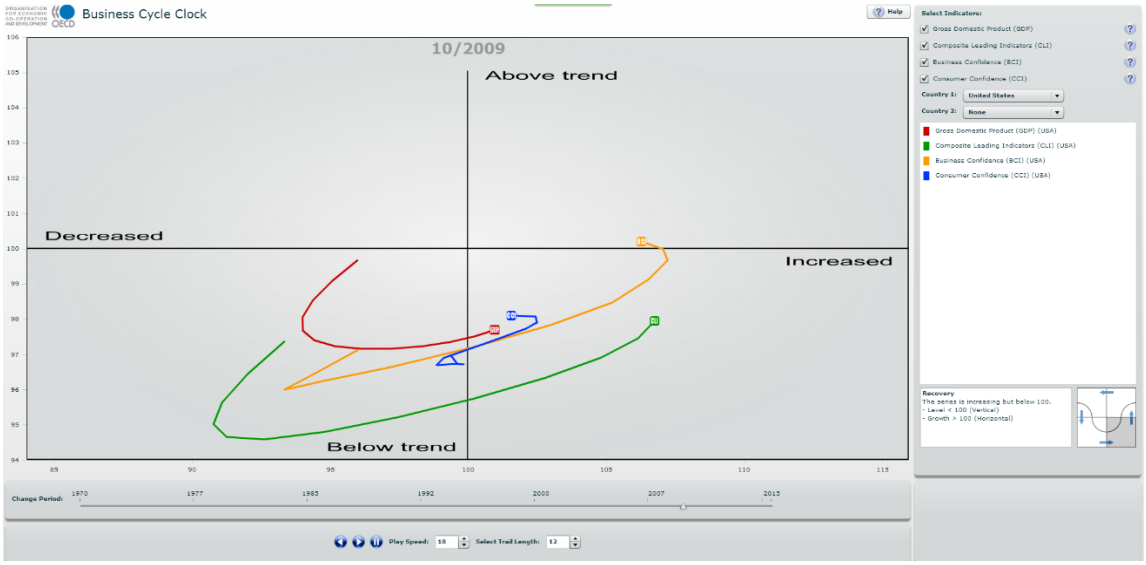
3.5.1. OECD Business Cycle Clock

So far only the "raw" economic indicator numbers were presented. Some of these economic indicators can also be used to describe the stage of the business cycle a certain country is in. Therefore, the OECD designed a business cycle clock as a tool to visualize business cycles. It shows the fluctuation of the economic activity of a certain country around its long term potential level and highlights how certain economic indicators interact with the business cycle. The business cycle clock includes the GDP (ratio-to-trend), the CLI, the BCI, and the CCI as economic indicators. In the OECD framework the monthly GDP data is used to describe a country's business cycle. The behavior of the other economic indicators relative to the GDP development, indicates if these variables exhibit leading, coincident, or lagging behavior relative to the business cycle (OECD (2015h)).

An example of the business cycle clock is provided in Figure 2 below. Figure 2 shows the development of the business cycle of the U.S. in October 2009. The y-axis represents the index-level of the respective indicator as published in the OECD database, while the x-axis represents the annualized semi-annual rate of change of this indicator. The OECD uses annualized semi-annual rates of change to find the right balance between noise and phase shift. A complete turn of the clock lasts two to 10 years in general. Peaks and troughs of the business cycle occur normally a few months before the indicators cross the y-axis (OECD (2015i)).

The clock is divided into four categories, which represent the four stages of the business cycle. In a counterclockwise order starting from the top left the categories are as follows: downturn, slowdown, recovery, and expansion. The trail of each indicator has a length of 12 months and shows where the country's economy was in each of the last 12 months. The level of an indicator determines whether a country lies above the trend (>100) or below the trend (<100), while the rate of change of an indicator determines if a country is increasing (>100) or decreasing (<100). It can be clearly seen in running the U.S. example that the CLI, BCI, and CCI are leading compared to the GDP development. The CLI seems to lead around three to eight months in relation to the GDP business cycle, which confirms the OECD description from earlier. In conclusion, the business cycle clock is a fitting tool to get a visual overview of the business cycle development of a country. It was also shown that the CLI, BCI, and CCI are leading indicators of the business cycle and should therefore be used in a business cycle analysis.

Figure 2: OECD Business Cycle Clock (OECD (2015h))

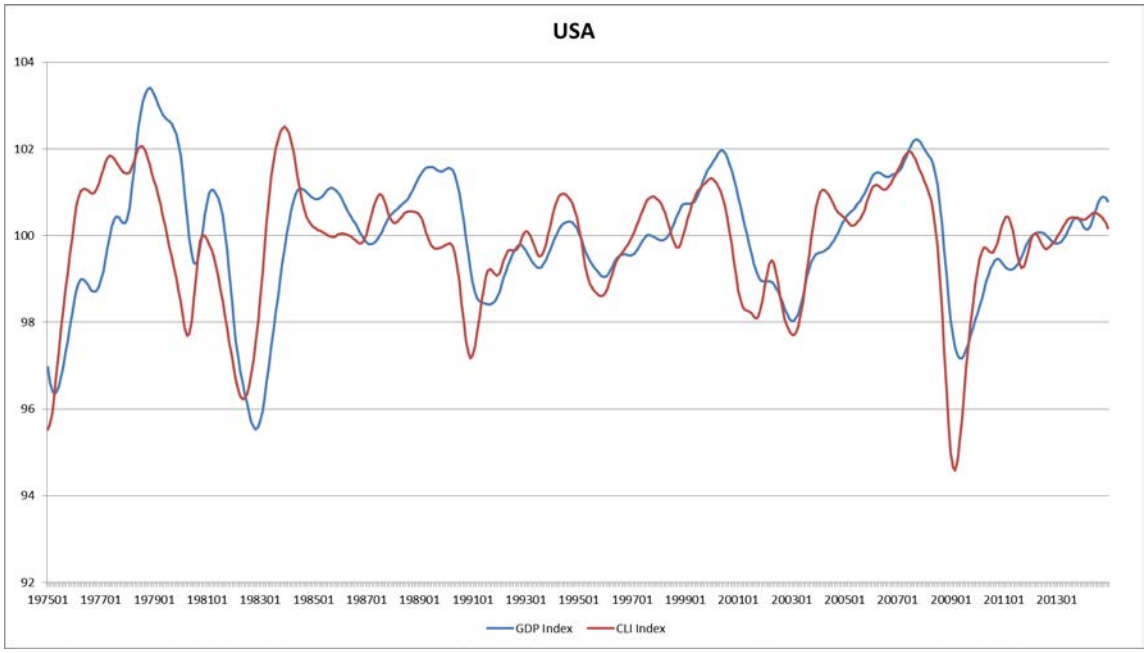


Furthermore, knowing the index level plus the annualized semi-annual rate of change of a certain indicator, I am able to define the stage of the business cycle a country is in in each month of the dataset. The index levels are already provided in the data, but the rates of changes need to be calculated. This was done by first adding "1" to the growth rate to bring the rate of change to a new format. Next, I calculated the six month rate of change by using the growth rates of the month in question plus the previous five months. In the final step, I annualized the six month rate of change. An example of this calculation can be found in appendix 5. The monthly business cycle stage will be useful in the analysis in chapter 5, to define the monthly stage of the business cycle a country is in.

3.5.2. Business Cycle Charts

Going a step further, the data of the GDP and CLI indices can also be used to create a chart of a country's business cycle development along a timeline. Hence, using the GDP and CLI index levels, one can visualize the movements of the business cycle over time. This is a nice way of showing the business cycles over time and to see the impact of recessions and boom periods. In addition, the leading behavior of the CLI index can also be observed in these kind of charts. An example of the business cycle development of the U.S. is provided in figure 3. This graph allows one to easily spot economically impactful events such as the financial crisis in 2008, the dot-com bubble in 2001, or the recessions in the early 1980s. The date of the peaks and troughs in the chart also correspond to the ones released by the NBER in the U.S. For example, the NBER defines the trough of the financial crisis as June 2009, which matches the OECD data that states that the lowest GDP index data is in May and June 2009. The complete set of business cycle charts for all countries in the sample is provided in appendix 6.

Figure 3: Business Cycle - USA



Analyzing the business cycle graphs in the appendix, one can conclude that the leading behavior characteristics of the CLI index are inherent to all countries in the sample. In addition, it can be clearly observed that the individual countries show similarities in the movement of the business cycles in terms of time and direction of change. It seems that the business cycles of individual countries follow a global type of business cycle. Regarding far-reaching economic events such as the financial crisis in 2008, which had a global impact and affected most economies on this planet, this is not that surprising. In todays interconnected and globalized world, a country's economic performance is influenced by other external events and depends on factors that cannot be controlled to some degree. This observation matches the evidence for a global business cycle found by Kose, Otrok and Whiteman (2003). As mentioned earlier, they find evidence for a world business cycle by analyzing volatility of macroeconomic aggregates in a 60 country sample.

The fact that countries business cycles follow the same pattern to some extent, is also going to be a useful result when explaining stock market returns with business cycle data. The correlations of countries stock market portfolios shown in table 4 are also connected to the global business cycle and to the interplay of world financial markets.

To summarize, chapter three provided a detailed overview of the financial returns data and the economic data used in the later analysis. The presented dataset was already used to provide updated evidence of the value premium measured in excess return and by calculating the Sharpe-ratio. Additionally, the value and growth returns were also analyzed in relation to the CAPM. The individual economic indicators were explained and linked to their relevance for the business cycle. GDP, CLI, CCI, and BCI data are closely linked to the business cycle and were used to visualize the movement of business cycles over time. In the next chapter, the methodology of the further analysis will be described in more detail.

4. Methodology

The main goal of this thesis is to investigate the relationship of value and growth portfolios in the context of business cycles for selected countries. The analysis will focus on two areas. First, the researcher wants to find the impact of the different stages of the business cycle on the performance of value and growth portfolios. I want to answer the question of if the value premium persists in the different phases of the business cycle, and which investment style fares the best in what stage of the business cycle. While the first part only distinguishes between the different stages of the business cycle, the second part focuses directly on the underlying economic data that shape the business cycle. Moreover, in the second part, the thesis wants to investigate the outcome of an active strategy of overweighting- and underweighting of country-portfolios to take advantage of differences in the business cycles. Both parts of the analysis will focus on the B/M-sorting of value portfolios; this is the most popular value-sorting method in academic research. In addition, I will also include the CE/P-sorting because it achieved the highest mean returns and Sharpe-ratios in the descriptive analysis in chapter 3. Accordingly, most results concerning the value portfolios will be available for both the B/M and CE/P-sorting. This chapter is going to introduce the methodology used in the analysis in chronological order.

4.1. Value- and Growth-Investing – Business Cycle Analysis

As already mentioned, the first part of the analysis focuses on the four stages of the business cycle – expansion, crisis, recession, and recovery – and how they affect value and growth portfolios. The analysis follows the approach used by Kwag and Whi (2006) who showed that a U.S.-value portfolio consistently outperformed a U.S.-growth portfolio throughout the business cycle. Their study compares a value portfolio with a growth portfolio in expansion and contraction periods of the business cycle. They form value and growth portfolios the same way I did in this thesis, by sorting using B/M, E/P, CE/P, and D/P. The return data are used to form three risk-adjusted performance measures: Sharpe-ratio, Treynor-ratio, and information-ratio. I will extend their analysis by differentiating between the four stages of the business cycle instead of just the two. Furthermore, the analysis is performed for all 19 countries in sample, whereas Kwag and Whi (2006) just focused on the United States. However, my analysis will only focus on the mean return and the Sharpe-ratio since they are sufficient to answer the research question. This analysis enables me to compare value and growth portfolio returns throughout the business cycle in order to answer the question of if value outperforms growth in all four states of the business cycle. Furthermore, one will be able to see which economic stage favors which type of investment style.

4.2. Regression Analysis & Creation of Global Active Value Portfolio

The second part of the analysis wants to find the relationship between different economic indicators and the return data of value portfolios. The obtained results will be used to create an actively managed global portfolio that rebalances the country-weights monthly, depending on the return forecasts from the economic model. The chosen approach uses regression analysis to estimate the relationship between the economic data – the explanatory variables – and the value-portfolio return data – the dependent variable. This approach is inspired by Vu (2015), who also uses time-

series stock market data and economic OECD data to perform regressions to inquire about how a surprise movement in stock market volatility can affect future economic output forecasts.

A similar approach is also used by Zhu and Zhu (2014), who investigate the predictive power of a European leading economic indicator (ELEI) on European stock returns. They use a standard forecasting specification, which regresses an independent lagged predictable variable on stock returns. The general form of such a forecasting specification can be written as follows:

$$r_{t+1} = \alpha + \beta x_t + \varepsilon_{t+1} \quad (3)$$

r_{t+1} is the stock return, and x_t is an explanatory variable. The stock return can include a time lag to account for the fact that changes in economic indicators are only reflected in stock return data after a certain delay. They conduct both in-sample and out-of-sample regressions to analyze their forecasting models. They find that the ELEI generally outperforms a country-specific economic indicator (CLEI) in the European stock market and strongly predicts European stock returns. Their out-of-sample R-square ranges between 1.3% and 8.5% and is statistically significant (Zhu and Zhu (2014)).

Therefore, the approach of the second part of the analysis loosely follows the method used by Vu (2015) and Zhu and Zhu (2014). The analysis is split into an in-sample and out-of-sample analysis, which follows the seven steps stated below to find answers to the research question.

In the first step, I select the economic indicators that will be included in the model. Instead of including all the 12 economic variables presented in chapter 3.4.2., I select the indicators that are most closely related to the business cycle and that are most significant in predicting value returns. To select the appropriate economic indicators for the model, I look at three areas. First, I carry out a univariate regression analysis for each of the economic indicators, where I regress the monthly value returns (dependent variable y) of a certain country on the respective monthly economic variable (explanatory variable x). I am mostly interested in the strength of the relationship between the two variables and in the significance of the explanatory coefficient. Second, I perform a stepwise regression process following a backward elimination procedure to choose the predictive variables for the model. The elimination process uses the form of a t-test. Starting from a regression model that includes all 12 variables, the stepwise regression process eliminates the explanatory variable with the smallest t-statistic, while the R-squared usually gets larger with each elimination (Duke University (2015a)). This step is repeated until the "optimal" model is found. The "optimal" model from the stepwise regression process has the highest R-squared and eliminated some insignificant explanatory variables. Third, I look at the qualitative fit of the variables to explain stock market returns and how closely related they are to business cycles. Taking into account all three areas, I will select the economic indicators that fit best for the desired model. For efficiency reasons, these analysis will be done for one country only. The resulting model will then be used for the analysis of all countries in sample. I chose the U.S. market for this initial variable selection process, because of its popularity in academic research and the reliability of the data. The outcome from this first step is the final selection of economic indicators that I am going to use in my regression model.

In the second step, I am going to perform a separate multiple regression analysis for each country in sample. The regression model will include all the monthly economic indicators as explanatory

variables that were selected in step one. The dependent variable is the monthly value portfolio return of the respective country. The time period considered for the in-sample analysis is generally from 1975 to 2014. The goal is to find the correlations and the regression coefficients of the economic indicators together with their significance level. Additionally, the R-squared value is also of interest to obtain insights about the goodness of fit of the model. Furthermore, this regression analysis is performed multiple times to include different time lags in the data. The lag constitutes of one, three, six, and twelve months of difference between the return data and the economic data.

In the third step, I will use the regression results from the second step together with the economic indicator data to calculate theoretical predicted monthly returns for the value portfolios. The sum of all regression coefficients multiplied with the appropriate monthly economic figures results in a predicted return for this specific month. This process is continued for each month in the research period and is repeated for every country in the sample. As a result, I get hypothetical monthly return data for each country's value portfolio, which were predicted from the economic indicators in that country.

The fourth step now uses these predicted returns to overweight and underweight countries in the global value portfolio relative to their OECD weight. Countries with a negative predicted return for the upcoming month are assigned a lower portfolio weighting, which is equivalent to investing a lower share of the total portfolio endowment in these countries. The reduction in portfolio weights will be the same in relative terms for each country with a negative monthly return prediction. This freed-up capital from the underweighted countries can now be invested in countries with a positive return prediction for the upcoming month. The freed-up capital will be split among the countries with a positive return prediction in proportion to the size of the predicted return. Hence, the higher a predicted return of a country, the more this country will be overweighed. The total sum of the invested capital, respectively the total weight, always stays the same and is equal to one.

The fifth step allows me to calculate the monthly excess returns of this actively managed global portfolio. With the new weights, I am able to calculate the monthly excess returns of this active portfolio. Multiplying the overweighted and underweighted country-portfolio-weights with the effective realized returns will result in the monthly returns for this global portfolio.

Sixth, I can use the monthly global returns to calculate the mean return, standard deviation, and Sharpe ratio of the global active value portfolio for the whole research period. Finally, this return can be compared to the global balanced value-, growth-, and market-portfolios, which just use the OECD weighting and were not rebalanced using business cycle data.

Steps one to six will be repeated for the alternatives that include time lags in the data. A comparison of the different results with the lags will also provide further insights on the predictability of value returns based on economic business cycle data. Finally, a complete overview of the results of the in-sample-analysis will be provided.

In the last step, I will also perform an out-of-sample-analysis. Out-of-sample analysis are quite common in economic and financial research and were for example used by Zhu and Zhu (2014). For this purpose, I am going to use the time period from 1975 to 1990 to perform the regression

analysis as described in step two. The results from these regressions will then be used to predict the returns from 1990-2014 by using economic business cycle data. This approach follows the same steps as described above and will also provide a final overview of the outcomes.

In the next chapter, I will use the analysis described above to answer the research question.

5. Analysis

The analysis is going to follow the suggested approach introduced in the methodology section above. Consequently, I am first going to analyze the impact of the four stages of the business cycle on the performance of value and growth portfolios.

5.1. Business Cycle Effect on Value vs. Growth Portfolios

As it was already shown in chapter 3.3., value portfolios generally outperform growth portfolios. This is true for most countries during the research period of 1975 until 2014. Furthermore, the value premium is persistent in all four sorting methods and lies on average in the range of 3% to 5.3%. I am now going to analyze how value and growth portfolios behave during the four stages of the business cycle. As mentioned before, the approach used follows the paper of Kwag and Whi (2006).

The four stages of the business cycle are downturn, expansion, recovery, and slowdown. In chapter 3.5.1. I showed how the CLI index level and growth rate can be used to define the stage of the business cycle a country is in. Using the CLI data, I was able to define the business cycle stage of each country in sample for every month in the period under observation. An illustrative example of the layout of the datasheets that includes the business cycle stage can be found below in table 8.

Table 8: Business Cycle Stages - Example

	Switzerland					
		B/M			CE/P	
	Market Return	Value Return (B/M)	Growth Return (B/M)	Economic State	Value Return (CE/P)	Growth Return (CE/P)
197501	22,6	19,7	24,79	Slowdown	14,44	27,83
197502	7,54	-0,36	9,56	Slowdown	2,93	5,93
197503	-1,13	-2,56	-2,16	Slowdown	-1,64	-0,19
197504	4,9	6	2,05	Slowdown	-0,77	6,92
197505	-2,15	-3,57	-0,83	Slowdown	-2,48	-1,69
197506	-3,45	-5,23	-0,35	Slowdown	-3,02	-2,95
197507	-5,87	-4,93	-4,58	Recovery	-6,79	-6,14
197508	-4,85	-5,6	-3,01	Recovery	-4,02	-6,03
197509	-8,86	-8,94	-6,19	Recovery	-9,09	-13,3
197510	14,32	14,62	9,21	Recovery	13,41	21,39
197511	3,61	2,87	1,62	Recovery	-0,67	2,4
197512	4,36	5,41	4,78	Recovery	6,67	4,56
197601	3,61	6,44	1,98	Recovery	3,29	4,49
197602	-0,24	1,54	0,81	Recovery	7,49	-5,89
197603	0,76	5,1	-0,48	Expansion	5,46	1,2
197604	-1,27	-2,56	-1,49	Expansion	-0,49	-1,79
197605	0,69	-1,02	1,08	Expansion	1,88	0,53
197606	1,48	3,78	1,64	Expansion	4,7	-1,31
197607	-0,03	0,69	2,04	Expansion	4,56	-4,85
197608	-0,08	0,56	2,62	Expansion	3,2	-6,21
197609	-0,87	-4	-0,71	Expansion	-0,22	1,49
197610	-3,44	-5,16	-2,74	Expansion	-6,32	-5,18
197611	0,4	0,98	0,41	Expansion	1,36	-0,66
197612	6,05	6,55	4,91	Downturn	4,89	9,03
197701	-1,21	-0,62	-0,82	Downturn	-4,92	-2,69
197702	-2,55	-1,86	-1,74	Downturn	-5,08	-4,41
197703	0,92	1,61	0,7	Downturn	0,45	1,7
197704	0,91	7,94	-5,94	Downturn	3,02	4,59
197705	-3,25	-4,38	-3,26	Downturn	-3,79	-2,01
197706	2,47	2,1	0,78	Downturn	4,46	3,71
197707	2,29	2,22	2,33	Downturn	2,2	1,44
197708	3,2	2,42	4,74	Downturn	5,7	1,1
197709	11,51	10,68	12,01	Expansion	11,08	12,86
197710	-0,69	-4,37	0,6	Expansion	-3,46	-0,31
197711	3,39	0,09	5,03	Expansion	5,69	2,38
197712	7,48	6,81	9,89	Expansion	9,18	3,39

Every month has the appropriate business cycle stage, i.e. economic state, assigned. By sorting on the four stages, I was able to calculate the monthly mean returns and standard deviations of

each state. The monthly mean returns were multiplied by 12, and in case of standard deviations they were multiplied by √ (12) to annualize the data.[4]

I start by calculating the market mean returns for the four stages, which is shown in table 9. As one would logically expect, the market returns were on average the lowest in the downturn and slowdown phase of the business cycle. 11 out of 19 countries have their lowest mean return in the downturn phase, while 6 countries have their lowest mean return in the slowdown stage. Therefore, it is not a surprise that on average the downturn- and slowdown-phase returns are negative with minus 1.8 and minus 0.29 percent on average across all countries. In contrast, the expansion and recovery stage show positive mean returns for almost all countries. As a result, on average the expansion and recovery stage have annual returns of 16.8 and 15.02 percent. The balanced portfolio, which uses the OECD weighting to weight the country returns, reaches very similar results.

Table 9: Market Mean Annual Returns in Business Cycle

	Market Mean Return			
	Downturn	**Expansion**	**Recovery**	**Slowdown**
Australia	-8,88	16,16	13,70	8,61
Austria	-10,72	24,53	9,52	-3,81
Belgium	0,17	17,98	7,10	6,63
Canada	11,35	14,06	8,66	-4,31
Denmark	12,45	22,06	14,60	-8,09
Finland	10,31	36,24	7,01	-18,75
France	-8,40	15,72	16,62	5,99
Germany	10,83	15,15	-0,53	1,15
Ireland	-22,40	11,12	16,75	6,55
Italy	-8,71	5,22	11,43	10,98
Japan	-7,39	5,06	28,25	2,91
Netherlands	5,70	12,49	19,00	3,72
New Zealand	5,22	15,06	21,38	-14,90
Norway	-10,62	25,76	35,98	-21,00
Spain	-16,85	18,49	3,36	6,77
Sweden	-6,19	24,69	22,79	1,89
Switzerland	-2,59	16,60	18,89	-0,41
UK	5,76	11,20	17,40	9,26
USA	6,74	11,65	13,38	1,24
Average	**-1,80**	**16,80**	**15,02**	**-0,29**
Balanced Portfolio	**-1,59**	**16,61**	**15,64**	**-0,60**

Since I calculated the mean return and the standard deviations for each country, I am also able to form the Sharpe ratio. This provides me with a risk-adjusted performance measure. An overview of the Sharpe ratio throughout the business cycle for the market portfolio is provided in table 10. The results resemble the outcomes of the market mean returns. Downturn and slowdown have the smallest risk-adjusted returns, while expansion and recovery show the highest Sharpe-ratio. It is interesting to note that Switzerland and the Nordic countries such as Denmark, Finland, Norway,

[4] Following the approach of Lettau and Wachter ((2007)), p. 8.

and Sweden achieve the highest Sharpe ratios for the countries market returns. Here again, the outcomes of the average portfolio are almost equal to the balanced portfolio.

Table 10: Market Sharpe Ratio in Business Cycle

	Market Sharpe Ratio			
	Downturn	**Expansion**	**Recovery**	**Slowdown**
Australia	-0,42	0,65	0,71	0,34
Austria	-0,42	1,07	0,54	-0,15
Belgium	0,01	0,94	0,40	0,32
Canada	0,59	0,88	0,50	-0,18
Denmark	0,86	1,34	0,79	-0,33
Finland	0,44	1,42	0,25	-0,51
France	-0,35	0,61	0,91	0,28
Germany	0,51	0,82	-0,02	0,05
Ireland	-1,07	0,55	0,66	0,24
Italy	-0,34	0,21	0,45	0,39
Japan	-0,33	0,27	1,24	0,14
Netherlands	0,28	0,78	1,08	0,16
New Zealand	0,30	0,67	0,81	-0,64
Norway	-0,40	1,12	1,52	-0,72
Spain	-0,78	0,93	0,13	0,27
Sweden	-0,28	1,09	1,06	0,07
Switzerland	-0,14	1,12	1,15	-0,02
UK	0,36	0,65	0,70	0,33
USA	0,52	0,85	0,92	0,06
Average	**-0,04**	**0,84**	**0,73**	**0,01**
Balanced Portfolio	**-0,02**	**0,84**	**0,75**	**-0,01**

In the next step, I want to focus on the mean returns and Sharpe ratios of the value and growth portfolios in the different economic stages. As mentioned earlier, I will just use the B/M and the CE/P ratios to sort for value and growth. Table 11 and 12 summarize the performance of value investing relative to growth investing over the four economic states. Table 11 highlights the outcomes of value and growth investing according to the book-to-market sorting. The general picture seems fairly similar to the market performance shown before. Downturn and slowdown exhibit low and often negative returns, while expansion and recovery have high positive returns. On average, in a *downturn* period both value and growth portfolios exhibit negative returns, while value actually underperforms growth slightly by -0.26. Looking at individual countries, in 10 out of 19 countries value underperforms growth in a downturn, which means that in 9 out of 19 countries value outperforms growth in a downturn. Therefore, it is difficult to draw a general conclusion about which investing style fares better in a downturn scenario. It seems that there are country-specific factors, which determine the behavior of value and growth during the downturn phase.

If we look at the next stage in the business cycle – *recovery* – the picture changes. Value portfolios clearly outperform growth portfolios on an average level, but also on a country level in 15 out of 19 countries. The absolute difference between the value investing style and the growth investing style seems to be the biggest in this stage of the business cycle. The average difference amounts to around 8 percentage points. Examples such as Sweden or Norway show that the mean return difference during recovery can even be around 20 to 30 percentage points per annum. Hence, it seems value investments are a lot more profitable on an absolute and relative level in the recovery

phase than in any other stage of the business cycle. From an investor perspective it would make sense to shift assets from growth- and normal stocks to value stocks, as soon as the worst part of a market downturn has passed. This evidence partly matches the presented results in the theory section. Value seems to do better or equally well in all four stages of the economic cycle. Furthermore, value outperforms growth the most clearly in the recovery phase, which takes place directly after economic bad times. This could be connected to the proposal of Zhang (2005) that value stocks are riskier, especially during economic bad times. Consequently, after an economic downturn value stocks are rewarded with high returns for the additional risk they incurred. Another explanation approach would be that value firms were additionally underestimated and undervalued by investors during the downturn. As a result, after the downturn high returns that increase the market price try to correct for that undervaluation.

Table 11: Value and Growth Performance in Business Cycle (B/M)

	Mean Return							
	Downturn		Expansion		Recovery		Slowdown	
	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)
Australia	-6,52	-11,73	19,40	14,81	21,09	9,13	8,88	7,75
Austria	-16,96	-4,38	30,14	26,33	11,40	1,16	5,23	-14,43
Belgium	1,69	0,96	20,67	16,40	10,13	7,60	11,16	7,78
Canada	9,78	10,30	11,19	14,12	13,96	4,75	-1,67	-7,64
Denmark	21,45	15,15	22,07	24,48	12,46	17,51	-7,02	-6,82
Finland	5,22	16,09	32,98	42,89	24,70	-0,97	-16,35	-17,17
France	-9,36	-6,21	19,75	15,43	23,15	12,41	9,67	4,05
Germany	15,73	10,02	18,21	14,36	9,84	-3,00	2,39	1,58
Ireland	-18,93	-16,45	12,31	12,68	14,38	15,26	18,56	3,70
Italy	-14,42	-5,92	7,62	5,94	15,94	11,10	6,06	12,66
Japan	-4,48	-10,30	14,87	-0,58	30,87	26,82	9,91	-1,47
Netherlands	0,61	11,04	11,36	11,83	30,97	14,47	4,52	4,37
New Zealand	-3,79	8,24	7,20	14,19	17,08	28,71	-18,31	-15,25
Norway	0,90	-12,39	20,27	24,58	59,33	27,97	-31,13	-19,16
Spain	-0,92	-22,99	19,02	15,67	-3,48	4,26	8,73	7,50
Sweden	-3,77	-3,35	26,84	23,57	37,76	16,84	3,98	1,12
Switzerland	-10,79	-0,14	22,04	15,10	19,94	19,05	0,49	-0,89
UK	7,59	7,41	12,59	8,25	27,54	13,06	5,86	11,11
USA	12,63	5,29	12,87	10,33	14,74	13,74	4,67	1,49
Average	**-0,75**	**-0,49**	**17,97**	**16,34**	**20,62**	**12,62**	**1,35**	**-1,04**
Balanced Portfolio	**-0,23**	**-0,26**	**17,73**	**16,09**	**21,08**	**13,54**	**1,17**	**-1,26**

	Sharpe Ratio							
	Downturn		Expansion		Recovery		Slowdown	
	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)	Value (B/M)	Growth (B/M)
Australia	-0,32	-0,50	0,81	0,52	1,02	0,46	0,34	0,30
Austria	-0,60	-0,17	1,06	1,08	0,45	0,07	0,16	-0,55
Belgium	0,08	0,05	0,85	0,86	0,49	0,41	0,42	0,37
Canada	0,51	0,48	0,61	0,73	0,62	0,27	-0,07	-0,27
Denmark	1,07	0,80	1,22	1,37	0,55	0,88	-0,23	-0,25
Finland	0,24	0,56	1,32	1,41	0,74	-0,03	-0,54	-0,39
France	-0,37	-0,25	0,68	0,61	1,01	0,74	0,34	0,19
Germany	0,71	0,46	0,87	0,73	0,42	-0,13	0,09	0,06
Ireland	-0,56	-0,49	0,46	0,62	0,45	0,48	0,38	0,13
Italy	-0,49	-0,23	0,27	0,24	0,55	0,45	0,18	0,47
Japan	-0,21	-0,44	0,72	-0,03	1,22	1,10	0,39	-0,07
Netherlands	0,02	0,54	0,54	0,74	1,51	0,85	0,14	0,23
New Zealand	-0,17	0,42	0,23	0,60	0,43	1,05	-0,59	-0,63
Norway	0,03	-0,41	0,79	0,94	1,85	1,12	-0,86	-0,61
Spain	-0,04	-0,87	1,00	0,68	-0,11	0,16	0,26	0,31
Sweden	-0,15	-0,14	1,00	0,99	1,50	0,74	0,13	0,04
Switzerland	-0,49	-0,01	1,30	0,97	0,81	1,24	0,02	-0,04
UK	0,43	0,45	0,67	0,46	0,90	0,54	0,19	0,40
USA	1,06	0,38	0,91	0,69	0,92	0,88	0,22	0,08
Average	**0,04**	**0,03**	**0,81**	**0,75**	**0,81**	**0,59**	**0,05**	**-0,01**
Balanced Portfolio	**0,07**	**0,05**	**0,80**	**0,75**	**0,82**	**0,63**	**0,04**	**-0,02**

After an economy recovers and production and growth are back on a stable level, the economy is situated in the *expansion* phase of the business cycle. The expansion stage is generally characterized by high levels of returns among both growth and value portfolios. All countries show positive return rates for value portfolios as well as growth portfolios. The only exception is Japan, which has a slightly negative return rate for growth portfolios. However, Japan is a special case in itself given its economic history. I am not going to look deeper into that issue here. Average returns across all countries are 17.97 percent for value and 16.34 percent for growth portfolios. In 12 out of 19 countries value outperforms growth even in the expansion period. This is quite surprising since one would expect growth stocks to achieve higher returns in an expansion phase. But most country portfolios return rates only differ by 2 to 3 percentage points in this phase. As a result, value portfolios are even able to outperform growth portfolios during a boom period of the economic circle. Nevertheless, it should not be forgotten that we are always looking at portfolios and not individual stocks. Therefore, there will always be growth stocks that will outperform value stocks when compared on an individual level.

The final stage of the business cycle is the *slowdown* period, where economic activity is decreasing and stock markets are cooling down as well. Nevertheless, the trend continues and value portfolios actually outperform growth portfolios in 15 out of 19 countries. The annual return for a value portfolio is on average slightly positive with a 1.35 percent return, while a growth portfolio suffers on average a loss of -1.04 percent. The same picture applies to the balanced portfolio. Interpreting this result, one could reach the conclusion that as soon as an economy starts slowing down, growth stocks are being sold more often and incorporate higher losses in stock price due to the unfavorable change in expected growth. This effect is higher for growth stocks than value stocks, since growth stocks have a history of high growth rates and their business model is often based on growth. Furthermore, following the mindset of Lakonishok, Shleifer and Vishny (1994) growth companies might not fulfill the high (earnings)-growth expectations of the investors, and therefore leads the disappointed growth investors to sell the stocks. Nevertheless, the case of the individual country should also be considered. Some countries exhibit positive returns in both value and growth portfolios during a slowdown, while other countries show only negative returns or a mix of both positive and negative returns.

To compare these results with previous research, Lakonishok, Shleifer and Vishny (1994) reached similar results in their analysis of the U.S. stock market between 1968 and 1990. They found that when the market was performing badly, value stocks outperformed growth stocks. In addition, when the market earned positive returns, value and growth portfolios showed similar rates of return. This matches the results for the U.S. in table 11. The U.S.-value portfolios clearly outperform the growth portfolios in the downturn and slowdown period, but are only 1 to 2.5 percentage points away from each other in the expansion and recovery phase.

In a next step, I will quickly analyze the Sharpe ratios for the four different stages of the business cycle. The highest risk-adjusted returns are reached in the recovery and expansion period for both value and growth portfolios. The relative difference in the Sharpe ratio is also the highest in the recovery stage, similarly to the mean return analysis. The Sharpe ratio are relatively close to zero for the downturn and slowdown stage. In the downturn stage value has a higher Sharpe ratio than growth in 12 out of 19 countries. The same applies to the expansion stage in 11 out of 19 countries,

the recovery stage in 14 out of 19 countries, and in the slowdown stage in 13 out of 19 countries. Overall, it looks as if the risk-adjusted view of the Sharpe ratio did not change much in the aggregate takeaway from this analysis.

Table 12: Value and Growth Performance in Business Cycle (CE/P)

	Mean Return							
	Downturn		Expansion		Recovery		Slowdown	
	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)
Australia	-6,24	-12,48	20,58	13,62	27,93	9,45	10,32	6,11
Austria	24,36	1,36	7,71	-9,28	18,87	3,53	22,27	20,11
Belgium	5,04	3,70	18,44	19,50	17,36	7,56	13,60	3,60
Canada	16,95	10,65	12,92	13,90	10,36	3,93	1,40	-10,41
Denmark	16,66	13,36	20,90	30,05	25,12	11,65	-5,47	-4,96
Finland	6,33	13,22	27,81	41,73	24,26	12,24	-13,75	-15,79
France	-6,67	-9,56	21,64	16,65	22,34	11,29	9,09	4,18
Germany	18,69	8,36	16,79	11,06	8,78	-6,63	4,00	0,50
Ireland	-21,15	-25,55	21,86	12,25	13,90	21,40	25,59	-2,66
Italy	-15,36	-13,38	4,11	5,86	16,84	0,61	19,17	6,88
Japan	-3,84	-8,03	10,52	-0,41	31,15	18,40	7,30	1,77
Netherlands	1,13	12,07	13,28	10,72	24,36	17,39	-1,91	1,06
New Zealand	7,39	3,60	21,86	16,60	19,26	16,16	-16,98	-9,43
Norway	-0,72	-11,77	20,80	12,73	43,37	16,34	-21,55	-17,62
Spain	-5,85	-27,31	24,47	17,47	-0,20	0,09	4,51	6,69
Sweden	-5,31	-7,27	27,19	20,22	33,28	15,90	3,63	3,08
Switzerland	-8,31	0,11	23,56	11,31	22,35	23,73	-8,84	-2,73
UK	9,48	5,12	15,21	7,92	23,53	12,64	10,44	10,50
USA	13,60	4,66	13,75	10,73	13,09	13,92	5,31	0,95
Average	**2,43**	**-2,06**	**18,07**	**13,82**	**20,84**	**11,03**	**3,59**	**0,10**
Balanced Portfolio	**2,24**	**-1,93**	**18,39**	**14,20**	**21,26**	**11,77**	**3,13**	**-0,61**

	Sharpe Ratio							
	Downturn		Expansion		Recovery		Slowdown	
	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)	Value (CE/P)	Growth (CE/P)
Australia	-0,30	-0,51	0,84	0,47	1,26	0,48	0,39	0,23
Austria	1,02	0,07	0,25	-0,34	0,58	0,12	0,88	1,02
Belgium	0,22	0,17	0,95	1,01	0,75	0,36	0,48	0,17
Canada	0,87	0,48	0,85	0,70	0,53	0,20	0,06	-0,36
Denmark	0,89	0,72	0,89	1,53	0,95	0,53	-0,17	-0,17
Finland	0,26	0,45	1,18	1,33	0,77	0,38	-0,45	-0,35
France	-0,26	-0,36	0,76	0,66	0,98	0,65	0,33	0,19
Germany	0,87	0,38	0,86	0,60	0,41	-0,30	0,16	0,02
Ireland	-0,68	-1,00	0,74	0,57	0,43	1,08	0,46	-0,09
Italy	-0,59	-0,55	0,16	0,21	0,57	0,03	0,58	0,26
Japan	-0,17	-0,33	0,55	-0,02	1,26	0,96	0,33	0,08
Netherlands	0,04	0,57	0,61	0,61	1,11	0,96	-0,05	0,05
New Zealand	0,38	0,20	0,72	0,76	0,41	0,70	-0,63	-0,40
Norway	-0,03	-0,50	0,88	0,55	1,58	0,69	-0,65	-0,55
Spain	-0,26	-1,05	1,10	0,62	-0,01	0,00	0,14	0,27
Sweden	-0,22	-0,28	1,10	0,83	1,33	0,65	0,12	0,11
Switzerland	-0,41	0,00	1,37	0,72	1,11	1,27	-0,37	-0,12
UK	0,54	0,30	0,81	0,43	0,84	0,51	0,35	0,37
USA	1,13	0,32	0,99	0,70	0,91	0,86	0,28	0,05
Average	**0,17**	**-0,05**	**0,82**	**0,63**	**0,83**	**0,53**	**0,12**	**0,04**
Balanced Portfolio	**0,18**	**-0,04**	**0,83**	**0,66**	**0,85**	**0,57**	**0,10**	**0,01**

Table 12 summarizes the same kind of analysis that was just discussed, but instead uses the cash earnings-to-price ratio to select value and growth portfolios. The overall findings stay the same regardless of whether the B/M or the CE/P sorting method was used. Value outperforms growth in 15 out of 19 countries during downturn, in 14 out of 19 countries during expansion, in 15 out of 19 countries during recovery, and in 12 out of 19 countries during slowdown. The one remarkable contrast to the B/M analysis is the fact that value and growth have relatively bigger differences in the CE/P sorting. In downturn periods value has on average around 4.5 percentage points' higher returns than growth, while there was only a minimal difference of 0.26 percentage points in the B/M analysis. The same is true for expansion where there is a 1.63 percentage point difference in B/M versus a 4.25 difference in CE/P. The difference between B/M and CE/P is also

around 1 percentage point bigger for recovery and slowdown. Thus, it seems that CE/P-sorting amplifies the value premium throughout all stages of the business cycle. Interestingly, this sorting-difference also appears in the risk-adjusted view by using the Sharpe ratio. The Sharpe ratio is slightly higher for value portfolios and lower for growth portfolios in most countries.

Overall, the results of my analysis show that value portfolios outperform growth portfolios with respect to mean return and risk-adjusted return in the majority of researched countries throughout all four stages of the business cycle. Furthermore, the performance of value and growth portfolios are heavily influenced by the changes in the business cycle, which can be observed in the differences in returns between the four economic stages. The relative advantage between value and growth is the biggest in the recovery stage. Investors could use this knowledge to their advantage when making investment decisions. In addition, it is also advisable to switch to a value-investing style during slowdown and downturn stages of the economic cycle, to minimize losses that could occur for growth and market portfolios. My results also match the outcomes from Kwag and Whi (2006), who conclude that the U.S. value portfolios superior performance is robust for all economic conditions. In addition, they state that the benefits of value investing are even greater during economic bad times – downturn/recovery – than during periods of expansion. This is chapter analyzed value and growth portfolios on an average country level. For lack of space, I cannot go into more detail to analyze specific countries stock markets behavior in times of different economic conditions. One should also keep in mind that the above analysis is highly dependent on the classification of the countries into the four stages of the business cycle. If another economic measure than the CLI is used to classify the stage of the business cycle, other results might follow. Nevertheless, the analysis showed the performance of value and growth throughout the business cycle and helped explain how these portfolios are influenced by the economic cycle.

5.2. In-Sample Regression Analysis & Construction of Global Active Value Portfolio

In this chapter, I am going to proceed with the second part of the analysis, which uses regressions to find the relationship between different economic indicators and the return data of value portfolios. The final goal is to build an actively managed global value portfolio that rebalances the country-weights monthly. The approach of the upcoming analysis will follow the methodology introduced in chapter 4.2.

5.2.1. Economic-Variable Selection

In a first step, I select the economic variables that are to be included in the regression model, which is going to be used to answer the research question. The twelve economic indicators considered – CLI, industrial production, GDP ratio-to-trend growth rate (GDP R), nominal GDP, GDP growth rate, BCI, CCI, export growth, import growth, consumer prices growth (CPI), consumer opinion survey, and unemployment rate – will be analyzed using three criteria; *univariate regression analysis, stepwise regression analysis, and qualitative factors*. The model selection process targets to find the most suitable economic indicators that have a relationship to the business cycle and that have some predictive power for stock returns. The analysis to select the ap-

propriate economic variables is conducted solely on the U.S. dataset, using the U.S. value portfolio return data (B/M-sorting) and economic data from 1975 until 2014. First, I performed the *univariate regression analysis* for all eleven economic variables. The U.S. value return portfolio constitutes the dependent variable whereas the examined economic indicator is the explanatory variable. An extract of the regressions of four out of the eleven economic variables can be found below in table 13.

Table 13: Univariate Regressions for Economic Variable Selection (Extract)

USA Value Portfolio - CLI Amplitude adjusted

Regression Statistics	
Multiple R	0,32
R Square	0,10
Adjusted R Square	**0,10**
Standard Error	4,48
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1098,65	1098,65	54,82	0,00
Residual	478	9580,16	20,04		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,84	0,20	4,13	0,00	0,44	1,25	0,44	1,25
CLI A %Change	6,88	0,93	7,40	0,00	5,05	8,70	5,05	8,70

USA Value Portfolio - BCI

Regression Statistics	
Multiple R	0,20
R Square	0,04
Adjusted R Square	**0,04**
Standard Error	4,63
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	419,00	419,00	19,52	0,00
Residual	478	10259,81	21,46		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,88	0,21	4,14	0,00	0,46	1,29	0,46	1,29
BCI % Change	3,14	0,71	4,42	0,00	1,74	4,53	1,74	4,53

USA Value Portfolio - CCI

Regression Statistics	
Multiple R	0,32
R Square	0,10
Adjusted R Square	**0,10**
Standard Error	4,49
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1060,40	1060,40	52,70	0,00
Residual	478	9618,41	20,12		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,85	0,20	4,17	0,00	0,45	1,26	0,45	1,26
CCI % Change	6,52	0,90	7,26	0,00	4,76	8,29	4,76	8,29

USA Value Portfolio - GDP Ratio-to-trend Growth

Regression Statistics	
Multiple R	0,11
R Square	0,01
Adjusted R Square	**0,01**
Standard Error	4,70
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	119,51	119,51	5,41	0,02
Residual	478	10559,30	22,09		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,89	0,21	4,15	0,00	0,47	1,31	0,47	1,31
GDP R % Change	2,90	1,25	2,33	0,02	0,45	5,36	0,45	5,36

From the results of the univariate regressions, the growth rates of the following economic indicators reached the highest adjusted R-squared and lowest p-values; *the CLI, the GDP ratio-to-trend, the BCI, the CCI, and the consumer opinion survey*. The complete set of univariate regression is listed in appendix 7. I also repeated this analysis with a lag of one, three, six, and twelve months respectively between the economic indicator data and the value return. The outcome did not change much and the above five variables remain the most significant. Nevertheless, export-, import-, and GDP-growth proved to be most significant with a six month lag. As a result, I included these three variables with a six month lag in the upcoming stepwise regression analysis. Keeping the results from the univariate regressions in mind, I then continued the analysis by performing a stepwise regression analysis.

As explained in the methodology section, the starting model for the *stepwise regression* consists of all twelve economic variables. In addition, I will also add three dummy variables to introduce a categorical value for the stage of the business cycle a country is in. The three dummy variables are “downturn”, “slowdown”, and “recovery”, plus the “expansion” period which is the omitted category. The monthly stage of the business cycle is defined by the CLI data. Hence, the same set of data is used for the dummies as in chapter 5.1. I then perform a regression, where the monthly data of the twelve economic indicator plus the three dummy variables are the explanatory variables, and the monthly U.S. value portfolio return is the dependent variable. Looking at the regression output, the economic indicator with the least explanatory power, i.e. lowest t-statistic, is eliminated. This process is repeated as long as the R-squared of the model is increasing, or a smaller regression model with relevant explanatory variables has been found. The first regression output from the beginning of the stepwise regression process can be found in appendix 8. This initial model provides satisfactory results, but includes a lot of variables that are not significant. The high number of variables is not optimal since the phenomenon of overfitting could occur. Therefore, I tried to get a smaller model with less, but significant, variables instead.

As a result, the elimination process was continued until I ended up with an appropriate model. This model is depicted in table 14 below.

Table 14: Stepwise Regression - Final Model

Stepwise Regression (Eliminated: Export / GDP Growth % Change / GDP Ratio Index / Unemployment Rate Index / Consumer Opinion Survey / Import % Change / GDP N % Change / GDP R % Change / GDP N Index)

Regression Statistics	
Multiple R	0,43
R Square	**0,19**
Adjusted R Square	**0,18**
Standard Error	4,29
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	2008	287	16	0
Residual	472	8671	18		
Total	479	10679			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,81	0,37	2,18	0,03	0,08	1,54	0,08	1,54
Downturn	1,38	0,60	2,31	0,02	0,21	2,56	0,21	2,56
Slowdown	0,58	0,58	1,01	0,32	-0,56	1,72	-0,56	1,72
Recovery	-0,97	0,57	-1,69	0,09	-2,09	0,16	-2,09	0,16
CLI A %Change	10,20	1,63	6,26	0,00	7,00	13,41	7,00	13,41
Industrial Production % Change	-1,17	0,31	-3,72	0,00	-1,78	-0,55	-1,78	-0,55
BCI % Change	-2,07	1,03	-2,02	0,04	-4,09	-0,05	-4,09	-0,05
CCI % Change	3,43	1,03	3,35	0,00	1,42	5,45	1,42	5,45

The final regression model of the backward stepwise regression process includes the following economic variables: *the three business cycle dummy variables – downturn, slowdown, recovery –, CLI amplitude adjusted, industrial production, BCI, and CCI*. The four economic variables are all significant on the five percent level, while the dummy variables have p-values between 0.02 and 0.32. The recovery-dummy, industrial production, and BCI actually have a negative coefficient, which means they have a negative relationship with the U.S.-value portfolio return. The R-squared is 18%, which is a good value for this type of analysis. It is surprising that all of the three GDP variables are not significant and were eliminated. This might be due to the fact that the raw GDP data is only quarterly in contrast to all other data which is monthly. Since I took the quarterly data and assigned every month of this quarter the same value, this could have had some impact on this regression. It is also conceivable that a three month lag (instead of a six month lag) should be added to the GDP growth rate, to account for the fact that these numbers are only available quarterly. Furthermore, it is possible that the insignificance of GDP in explaining value returns could also be just a country specific problem to the U.S.

This brings me to the third area I wanted to look at to decide on which economic factors to include in the model. From a *qualitative point of view*, CLI, industrial production, BCI, and CCI all make sense since they are closely related to the business cycle. The CLI, BCI, and CCI were actually designed by the OECD to provide an indication of the future economic performance of a country. Hence, it definitely makes sense to include these indicators in the analysis. The three dummy variables provide a direct definition of the business cycle stage of a country and need to be included as well. Lastly, I decided to also include the quarterly GDP growth rate and the monthly GDP ratio-to-trend growth rate (GDP R). Since the business cycle is so closely related to the GDP performance of a country, it is unimaginable to not include these two factors. GDP R was included to have also a proper monthly GDP growth rate. It was picked over GDP N, because GDP R is the official data source for the OECD business cycle clock and it is more relevant than nominal GDP for the upcoming analysis.

To sum up, the final model used for the regression analysis includes the following economic indicators: *Downturn dummy, slowdown dummy, recovery dummy, CLI-change, industrial production growth rate, BCI-change, CCI-change, GDP growth rate (quarterly, but used monthly), and GDP-R growth rate.*

5.2.2. Results of Multiple Regression Analysis

After the economic variables for the multiple regression model were selected in the previous chapter, it is now time to use this model to find the relationship between the economic indicators and value returns. This first analysis is going to be an in-sample analysis, which means that the whole sample period is included when performing the regressions. For the majority of countries, the dataset from 1975 until 2014 is used for the return- and economic data. Countries with a shorter availability of data such as Austria or New Zealand, use their respective shorter dataset instead. An overview of the time periods of the individual countries can be found in table 1. The value portfolios for this analysis are selected according to the B/M-sorting method. It should be noted that because two indicators for GDP were selected – GDP growth rate (quarterly used as monthly) and GDP R growth rate – only one of them is going to be included in each model. I

differentiate between these two models to avoid potential problems, such as multicollinearity between GDP and GDP R. As a result, I performed the complete analysis twice – once with GDP growth in the model and once with GDP R growth in the model. This allows me to compare the results and see if there are crucial differences between the two GDP measurements. Another difference is the fact that for the GDP growth rate a lag of three months is included between the economic indicator and the value return data. For instance, the GDP growth rate of January 2014 (which actually is the GDP growth of the first quarter of 2014) corresponds to the value return data of April 2014. As already explained earlier, this extraordinary lag is included to account for the fact that the quarterly GDP data is not released before the beginning of the new quarter. Consequently, the earliest date the market can react to the new GDP data is three months later. Since the GDP R growth rate is naturally a monthly indicator, this lag does not apply there.

The regression analysis is run for each country to find the country-specific relationship between each economic indicator and the excess value returns in this country's stock market. Appendix 9 illustrates how the country-specific datasheets are constructed, which are used to perform the regression analysis. The analysis is first run with no lag, apart from the aforementioned GDP growth rate lag. For example, the CLI change of January 2014 corresponds to the excess value return of the same month. One example of such a regression output is provided below in table 15. It is apparent that the CLI A, the BCI, and the CCI are each significant on the 1%-level in predicting the return of the value portfolio in the Swedish stock market for the sample period considered. For instance, a one percent increase in the CLI A indicator is predicted to increase the value return by 13.94 percentage points. From the three dummy variables, only the downturn-dummy is significant on the 10%-level. The adjusted R-squared in this regression model is 0.096, which means that the proportion of the variance in the data explained by this model is 9.6%. The Sweden regression output is just one out of many regressions performed. Its main use is to visualize an example of a regression output from the model that I created.

Table 15: Example of Regression Model Output - Sweden

Sweden - Regression Output (Model with GDP % Growth)

Regression Statistics	
Multiple R	0,333715793
R Square	0,111366231
Adjusted R Square	**0,096272664**
Standard Error	7,731548599
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	3528,455101	441,0568876	7,378390361	2,87046E-09
Residual	471	28154,8934	59,77684373		
Total	479	31683,3485			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,12	0,78	0,15	0,88	-1,41	1,64	-1,41	1,64
Downturn	2,25	1,31	1,72	0,09	-0,32	4,82	-0,32	4,82
Slowdown	1,54	1,08	1,43	0,15	-0,57	3,66	-0,57	3,66
Recovery	0,68	1,05	0,65	0,52	-1,39	2,75	-1,39	2,75
CLI A %Change	13,94	2,41	5,78	0,00	9,19	18,68	9,19	18,68
Industrial Production % Change	-0,06	0,14	-0,45	0,65	-0,35	0,22	-0,35	0,22
BCI % Change	-5,00	2,01	-2,49	0,01	-8,96	-1,05	-8,96	-1,05
CCI % Change	6,04	2,24	2,69	0,01	1,63	10,44	1,63	10,44
GDP % Change	0,36	0,32	1,14	0,26	-0,27	0,99	-0,27	0,99

Subsequently, the regression results of each country are summarized in a single table to give a better overview over the individual regression outcomes. Table 16 below incorporates the results from all the country-specific regression outputs into one table. The table includes the coefficients, the p-values, and the standard errors for each economic indicator in every country. Additionally,

the R-squared, the standard error, and the number of observations are also provided for each country regression. Regarding the economic indicators, table 16 includes the regression models that used the GDP growth rate, while table 17 includes the regression models that used the GDP R growth rate.

When comparing the outcomes of the different regressions, it is striking that the CLI economic indicator is significant on the 10% level in 17 out of 19 countries. This is even more impressive when considering that in 11 countries the indicator is significant on the 1% level and in 4 countries on the 5% level. It looks as if the OECD composite leading indicator is closely related to the performance of value portfolios in the majority of countries in sample. The CLI is an indicator of economic movements in the short-term future, which takes into account a variety of other economic indicators. Therefore, it seems that value portfolio returns are correlated to the predicted short-term economic movement of a country, i.e. business cycle movement expressed through the CLI-change. In addition, the business confidence index (BCI) and especially the consumer confidence index (CCI) also proved to be significant predictors of value performance. The CCI resulted to be significant on the 5% level in 11 out of 18 countries where it was available. The BCI also shows a high significance in 6 out of 18 countries. CCI indicator data was not available for Norway, and respectively for Canada regarding the BCI data. The CLI, CCI, and BCI are all more qualitative economic indicators compared to the typical quantitative indicators, such as GDP growth or industrial production growth. So it appears that these kind of economic indicators that take into consideration different economic indicators plus qualitative information from consumer and business surveys, are more meaningful in predicting value returns. As mentioned, industrial production and GDP growth were surprisingly not significant in the majority of countries analyzed. Finally, the three dummy variables, used to categorize each month within the business cycle, proved to be significant in seven countries on the 10% level for “downturn” and “slowdown”. In five from these seven countries the dummies were also significant on the 5% level. The dummy for “recovery” was only significant in four countries on the 10% level and in two on the 5% level. A compact overview of the number of significant variables is provided in table 16 below.

Attempting to explain the insignificance of the quantitative economic indicators, one possibility could be a timing issue. The fact that new GDP and industrial production numbers are normally released after that kind of economic change already happened could imply that the markets already reacted and priced that implicit information into the stock market. Another explanation would be that the market reacts to these kind of economic figures with a time lag. Hence, the markets do not react until a few weeks or months after the release of new economic data. A third possible explanation could be that qualitative economic indicators are better suited for that kind of analysis. The buying and selling decisions of people heavily influence stock market returns; therefore, qualitative factors that take into account the mood concerning the economic situation and the confidence level about future developments of people and businesses might provide a more accurate prognosis for such an analysis. Since these indicators are forward looking and are concerned with the short-term economic development, they might also be a better fit for an analysis that wants to “predict” future value returns with economic data.

Table 16: Summary of Regressions with GDP % Change

Regression Model with GDP % Change (No Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,55	0,42	0,24	0,82	0,48	0,51	-0,53	0,41	0,83	0,28	1,70	0,08	-0,21	0,83	-0,35	0,58	-0,76	0,55		0,27
Downturn	1,03	0,30	1,35	0,40	0,56	0,60	2,52	0,00	2,64	0,03	0,16	0,91	1,40	0,27	2,81	0,00	2,11	0,40	1,04	0,45
Slowdown	0,94	0,31	2,10	0,14	1,51	0,13	2,12	0,01	0,28	0,81	-1,56	0,29	2,38	0,04	2,39	0,02	3,58	0,05	2,86	0,02
Recovery	-0,97	0,30	-2,97	0,04	-0,75	0,44	-1,63	0,06	-1,76	0,11	-1,30	0,35	-0,09	0,93	-1,12	0,24	-0,23	0,89	0,03	0,98
CLI A % Change	9,97	0,00	22,67	0,00	1,74	0,55	13,51	0,00	8,88	0,01	5,86	0,01	8,14	0,09	7,11	0,01	7,59	0,02	10,59	0,03
Industrial Production % Change	0,15	0,81	-0,01	0,95	0,03	0,82	-0,46	0,09	0,11	0,41	0,01	0,96	-0,03	0,90	0,04	0,85	-0,14	0,27	-0,12	0,60
BCI % Change	2,53	0,13	-5,71	0,28	4,20	0,13	-	-	2,33	0,16	0,28	0,88	7,35	0,05	1,42	0,69	-0,13	0,92	-0,31	0,94
CCI % Change	5,36	0,00	4,84	0,19	7,91	0,00	2,23	0,15	4,98	0,08	0,75	0,69	7,40	0,03	5,29	0,00	9,47	0,00	5,60	0,02
GDP % Change	0,04	0,90	0,43	0,53	0,24	0,63	0,59	0,17	-0,55	0,13	-0,09	0,83	0,55	0,49	0,37	0,28	0,34	0,29	0,79	0,13
R-squared / Standard Error	**0,11**	6,44	**0,10**	8,14	**0,05**	6,81	**0,14**	5,63	**0,10**	6,57	**0,06**	7,84	**0,07**	7,54	**0,09**	6,42	**0,06**	10,26	**0,05**	8,49
Number of Observations	480		336		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	1,14	0,06	0,37	0,58	-0,74	0,49	0,86	0,24	-0,56	0,55	0,12	0,88	1,51	0,01	-0,62	0,34	0,73	0,10
Downturn	-0,68	0,47	1,94	0,09	-0,26	0,86	1,59	0,23	1,98	0,18	2,25	0,09	-0,25	0,79	2,27	0,01	1,39	0,02
Slowdown	0,00	1,00	1,05	0,28	-1,18	0,44	-1,61	0,15	2,05	0,09	1,54	0,15	-0,54	0,56	2,42	0,01	0,63	0,29
Recovery	0,14	0,88	0,15	0,88	1,40	0,42	1,66	0,14	-1,85	0,07	0,68	0,52	-2,39	0,01	-0,12	0,91	-0,95	0,10
CLI A % Change	4,66	0,06	16,70	0,00	-0,71	0,85	9,73	0,00	11,93	0,05	13,94	0,00	11,08	0,00	13,20	0,00	10,12	0,00
Industrial Production % Change	0,20	0,28	0,00	0,99	0,07	0,52	-0,04	0,69	-0,25	0,16	-0,06	0,65	-0,57	0,16	0,04	0,87	-1,21	0,00
BCI % Change	-2,79	0,34	-11,54	0,01	5,43	0,04	10,83	0,00	3,92	0,23	-5,00	0,01	-2,84	0,28	-0,94	0,68	-2,06	0,05
CCI % Change	7,15	0,00	8,15	0,00	-3,27	0,25	-	-	10,53	0,00	6,04	0,01	-1,48	0,26	1,55	0,32	3,45	0,00
GDP % Change	-0,11	0,71	-0,35	0,26	1,24	0,06	-0,14	0,64	1,19	0,03	0,36	0,26	-0,36	0,45	0,49	0,21	0,10	0,74
R-squared / Standard Error	**0,06**	6,44	**0,10**	7,31	**0,01**	8,72	**0,14**	8,43	**0,07**	7,80	**0,10**	7,73	**0,09**	6,22	**0,09**	6,69	**0,17**	4,29
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:

p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,68	1,04	0,72	0,64	0,77	0,98	0,97	0,64	1,28	0,80	0,60	0,67	1,06	0,73	0,92	0,78	0,61	0,65	0,45
Downturn	1,00	1,61	1,07	0,84	1,24	1,37	1,27	0,93	2,48	1,37	0,95	1,13	1,44	1,32	1,47	1,31	0,93	0,92	0,60
Slowdown	0,93	1,41	1,00	0,83	1,14	1,48	1,17	0,99	1,84	1,27	1,03	0,96	1,54	1,12	1,21	1,08	0,94	0,94	0,60
Recovery	0,94	1,41	0,97	0,86	1,11	1,40	1,04	0,96	1,61	1,07	0,95	1,01	1,75	1,13	1,01	1,05	0,96	1,02	0,58
CLI A %Change	3,19	6,77	2,88	2,16	3,23	2,27	4,85	2,63	3,21	4,83	2,44	3,42	3,69	3,02	6,04	2,41	2,46	2,66	1,65
Industrial Production % Change	0,64	0,24	0,14	0,27	0,13	0,20	0,27	0,18	0,12	0,23	0,19	0,13	0,10	0,09	0,18	0,14	0,41	0,25	0,34
BCI % Change	1,66	5,31	2,76	-	1,66	1,80	3,73	3,52	1,29	4,31	2,94	4,48	2,61	3,02	3,24	2,01	2,63	2,25	1,03
CCI % Change	1,41	3,72	2,39	1,54	2,82	1,90	3,38	1,71	2,79	2,48	1,92	2,70	2,83	-	2,80	2,24	1,32	1,55	1,03
GDP % Change	0,36	0,69	0,50	0,43	0,37	0,41	0,80	0,35	0,32	0,52	0,30	0,31	0,66	0,30	0,54	0,32	0,47	0,39	0,31

Next to the significance, the size and direction of the economic variables coefficients are also of high interest. Starting with the dummy variables, *downturn* actually seems to have a positive impact on value returns. Thus, when a country is classified to be in the downturn stage of the business cycle, a higher value return can be expected in that month. For instance, the regression analysis showed that when the U.S. is in the downturn phase of the business cycle, the monthly value returns are 1.39 percentage points higher than in an expansion phase. The same applies to the *slowdown* stage, in which the majority of countries display a positive effect on value returns as well. In contrast, the *recovery* stage seems to decrease the monthly return. Looking at the U.S. example again, it can be seen that when the country was in the recovery stage the monthly value portfolio return was 0.95 percentages points smaller than in the expansion phase. While the direction of the impact is the same in most countries, the coefficient size differs by country. To sum up, the regression analysis shows that on average value portfolios have higher regression coefficients in economic bad times than during a recovery or expansion phase (ceteris paribus). While the CLI, CCI, and GDP growth generally seem to have a positive impact on value returns, the effect is less clear for industrial production growth and BCI change. The direction of change is varying by country and no clear insight can be drawn from the regression results. Some countries such as Switzerland and the U.S. show a decrease in value returns when an increase in the BCI indicator is reported, while other countries such as France or Germany have an increase in the BCI indicator followed by an increase in value returns. Since this is a qualitative indicator, country-specific characteristics might be responsible for these differences.

Finally, the R-squared of the different country regression lies in the range of 1% (of New Zealand) and 17% (of the U.S.). The average R-squared of all countries is located at around 9%. The high R-squared of the U.S. can partially be explained with the fact that the economic variable selection was based on the U.S. market. As a result, the high number of significant variables and the large R-squared value in the regression analysis are not too surprising. In contrast, New Zealand is a fairly small stock market and has one of the lowest numbers of observation that could be used for the regression. These characteristics could explain the very low R-squared value for New Zealand. Even though the R-squared values of the entire range of regressions are not very high when compared with the R-squared values that were achieved in the CAPM-analysis in table 6, they are still good results for this type of regression analysis. The nature of stock market return data and economic data is that they are quite noisy and inherently characterized by high-variability. Therefore, it is not surprising that the R-squared values are lower than in other fields of research. Nevertheless, that kind of noisy data can still have a significant trend, which indicates that the explanatory variable provides information about the response of the dependent variable. It also follows that the interpretations of significant variables are the same for both high and low R-squared models. So the low R-squared values should have no big impact on the relationship between the economic variables and the value portfolio returns and their predictability. However, the one downside of low R-squared is the lower precision of these predictions (Frost (2014)).

Table 16 also includes an overview of the standard errors of all the different economic indicators. The standard errors differ in their magnitude for different economic variables. The CLI has the highest regression coefficients, which is also accompanied by the highest standard errors. As expected, countries with a higher number of observations also show lower standard errors.

Table 17: Summary of Regressions with GDP R % Change

Regression Model with GDP R % Change (No Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,58	0,32	0,37	0,67	0,69	0,25	-0,05	0,91	0,68	0,37	0,50	0,59	0,59	0,41	0,06	0,92	-0,39	0,75	-0,38	0,60
Downturn	1,03	0,30	1,12	0,48	0,50	0,63	2,34	0,01	2,47	0,05	0,95	0,49	1,20	0,34	2,73	0,00	2,29	0,37	0,86	0,53
Slowdown	0,96	0,30	2,30	0,09	1,30	0,19	1,95	0,02	0,27	0,82	0,89	0,57	1,23	0,27	1,80	0,07	3,62	0,05	2,33	0,07
Recovery	-0,97	0,29	-2,44	0,10	-0,85	0,38	-1,73	0,04	-1,84	0,11	0,59	0,67	-0,76	0,47	-1,53	0,12	-0,34	0,84	-0,13	0,90
CLI A % Change	9,86	0,00	19,51	0,00	1,41	0,63	12,27	0,00	9,97	0,00	7,84	0,00	9,88	0,05	6,37	0,01	7,87	0,02	8,77	0,08
Industrial Production % Change	0,14	0,83	-0,05	0,84	0,03	0,80	-0,47	0,09	0,12	0,35	-0,10	0,62	0,05	0,86	0,06	0,75	-0,14	0,27	-0,11	0,64
BCI % Change	2,50	0,13	-6,03	0,25	4,44	0,10	-	-	2,49	0,14	-1,37	0,46	8,91	0,02	3,16	0,38	-0,34	0,80	0,55	0,90
CCI % Change	5,37	0,00	5,61	0,13	7,95	0,00	2,32	0,14	4,54	0,11	0,06	0,97	6,93	0,04	5,27	0,00	9,40	0,00	6,03	0,02
GDP R % Change	0,42	0,83	5,25	0,16	-0,05	0,99	1,76	0,37	-2,35	0,32	6,76	0,00	-6,59	0,16	-2,09	0,36	0,81	0,75	1,49	0,65
R-squared / Standard Error	**0,11**	6,44	**0,10**	8,12	**0,04**	6,81	**0,14**	5,64	**0,10**	6,59	**0,09**	7,73	**0,08**	7,53	**0,09**	6,42	**0,06**	10,28	**0,05**	8,51

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,88	0,13	0,43	0,50	0,22	0,81	0,86	0,20	0,80	0,31	0,46	0,53	1,24	0,02	-0,29	0,63	0,81	0,03
Downturn	-0,14	0,88	1,75	0,12	-0,22	0,88	1,55	0,24	1,63	0,27	2,18	0,10	-0,18	0,84	2,29	0,01	1,38	0,02
Slowdown	0,36	0,73	0,68	0,48	-1,65	0,31	-1,89	0,10	0,69	0,56	1,22	0,26	-0,20	0,83	2,31	0,02	0,59	0,35
Recovery	-0,08	0,93	-0,24	0,82	0,64	0,71	1,61	0,15	-2,74	0,01	0,49	0,65	-2,16	0,03	-0,36	0,72	-0,97	0,09
CLI A % Change	6,98	0,01	19,56	0,00	-0,29	0,94	10,81	0,00	13,54	0,03	13,83	0,00	11,50	0,00	12,92	0,00	10,20	0,00
Industrial Production % Change	0,25	0,18	0,01	0,93	0,07	0,51	-0,03	0,76	-0,26	0,15	-0,06	0,69	-0,68	0,10	0,05	0,86	-1,17	0,00
BCI % Change	-1,13	0,71	-11,61	0,01	4,29	0,09	10,46	0,00	4,14	0,21	-4,94	0,02	-3,67	0,16	-0,69	0,76	-2,07	0,05
CCI % Change	7,40	0,00	7,57	0,01	-2,98	0,30	-	-	9,89	0,00	5,95	0,01	-1,44	0,28	1,44	0,35	3,43	0,00
GDP R % Change	-3,72	0,06	-5,61	0,02	0,83	0,76	-2,77	0,23	-2,86	0,44	0,07	0,97	0,70	0,77	0,66	0,77	0,01	0,99
R-squared / Standard Error	**0,07**	6,42	**0,10**	7,27	**0,00**	8,76	**0,14**	8,42	**0,06**	7,83	**0,09**	7,74	**0,09**	6,23	**0,09**	6,70	**0,17**	4,29

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,58	0,86	0,59	0,49	0,77	0,92	0,72	0,59	1,24	0,72	0,58	0,64	0,93	0,67	0,78	0,73	0,54	0,59	0,38
Downturn	1,00	1,59	1,06	0,83	1,26	1,36	1,25	0,93	2,54	1,37	0,98	1,12	1,45	1,31	1,48	1,31	0,92	0,92	0,60
Slowdown	0,93	1,36	0,98	0,82	1,18	1,58	1,11	1,01	1,88	1,27	1,04	0,97	1,61	1,14	1,19	1,08	0,94	0,96	0,62
Recovery	0,92	1,47	0,96	0,86	1,16	1,38	1,05	0,98	1,66	1,07	0,95	1,02	1,71	1,12	1,02	1,06	0,97	1,02	0,58
CLI A %Change	3,24	6,80	2,94	2,12	3,35	2,24	5,04	2,53	3,27	4,93	2,72	3,57	3,73	3,12	6,33	2,49	2,39	2,66	1,75
Industrial Production % Change	0,64	0,24	0,14	0,28	0,13	0,20	0,28	0,18	0,12	0,23	0,19	0,13	0,10	0,09	0,18	0,14	0,42	0,26	0,35
BCI % Change	1,67	5,27	2,73	-	1,67	1,85	3,81	3,61	1,31	4,32	2,99	4,45	2,55	3,04	3,28	2,04	2,61	2,30	1,03
CCI % Change	1,41	3,69	2,40	1,56	2,87	1,88	3,40	1,71	2,85	2,58	1,91	2,69	2,84	-	2,84	2,25	1,32	1,55	1,03
GDP R% Change	1,98	3,74	2,48	1,96	2,36	2,22	4,68	2,27	2,55	3,25	1,94	2,33	2,73	2,31	3,68	2,18	2,42	2,21	1,76

Another takeaway of this analysis is also the fact that one cannot make generalized conclusions about the explanatory power of certain economic indicators. One indicator might be significant in one country, but it is not significant in another. In the end, the economic indicators should always be examined on a country-level to make predictions about stock market returns.

Since the regression results in table 16 used the model that used the GDP growth rate, I repeated the analysis with a new model that included the GDP R – ratio-to-trend – growth rate instead of the quarterly GDP growth rate. The results of this analysis are summarized in table 17.

Overall, there are no big changes regarding the significance of the economic variables. The CLI, CCI, and BCI remain the coefficients, which are significant in the most countries. The change from the quarterly GDP growth rate to the monthly GDP R growth rate did not prove to make a noticeable difference. GDP R has high p-values in most countries, which also makes it not significant in predicting value returns. The same applies to the industrial production indicator, which is only significant in two countries – the U.S. and Canada. The change of the model had some impacts on the size of the coefficients though. While the direction of the coefficients remains mostly the same, some coefficients have a smaller or bigger impact in this new model than in the model with GDP growth. The R-squared values for each country were not considerably affected and remained the same as well. Hence, the change to a different measure of GDP did not change anything about the goodness-of-fit of the model.

To allow for better comparison between the two models, table 18 shows in how many countries the economic variables are significant. As already discussed before, the change from the GDP to the GDP R measure did not result in big changes in the regression outcome.

Table 18: Overview - Significance of Economic Variables

Model with GDP % Change: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	1	2	**3**
Downturn	2	3	2	**7**
Slowdown	0	5	2	**7**
Recovery	0	2	2	**4**
CLI A %Change	11	4	2	**17**
Industrial Production	1	0	1	**2**
BCI % Change	1	5	0	**6**
CCI % Change	9	2	1	**12**
GDP % Change	0	1	1	**2**
	24	23	13	

Model with GDP R % Change: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	2	0	**2**
Downturn	2	2	2	**6**
Slowdown	0	2	5	**7**
Recovery	1	2	2	**5**
CLI A %Change	11	4	2	**17**
Industrial Production	1	0	1	**2**
BCI % Change	2	3	1	**6**
CCI % Change	9	2	0	**11**
GDP R % Change	1	1	1	**3**

In addition to the described regression analysis, I also performed the same kind of analysis with a different sorting method for value. Instead of using the B/M-sorting method, I also used the CE/P-sorting because it achieved high results for the value premium in chapter 3.3. The detailed results of these regressions can also be found in appendix 11. The overall outcome does not change by much. Downturn and Slowdown dummies have a positive influence on value returns of the same month. In contrast, the recovery-dummy decreases value returns of the same period. The CLI and CCI economic indicator have relatively big coefficients across all countries and are the statistically most significant ones. Surprisingly, the GDP R regression model shows an increased significance for the GDP R variable compared to the B/M-sorting. In addition, the R-squared values are in the range of 8% for both models. The significance of the variables can be compared in table 19. However, the main focus of the analysis will remain on the B/M-sorting. Nevertheless, the CE/P-sorting results will also be used in the final analysis for reasons of comparison.

Table 19: Overview - Significance of Economic Variables (CE/P-Sorting)

Model with GDP % Change - CEP-Sorting: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	1	2	**3**
Downturn	2	2	1	**5**
Slowdown	4	2	3	**9**
Recovery	0	1	2	**3**
CLI A %Change	9	4	2	**15**
Industrial Production	1	1	2	**4**
BCI % Change	1	2	3	**6**
CCI % Change	5	7	0	**12**
GDP % Change	0	3	2	**5**
	22	23	17	

Model with GDP R % Change - CEP-Sorting: Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	2	1	**4**
Downturn	2	1	1	**4**
Slowdown	2	3	3	**8**
Recovery	1	1	1	**3**
CLI A %Change	9	5	2	**16**
Industrial Production	1	2	0	**3**
BCI % Change	0	4	3	**7**
CCI % Change	4	7	1	**12**
GDP R % Change	1	2	4	**7**
	21	27	16	

In conclusion, the regression analysis showed the relationship between different economic indicators and the value portfolio returns in 19 countries. The coefficients of each indicator show how much value returns are expected to change in that country with a change in the respective indicator. The size of the coefficients are going to be important in the next steps of the analysis, where I am going to predict how value returns will be impacted by a changes in the economy. Furthermore, the regression results will also be used to predict which countries to overweight and underweight in the global active value portfolio.

5.2.3. Results of Multiple Regression Analysis – Lags Included

In the regression analysis in chapter 5.2.2., I investigated the direct relationship of a change in monthly economic indicators on the value portfolio return in the same month. As mentioned earlier, time lags might be a relevant property that should be introduced when working with stock market return data. It is unclear when and how fast investors react to changes in the economy. It is possible that economic changes have a direct effect on the stock market, but it is also feasible that a few weeks are passing until changes in the stock market can be observed. Furthermore, the question of causality remains. It is unclear and difficult to identify, which factors actually caused a movement in the stock market. When looking at the issue of timing, it is also important to keep in mind that often economic data for a certain month is not available until a few weeks or even months later. So it is difficult to assess when and to what degree investors are already informed

about changes in the economy. Nevertheless, the issue of time lags has to be addressed. For that reason, I am going to include a time lag of one, three, six, and twelve months in the analysis. As an example, a lag of three month is incorporated in the analysis as follows. When performing the regression, the return data of a certain month is paired with the economic indicator data of three months ago. Therefore, it can be observed if the economic indicators of the past had an influence on the value returns today. These results can then be compared to the results that were obtained with no lag in chapter 5.2.2. Thanks to this analysis, I expect to get some insights about the behavior of value portfolio returns when including a time lag.

To keep the content of the thesis focused on the essential, the outcomes of the regressions with the one, three, six, and twelve month lag are not listed here directly, but in appendix 10. First let's examine the results with the one month lag. The R-squared of the regressions with the one month lag are slightly smaller with an average of 6% for the models that include GDP growth, and 6.2% for the models with GDP R growth. The range of R-squared spans from 0% to 11%. Hence, the one month time lag comes with a decrease in the R-squared values across all countries. Regarding the coefficients of the regressions I made the following observations. The GDP growth variable has a negative effect on value returns in 12 countries, while the BCI indicator has a negative coefficient in 10 countries. The CLI and CCI both proved to be positively correlated with value returns. The effect of industrial production remains unclear and is fairly country-specific. As seen in the first analysis, the dummies for slowdown and downturn had a positive effect on value portfolios in almost all countries, whereas recovery had a negative effect in 11 countries. The regression results for the model that includes the GDP R growth rate are almost identical to the model with GDP growth rate. The GDP R growth rate is also negatively correlated with value returns in 12 countries. The effect of the other variables is on a similar level. Concerning the significance of the economic variables, the results indicate a small decrease in significance especially on the 5% level. The CLI remains a highly significant explanatory variable even with a one month lag. It is followed by the BCI and the dummy business cycle variables which are also significant in 7 countries. Nevertheless, the one month lag did not have a positive influence on the obtained results.

The second analysis, which included a three month lag, also yielded no improved results regarding the significance and the R-squared of the regression model output. The R-squared for both the GDP and the GDP R model decreased heavily and averaged at around only two to three percent. Furthermore the number of significant variables on the 1% level dropped remarkably. Only the CLI economic indicator remained significant on the 1% level. However, the overall number of significant variables is quite low. While the direction of the variable's correlation remained similar, the size of the coefficients changed with the lags. The only exception is the downturn dummy, which has a negative effect on value in 7 countries, in this three month lag setting.

The statistical significance and the goodness-of-fit of the model further decreases with the six and twelve month lag. The six month lag has an average R-squared of two percent, while the twelve month lag has an average R-squared of only one percent. The amount of significant economic variables was further diminished and also the direction of the relationship changed for some variables. While the CLI is still the most significant variable, its coefficient shows a negative relationship with value returns in the six and twelve month lag setting.

Table 20: Regression Models with Lag - Overview of Significant Variables

Model with GDP % Change - 1 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	1	1	**2**
Downturn	2	4	1	**7**
Slowdown	0	3	4	**7**
Recovery	1	1	0	**2**
CLI A %Change	12	3	0	**15**
Industrial Production	0	1	1	**2**
BCI % Change	4	2	1	**7**
CCI % Change	2	1	1	**4**
GDP % Change	0	1	1	**2**
	21	17	10	

Model with GDP R % Change - 1 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	1	0	**1**
Downturn	2	3	2	**7**
Slowdown	1	2	4	**7**
Recovery	0	1	2	**3**
CLI A %Change	12	2	2	**16**
Industrial Production	0	1	1	**2**
BCI % Change	4	3	0	**7**
CCI % Change	2	2	0	**4**
GDP R % Change	1	1	1	**3**
	22	16	12	

Model with GDP % Change - 3 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	1	0	**2**
Downturn	0	1	1	**2**
Slowdown	0	2	4	**6**
Recovery	0	1	1	**2**
CLI A %Change	6	4	2	**12**
Industrial Production	0	1	2	**3**
BCI % Change	0	2	3	**5**
CCI % Change	0	3	1	**4**
GDP % Change	0	2	0	**2**
	7	17	14	

Model with GDP R % Change - 3 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	2	0	**3**
Downturn	0	1	1	**2**
Slowdown	0	2	2	**4**
Recovery	0	2	1	**3**
CLI A %Change	8	1	2	**11**
Industrial Production	0	0	2	**2**
BCI % Change	0	3	3	**6**
CCI % Change	0	2	0	**2**
GDP R % Change	0	0	2	**2**
	9	13	13	

Model with GDP % Change -6 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	2	3	3	**8**
Downturn	3	2	1	**6**
Slowdown	0	1	1	**2**
Recovery	0	3	1	**4**
CLI A %Change	0	3	0	**3**
Industrial Production	0	2	0	**2**
BCI % Change	0	1	2	**3**
CCI % Change	1	1	0	**2**
GDP % Change	1	3	0	**4**
	7	19	8	

Model with GDP R % Change -6 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	3	3	**7**
Downturn	3	2	1	**6**
Slowdown	0	1	2	**3**
Recovery	1	2	0	**3**
CLI A %Change	0	2	2	**4**
Industrial Production	0	2	0	**2**
BCI % Change	0	1	0	**1**
CCI % Change	1	0	2	**3**
GDP R % Change	1	1	1	**3**
	7	14	11	

Model with GDP % Change - 12 Month Lag: Number of Significant Variables

	1%	5%	10%	Total
Intercept	0	1	1	**2**
Downturn	1	1	1	**3**
Slowdown	0	4	1	**5**
Recovery	1	4	3	**8**
CLI A %Change	1	3	2	**6**
Industrial Production	1	0	1	**2**
BCI % Change	0	2	2	**4**
CCI % Change	0	1	0	**1**
GDP % Change	0	0	1	**1**
	4	16	12	

Model with GDP R % Change - 12 Month Lag: Number of Significant Variable

	1%	5%	10%	Total
Intercept	1	0	1	**2**
Downturn	1	1	1	**3**
Slowdown	0	2	0	**2**
Recovery	1	1	3	**5**
CLI A %Change	0	4	0	**4**
Industrial Production	1	0	0	**1**
BCI % Change	1	2	1	**4**
CCI % Change	0	2	0	**2**
GDP R % Change	1	3	1	**5**
	6	15	7	

Table 20 provides an overview of the number of countries in which the economic variables were significant. The detailed regression results can be found in appendix 10. Regarding the CE/P-sorting method, only a one month lag analysis was conducted because a more detailed analysis seemed unnecessary given the results from the B/M-sorting time-lag analysis. The results from the CE/P-sorting one month lag regression are summarized in appendix 11.

In conclusion, it is surprising that the included time lags did not result in improved predictability of value returns. From a practical point of view, one would expect the stock markets to react with a certain delay. However, in aspect of the obtained regression results, time lags did not yield better statistical results regarding the significance or the R-squared of the models. On the contrary, the longer the incorporate time lag, the worse was the statistical significance of the regressions. For future research, it would make sense to have a closer look at the topic of time lags in relation to economic indicators. A further analysis would unfortunately be out of the scope of this thesis. As a result, the takeaway from this section is the fact that the economic indicators proved to be most

significant in predicting value returns for the same month. Nevertheless, the time-lag results are still valuable for the next step, where I will create a global value portfolio.

5.2.4. Construction of Global Active Value Portfolios

In the last chapter, I obtained the coefficients for the relationship between value portfolio returns and the economic variables for each country. I now use these regression results to construct a global value portfolio that monthly rebalances the country weights, while using every country's economic situation as an investing criteria. The insights from the regression analysis are used to decide if a country should receive a higher or lower weighting for every month in the research time period.

As explained in the methodology section, I am first calculating the predicted return for each country's value portfolio for every month from 1975 to 2014. These theoretical predicted returns will be used to make decisions regarding the monthly country portfolio weighting. To predict the monthly returns of the value portfolio, I am applying an equation of the form:

$$Y_t = b_1X_{1,t} + b_2X_{2,t} + b_3X_{3,t} + b_4X_{4,t} + b_5X_{5,t} + b_6X_{6,t} + b_7X_{7,t} + b_8X_{8,t} \quad (4)$$

,where:

Y_t is the predicted monthly return of a certain country's value portfolio;

X_1 is downturn, coded as 1 if the country is situated in a downturn phase of the business cycle, in all other stages of the business cycle it is coded as 0;

X_2 is slowdown, coded as 1 if the country is in a slowdown period, otherwise coded as 0;

X_3 is recovery, coded as 1 if the country is in a recovery period, otherwise coded as 0;

X_4 is the monthly CLI A economic indicator change;

X_5 is the monthly industrial production growth;

X_6 is the monthly BCI economic indicator change;

X_7 is the monthly CCI economic indicator change;

X_8 is the monthly GDP growth rate or the GDP R growth rate

The b_n's are the country's respective slopes of each economic variable obtained by the regression analysis.

If a certain country is in the expansion phase of the business cycle, all three dummies are coded as 0. Since the intercept is not significant in the majority of countries, the intercept is excluded in the value return prediction. This predictive calculation is performed for each country individually, to obtain the monthly predicted value returns of each country. Every countries prediction calculation will only include one of the two GDP variables. As a selection criteria, I will pick the GDP variable that resulted in lower p-values and higher R-squared values for the regression. Finally, I am going to estimate two predicted returns: The first prediction takes into consideration all eight

economic variables. For the second I only include the significant variables in the prediction-calculation. Then by multiplying each economic indicator's monthly value times the respective coefficient from the regression and summing up the result for all variables, the outcome equals the predicted return of this country's value portfolio in that specific month.

To illustrate the value return prediction process, a small excerpt of the calculation for the UK market is depicted below in table 21.[5] For example, the all-variables predicted return for January 1975 was calculated as follows:

$$6{,}3 = 0\times 2{,}27 + 1\times 2{,}42 + 0\times -0{,}12 + 0{,}372\times 13{,}2 + 0{,}846\times 0{,}04 + 0\times -0{,}94 + -0{,}332\times 1{,}55 + -1{,}176\times 0{,}49 \quad (5)$$

The same approach was used to calculate the predicted return for every following month for the UK. The calculations followed the same method for all other countries in sample. The outcome of this third step in the methodology is that I obtained the monthly predicted value returns for every country in sample.

Table 21: Excerpt of Calculations of Predicted Value Return

UK Regression Results										
	Intercept	Downturn	Slowdown	Recovery	CLI A %	Ind. Prod. %	BCI %	CCI %	GDP %	
P-Value	0,339	0,014	0,010	0,910	0,000	0,868	0,677	0,316	0,215	
Coefficient	-0,62	2,27	2,42	-0,12	13,20	0,04	-0,94	1,55	0,49	

Month	Downturn	Slowdown	Recovery	CLI A %	nd. Prod. %	BCI %	CCI %	GDP R%	GDP %	All Variables: Predicted return	Only signif. Variables: Predicted return
197501	0	1	0	0,372	0,846	0	-0,332	-0,341	-1,176	6,3	7,3
197502	0	0	1	0,541	-0,699	0	-0,439	-0,382	-1,176	5,7	7,0
197503	0	0	1	0,433	-1,972	0	-0,440	-0,424	-1,176	4,3	5,6
197504	0	0	1	0,414	-1,724	0	-0,329	-0,432	0,324	4,9	5,3
197505	0	0	1	0,375	-1,316	0	-0,127	-0,389	0,324	4,7	4,8
197506	0	0	1	0,321	0,741	0	0,160	-0,295	0,324	4,6	4,1
197507	0	0	1	0,256	-1,324	0	0,336	-0,173	-1,588	3,0	3,3
197508	0	0	1	0,221	-1,341	0	0,361	-0,038	-1,588	2,5	2,8
197509	0	0	1	0,242	1,964	0	0,329	0,094	-1,588	2,9	3,1
197510	0	0	1	0,243	1,185	0	0,288	0,192	-0,172	3,5	3,1
197511	0	0	1	0,289	0,000	0	0,266	0,243	-0,172	4,0	3,7
197512	0	0	1	0,319	-0,439	0	0,313	0,243	-0,172	4,5	4,1
197601	0	0	1	0,334	0,588	0	0,368	0,191	1,382	5,6	4,3
197602	0	0	1	0,304	1,170	0	0,366	0,101	1,382	5,2	3,9
197603	0	0	0	0,241	0,434	0	0,338	0,003	1,382	4,4	3,2
197604	0	0	0	0,140	0,719	0	0,255	-0,051	1,701	3,1	1,8
197605	0	0	0	0,008	1,714	0	0,054	-0,042	1,701	1,1	0,1
197606	0	0	0	-0,117	-1,966	0	-0,277	0,026	1,701	-1,2	-1,5
197607	0	0	1	-0,199	0,287	0	-0,502	0,115	-0,872	-3,9	-2,7
197608	0	1	0	-0,246	-0,286	0	-0,562	0,202	-0,872	-2,1	-0,8
197609	0	1	0	-0,246	1,719	0	-0,503	0,263	-0,872	-2,0	-0,8
197610	0	1	0	-0,180	2,254	0	-0,267	0,271	0,906	0,2	0,0
197611	0	1	0	-0,075	0,826	0	0,090	0,223	0,906	2,0	1,4
197612	0	1	0	0,013	0,546	0	0,313	0,132	0,906	3,5	2,6
197701	0	1	0	0,106	1,902	0	0,365	0,032	2,062	5,5	3,8
197702	0	1	0	0,208	-0,400	0	0,210	-0,052	2,062	6,5	5,2
197703	0	0	1	0,273	0,134	0	0,063	-0,107	2,062	4,6	3,5
197704	0	0	0	0,329	-0,936	-0,205	0,080	-0,118	0,227	4,7	4,3
197705	0	0	0	0,220	2,699	-0,205	0,203	-0,085	0,227	3,6	2,9
197706	0	0	0	0,239	-4,074	-0,115	0,444	-0,017	0,227	3,9	3,2
197707	0	0	0	0,261	0,548	-0,061	0,614	0,058	-0,451	4,3	3,4

[5] The complete calculations can be found in the Excel-files enclosed to this thesis. The same applies to all other data calculations that were performed in obtaining results for this thesis.

I now obtained enough information to start constructing the global value portfolio and to manage the country weighting by using the predicted return data. This marks the fourth step in my initial laid-out methodology.

The basis of the global value portfolio are the OECD country weights, which determine the fraction of the "total funds" of the global portfolio that are invested in every country's value portfolio. These base percentages were introduced earlier in this thesis including the overview in table 1. The OECD weightings are also used as a benchmark, in the sense that the portfolio consisting of these weights is called the global balanced portfolio. These OECD country weights are changing on a monthly basis. These changes are incorporated into the analysis by assigning every individual country portfolio the appropriate monthly OECD weight, which is updated every month. The global balanced portfolio will be used to compare its performance to the returns of the active portfolio that takes into account business cycle data.

This global active value portfolio also takes the OECD weighting for every month as the standard weighting. In addition, I am going to actively overweight and underweight certain country portfolios according to the predicted value returns that were calculated before in step three. The predicted value returns themselves are determined by the country's economic situation and the state of the business cycle. The over-and underweighting approach follows the procedure described in step four of the methodology section. Hence, countries with a negative predicted return, i.e. worse economic conditions for value investing, will their weights have reduced. Any country in a given month with a negative prediction will have a smaller percentage of the total portfolio assigned to that country portfolio. The range of the portfolio weight reduction is flexible, but my analysis showed that a complete disinvestment of all funds from country portfolios with a negative prediction resulted in the best outcomes. This is equal to a reduction of the OECD-weight by a 100%. Let's use the UK example again from before. The all-variables predicted return for July 1976 is minus 3.9%, which means that on the basis of the economic indicators, the UK value portfolio is expected to perform badly in that month. The standard OECD-weight for the UK for July 1976 is 4.55%. As a result of the negative prediction, the UK-weight will be set to 0% for that month. The same procedure is applied to all other country portfolios with a negative prediction for that month. Next, the freed-up capital, i.e. the sum of the weighting percentages of all countries with a negative prediction, is redistributed to the country portfolios with a positive prediction. The portfolio weights from "negative"-countries are redistributed proportionally to a country's share of the total positive predicted returns for that month. For instance, the U.S. value portfolio has a predicted return of 2.9% for January 2014, while the sum of all positive return predictions in that month is 23.3%. Hence, the proportion of 2.9 to 23.3 is 12.4%, which means that the U.S. will receive 12.4% of the portfolio weights that are to be distributed. The total freed-up portfolio weights are 15.1%, which results in the U.S. value portfolio being overweighted in January 2014 by +1.9% (12.4% of 15.1%). A detailed example is provided in appendix 13.

After every month the country weights are set to their default values – the OECD weights – and then the same over-and underweighting procedure is repeated. As a result, I receive the new actively-managed country portfolio weights for the whole time period. The same method is used to

calculate the adjusted country-weights for the case where only the significant economic variables are considered for return-predictions. It should be noted that even though the portfolios weights are changing, the overall size of the portfolio stays the same. Hence, differences in the outcomes can be exclusively attributed to changes in the country portfolio weightings.

5.2.5. Performance of Global Active Value Portfolios

Finally, it is now possible to calculate the monthly excess returns of the actively managed global value portfolio. By multiplying the new country weights with the country-specific realized value portfolio return in that month, and adding up the results, the global value portfolio return can be calculated. An example to visualize this process is provided in appendix 14. It is already apparent in this small excerpt that the actively-managed global value portfolio achieves higher returns than the balanced global value portfolio. Once all the monthly excess returns of the global portfolio are calculated, one can compute the average monthly value returns and the standard deviation of the global active value portfolio. Furthermore, the monthly results can be annualized to find the annual mean return, annual standard deviation, and the Sharpe ratio. These results can then be directly compared to the performance of the balanced global value portfolio, which invested its funds solely according to the OECD weighting. Therefore, it is now possible to observe if a portfolio that based its portfolio allocation decision on economic indicator and business cycle data, is able to outperform a global balanced portfolio. This procedure represents steps five and six in the methodology.

As mentioned earlier, the whole analysis is repeated to analyze what effect an inclusion of time-lags has on the final outcome. Following the same approach as for the no-lag case, the regression results that took into account a time-lag of one, three, six, and twelve months are used to forecast the value return for each month. Since there is a time-lag and the regression coefficients have changed, the predicted value returns are different. Taking into account the predicted value returns, the new country portfolio weights that include a time-lag are going to be calculated. Moreover, the whole process is also repeated for the CE/P-sorting method for value portfolios. The CE/P-result will allow me to compare if there are any significant differences in the outcomes between B/M and CE/P. The whole portfolio-creation process was performed for the no-lag and one-month lag scenario for the CE/P-sorting.

After the whole portfolio formation process has been thoroughly discussed and introduced, it is now possible to present and discuss the outcomes of this analysis. The results from the global portfolios that were created by using all economic variables are listed in table 22.

First of all, the overall results are positive and confirm the hypothesis that a global value portfolio can increase its performance by including economic indicators and business cycle information in the portfolio formation process. The created global active value portfolio (B/M-sorting) achieves an annual mean return of 18 percent. In comparison, the global balanced B/M-value portfolio has an average annual return of 10.95 percent. These two numbers are the average results from the monthly excess returns for the period from 1975 to 2014. From an investor perspective, both annual return numbers are quite high, especially when they are compared with the average global stock market return of 8.68 percent for the research time period.

Table 22: Final Results: Global Active Portfolio - All Economic Variables Considered

Portfolios were constructed by using all variables from regressions (1975 - 2014)	Balanced Global Value- and Market-Portfolios			Active Global Value Portfolios						
	Global B/M-Value Portfolio balanced	Global CEP-Value Portfolio balanced	Global Market Portfolio	B/M all var	B/M all var - 1 Month Lag	B/M all var - 3 Month Lag	B/M all var - 6 Month Lag	B/M all var - 12 Month Lag	CEP all var	CEP all var - 1 Month Lag
Portfolio Characteristics										
Avg. monthly Return	0,91	0,99	0,72	1,50	1,46	1,29	1,31	1,30	1,45	1,43
Avg. annual Return	10,95	11,84	8,68	18,00	17,51	15,46	15,73	15,64	17,45	17,10
Std. Dev monthly	5,36	5,19	4,86	5,57	5,65	5,30	5,82	5,62	5,63	5,60
Std. Dev annual	18,58	17,99	16,83	19,28	19,57	18,37	20,16	19,46	19,49	19,38
Sharpe Ratio	0,59	0,66	0,52	0,93	0,89	0,84	0,78	0,80	0,90	0,88
Number of positive monthly returns	287	291	281	318	312	302	288	297	312	305
Number of negative monthly returns	193	189	199	162	168	178	192	183	168	175
Comparison vs. Global balanced value portfolio										
Outperformance in Return % vs. Balanced Portfolio				7,05	6,56	4,51	4,77	4,68	5,60	5,26
% of months that outperform Balanced Portfolio				69%	65%	60%	62%	63%	58%	57%
Comparison vs. Global market portfolio										
Alpha vs Market*	1,89	3,06		9,19	8,45	6,91	6,44	6,45	8,33	8,17
SE of αi	0,96	0,93		1,43	1,38	1,26	1,45	1,25	1,31	1,39
Beta vs Market*	1,04	1,01		1,02	1,04	0,99	1,07	1,06	1,05	1,03
SE of βi	0,02	0,02		0,02	0,02	0,02	0,02	0,02	0,02	0,02
R2 vs Market	0,90	0,90		0,79	0,81	0,82	0,80	0,84	0,82	0,80

**Alpha and Beta are significant on 1%-Level in all Portfolios*

The difference of seven percent between the two annual value mean returns is a very favorable result, which exceeds the expectations. It is also not surprising that the higher annual return comes with the price of higher standard deviation. Nevertheless, the difference between the 19.28% standard deviation for the active portfolio and the 18.58% for the balanced portfolio standard deviation is quite small, compared to the high difference in return.

In addition, the Sharpe ratios also show a clear picture. The Sharpe ratio of the global active value portfolio is 0.93, which is an excellent result, whereas the global balanced value portfolio reaches a Sharpe ratio of 0.59. Consequently, the value portfolio that used business cycle information to choose their investment allocations also shows a better risk-adjusted return performance. Finally, the active portfolio not only outperformed the balanced value portfolio in 69% of all monthly returns, but also managed to reduce the number of months with negative returns. All these results provides strong evidence that the detected relationships between economic indicators and value returns are true, and that economic indicators can be used to take advantage of differences in business cycles among a portfolio of countries.

Further evidence is provided in the third part of the table, which compares the performance of the value portfolios with the performance of the global market portfolio. The table provides the alphas, betas, standard errors, and the R-squared of this comparison. Again, the actively over-and underweighted value portfolio achieves a higher alpha than the normal balanced value portfolio, while having a very similar beta. The global balanced B/M-value portfolio achieved a beta of 1.04. Since the market betas for the active value portfolios are situated in the range of 0.99 to 1.07, depending on the model and the time-lag, it does not seem that systematic risk is responsible for the difference in return.

Table 22 also summarizes the results of the global active value portfolios that incorporated a time-lag. It seems that a one month lag did not change much to the overall outcome and the superior performance of the active value portfolio. The difference in return adds up to only 0.5%, which also results in a slightly smaller Sharpe-ratio. Nonetheless, the portfolio with the one-month time lag performs a lot better than the balanced value portfolio and the global market portfolio. This results shows that the implications of this analysis can also be relevant for the real world, where time-lags occur. Since normally a few months pass between the dates where economic information becomes available and an investing decision is made, the above results show that one can still perform better when one follows that investment approach. The same takeaways apply to the models that include a three, six, and twelve month lag. The annual mean returns decreased further, but are still on a high level with mean returns of 15.45%, 15.73%, and 15.64%. So, even the prediction models that included time-lags of several month managed to outperform a global balanced value portfolio and the global market portfolio. Last but not least, the table also shows the results for the analysis of the CE/P-value portfolios. The findings of the B/M-value portfolios also persist for the CE/P-sorting. By reallocating portfolio weights according to the economic situation of the countries in sample, the resulting global active CE/P-value portfolio also outperformed the balanced global CE/P-value portfolio and the global markets. The average annual returns amount up to 17.45% for the portfolio with no time lag, and 17.1% for the CE/P-portfolio with a one-month lag.

To sum up, by taking into account the relationships between value returns and economic indicators, which were found by means of regression analysis, it was possible to create a global value portfolio that rebalances the country-weights on a monthly basis. In this first analysis, all economic variables were included in the return-forecasting-process. Despite the fact that some of these variables were not significant, such as GDP- or industrial production growth, the results were overwhelmingly positive. The monthly changes in the portfolio composition, on the basis of the economic condition of every country, resulted in positive impacts on the annual returns, Sharpe-ratio, and alphas, while the traditional measures of risk were not increased.

The previous section discussed the results from the analysis that included all economic variables in the decision process that determined, which countries should be overweighted and which ones should be underweighted. Since some of the economic variables were statistically highly significant in most countries, such as the CLI, a separate analysis was run that only used the statistically significant economic indicators to decide about the country weighting. The significant economic variables differ from country to country. However, the overall most impactful economic indicators are the CLI, the BCI, and the business cycle dummy variables. The results from the analysis that only used significant economic variables are summarized in table 23.

The general results are very similar to the previous analysis, with the actively managed global value portfolio outperforming the global balanced value portfolio. Still, it is noticeable that the results are slightly more “extreme” in the sense that the no-lag results are even higher than in the previous analysis, but the portfolios that incorporated a lag are actually doing worse. The no-lag active value portfolio accomplishes an annual average excess return of 19.11%, which beats the same portfolio that included all economic variables by 1.11%. Comparing the alpha versus the global market portfolio, the active value portfolio manages to generate an alpha of 10.19%, which is impressive. Furthermore, this portfolio was also able to improve its Sharpe ratio even more. It also managed to outperform the global balanced portfolio in 71% of all months throughout the research period of 1975 to 2014. However, as soon as a time-lag is included, the prediction model that only uses the significant economic indicators performs worse. Depending on the length of the time-lag, the annual mean return of the global value portfolio lies in the range of 12.99% to 16.75%. It looks as if the model that used a six month lag performed the worst. The same image is also displayed in the analysis that uses the CE/P-sorting method for value. While the no-lag mean return of 17.6% of the active value portfolio is slightly better than the 17.1% of the comparable portfolio, the picture changes minimally when a one-month lag is included. The CE/P model that only uses significant economic variables underperforms the model that used all economic variables by about 0.2% annually. However, the overall conclusion remains the same: The actively monthly rebalanced value portfolios manage to outperform a comparable balanced global value portfolio, as well as the global market as a whole. These results are not only true for a no-lag analysis, but also when a lag of one, three, six, and twelve months is included. Furthermore, it does not seem that the increase in return comes at the cost of additional risk, since the standard errors and market betas are on comparable levels.

Table 22: Final Results: Global Active Portfolio - Only Significant Economic Variables Considered

Portfolios were constructed by using only significant variables from regressions (1975 - 2014)	Balanced Global Value- and Market-Portfolios			Active Global Value Portfolios						
	Global B/M-Value Portfolio balanced	Global CEP-Value Portfolio balanced	Global Market Portfolio	B/M only signif	B/M only signif - 1 Month Lag	B/M only signif - 3 Month Lag	B/M only signif - 6 Month Lag	B/M only signif - 12 Month Lag	CEP only signif	CEP only signif - 1 Month Lag
Portfolio Characteristics										
Avg. monthly Return	0,91	0,99	0,72	1,59	1,40	1,29	1,08	1,19	1,47	1,41
Avg. annual Return	10,95	11,84	8,68	19,11	16,75	15,50	12,99	14,32	17,60	16,91
Std. Dev monthly	5,36	5,19	4,86	5,58	5,55	5,36	5,46	5,50	5,63	5,61
Std. Dev annual	18,58	17,99	16,83	19,32	19,24	18,58	18,92	19,04	19,49	19,45
Sharpe Ratio	0,59	0,66	0,52	0,99	0,87	0,83	0,69	0,75	0,90	0,87
Number of positive monthly returns	287	291	281	319	310	304	289	297	313	312
Number of negative monthly returns	193	189	199	161	170	176	191	183	167	168
Comparison vs. Global balanced value portfolio										
Outperformance in Return % vs. Balanced Portfolio				8,15	5,79	4,55	2,03	3,37	5,76	5,07
% of months that outperform Balanced Portfolio				71%	64%	63%	56%	63%	59%	57%
Comparison vs. Global market portfolio										
Alpha vs Market*	1,89	3,06		10,19	7,79	6,88	4,01	5,32	8,46	7,91
SE of αi	0,96	0,93		1,37	1,32	1,30	1,19	1,22	1,29	1,37
Beta vs Market*	1,04	1,01		1,03	1,03	0,99	1,03	1,04	1,05	1,04
SE of βi	0,02	0,02		0,02	0,02	0,02	0,02	0,02	0,02	0,02
R2 vs Market	0,90	0,90		0,80	0,82	0,81	0,85	0,84	0,83	0,81

**Alpha and Beta are significant on 1%-Level in all Portfolios*

The entire results of this study were based on an in-sample analysis. Both, the regression time period and the period where the portfolio was managed, were the same. Consequently, the regression slopes that were estimated for the period of 1975 until 2014 were used to predict the value returns for the same time period. Therefore, the high outperformance of the active value portfolios and the favorable results might also be partly due to that. There is also the danger of overfitting, which needs to be avoided. It is also often the case, that significant in-sample evidence of predictability does not guarantee significant out-of-sample predictability. Therefore, to get a more realistic picture and to validate the results from this chapter, an out-of-sample analysis will be conducted in the next chapter.

5.3. Out-of-Sample Regression Analysis & Construction of Global Active Value Portfolio

Since I already explained the entire regression analysis and portfolio formation process in detail in the previous chapters, I am going to keep the out-of-sample analysis shorter and focused on the results. First, I am presenting briefly the results of the multiple regression analysis, both with and without time-lags. Second, I will present the performance of the global active value portfolio that was created with out-of-sample prediction data.

5.3.1. Results of Multiple Regression Analysis

A true out-of-sample analysis would require that I estimate the model based on data up to the latest month, then construct a forecast of next month's value return Y_{t+1} and weight the country portfolios accordingly, wait until the next month, then record the realized return of the active value portfolio and compare it to the balanced value portfolio. Subsequently, I would re-estimate the model, make a new forecast of the value return in Y_{T+2}, re-balance the global active value portfolio, and so forth. At the end of this procedure, one would have a sample of returns of the global active value portfolio, which would be truly out-of-sample and would give a very realistic picture of the model's performance.

However, this procedure is very time-consuming, that’s why I will perform a simulated out-of-sample analysis that mimics the just-described procedure. Therefore, I choose a historical date, rather than today’s month, as the starting point. I use the time period of 1975 until 1990 to perform the regression analysis, with the goal to find the slopes of the economic variables that explain the value returns for this time period. These regression results are then used to forecast the value portfolio return of each country in sample for the period of 1990 until 2014. For instance, the regression results that estimate the relationship between the U.S. economic variables and the value returns in the U.S. are calculated by including all data from January 1975 up to December 1989 in the analysis. The resulting regression coefficients are used to predict the U.S. value portfolio return for January 1990, and so on. Since the two time periods are not overlapping, this approach simulates an out-of-sample analysis.

The out-of-sample-analysis uses the same model of economic variables that was created in chapter 5.2.1. Apart from the obvious difference regarding the two time periods, the analysis and the

creation of the global active value portfolio follows the same approach as in the in-sample analysis. Again there are two models, one that includes the GDP growth and another one that includes GDP R growth. The regression outputs show the same kind of characteristics as in the in-sample analysis. For both models, the CLI and the CCI are significant in explaining value returns on the 1% and 5% level in eight to eleven countries. Again it seems that a positive CLI change has a strong positive influence on value portfolios returns in the same month. The same applies to the CCI, which has a positive regression slope in the majority of countries. The downturn dummy also has a positive influence on value returns in 14, respectively 15 countries, depending on the model. The effect is less clear for the slowdown period of the business cycle, where eleven to thirteen countries report a positive influence on value returns while the rest shows a negative impact. The exact opposite applies to the recovery stage, where 13 countries in both models show a negative relationship between this stage of the business cycle and the value portfolio returns. While industrial production does often not show any statistical significance, its coefficients show mainly a negative effect. In contrast, GDP growth shows a positive effect on value in 13 countries, while GDP R shows a negative effect in 12 countries. The effect of BCI depends highly on the country and is often not significant. The R-squared values differ by country, but are at around 5% on average. Countries such as Norway, Sweden, or the U.S. even have R-squared values in the range of 11% to 13%. The full out-of-sample regression results are listed in appendix 12.

Table 23: Out-of-Sample - Regression Models - Overview of Significant Variables

Model with GDP % Change - Out-of-Sample: Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	1	3	**5**
Downturn	0	1	3	**4**
Slowdown	0	1	3	**4**
Recovery	0	1	1	**2**
CLI A %Change	6	0	2	**8**
Industrial Production %	1	1	0	**2**
BCI % Change	0	1	2	**3**
CCI % Change	5	3	0	**8**
GDP % Change	0	2	1	**3**
	13	11	15	

Model with GDP R % Change - Out-of-Sample: Number of Significant Variables

	1%	5%	10%	Total
Intercept	2	1	2	**5**
Downturn	0	1	2	**3**
Slowdown	0	1	1	**2**
Recovery	1	1	1	**3**
CLI A %Change	6	1	4	**11**
Industrial Production %	0	1	1	**2**
BCI % Change	1	1	0	**2**
CCI % Change	6	2	0	**8**
GDP R % Change	0	1	2	**3**
	16	10	13	

Model with GDP % Change - Out-of-Sample (1 Month Lag): Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	2	0	**3**
Downturn	1	4	2	**7**
Slowdown	0	1	1	**2**
Recovery	0	3	0	**3**
CLI A %Change	7	2	1	**10**
Industrial Production %	0	0	2	**2**
BCI % Change	1	1	2	**4**
CCI % Change	3	1	0	**4**
GDP % Change	0	1	1	**2**
	13	15	9	

Model with GDP R % Change - Out-of-Sample (1 Month Lag): Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	1	2	**4**
Downturn	1	4	1	**6**
Slowdown	0	0	3	**3**
Recovery	0	1	3	**4**
CLI A %Change	8	1	2	**11**
Industrial Production %	0	1	1	**2**
BCI % Change	2	1	2	**5**
CCI % Change	3	1	0	**4**
GDP R % Change	0	1	1	**2**
	15	11	15	

Model with GDP % Change - Out-of-Sample (3 Month Lag): Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	0	1	**2**
Downturn	0	0	0	**0**
Slowdown	0	1	2	**3**
Recovery	1	1	2	**4**
CLI A %Change	2	1	1	**4**
Industrial Production %	0	0	0	**0**
BCI % Change	0	3	2	**5**
CCI % Change	1	0	0	**1**
GDP % Change	1	2	1	**4**
	6	8	9	

Model with GDP R % Change - Out-of-Sample (3 Month Lag): Number of Significant Variables

	1%	5%	10%	Total
Intercept	1	1	1	**3**
Downturn	1	0	0	**1**
Slowdown	1	1	2	**4**
Recovery	1	2	2	**5**
CLI A %Change	2	2	0	**4**
Industrial Production %	1	0	0	**1**
BCI % Change	1	4	1	**6**
CCI % Change	1	0	1	**2**
GDP R % Change	0	0	1	**1**
	9	10	8	

Furthermore, a lag of one and three months is also included in the out-of-sample analysis. While the regression coefficients did not show essential changes after the lag was included, there was

an interesting change for the significance of the variables. Surprisingly, there was an increase in the numbers of countries where certain economic variables showed a significant effect on value returns. For example, in the GDP-model the CLI indicator is significant on the 5% level in two additional countries, when a one month lag is included in the regression analysis. There is also a small increase in the number of significant variables for the GDP R model. Nevertheless, it is hard to evaluate the reason for this change. Especially, when one considers that the three month lag comes with a substantial decrease in the number of significant variables. A compact overview of the number of countries where the economic variables are significant is presented in table 24.

5.3.2. Performance of Global Active Value Portfolios

Once I obtained the regression coefficients for all countries for the out-of-sample time period, I used the slopes of the economic coefficients to predict the value portfolio returns of these country portfolios. Then following the same approach, which was discussed in detail in the previous chapter, I over- and underweight the different country portfolios in each month to form the global active value portfolio.

The overview of the final results of the out-of-sample analysis are summarized in table 25. First of all, it is very pleasing to see that the out-of-sample analysis confirms the results that were obtained in the in-sample analysis in the previous chapter. The global active value portfolios managed to achieve higher annual returns than the global balanced value portfolio that serves as a benchmark. The annual mean return of the active portfolio adds up to 15.45% for the all-variable model, whereas the only-significant model also reaches an annual return of 12.25%. These are both excellent results when compared with the benchmark portfolio that achieved an average annual return of 8.75%. Since these results were obtained out-of-sample, it is understandable that the mean returns are slightly smaller than in the in-sample analysis. The difference between the in-sample and out-of-sample results lies only in the range of around three percentage points.

The same outcome applies to the portfolios that included a time-lag. Hence, the one-month lag value portfolios outperformed the global balanced benchmark portfolio annually by around 4 percent. The three-month lag active value portfolios generated returns of 12, respectively 9.64 percent. Accordingly, even the three-month lag portfolios still achieve higher returns than the benchmark portfolio and the global market portfolio. Furthermore, it is also a positive sign that the over- and underweighted value portfolios managed to decrease their risk by reducing the standard deviation compared to the balanced value portfolio. As a result, all value portfolios that were constructed and managed by using economic data, achieved higher Sharpe-ratios than the two benchmark portfolios. The Sharpe-ratios add up to 0.8 and 0.6 for the no-lag global active portfolios. The one-month lag portfolio reaches Sharpe-ratios of 0.67 and 0.65, which are significantly higher than the benchmark of 0.43. Even the Sharpe-ratios of the three-month lag portfolios with values of 0.6 and 0.48 are above the benchmark. It is also favorable that the active value portfolios managed to decrease the number of months with negative returns, while outperforming the balanced portfolio in 59% to 63% of all months in the 1990 to 2014 period.

Table 24: Final Results: Out-of-Sample Analysis - Global Active Value Portfolio

Final Results: Out-of-Sample Analysis - Global Active Value Portfolio

	Global B/M-Value Portfolio balanced	Global Market Portfolio	B/M all var	B/M only signif	B/M all var - 1 Month Lag	B/M only signif - 1 Month Lag	B/M all var - 3 Month Lag	B/M only signif - 3 Month Lag
Portfolio Characteristics								
Avg. monthly Return	0,73	0,52	1,29	1,02	1,12	1,05	1,00	0,80
Avg. annual Return	8,75	6,20	15,45	12,25	13,39	12,60	12,00	9,64
Std. Dev monthly	5,84	5,08	5,59	5,85	5,75	5,57	5,73	5,81
Std. Dev annual	20,25	17,60	19,37	20,27	19,93	19,30	19,84	20,13
Sharpe Ratio	0,43	0,35	0,80	0,60	0,67	0,65	0,60	0,48
Number of positive monthly returns	172	174	180	179	191	179	182	177
Number of negative monthly returns	128	126	120	121	109	121	118	123
Comparison vs. Global balanced value portfolio								
Outperformance in Return % vs. Balanced Portfolio			6,70	3,50	4,64	3,85	3,25	0,89
% of months that outperform Balanced Portfolio			0,63	0,59	0,56	0,59	0,57	0,50
Comparison vs. Global market portfolio								
Alpha vs Market*	2,00		9,31	5,72	7,19	6,47	5,55	3,04
SE of αi	1,32		1,70	1,66	1,88	1,68	1,54	1,47
Beta vs Market*	1,09		0,99	1,05	1,00	0,99	1,04	1,07
SE of βi	0,02		0,03	0,03	0,03	0,03	0,03	0,02
R2 vs Market	0,89		0,81	0,84	0,78	0,81	0,85	0,87

**Alpha and Beta are significant on 1%-Level in all Portfolios*

Finally, the last part of the table shows the key results from the comparison of the global active value portfolio and the global market portfolio. The results show that all active value portfolios generated positive alphas in the range of 3% to 9.3%. The betas compared to the global market portfolio are close to one. As a result, all constructed out-of-sample value portfolios have a lower market beta value than the balanced value portfolio that shows a beta of 1.09. It looks as if the active country-weighting also manages to reduce systematic risk. All the values for alpha and beta are highly significant on the 1% level for all portfolios, while the R-squared lies in the range of 78% to 87%.

If we compare the results from the out-of-sample analysis with the outcomes of the in-sample analysis, it is apparent that the out-of-sample portfolios don't perform equally well as the in-sample portfolios. The in-sample portfolios' return data are slightly higher, their standard deviation lower, and consequently their Sharpe-ratios are better. The in-sample portfolios also perform somewhat better in terms of the number of months that outperform the global balanced portfolio. However, given the nature of in-sample analysis, it is not surprising that its results are better than the outcomes of the out-of-sample analysis. In addition, the obtained out-of-sample results are very promising and provided substantial evidence that there is a significant relationship between value investing returns and the business cycle of countries.

In conclusion, it was shown that value-investment allocation-decisions across countries – based on economic movements – are not only profitable by using in-sample analysis, but also proved to be profitable in out-of-sample tests. Significant evidence was found that there are meaningful relationships and correlations between certain economic indicators and countries' value-investment performance. The main goal of this thesis – to investigate the outcome of an active strategy of overweighting- and underweighting of countries to take advantage of differences in business cycles – was accomplished successfully. The created global active value portfolios generated higher returns than the balanced global value portfolio, while also reducing the risk and increasing the number of months with positive returns. Hence, by over-and underweighting certain country portfolios that show favorable economic conditions for value investing, investors that have global access to value investments can increase their return potential.

6. Discussion of Analytical Results

Summarizing the outcomes of this thesis, there are four main findings. First, the positive difference between value and growth portfolio returns, specified by four different sorting-ratios, occurs in 16 (17) of the 19 countries that were analyzed. Apart from Finland, Italy, and New Zealand all countries showed a distinctive value premium when using the B/M-sorting. Therefore, the value premium seems to be a global phenomenon that is also not subject to a specific time period. The previously introduced research of Fama and French (1992) and Chan and Lakonishok (2004) quantified the value premium in the U.S. during the time period of 1969 to 1990 to around 12 percentage points, and between 1979 to 2002 to either 10.4 or 18.8 percentage points. According to my analysis in table 2, the annual value premium in excess returns in the U.S. for the 1975 to 2014 sample adds up to 3.76 percentage points for the B/M-sorting. The smaller spread could be explained with recent time periods that were more favorable for growth stocks, such as the dot-com boom or the years after the financial crisis. In addition, these previous analysis only considered the top and bottom deciles for their value and growth portfolios, while my analysis includes the top and bottom 30% of firms. Moreover, the results of this thesis provide some updated evidence regarding the findings of Fama and French (1998) about the value premium in an international setting. By applying the same method as Fama and French, I managed to come up with updated results regarding the international value premium for the four sorting-methods for the sample of 1975 to 2014. Most countries showed a clear outperformance of value portfolios with an average annual value premium of 3 to 4 percentage points compared to growth portfolios. It is remarkable that the results of table 2 compared to the results of Fama and French only differ minimally. Besides, certain countries still show the same characteristics regarding the value premium. For instance, Italy is one of the only countries that exhibits a negative value premium, which is shown both in table 2 and in the analysis of Fama and French (1998). By using the approach of Lettau and Wachter (2007), I was also able to analyze the different country value portfolios in light of the CAPM to find the alphas with respect to the market portfolio. Value stocks exhibit positive alphas while growth stocks show negative alphas relative to the CAPM. Betas are close to one and on comparable levels for both value and growth portfolios. To sum up, the results from my thesis provide more evidence that the value premium is present in a wide number of countries and that it is not subject to a specific time-sample.

Second, the results of chapter 5.1 show that value portfolios outperform growth portfolios with respect to mean return and risk-adjusted return in the majority of researched countries throughout all four stages of the business cycle. In addition, the performance of value and growth portfolios is influenced by a great degree by changes in the business cycle. There are striking differences in the returns and Sharpe-ratios between the four economic stages – slowdown, downturn, recovery, and expansion. The recovery and expansion phase show the absolute highest risk-adjusted returns for both investing styles, while the slowdown and downturn stages naturally exhibit low or negative returns that are also reflected in low Sharpe ratios. However, the relative advantage of value investing is the biggest in the recovery phase (for both B/M and CE/P sorting). The difference in the average annualized returns of the recovery phase are as high as 8 (B/M) to 9.8 (CE/P) percentage points.

In contrast downturn, expansion, and slowdown only show differences of 0.35 to 4.4 percentage points between value and growth. Nevertheless, the relative advantage of value versus growth is the second most distinctive in the slowdown (B/M) or the downturn (CE/P) period. Since growth portfolios and the rest of the market are normally suffering losses in negative stages of the economic cycle, the relative advantage of value portfolios is heightened because they manage to preserve positive returns even in bad times. This can be even more extreme for specific countries, e.g. the U.S., where value investing proves to yield the highest risk-adjusted returns in the downturn stage. In comparison to past research, my results confirm the work of Kwag and Whi ((2006)), who found that in the U.S. value portfolios consistently outperform growth portfolios throughout the business cycle. I extended their analysis by separating between four stages of the business cycle instead of two and by analyzing 19 countries instead of just the United States. Even though the general takeaway is that global-scale investments pay-off more in value portfolios than in growth portfolios, one should always also look at the individual country-specific case. In some countries growth portfolios actually outperform value portfolios during the expansion phase of the business cycle. However, in almost all countries value portfolios achieve better risk-adjusted returns in economic bad times – when the price of risk is high – and in the recovery phase of the economic cycle.

Third, thanks to the regression analysis in chapter 5.2., I managed to examine the relationship between certain economic indicators and value returns. The obtained regression slopes show which economic indicators are helpful in predicting value returns. Furthermore, more quantitative information about the direction and size of these relationships was obtained. Since the regression analysis was performed for all 19 countries in sample, I compiled country-specific overviews on the correlations between economic indicators and value returns. The finding that qualitative economic indicators – specifically the CLI and the CCI – proved to be the most significant indicators in predicting value returns, could also be used for future research. These indicators, which are designed to capture the mood and confidence of consumers and businesses within a country regarding the economic situation, showed significant relationships to value returns in a majority of countries. From a regression-results point of view, it seems that countries that are classified to be in a slowdown or downturn period of the business cycle are actually more favorable for value investments than countries that are in a recovery or expansion phase. [6] Surprisingly, classical measures of the business cycle such as GDP and industrial production did not prove to be helpful in predicting value returns.

Fourth, the three previous results were used to answer the main research question, which asked to investigate the outcome of an active strategy of overweighting- and underweighting of countries in a global value portfolio, to take advantage of differences in business cycles between these countries. The created actively-managed global value portfolio generated a higher performance on an absolute and risk-adjusted scale than the global balanced value portfolio. The global active value portfolios managed to outperform the global balanced value portfolios very distinctively by an up to 8 percentage points difference in annual returns for the in-sample-, and an up to 6.7

[6] The classification into the four stages of the business cycle follows the OECD-approach and uses the CLI indicator.

percentage points difference in annual returns for the out-of-sample analysis. Consequently, the findings of my research came to the following conclusion: Value portfolios that invest in a multitude of different countries can definitely take advantage of differences in business cycles between these countries.

It seems that increases in the CLI and CCI provide early signs of an improvement in the domestic economy. As a result, they are suitable tools to predict an increase in the stock market of that country. In addition, given the fact that many value investments have a low market price compared to their book value (i.e. they are undervalued), value portfolios seem to profit even more from a positive development of a countries economy than the general market. Consequently, the no-lag economic indicators proved to be very effective in predicting value returns. Even though it is not realistic from a practical point of view, to have instant access to these economic figures, the obtained no-time-lag results are still very valuable from a research point of view. Furthermore, the portfolios which included a time-lag provide evidence that the obtained results are still viable when including lags of one, three, six, or twelve months. It should be noted that the results are always the most favorable, when no lag is included. The longer the included time-lag, the more the annual returns are decreased and the bigger is the diminishing effect on the Sharpe-ratio. Nevertheless, even the portfolios that include a time-lag managed to outperform the balanced value portfolio.

In that light, it should also be mentioned that it is quite surprising that GDP and industrial production did not prove to be significant in predicting value returns. It is feasible given some of the theoretical results that GDP and industrial production are lagging indicators regarding stock market movements. Since all of the highly significant economic variables such as CLI, BCI, and CCI are forward looking indicators, this could be a reasonable explanation. As was shown in the theory section, the classical business cycle is indeed lagging in relation to the stock-market. Hence, my results confirm that GDP and industrial production are not predicting value returns on a significant level.

However, even though economic indicators can help to allocate funds into different country portfolios that have the best return potential, this does not protect an investor from global events that influence the stock market. Unpredictable domestic and global events that move the stock markets, such as the financial crisis or the dot-com bubble, can occur and have negative effects on the portfolio. For instance, even though the global active portfolio performed overall a lot better than the global balanced portfolio, it still suffered equally during the financial crisis 2008. Another factor to be considered is the fact, that a focus on only a few countries with good economic outlooks, decreases the diversification benefit of the overall portfolio. History has shown that it is extremely difficult to form exact and reliable stock return-predictions, since there are countless factors that influence stock prices, which makes it impossible to predict all of them. While economic business cycle information were shown to be a helpful tool in predicting value returns, it should not be forgotten that they are just a fraction of the whole picture.

In addition, there are also a few more caveats that one should be aware about when interpreting these results. First of all, the presented results are only correct under the assumption that the formed regression model is correct. This implies that the dependent variable – the value return -

really is a linear function of the independent variables – the economic indicators -, with independent and identically normally distributed errors. Furthermore, the coefficient estimates are expected to be unbiased and their errors are normally distributed (Duke University (2015b)). The way the regression model was constructed tried to avoid potential problems with the regression outputs. Accordingly, potential problems that could dilute the outcome of the analysis, such as multicollinearity, heteroscedasticity, and autocorrelation, are assumed to be absent. Nevertheless, applying some more sophisticated methods, which are beyond the scope of this thesis, could lead to additional verification of the discovered results. It should also be noted that the conducted analysis made some simplifying assumptions, which are common in the area of financial research. For instance, the models and analysis in this thesis don't include trading costs. Since the global value portfolio is rebalanced on a monthly basis, transaction fees would definitely be an issue in a real world environment. Hence, the portfolio performance would be diminished by the amount of these fees and charges. Another assumptions made is perfect information, i.e. the fact that economic data is available immediately to make investment decisions. As soon as there is a change in an economic variable, the market is aware about it. In reality one is confronted with a time-lag of several weeks or months, which was simulated by including time-lags in the created models.

After discussing the results, the obtained results can finally be compared to the initial hypothesis that guided this thesis. The hypothesis stated the following: *Value strategies tend to outperform growth strategies throughout all phases of the business cycle. Furthermore, a country's economic condition and stage in the business cycle has a direct influence on the performance of the value investing portfolio in that country. Since different countries are located at different stages of the business cycle, one can increase the performance of a global value portfolio by over-and under-weighting the different country-value-portfolios.* Given the above summarized results, the hypothesis cannot be refuted. It was possible to prove that value investing returns are influenced by economic indicators and the business cycle. Furthermore, the created global active value portfolio successfully used the economic information, to over-and underweight the individual country-portfolios. As a result, the global active value portfolio outperformed a similar global balanced value portfolio that did not change the weightings based on economic data.

7. Conclusion

This thesis first provided an introduction to value investing and its link to economic business cycles. It was shown that business cycles are inherent to the nature of the economy and consequently, they might have a big impact on stock market returns. Economic business cycles in combination with value investing did not gain much attention in previous research, even though this is a relevant topic which should be looked at in more detail. In particular, investors and mutual funds that follow a global value investing approach could profit from additional insights regarding the relationship of value investing returns and economic development of countries. In the theoretical part of the thesis, the famous value-premium was examined and different academic explanations were discussed. In this context, the three-factor model of Fama and French (1992) was introduced as well. Next, I briefly discussed the nature of business cycles, before I focused on previous research that inquired business cycles and stock (value)-returns. This theoretical overview allowed me to locate the current status of research in this field and to summarize the important results in the area of value investing.

In the data section, the whole dataset that was used in this thesis was introduced, consisting of investment return data and economic indicator data. The monthly return data for value and growth portfolios for 19 countries were obtained from the Kenneth R. French – Data library. The following four ratios – B/M, E/P, CE/P, and D/P – were used to define value and growth portfolios. In addition, the economic indicators and their time-series data were retrieved from the OECD. The whole research period included all months from 1975 until 2014. After introducing the dataset, the return data were used to provide updated evidence on the value premium in a global context. The individual country's value portfolio returns were also analyzed in context of the CAPM. The results showed that the value premium appears distinctively in the majority of countries analyzed. Furthermore, most value portfolios across all four-sorting methods showed positive alphas relative to the market, whereas growth portfolios mainly showed negative alphas compared to the market. I also illustrated how the economic indicator data relates to the business cycle. Of all economic indicators, the gross domestic product (GDP) and the amplitude-adjusted Composite Leading Indicator of OECD (CLI) proved to be the most relevant in defining business cycle movement of countries. Afterwards, I used the methodology section to describe the approach of this thesis' main analysis in more detail.

In the analysis part of the thesis, the monthly changes in the economic indicators were used as explanatory variables to perform regressions that aim to explain the monthly value returns – the dependent variable. Following the different steps of the methodology, I managed to answer the research question and "accept" the hypothesis of this thesis. It was shown that value outperforms growth throughout the business cycle not only in the U.S., but also in the majority of the 18 other countries analyzed. It seems that value portfolios performed especially well relative to growth portfolios in the slowdown and recovery phase of the business cycle. Furthermore, value portfolios managed to keep positive returns in economically bad periods, while growth portfolios and the general market suffer losses. Hence, the relative benefit of value investing versus growth investing is even bigger during periods of economic contraction. By means of the regression analysis, I was able to create a model that uses changes in economic indicators to predict the value

return of a certain country. Subsequently, I adjusted the monthly country-weights of a global value portfolio according to the respective predicted value-returns. These created actively-managed global value portfolios generated higher performances on an absolute and risk-adjusted scale than a global balanced value portfolio, which was weighted according to OECD country-weightings. That result proved to be consistent in both in-sample and out-of-sample analysis. Although the magnitude of the results decreased after a time-lag was introduced, the active value portfolio still outperformed the balanced value portfolio. This was examined with a time lag of one, three, six, and twelve months. In the end, it was successfully proven that value investing returns have a relationship with certain economic indicators and the business cycle. Furthermore, one can take advantage of these results by selectively investing in value portfolios of countries that show positive economic predictions and that are located in a favorable position within the business cycle.

The results of this master thesis hope to fill a gap in the area of value investing research and provide new insights into the relationship of value investing and economic business cycles. While some previous findings of research performed by Fama and French (1998) and Kwag and Whi (2006) were updated and expanded upon, this thesis also provided completely new evidence and results in the area of value investing and business cycles. The field of value investing remains a fascinating area of research that still leaves many questions unanswered. While the value premium and its different explanations are going to remain a widely debated issue, there are also additional aspects in relation to business cycles that could be explored further. One could have a more detailed look at the relationship of value investing and business cycles by examining just one specific country. This could lead to further insights about the influence of economic indicators on the stock market as a whole, but also on value returns. Other studies might also want to change the time period analyzed, or focus on countries that were not subject to my analysis, for example economies in South America or Asia. In addition, one could focus more on a specific economic indicator, such as industrial production, that was surprisingly not that important in predicting value returns in this thesis. It is also conceivable to repeat the analysis with a new model of other economic indicators that might yield different results. These are just a few of many more potential areas of research, which could lead to further insights about dependencies of value investing and economic movements of countries.

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Appendix

Appendix 1: Excerpt of OECD Country Weights - Monthly[7]

OECD - Share Price Index - Country Weightings

	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Ireland	Italy	Japan	Netherlands	New Zealand	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
200801	4,87%	6,08%	5,61%	4,20%	4,42%	5,86%	5,12%	5,06%	8,75%	6,23%	5,86%	5,21%	5,32%	4,55%	5,33%	3,75%	4,68%	4,24%	4,86%
200802	4,80%	6,08%	5,58%	4,36%	4,58%	6,15%	4,98%	4,93%	8,86%	6,08%	5,90%	5,18%	5,17%	4,51%	5,24%	3,79%	4,62%	4,27%	4,93%
200803	4,68%	6,12%	5,78%	4,52%	4,66%	5,84%	4,99%	4,86%	8,65%	5,97%	5,72%	5,29%	5,15%	4,62%	5,41%	3,87%	4,58%	4,27%	5,01%
200804	4,72%	6,21%	5,81%	4,56%	4,58%	5,59%	5,06%	4,85%	8,43%	5,99%	5,80%	5,42%	5,00%	4,78%	5,42%	3,87%	4,55%	4,34%	5,03%
200805	4,77%	6,42%	5,57%	4,65%	4,60%	5,43%	5,03%	4,84%	8,27%	5,89%	5,95%	5,50%	4,88%	5,19%	5,32%	3,84%	4,51%	4,34%	5,00%
200806	4,73%	6,51%	5,49%	4,95%	4,75%	5,32%	4,96%	4,86%	7,74%	5,78%	6,32%	5,50%	4,88%	5,37%	5,15%	3,78%	4,57%	4,29%	5,05%
200807	4,79%	6,36%	5,30%	5,05%	4,77%	5,43%	4,98%	4,99%	7,22%	5,80%	6,49%	5,32%	5,00%	5,23%	5,22%	3,73%	4,74%	4,39%	5,21%
200808	4,80%	6,25%	5,23%	4,96%	4,87%	5,50%	5,14%	5,06%	6,73%	5,85%	6,30%	5,40%	5,25%	5,06%	5,19%	3,83%	4,95%	4,47%	5,18%
200809	5,01%	5,95%	5,34%	4,92%	4,84%	5,24%	5,22%	5,10%	6,66%	5,98%	6,25%	5,34%	5,44%	4,70%	5,33%	3,85%	5,11%	4,54%	5,19%
200810	5,47%	5,06%	5,16%	4,86%	4,70%	5,40%	5,42%	5,12%	6,15%	6,05%	6,19%	5,00%	6,08%	4,30%	5,78%	3,87%	5,57%	4,72%	5,11%
200811	5,32%	4,66%	5,25%	4,88%	4,59%	5,42%	5,52%	5,17%	5,90%	6,23%	6,28%	4,95%	6,19%	4,24%	5,71%	3,99%	5,70%	5,03%	4,98%
200812	5,24%	4,52%	5,03%	4,75%	4,46%	5,27%	5,57%	5,29%	5,70%	6,05%	6,35%	4,93%	6,26%	4,15%	6,05%	4,18%	5,73%	5,29%	5,18%
200901	5,22%	4,54%	5,19%	4,97%	4,54%	5,22%	5,43%	5,16%	5,60%	5,98%	6,28%	5,05%	6,31%	4,45%	5,87%	4,14%	5,64%	5,29%	5,12%
200902	5,31%	4,50%	5,17%	5,01%	4,74%	5,10%	5,41%	5,11%	5,50%	5,85%	6,16%	5,13%	6,54%	4,57%	5,66%	4,41%	5,48%	5,33%	5,01%
200903	5,57%	4,69%	5,15%	5,25%	4,45%	4,99%	5,40%	5,06%	5,38%	5,40%	6,51%	4,87%	6,62%	4,69%	5,60%	4,63%	5,48%	5,24%	5,00%
200904	5,49%	4,92%	4,98%	5,24%	4,41%	5,13%	5,38%	5,19%	5,60%	5,75%	6,44%	4,80%	6,12%	4,53%	5,76%	4,75%	5,37%	5,07%	5,07%
200905	5,19%	4,97%	5,02%	5,23%	4,75%	5,29%	5,33%	5,02%	5,73%	5,91%	6,23%	4,87%	5,94%	4,89%	5,60%	4,68%	5,23%	5,05%	5,07%
200906	5,26%	5,01%	4,97%	5,33%	4,62%	5,16%	5,25%	4,97%	5,96%	5,76%	6,44%	4,87%	5,84%	5,03%	5,70%	4,60%	5,17%	4,93%	5,13%
200907	5,30%	5,02%	5,00%	5,28%	4,61%	5,00%	5,21%	4,99%	5,72%	5,66%	6,31%	4,90%	5,93%	4,88%	5,99%	4,79%	5,30%	4,96%	5,16%
200908	5,36%	5,25%	5,01%	5,10%	4,68%	4,92%	5,27%	5,00%	5,71%	5,71%	6,17%	4,96%	5,84%	4,75%	6,06%	4,76%	5,29%	4,95%	5,18%
200909	5,40%	5,38%	5,18%	5,07%	4,58%	5,06%	5,34%	4,98%	6,04%	5,77%	5,75%	5,00%	5,61%	4,68%	6,10%	4,69%	5,24%	5,01%	5,14%
200910	5,50%	5,52%	5,22%	5,03%	4,54%	4,84%	5,35%	5,01%	5,89%	5,87%	5,42%	5,06%	5,57%	4,89%	6,10%	4,69%	5,24%	5,07%	5,19%
200911	5,46%	5,43%	5,19%	5,13%	4,55%	4,88%	5,34%	5,02%	5,38%	5,73%	5,23%	5,08%	5,54%	5,10%	6,18%	4,94%	5,29%	5,20%	5,32%
200912	5,43%	5,18%	5,19%	5,13%	4,56%	4,86%	5,38%	5,12%	5,37%	5,66%	5,39%	5,20%	5,46%	5,24%	6,12%	4,89%	5,33%	5,19%	5,30%
201001	5,44%	5,22%	5,15%	5,05%	4,69%	5,00%	5,38%	5,04%	5,45%	5,66%	5,51%	5,25%	5,46%	5,21%	5,93%	4,86%	5,29%	5,17%	5,25%
201002	5,39%	5,20%	5,22%	5,16%	4,94%	5,21%	5,29%	4,99%	5,44%	5,49%	5,49%	5,22%	5,47%	5,14%	5,48%	4,98%	5,46%	5,20%	5,23%
201003	5,38%	5,04%	5,21%	5,13%	4,93%	5,36%	5,36%	5,06%	5,42%	5,47%	5,47%	5,26%	5,27%	5,11%	5,44%	5,06%	5,47%	5,32%	5,26%
201004	5,32%	5,25%	5,11%	5,05%	5,03%	5,26%	5,29%	5,11%	5,71%	5,39%	5,58%	5,31%	5,19%	5,18%	5,31%	5,09%	5,30%	5,25%	5,27%
201005	5,26%	5,22%	5,19%	5,30%	5,31%	5,14%	5,17%	5,19%	5,66%	5,16%	5,62%	5,27%	5,39%	5,24%	4,97%	5,13%	5,33%	5,20%	5,25%
201006	5,25%	5,11%	5,30%	5,29%	5,48%	5,17%	5,21%	5,31%	5,64%	5,16%	5,39%	5,32%	5,24%	5,24%	4,96%	5,32%	5,34%	5,14%	5,12%
201007	5,20%	5,14%	5,33%	5,25%	5,54%	5,14%	5,20%	5,32%	5,42%	5,26%	5,24%	5,29%	5,18%	5,19%	5,33%	5,40%	5,21%	5,18%	5,17%
201008	5,22%	5,28%	5,34%	5,27%	5,47%	5,24%	5,24%	5,30%	5,23%	5,23%	5,10%	5,24%	5,18%	5,22%	5,41%	5,39%	5,23%	5,23%	5,19%
201009	5,25%	5,25%	5,38%	5,33%	5,41%	5,33%	5,28%	5,27%	4,95%	5,17%	5,00%	5,26%	5,27%	5,23%	5,39%	5,45%	5,19%	5,34%	5,23%
201010	5,19%	5,40%	5,41%	5,38%	5,36%	5,46%	5,28%	5,34%	4,76%	5,18%	4,82%	5,23%	5,22%	5,34%	5,31%	5,46%	5,13%	5,37%	5,35%
201011	5,16%	5,43%	5,35%	5,45%	5,48%	5,38%	5,27%	5,55%	4,72%	5,08%	4,90%	5,24%	5,24%	5,46%	4,93%	5,44%	5,17%	5,37%	5,39%
201012	5,10%	5,58%	5,18%	5,49%	5,53%	5,44%	5,20%	5,63%	4,83%	4,92%	5,04%	5,27%	5,07%	5,58%	4,72%	5,57%	5,07%	5,36%	5,41%
201101	5,02%	5,62%	5,13%	5,42%	5,59%	5,51%	5,23%	5,56%	4,82%	5,00%	5,09%	5,30%	5,04%	5,61%	4,76%	5,53%	4,98%	5,33%	5,47%
201102	5,04%	5,64%	5,10%	5,53%	5,48%	5,33%	5,28%	5,63%	4,84%	5,13%	5,13%	5,32%	4,99%	5,59%	4,95%	5,24%	4,95%	5,28%	5,55%
201103	5,00%	5,59%	5,10%	5,68%	5,52%	5,26%	5,25%	5,52%	4,81%	5,14%	4,89%	5,34%	5,08%	5,76%	4,93%	5,35%	4,87%	5,27%	5,64%
201104	5,11%	5,58%	5,13%	5,60%	5,44%	5,26%	5,28%	5,63%	4,88%	5,14%	4,61%	5,29%	5,11%	5,76%	4,90%	5,42%	4,86%	5,33%	5,68%
201105	4,97%	5,53%	5,11%	5,53%	5,47%	5,21%	5,33%	5,67%	4,96%	5,10%	4,64%	5,22%	5,29%	5,66%	4,82%	5,52%	4,95%	5,32%	5,70%
201106	4,99%	5,61%	5,08%	5,55%	5,36%	4,93%	5,37%	5,75%	5,07%	4,99%	4,73%	5,18%	5,42%	5,67%	4,85%	5,44%	4,90%	5,40%	5,72%
201107	5,01%	5,55%	4,99%	5,64%	5,34%	4,79%	5,34%	5,87%	5,08%	4,78%	4,97%	5,20%	5,37%	5,71%	4,74%	5,43%	4,77%	5,53%	5,87%
201108	5,31%	5,38%	5,12%	6,01%	5,19%	4,64%	5,16%	5,46%	5,01%	4,56%	5,13%	5,09%	5,91%	5,75%	4,68%	5,28%	4,75%	5,63%	5,94%
201109	5,31%	5,18%	5,20%	6,08%	5,10%	4,71%	5,00%	5,19%	5,10%	4,41%	5,14%	5,06%	6,07%	5,81%	4,65%	5,26%	5,03%	5,78%	5,94%
201110	5,28%	4,88%	5,19%	5,79%	5,03%	4,71%	5,08%	5,41%	5,22%	4,63%	4,96%	5,22%	5,87%	5,79%	4,84%	5,31%	5,10%	5,80%	5,89%
201111	5,37%	4,65%	5,06%	5,92%	5,23%	4,71%	4,94%	5,44%	5,33%	4,48%	4,89%	5,19%	5,87%	6,04%	4,57%	5,35%	5,07%	5,87%	6,02%
201112	5,28%	4,60%	5,14%	5,77%	5,33%	4,51%	4,97%	5,41%	5,56%	4,43%	4,85%	5,33%	5,72%	6,02%	4,62%	5,39%	5,18%	5,89%	6,02%
201201	5,09%	4,69%	5,14%	5,74%	5,42%	4,65%	5,02%	5,54%	5,69%	4,36%	4,71%	5,35%	5,54%	6,02%	4,46%	5,51%	5,18%	5,86%	6,02%
201202	4,93%	4,89%	5,03%	5,57%	5,64%	4,73%	5,05%	5,68%	5,75%	4,45%	4,83%	5,26%	5,39%	6,03%	4,36%	5,59%	5,05%	5,78%	5,99%
201203	4,86%	4,81%	5,15%	5,46%	5,65%	4,67%	5,09%	5,74%	5,89%	4,44%	5,08%	5,22%	5,52%	6,07%	4,11%	5,56%	5,02%	5,68%	5,97%
201204	5,10%	4,76%	5,23%	5,49%	5,86%	4,50%	4,94%	5,74%	5,98%	4,14%	5,03%	5,17%	5,74%	6,13%	3,75%	5,51%	5,12%	5,72%	6,08%
201205	5,18%	4,78%	5,28%	5,50%	5,99%	4,38%	4,91%	5,66%	6,07%	4,02%	4,82%	5,16%	6,05%	6,16%	3,57%	5,52%	5,15%	5,71%	6,08%
201206	5,12%	4,72%	5,42%	5,57%	5,91%	4,20%	4,95%	5,53%	6,08%	4,02%	4,83%	5,24%	6,03%	6,09%	3,62%	5,49%	5,24%	5,83%	6,11%
201207	5,03%	4,64%	5,65%	5,41%	6,10%	4,17%	4,98%	5,61%	6,09%	3,97%	4,73%	5,38%	5,87%	6,22%	3,50%	5,53%	5,29%	5,79%	6,04%
201208	5,05%	4,61%	5,68%	5,35%	6,13%	4,22%	5,12%	5,71%	5,88%	4,08%	4,58%	5,37%	5,86%	6,21%	3,65%	5,47%	5,28%	5,74%	6,01%
201209	4,97%	4,64%	5,65%	5,37%	6,04%	4,24%	5,09%	5,80%	5,89%	4,26%	4,43%	5,26%	5,93%	6,25%	3,92%	5,40%	5,20%	5,61%	6,05%
201210	5,11%	4,71%	5,57%	5,39%	6,08%	4,21%	5,02%	5,82%	5,87%	4,20%	4,38%	5,20%	6,11%	6,17%	3,86%	5,34%	5,29%	5,62%	6,05%
201211	5,06%	4,81%	5,54%	5,34%	5,96%	4,27%	5,08%	5,83%	5,92%	4,15%	4,51%	5,23%	6,16%	6,07%	3,85%	5,34%	5,33%	5,61%	5,96%
201212	5,08%	4,93%	5,43%	5,23%	5,91%	4,33%	5,16%	5,91%	5,87%	4,17%	4,72%	5,20%	6,03%	5,96%	3,88%	5,38%	5,32%	5,56%	5,94%
201301	5,06%	4,90%	5,28%	5,16%	5,99%	4,34%	5,08%	5,80%	5,88%	4,31%	4,98%	5,11%	5,98%	5,95%	3,97%	5,35%	5,36%	5,54%	5,96%
201302	5,23%	4,76%	5,20%	5,12%	6,04%	4,38%	4,99%	5,70%	6,04%	4,08%	5,26%	4,96%	6,00%	5,98%	3,72%	5,49%	5,45%	5,61%	5,98%
201303	5,16%	4,72%	5,26%	5,03%	6,04%	4,30%	5,01%	5,73%	6,31%	3,90%	5,52%	4,92%	5,97%	5,88%	3,71%	5,47%	5,53%	5,59%	5,94%
201304	5,16%	4,62%	5,26%	4,88%	5,96%	4,19%	4,97%	5,63%	6,33%	3,95%	6,01%	4,89%	6,14%	5,85%	3,61%	5,40%	5,55%	5,57%	6,02%
201305	5,07%	4,55%	5,23%	4,79%	5,86%	4,22%	5,05%	5,69%	6,28%	4,09%	6,22%	4,90%	6,06%	5,79%	3,64%	5,40%	5,58%	5,58%	6,00%
201306	4,95%	4,54%	5,22%	4,87%	5,89%	4,19%	5,07%	5,77%	6,44%	4,02%	5,91%	4,90%	6,14%	5,91%	3,61%	5,42%	5,51%	5,54%	6,12%
201307	4,99%	4,33%	5,18%	4,84%	5,91%	4,17%	5,05%	5,68%	6,48%	3,90%	6,27%	4,96%	6,12%	5,92%	3,52%	5,44%	5,53%	5,58%	6,12%
201308	5,02%	4,46%	5,38%	4,77%	6,04%	4,20%	5,14%	5,67%	6,55%	4,05%	5,90%	4,95%	5,95%	5,88%	3,69%	5,46%	5,45%	5,44%	6,00%
201309	5,04%	4,44%	5,39%	4,74%	6,00%	4,43%	5,13%	5,66%	6,48%	4,05%	5,98%	4,90%	5,96%	5,87%	3,75%	5,48%	5,39%	5,36%	5,95%
201310	4,99%	4,40%	5,43%	4,73%	6,02%	4,41%	5,15%	5,74%	6,44%	4,22%	5,87%	4,86%	5,94%	5,88%	4,02%	5,39%	5,31%	5,26%	5,96%
201311	4,94%	4,44%	5,40%	4,73%	5,99%	4,51%	5,09%	5,83%	6,48%	4,18%	5,87%	4,88%	5,90%	5,97%	3,92%	5,36%	5,31%	5,22%	5,96%
201312	4,84%	4,31%	5,36%	4,76%	6,15%	4,46%	5,03%	5,94%	6,51%	4,11%	6,10%	4,86%	5,77%	6,02%	3,91%	5,43%	5,23%	5,18%	6,04%
201401	4,74%	4,37%	5,31%	4,73%	6,36%	4,43%	4,97%	5,90%	6,71%	4,20%	6,01%	4,85%	5,74%	5,99%	4,00%	5,42%	5,24%	5,11%	5,90%
201402	4,74%	4,33%	5,32%	4,79%	6,70%	4,43%	5,01%	5,86%	6,97%	4,28%	5,61%	4,78%	5,73%	5,93%	3,94%	5,44%	5,24%	5,07%	5,83%
201403	4,76%	4,09%	5,45%	4,86%	6,75%	4,36%	5,04%	5,72%	6,99%	4,42%	5,50%	4,75%	5,87%	5,96%	3,93%	5,48%	5,19%	4,98%	5,92%
201404	4,78%	4,10%	5,54%	4,87%	6,65%	4,33%	5,10%	5,72%	6,89%	4,54%	5,37%	4,81%	5,77%	5,98%	4,01%	5,47%	5,20%	4,95%	5,92%
201405	4,74%	4,01%	5,55%	4,87%	6,75%	4,37%	5,09%	5,69%	6,66%	4,38%	5,33%	4,80%	5,76%	6,30%	4,03%	5,51%	5,24%	5,02%	5,92%
201406	4,62%	4,05%	5,56%	4,88%	6,83%	4,40%	5,03%	5,68%	6,54%	4,41%	5,53%	4,82%	5,60%	6,46%	4,12%	5,45%	5,18%	4,90%	5,94%
201407	4,73%	3,92%	5,51%	5,02%	6,88%	4,40%	4,91%	5,61%	6,40%	4,28%	5,71%	4,80%	5,62%	6,52%	4,05%	5,50%	5,18%	4,92%	6,04%
201408	4,86%	3,81%	5,49%	5,16%	6,92%	4,40%	4,85%	5,44%	6,44%	4,14%	5,80%	4,80%	5,71%	6,45%	4,00%	5,48%	5,21%	4,97%	6,07%
201409	4,67%	3,73%	5,56%	5,03%	6,98%	4,40%	4,92%	5,50%	6,56%	4,22%	5,86%	4,88%	5,67%	6,38%	4,08%	5,43%	5,28%	4,90%	5,98%
201410	4,78%	3,66%	5,56%	4,98%	7,03%	4,45%	4,83%	5,40%	6,56%	4,10%	5,88%	4,86%	5,95%	6,21%	4,03%	5,48%	5,35%	4,87%	6,02%
201411	4,67%	3,63%	5,55%	4,90%	6,92%	4,45%	4,80%	5,49%	6,66%	3,96%	6,23%	4,86%	5,93%	6,11%	3,89%	5,64%	5,40%	4,85%	6,03%
201412	4,56%	3,56%	5,54%	4,74%	6,91%	4,50%	4,81%	5,67%	7,02%	3,92%	6,34%	4,89%	5,97%	5,75%	3,91%	5,73%	5,43%	4,77%	5,96%

[7] The complete dataset for all countries can be found on the DVD attached to the thesis. The same applies to all further presented data excerpts.

Appendix 2: Excerpt of Return Data: US Data of Excess Returns 1975-1980

USA - Example of Value-Weight Dollar Excess Returns - All 4 Data Items Not Reqd

		B/M			E/P			CE/P			D/P		
	Rm-Rf	Value (Hi 30)	Growth (Lo 30)	H-L	Value (Hi 30)	Growth (Lo 30)	H-L	Value (Hi 30)	Growth (Lo 30)	H-L	Value (Hi 30)	Growth (Lo 30)	H-L
197501	13,66	23,35	10,45	12,9	23,65	10,04	13,61	22,66	10,29	12,37	21,28	10	11,28
197502	5,56	2,15	7,72	-5,57	0,82	8	-7,18	1,22	7,89	-6,67	1,05	9,09	-8,04
197503	2,66	7,12	2,67	4,45	6,79	2,81	3,98	6,25	2,85	3,4	0,55	2,91	-2,36
197504	4,23	5,2	5,28	-0,08	3,69	5,31	-1,62	3,62	5,05	-1,43	0,3	4,9	-4,6
197505	5,19	2,31	5,42	-3,11	5,71	5,2	0,51	3,71	4,98	-1,27	6,76	5,12	1,64
197506	4,82	6,83	4,01	2,82	7,45	3,74	3,71	7,38	3,78	3,6	7,53	3,18	4,35
197507	-6,59	-4,21	-7,81	3,6	-4,37	-7,9	3,53	-4,6	-8,47	3,87	-4,23	-8,88	4,65
197508	-2,85	-4,51	-2,81	-1,7	-2,36	-3,33	0,97	-2,37	-3,45	1,08	-2,18	-3,15	0,97
197509	-4,26	-4,19	-4,45	0,26	-3,54	-4,52	0,98	-3,87	-5,25	1,38	-2,42	-5,35	2,93
197510	5,31	4	5,76	-1,76	2,14	6,79	-4,65	2,38	6,91	-4,53	4,95	6,06	-1,11
197511	2,65	3,82	2,56	1,26	2,47	3,04	-0,57	2,48	3,2	-0,72	3,02	2,68	0,34
197512	-1,6	-0,26	-2,3	2,04	-0,12	-2,6	2,48	-0,09	-2,87	2,78	0,01	-3,02	3,03
197601	12,16	20,44	10,48	9,96	19,82	10,46	9,36	20,12	10,74	9,38	11,33	11,49	-0,16
197602	0,32	7,58	-1,35	8,93	4,38	-1,23	5,61	4,56	-1,79	6,35	0,61	-2,02	2,63
197603	2,33	1,65	2,36	-0,71	1,55	2,64	-1,09	1,38	2,42	-1,04	2,23	2,43	-0,2
197604	-1,49	-1,77	-1,99	0,22	-0,62	-2,2	1,58	-0,42	-2,76	2,34	0,67	-2,83	3,5
197605	-1,35	-2,22	-0,99	-1,23	-1,3	-2,18	0,88	-1,13	-2,19	1,06	-2,2	-1,86	-0,34
197606	4,05	4,65	4	0,65	5,42	4,06	1,36	5,44	4,26	1,18	3,88	4,53	-0,65
197607	-1,07	0,05	-1,66	1,71	-1,33	-1,81	0,48	-0,12	-1,56	1,44	1	-1,92	2,92
197608	-0,56	-1,46	-0,86	-0,6	-1,84	-0,61	-1,23	-0,21	-0,84	0,63	2,47	-1,07	3,54
197609	2,06	2,22	1,8	0,42	2,75	1,74	1,01	3,3	0,94	2,36	2,4	1,57	0,83
197610	-2,42	-3,31	-2,89	-0,42	-2,08	-2,79	0,71	-1,34	-2,82	1,48	-0,65	-3,35	2,7
197611	0,36	2,32	-0,94	3,26	2,18	-1,01	3,19	2,34	-1,02	3,36	2,2	-0,78	2,98
197612	5,65	8,84	4,61	4,23	8,71	4,29	4,42	6,33	4,13	2,2	5,98	3,99	1,99
197701	-4,05	0,67	-6,33	7	0,77	-7,16	7,93	0,06	-7,57	7,63	0,31	-7,1	7,41
197702	-1,95	-1,52	-2,17	0,65	-1,9	-2,22	0,32	-0,64	-1,89	1,25	-1,67	-2,22	0,55
197703	-1,37	0,01	-1,93	1,94	0,19	-2,18	2,37	-0,9	-1,65	0,75	-1	-1,62	0,62
197704	0,15	3,27	-1,38	4,65	2,04	-1,66	3,7	1,64	-2,03	3,67	1,68	-1,8	3,48
197705	-1,46	-1,09	-2,1	1,01	-0,64	-2,23	1,59	-0,33	-2,55	2,22	0,57	-2,5	3,07
197706	4,71	5,25	5,35	-0,1	4,83	5,71	-0,88	3,86	5,6	-1,74	3,45	6,05	-2,6
197707	-1,69	-2,43	-1,8	-0,63	-2,11	-1,68	-0,43	-2	-1,38	-0,62	-1,05	-2,24	1,19
197708	-1,75	-2,95	-0,08	-2,87	-2,75	0,3	-3,05	-3,31	0,57	-3,88	-3,29	-0,22	-3,07
197709	-0,27	-0,69	-0,98	0,29	0,61	-1,4	2,01	1,92	-1,48	3,4	1,05	-0,21	1,26
197710	-4,38	-3,13	-4,78	1,65	-3,54	-4,84	1,3	-4,11	-4,82	0,71	-3,79	-5,12	1,33
197711	4	5,45	3,79	1,66	5,93	4,03	1,9	3,71	4,03	-0,32	2,14	5,62	-3,48
197712	0,27	0,8	-0,07	0,87	0,45	0,09	0,36	0,71	-0,14	0,85	0,3	0,65	-0,35
197801	-6,01	-3,1	-6,78	3,68	-4,42	-6,24	1,82	-5,66	-6,32	0,66	-4,69	-7,4	2,71
197802	-1,38	-0,83	-2,71	1,88	0,17	-3,34	3,51	1,12	-2,99	4,11	-0,1	-2,12	2,02
197803	2,85	4,55	1,96	2,59	4,75	1,84	2,91	4,09	1,97	2,12	2,53	3,31	-0,78
197804	7,88	6,45	10,44	-3,99	7,02	10,67	-3,65	5,66	10,63	-4,97	3,2	10,8	-7,6
197805	1,76	2,92	1,81	1,11	3,53	1,95	1,58	1	1,84	-0,84	-0,49	3,67	-4,16
197806	-1,69	-1,38	-1,9	0,52	-1,11	-1,61	0,5	-2,04	-1,31	-0,73	-2,04	-0,87	-1,17
197807	5,11	5,31	6,34	-1,03	5,52	6,51	-0,99	4,08	6,5	-2,42	2,64	6,81	-4,17
197808	3,75	3,12	3,47	-0,35	4,19	3,46	0,73	3,75	3,43	0,32	2,61	4,7	-2,09
197809	-1,43	-0,82	-3,12	2,3	-1,24	-3,08	1,84	0,33	-3,27	3,6	0,83	-3,02	3,85
197810	-11,91	-14,04	-11,96	-2,08	-14,85	-11,72	-3,13	-11,74	-11,47	-0,27	-8,63	-14,9	6,27
197811	2,71	2,63	2,79	-0,16	2,69	2,87	-0,18	3	2,38	0,62	2,04	4,13	-2,09
197812	0,88	-0,62	2,12	-2,74	0,34	2,27	-1,93	0,4	2,15	-1,75	-0,64	2,05	-2,69
197901	4,23	6,63	2,97	3,66	5,81	3,38	2,43	4,49	3,11	1,38	4,37	2,61	1,76
197902	-3,56	-3,38	-4,42	1,04	-3,96	-4,24	0,28	-2,87	-4,66	1,79	-2,33	-5,18	2,85
197903	5,68	6,97	5,49	1,48	7,38	5,47	1,91	6,14	4,92	1,22	3,94	6,77	-2,83
197904	-0,06	0,53	-0,46	0,99	0,58	-0,58	1,16	0,86	-0,43	1,29	-0,59	0,54	-1,13
197905	-2,21	-1,67	-2,73	1,06	-1,33	-2,75	1,42	-2,06	-2,8	0,74	-1,66	-2,99	1,33
197906	3,85	4,94	2,55	2,39	4,83	2,32	2,51	4,13	2,21	1,92	3,77	4,8	-1,03
197907	0,82	2,24	-0,03	2,27	2,17	-0,12	2,29	1,29	-0,36	1,65	0,66	1,92	-1,26
197908	5,53	5,01	6,23	-1,22	5,27	6,18	-0,91	5,19	5,86	-0,67	3,46	7,36	-3,9
197909	-0,82	-1,66	-1,41	-0,25	-1,52	-1,55	0,03	-0,18	-2,43	2,25	-1,58	0,22	-1,8
197910	-8,1	-9,8	-7,83	-1,97	-11,17	-7,59	-3,58	-8,01	-8,14	0,13	-7,6	-7,74	0,14
197911	5,21	3,67	6,08	-2,41	3,33	6,28	-2,95	4,46	5,43	-0,97	2,37	8,55	-6,18
197912	1,79	1,66	2,65	-0,99	1,72	2,77	-1,05	0,93	2,02	-1,09	-1,62	3,98	-5,6
198001	5,51	7,24	4,45	2,79	5,45	5,03	0,42	7,29	2,72	4,57	2,81	7,25	-4,44
198002	-1,22	-1,13	-3,64	2,51	-5,71	-3,19	-2,52	0,49	-4,85	5,34	-1,87	-1,83	-0,04
198003	-12,9	-15,16	-11,48	-3,68	-12,02	-12,19	0,17	-13,62	-10,47	-3,15	-9,21	-15,01	5,8
198004	3,97	4,81	2,75	2,06	2,79	2,9	-0,11	2,94	3,28	-0,34	5,52	3,59	1,93
198005	5,26	5,97	5,13	0,84	6,55	5,05	1,5	4,78	5,21	-0,43	5,24	5,41	-0,17
198006	3,06	2,15	2,83	-0,68	2,21	2,93	-0,72	2,93	2,7	0,23	1,74	3,79	-2,05
198007	6,49	2,94	9,26	-6,32	4,92	9,39	-4,47	4,68	10,74	-6,06	3,06	7,91	-4,85
198008	1,8	1,43	2,26	-0,83	1,6	2,66	-1,06	1,85	2,27	-0,42	1,01	3,29	-2,28
198009	2,19	-1,4	3,53	-4,93	0,86	3,87	-3,01	0,63	2,73	-2,1	-1,68	6,36	-8,04
198010	1,06	-1,2	1,34	-2,54	0,74	1,8	-1,06	1,03	0,27	0,76	-1,37	3,36	-4,73
198011	9,59	3,5	10,81	-7,31	8,98	11,8	-2,82	10,27	9,7	0,57	1,41	15,73	-14,32
198012	-4,52	-2,15	-3,84	1,69	-4,96	-5,18	0,22	-6,33	-3,09	-3,24	-1,39	-6,85	5,46

Appendix 3: Example of Annual Excess Return Data – U.S.

U.S. - Example of Value-Weighted Dollar Excess Annual Returns - All 4 Data Items Not Reqd

			BE/ME			E/P			CE/P			D/P	
	Mkt	High	Low	H-LB/M	High	Low	H-LE/P	High	Low	H-LCE/P	High	Low	H-LD/P
1975	32,45	48,88	29,4	19,48	50,12	29,43	20,69	45,11	27,04	18,07	42,35	25,2	17,15
1976	21,89	45,64	13,03	32,61	44,06	11,59	32,47	48,22	9,44	38,78	35,08	10,09	24,99
1977	-8,27	3,38	-12,86	16,24	3,66	-13,66	17,32	0,27	-13,74	14,01	-1,62	-11,41	9,79
1978	1,03	2,71	0,54	2,17	5,06	1,78	3,28	2,86	1,81	1,05	-3,58	4,91	-8,49
1979	13,08	16,15	9,12	7,03	13,45	9,69	3,76	15,65	4,1	11,55	2,79	23,25	-20,46
1980	22,12	5,78	26,19	-20,41	11,03	27,79	-16,76	17,55	23,41	-5,86	5,01	37,65	-32,64
1981	-18,13	0,03	-22,77	22,8	-10,11	-24,18	14,07	-14,47	-22,07	7,6	-1,32	-26,47	25,15
1982	10,66	18,79	11,09	7,7	12,05	11,34	0,71	7,59	11,5	-3,91	12,94	7,2	5,74
1983	13,75	21,08	6,52	14,56	19,25	6,56	12,69	19,72	5,76	13,96	17,77	8,24	9,53
1984	-6,06	5,16	-12,79	17,95	10,05	-19,08	29,13	8,47	-16,89	25,36	6,24	-15,03	21,27
1985	24,91	24,02	24,35	-0,33	25,76	19,65	6,11	25,11	23,81	1,3	24,71	25,49	-0,78
1986	10,12	14,56	6,93	7,63	16,05	10,55	5,5	16,02	13,56	2,46	17,39	8,82	8,57
1987	-3,87	-8,14	-0,54	-7,6	-8,57	2,22	-10,79	-5,74	0,89	-6,63	-4,02	0,02	-4,04
1988	11,55	20,12	6,51	13,61	15,06	6,23	8,83	16	5,64	10,36	16,45	6,57	9,88
1989	20,49	20,12	26,03	-5,91	14,74	24,71	-9,97	23,85	24,35	-0,5	19,63	19,94	-0,31
1990	-13,95	-22,78	-8,53	-14,25	-22,02	-7,35	-14,67	-19,46	-7,9	-11,56	-14,76	-10,69	-4,07
1991	29,17	23,61	38,27	-14,66	34,79	35	-0,21	21,65	38,95	-17,3	17,9	38,51	-20,61
1992	6,23	22,38	2,75	19,63	18,02	0,98	17,04	15,04	-1,16	16,2	9,06	3,36	5,7
1993	8,21	19,99	-1,22	21,21	10,21	2,56	7,65	13,81	2,62	11,19	12,09	2,73	9,36
1994	-4,11	-8,82	-2,18	-6,64	-8,86	-1,48	-7,38	-7,73	-0,93	-6,8	-3,67	-5,58	1,91
1995	31,21	30,35	31,07	-0,72	40,9	26,51	14,39	35,94	28,1	7,84	34,33	26,27	8,06
1996	15,97	10,96	16,53	-5,57	23,58	14,13	9,45	17,38	13,46	3,92	13,58	21,04	-7,46
1997	25,97	24,99	24,01	0,98	36,51	19,37	17,14	32,39	26,55	5,84	31,49	25,61	5,88
1998	19,46	9,71	31,58	-21,87	0,17	27,74	-27,57	8,85	28,37	-19,52	14,27	30,09	-15,82
1999	20,56	-4,06	23,14	-27,2	2,8	24,24	-21,44	0,56	22,75	-22,19	-15,53	14,72	-30,25
2000	-17,59	14,81	-19,56	34,37	20,32	-19,42	39,74	8,41	-15,21	23,62	20,03	-5,46	25,49
2001	-15,2	1,32	-18,19	19,51	4,54	-17,48	22,02	1,56	-17,71	19,27	2,84	-13,8	16,64
2002	-22,76	-21,73	-24,59	2,86	-10,59	-24,31	13,72	-19,87	-24,02	4,15	-9,19	-27,19	18
2003	30,75	33,16	28,07	5,09	33,62	28,5	5,12	25,74	29,46	-3,72	26,36	31,47	-5,11
2004	10,72	19,42	6,73	12,69	15,28	6,98	8,3	18,12	6,72	11,4	14,06	9,21	4,85
2005	3,09	8,75	0,74	8,01	8,78	3,2	5,58	12,48	1,01	11,47	0,24	6,15	-5,91
2006	10,6	19,07	4,71	14,36	15,9	5,43	10,47	17,76	6,53	11,23	14,57	-0,67	15,24
2007	1,04	-3,37	6,29	-9,66	-5,58	8,66	-14,24	5,75	6,63	-0,88	-5,99	2,14	-8,13
2008	-38,34	-39,48	-35,48	-4	-37,4	-40,84	3,44	-31,88	-39,8	7,92	-34,44	-45,92	11,48
2009	28,26	24,94	32,54	-7,6	21,41	34,41	-13	25,77	32,64	-6,87	13,37	36,91	-23,54
2010	17,37	13,04	16,18	-3,14	12,79	20,13	-7,34	15,51	18,88	-3,37	18,76	10,86	7,9
2011	0,44	-6,63	3,19	-9,82	3,29	-2,77	6,06	5,66	-0,44	6,1	13,82	-12,06	25,88
2012	16,28	24,73	15,75	8,98	15,57	17,61	-2,04	13,79	20,23	-6,44	11,69	20,79	-9,1
2013	35,19	38,05	34,16	3,89	38,55	36,45	2,1	35,91	37,62	-1,71	27,4	38,91	-11,51
2014	11,7	8,94	12,63	-3,69	13,98	12,18	1,8	12,11	11,75	0,36	10,82	9,6	1,22
Mean Return	**8,90**	**11,99**	**8,23**	**3,76**	**12,71**	**7,88**	**4,83**	**12,29**	**8,09**	**4,19**	**10,32**	**8,29**	**2,04**
St. Dev.	**(17,08)**	**(17,91)**	**(18,08)**	**(14,34)**	**(17,90)**	**(18,31)**	**(14,44)**	**(16,75)**	**(18,22)**	**(12,37)**	**(15,23)**	**(19,43)**	**(15,15)**
St. Error of Mean	**2,70**	**2,83**	**2,86**	**2,27**	**2,83**	**2,89**	**2,28**	**2,65**	**2,88**	**1,96**	**2,41**	**3,07**	**2,40**

Appendix 4: Excerpt of GDP Growth Rate Dataset

GDP - Expenditure Approach - GPSA: Growth rate compared to previous quarter, seasonally adjusted - Quarterly data used for all 3 months in the appropriate quarter

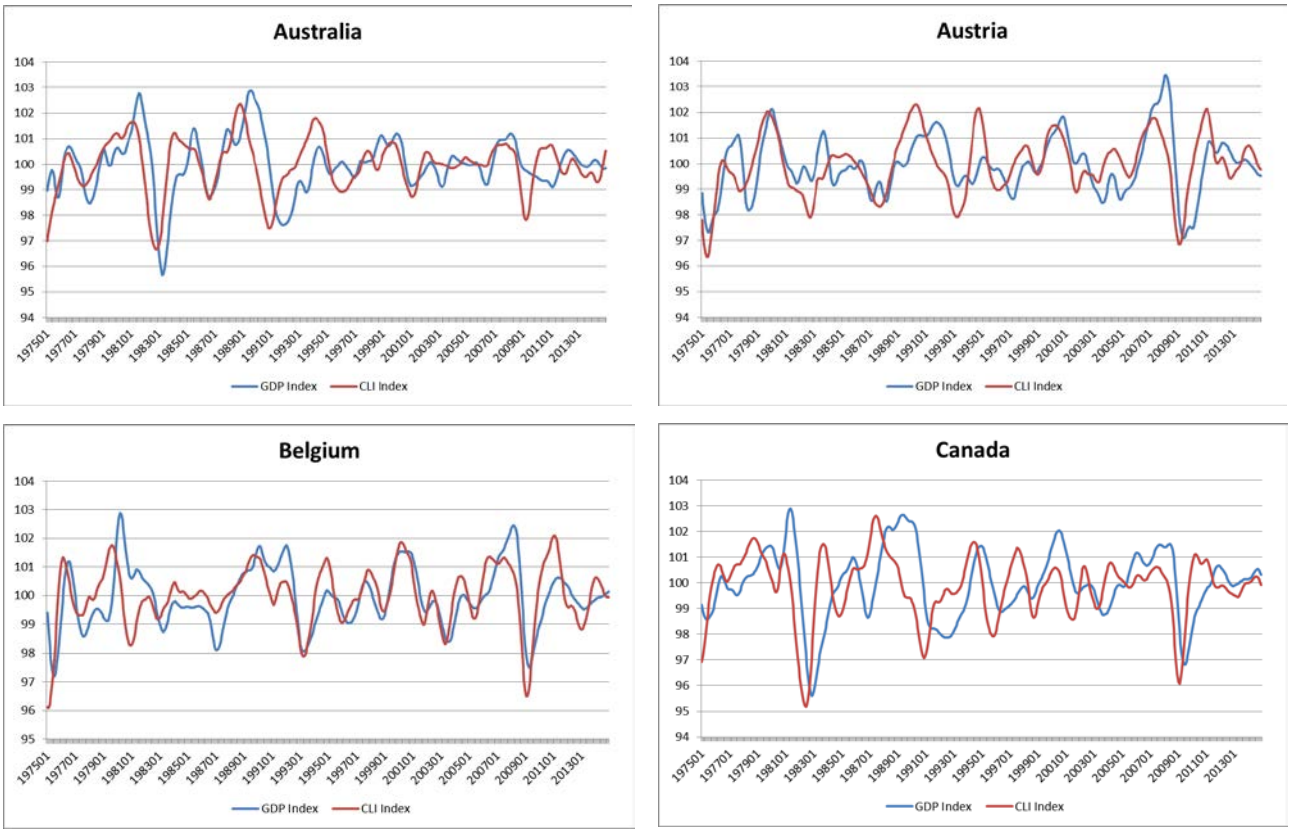
Year	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Ireland	Italy	Japan	Netherlands	New Zealand	Norway	Spain	Sweden	Switzerland	UK	US
197401	0,0052	2,0167	1,2827	0,9833	-0,4162	-0,5819	0,9593	0,8457	0,8616	0,811	-3,436	0,575		1,5225	1,6983	-0,5321	1,461	-2,4125	-0,8311
197402	0,0052	2,0167	1,2827	0,9833	-0,4162	-0,5819	0,9593	0,8457	0,8616	0,811	-3,436	0,575		1,5225	1,6983	-0,5321	1,461	-2,4125	-0,8311
197403	0,0052	2,0167	1,2827	0,9833	-0,4162	-0,5819	0,9593	0,8457	0,8616	0,811	-3,436	0,575		1,5225	1,6983	-0,5321	1,461	-2,4125	-0,8311
197404	-2,0416	-0,4214	1,2697	0,7995	-0,4902	0,3086	0,5006	-0,0769	1,1269	0,9551	0,7203	1,1469		1,2925	1,2636	1,7026	0,3025	1,9296	0,264
197405	-2,0416	-0,4214	1,2697	0,7995	-0,4902	0,3086	0,5006	-0,0769	1,1269	0,9551	0,7203	1,1469		1,2925	1,2636	1,7026	0,3025	1,9296	0,264
197406	-2,0416	-0,4214	1,2697	0,7995	-0,4902	0,3086	0,5006	-0,0769	1,1269	0,9551	0,7203	1,1469		1,2925	1,2636	1,7026	0,3025	1,9296	0,264
197407	1,3049	0,4662	0,1658	0,0141	-0,5652	1,2354	0,9435	0	1,5629	0,1667	1,2797	0,788		1,0715	0,7057	1,4087	-2,4246	1,0465	-0,9685
197408	1,3049	0,4662	0,1658	0,0141	-0,5652	1,2354	0,9435	0	1,5629	0,1667	1,2797	0,788		1,0715	0,7057	1,4087	-2,4246	1,0465	-0,9685
197409	1,3049	0,4662	0,1658	0,0141	-0,5652	1,2354	0,9435	0	1,5629	0,1667	1,2797	0,788		1,0715	0,7057	1,4087	-2,4246	1,0465	-0,9685
197410	0,0009	-1,2242	-1,0007	0,3827	-0,6414	0,023	-1,5102	-1,2627	1,878	-2,0904	-0,5423	-1,3854		0,8578	0,0662	1,361	-3,5727	-1,1762	-0,3997
197411	0,0009	-1,2242	-1,0007	0,3827	-0,6414	0,023	-1,5102	-1,2627	1,878	-2,0904	-0,5423	-1,3854		0,8578	0,0662	1,361	-3,5727	-1,1762	-0,3997
197412	0,0009	-1,2242	-1,0007	0,3827	-0,6414	0,023	-1,5102	-1,2627	1,878	-2,0904	-0,5423	-1,3854		0,8578	0,0662	1,361	-3,5727	-1,1762	-0,3997
197501	0,3664	0,1391	-1,0001	-0,179	-0,719	1,6035	-0,4499	-0,577	1,7822	-1,7396	0,1309	-1,9635		0,6499	-0,5019	0,6387	-2,1271	0,3237	-1,2096
197502	0,3664	0,1391	-1,0001	-0,179	-0,719	1,6035	-0,4499	-0,577	1,7822	-1,7396	0,1309	-1,9635		0,6499	-0,5019	0,6387	-2,1271	0,3237	-1,2096
197503	0,3664	0,1391	-1,0001	-0,179	-0,719	1,6035	-0,4499	-0,577	1,7822	-1,7396	0,1309	-1,9635		0,6499	-0,5019	0,6387	-2,1271	0,3237	-1,2096
197504	3,1752	-1,0302	-1,0047	0,769	0,0921	-0,7101	0,2528	-0,502	1,3475	-0,0516	2,2201	1,371		1,0452	-0,0831	-1,1545	-1,0714	-1,5882	0,7709
197505	3,1752	-1,0302	-1,0047	0,769	0,0921	-0,7101	0,2528	-0,502	1,3475	-0,0516	2,2201	1,371		1,0452	-0,0831	-1,1545	-1,0714	-1,5882	0,7709
197506	3,1752	-1,0302	-1,0047	0,769	0,0921	-0,7101	0,2528	-0,502	1,3475	-0,0516	2,2201	1,371		1,0452	-0,0831	-1,1545	-1,0714	-1,5882	0,7709
197507	-1,049	0,9603	0,5079	1,4283	0,9077	-0,9154	0,3874	1,0878	0,6129	1,4214	1,1381	0,5699		1,4298	0,4368	0,9116	-1,1369	-0,1721	1,6538
197508	-1,049	0,9603	0,5079	1,4283	0,9077	-0,9154	0,3874	1,0878	0,6129	1,4214	1,1381	0,5699		1,4298	0,4368	0,9116	-1,1369	-0,1721	1,6538
197509	-1,049	0,9603	0,5079	1,4283	0,9077	-0,9154	0,3874	1,0878	0,6129	1,4214	1,1381	0,5699		1,4298	0,4368	0,9116	-1,1369	-0,1721	1,6538
197510	-1,5538	2,3763	2,1276	0,8176	1,7078	-0,97	1,3503	1,9651	-0,0519	1,1203	1,0515	3,8134		1,7994	0,7028	1,2767	-0,7139	1,382	1,3465
197511	-1,5538	2,3763	2,1276	0,8176	1,7078	-0,97	1,3503	1,9651	-0,0519	1,1203	1,0515	3,8134		1,7994	0,7028	1,2767	-0,7139	1,382	1,3465
197512	-1,5538	2,3763	2,1276	0,8176	1,7078	-0,97	1,3503	1,9651	-0,0519	1,1203	1,0515	3,8134		1,7994	0,7028	1,2767	-0,7139	1,382	1,3465
197601	4,4378	-0,3638	2,0743	1,8018	2,4739	0,3732	1,4677	0,8985	-0,2314	1,7618	0,8473	0,1888		2,1505	0,9938	-1,6662	-0,0889	1,7007	2,2587
197602	4,4378	-0,3638	2,0743	1,8018	2,4739	0,3732	1,4677	0,8985	-0,2314	1,7618	0,8473	0,1888		2,1505	0,9938	-1,6662	-0,0889	1,7007	2,2587
197603	4,4378	-0,3638	2,0743	1,8018	2,4739	0,3732	1,4677	0,8985	-0,2314	1,7618	0,8473	0,1888		2,1505	0,9938	-1,6662	-0,0889	1,7007	2,2587
197604	0,3157	1,846	2,0191	2,063	1,8103	0,5344	1,1923	1,4855	0,1126	1,8075	0,5908	0,0995		1,7182	1,1542	1,7669	0,5129	-0,8724	0,7564
197605	0,3157	1,846	2,0191	2,063	1,8103	0,5344	1,1923	1,4855	0,1126	1,8075	0,5908	0,0995		1,7182	1,1542	1,7669	0,5129	-0,8724	0,7564
197606	0,3157	1,846	2,0191	2,063	1,8103	0,5344	1,1923	1,4855	0,1126	1,8075	0,5908	0,0995		1,7182	1,1542	1,7669	0,5129	-0,8724	0,7564
197607	0,8516	2,2955	0,8737	0,424	1,1849	1,1152	0,4729	0,0299	0,9415	2,5415	1,406	3,533		1,3086	0,9699	-0,5413	1,6585	0,9057	0,5087
197608	0,8516	2,2955	0,8737	0,424	1,1849	1,1152	0,4729	0,0299	0,9415	2,5415	1,406	3,533		1,3086	0,9699	-0,5413	1,6585	0,9057	0,5087
197609	0,8516	2,2955	0,8737	0,424	1,1849	1,1152	0,4729	0,0299	0,9415	2,5415	1,406	3,533		1,3086	0,9699	-0,5413	1,6585	0,9057	0,5087
197610	0,8355	1,3617	-0,2786	0,1199	0,5849	0,8343	1,2458	1,8516	1,8533	1,7347	0,1189	-1,6929		0,9161	0,7679	-0,463	1,1192	2,0615	0,7505
197611	0,8355	1,3617	-0,2786	0,1199	0,5849	0,8343	1,2458	1,8516	1,8533	1,7347	0,1189	-1,6929		0,9161	0,7679	-0,463	1,1192	2,0615	0,7505
197612	0,8355	1,3617	-0,2786	0,1199	0,5849	0,8343	1,2458	1,8516	1,8533	1,7347	0,1189	-1,6929		0,9161	0,7679	-0,463	1,1192	2,0615	0,7505
197701	-0,5714	0,1866	-0,2789	1,6316	-1,1981	-0,8614	1,1054	0,8539	2,4003	0,0396	2,1873	1,2138		0,5356	0,7922	-2,0329	-0,0583	0,2273	1,1635
197702	-0,5714	0,1866	-0,2789	1,6316	-1,1981	-0,8614	1,1054	0,8539	2,4003	0,0396	2,1873	1,2138		0,5356	0,7922	-2,0329	-0,0583	0,2273	1,1635
197703	-0,5714	0,1866	-0,2789	1,6316	-1,1981	-0,8614	1,1054	0,8539	2,4003	0,0396	2,1873	1,2138		0,5356	0,7922	-2,0329	-0,0583	0,2273	1,1635
197704	1,4453	1,4263	-0,2757	0,4487	-0,0699	-0,12	0,4348	0,5669	2,5495	-0,5569	0,7038	0,0137		0,71	0,4536	1,0107	-0,0051	-0,4505	1,9623
197705	1,4453	1,4263	-0,2757	0,4487	-0,0699	-0,12	0,4348	0,5669	2,5495	-0,5569	0,7038	0,0137		0,71	0,4536	1,0107	-0,0051	-0,4505	1,9623
197706	1,4453	1,4263	-0,2757	0,4487	-0,0699	-0,12	0,4348	0,5669	2,5495	-0,5569	0,7038	0,0137		0,71	0,4536	1,0107	-0,0051	-0,4505	1,9623
197707	-0,4107	0,3151	0,3129	0,4769	3,29	0,6181	0,4584	-0,0289	2,4335	-0,9353	0,6817	0,8253		0,8811	0,3323	0,1431	0,7806	0,7878	1,769
197708	-0,4107	0,3151	0,3129	0,4769	3,29	0,6181	0,4584	-0,0289	2,4335	-0,9353	0,6817	0,8253		0,8811	0,3323	0,1431	0,7806	0,7878	1,769
197709	-0,4107	0,3151	0,3129	0,4769	3,29	0,6181	0,4584	-0,0289	2,4335	-0,9353	0,6817	0,8253		0,8811	0,3323	0,1431	0,7806	0,7878	1,769
197710	-0,3298	2,3055	0,9404	1,5998	-0,9059	-0,2332	0,2283	1,7206	2,1326	0,8569	1,3565	0,9971		1,0479	0,6681	-0,5919	-0,0629	1,3948	0,01
197711	-0,3298	2,3055	0,9404	1,5998	-0,9059	-0,2332	0,2283	1,7206	2,1326	0,8569	1,3565	0,9971		1,0479	0,6681	-0,5919	-0,0629	1,3948	0,01
197712	-0,3298	2,3055	0,9404	1,5998	-0,9059	-0,2332	0,2283	1,7206	2,1326	0,8569	1,3565	0,9971		1,0479	0,6681	-0,5919	-0,0629	1,3948	0,01
197801	0,7068	-4,3758	0,926	1,1278	-1,9078	1,0832	1,3891	0,4121	1,7646	1,6343	1,8892	0,2535		1,5324	0,6243	1,6226	-0,0126	0,4606	0,3489
197802	0,7068	-4,3758	0,926	1,1278	-1,9078	1,0832	1,3891	0,4121	1,7646	1,6343	1,8892	0,2535		1,5324	0,6243	1,6226	-0,0126	0,4606	0,3489
197803	0,7068	-4,3758	0,926	1,1278	-1,9078	1,0832	1,3891	0,4121	1,7646	1,6343	1,8892	0,2535		1,5324	0,6243	1,6226	-0,0126	0,4606	0,3489
197804	0,8146	1,8847	0,9082	0,7549	2,1782	0,705	1,6626	0,3964	1,4264	1,7298	0,972	0,1839		1,621	0,2026	1,5579	0,2265	0,9552	3,8879
197805	0,8146	1,8847	0,9082	0,7549	2,1782	0,705	1,6626	0,3964	1,4264	1,7298	0,972	0,1839		1,621	0,2026	1,5579	0,2265	0,9552	3,8879
197806	0,8146	1,8847	0,9082	0,7549	2,1782	0,705	1,6626	0,3964	1,4264	1,7298	0,972	0,1839		1,621	0,2026	1,5579	0,2265	0,9552	3,8879
197807	1,5533	0,6576	0,6443	0,8493	1,6222	0,4369	-0,088	1,3113	1,0907	0,5262	1,2933	0,9351		1,2	-0,1227	-2,0623	0,0352	1,0913	0,977
197808	1,5533	0,6576	0,6443	0,8493	1,6222	0,4369	-0,088	1,3113	1,0907	0,5262	1,2933	0,9351		1,2	-0,1227	-2,0623	0,0352	1,0913	0,977
197809	1,5533	0,6576	0,6443	0,8493	1,6222	0,4369	-0,088	1,3113	1,0907	0,5262	1,2933	0,9351		1,2	-0,1227	-2,0623	0,0352	1,0913	0,977
197810	0,8159	0,6651	0,3636	0,9203	0,1987	2,1748	0,8511	1,1691	0,7993	1,5238	1,4431	1,7562		0,1316	-0,148	1,6289	0,3866	0,7697	1,3417
197811	0,8159	0,6651	0,3636	0,9203	0,1987	2,1748	0,8511	1,1691	0,7993	1,5238	1,4431	1,7562		0,1316	-0,148	1,6289	0,3866	0,7697	1,3417
197812	0,8159	0,6651	0,3636	0,9203	0,1987	2,1748	0,8511	1,1691	0,7993	1,5238	1,4431	1,7562		0,1316	-0,148	1,6289	0,3866	0,7697	1,3417

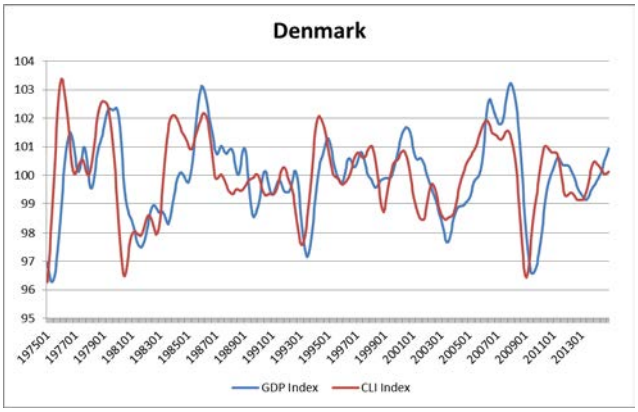
Appendix 5: Excerpt of Business Cycle State Calculations

GDP Ratio to Trend - monthly - Index - Used for Business Clock

	Australia						Austria					
Year	Index	%Change	Rate of Change	6-Month Rate of Change	annualized semi-annual rate of change	Economic State	Index	%Change	Rate of Change	6-Month Rate of Change	annualized semi-annual rate of change	Economic State
197501	98,9647	0,122	1,0012	-0,0017	99,6641	Slowdown	98,8459	-0,440	0,9956	-0,0268	94,6351	Slowdown
197502	99,1667	0,204	1,0020	0,0017	100,3420	Recovery	98,4273	-0,423	0,9958	-0,0271	94,5805	Slowdown
197503	99,4217	0,257	1,0026	0,0053	101,0570	Recovery	98,033	-0,401	0,9960	-0,0266	94,6774	Slowdown
197504	99,6486	0,228	1,0023	0,0083	101,6556	Recovery	97,693	-0,347	0,9965	-0,0253	94,9411	Slowdown
197505	99,7554	0,107	1,0011	0,0096	101,9234	Recovery	97,4473	-0,252	0,9975	-0,0230	95,3950	Slowdown
197506	99,6829	-0,073	0,9993	0,0085	101,6962	Recovery	97,3273	-0,123	0,9988	-0,0197	96,0602	Slowdown
197507	99,456	-0,228	0,9977	0,0050	100,9929	Recovery	97,3318	0,005	1,0000	-0,0153	96,9364	Slowdown
197508	99,1484	-0,309	0,9969	-0,0002	99,9631	Slowdown	97,4403	0,111	1,0011	-0,0100	97,9945	Slowdown
197509	98,8578	-0,293	0,9971	-0,0057	98,8656	Slowdown	97,6159	0,180	1,0018	-0,0043	99,1491	Slowdown
197510	98,6866	-0,173	0,9983	-0,0097	98,0692	Slowdown	97,8024	0,191	1,0019	0,0011	100,2240	Recovery
197511	98,7123	0,026	1,0003	-0,0105	97,9087	Slowdown	97,9481	0,149	1,0015	0,0051	101,0278	Recovery
197512	98,9483	0,239	1,0024	-0,0074	98,5261	Slowdown	98,0304	0,084	1,0008	0,0072	101,4448	Recovery
197601	99,3298	0,386	1,0039	-0,0013	99,7462	Slowdown	98,082	0,053	1,0005	0,0077	101,5415	Recovery
197602	99,7445	0,417	1,0042	0,0060	101,2024	Recovery	98,1591	0,079	1,0008	0,0074	101,4754	Recovery
197603	100,093	0,349	1,0035	0,0125	102,4989	Expansion	98,3116	0,155	1,0016	0,0071	101,4254	Recovery
197604	100,3461	0,253	1,0025	0,0168	103,3632	Expansion	98,5518	0,244	1,0024	0,0077	101,5325	Recovery
197605	100,5136	0,167	1,0017	0,0182	103,6496	Expansion	98,8685	0,321	1,0032	0,0094	101,8794	Recovery
197606	100,6189	0,105	1,0010	0,0169	103,3767	Expansion	99,2357	0,371	1,0037	0,0123	102,4590	Recovery
197607	100,679	0,060	1,0006	0,0136	102,7166	Expansion	99,6147	0,382	1,0038	0,0156	103,1253	Recovery
197608	100,7026	0,023	1,0002	0,0096	101,9211	Expansion	99,9646	0,351	1,0035	0,0184	103,6787	Recovery
197609	100,6903	-0,012	0,9999	0,0060	101,1935	Expansion	100,2515	0,287	1,0029	0,0197	103,9464	Expansion
197610	100,6385	-0,051	0,9995	0,0029	100,5828	Expansion	100,4603	0,208	1,0021	0,0194	103,8731	Expansion
197611	100,5449	-0,093	0,9991	0,0003	100,0623	Expansion	100,5899	0,129	1,0013	0,0174	103,4822	Expansion
197612	100,4174	-0,127	0,9987	-0,0020	99,5995	Downturn	100,6531	0,063	1,0006	0,0143	102,8586	Expansion
197701	100,2851	-0,132	0,9987	-0,0039	99,2175	Downturn	100,6832	0,030	1,0003	0,0107	102,1453	Expansion
197702	100,1784	-0,106	0,9989	-0,0052	98,9589	Downturn	100,7159	0,032	1,0003	0,0075	101,5031	Expansion
197703	100,1101	-0,068	0,9993	-0,0058	98,8476	Downturn	100,7753	0,059	1,0006	0,0052	101,0450	Expansion
197704	100,0538	-0,056	0,9994	-0,0058	98,8380	Downturn	100,8591	0,083	1,0008	0,0040	100,7939	Expansion
197705	99,9683	-0,085	0,9991	-0,0057	98,8530	Slowdown	100,9511	0,091	1,0009	0,0036	100,7182	Expansion
197706	99,8211	-0,147	0,9985	-0,0059	98,8124	Slowdown	101,0333	0,081	1,0008	0,0038	100,7555	Expansion
197707	99,6134	-0,208	0,9979	-0,0067	98,6604	Slowdown	101,0966	0,063	1,0006	0,0041	100,8212	Expansion
197708	99,3652	-0,249	0,9975	-0,0081	98,3765	Slowdown	101,1258	0,029	1,0003	0,0041	100,8140	Expansion
197709	99,1054	-0,261	0,9974	-0,0100	97,9928	Slowdown	101,0865	-0,039	0,9996	0,0031	100,6176	Expansion
197710	98,8641	-0,243	0,9976	-0,0119	97,6219	Slowdown	100,9144	-0,170	0,9983	0,0005	100,1097	Expansion
197711	98,6684	-0,198	0,9980	-0,0130	97,3994	Slowdown	100,5583	-0,353	0,9965	-0,0039	99,2218	Downturn
197712	98,5368	-0,133	0,9987	-0,0129	97,4268	Slowdown	100,0312	-0,524	0,9948	-0,0099	98,0163	Downturn

Appendix 6: Business Cycle Graphs

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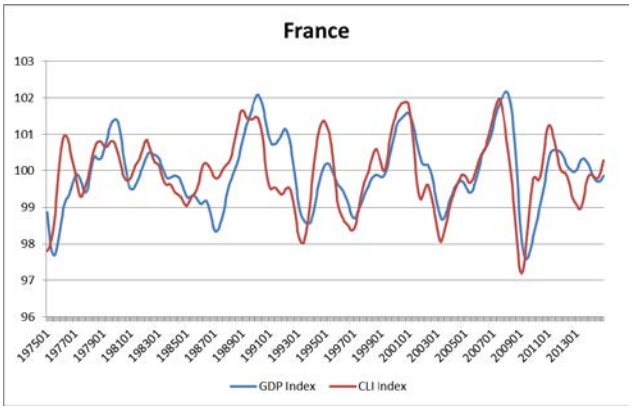
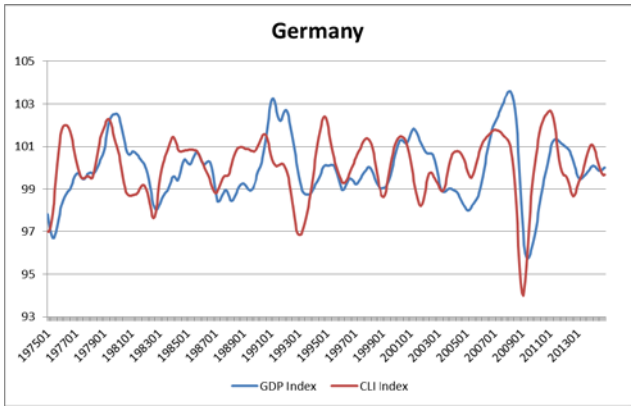
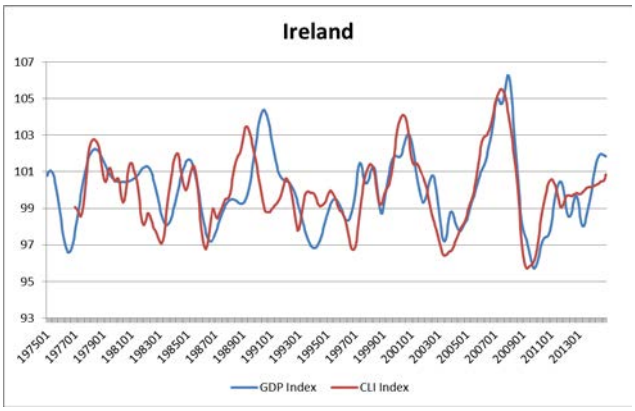
GDP Index
CLI Index


Finland
GDP Index
CLI Index


France
GDP Index
CLI Index


Germany
GDP Index
CLI Index


Ireland
GDP Index
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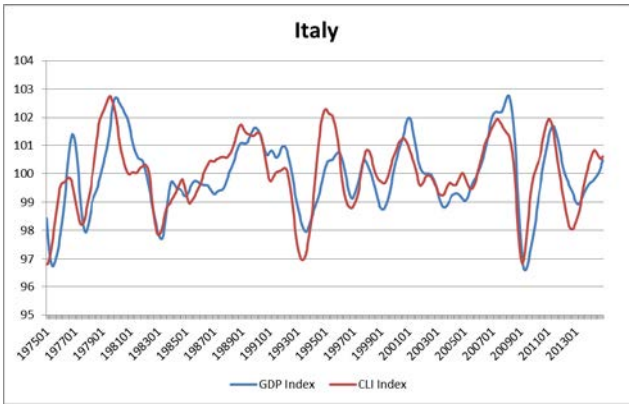
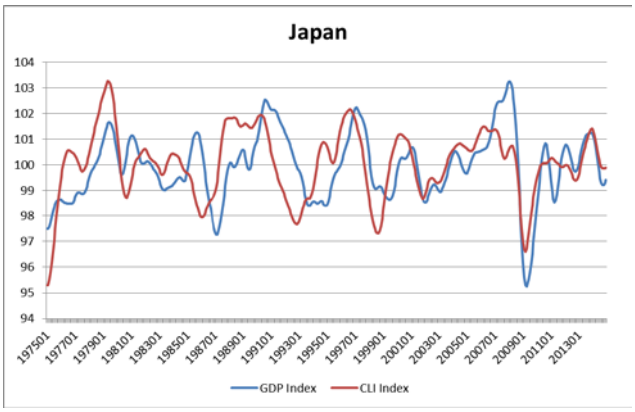
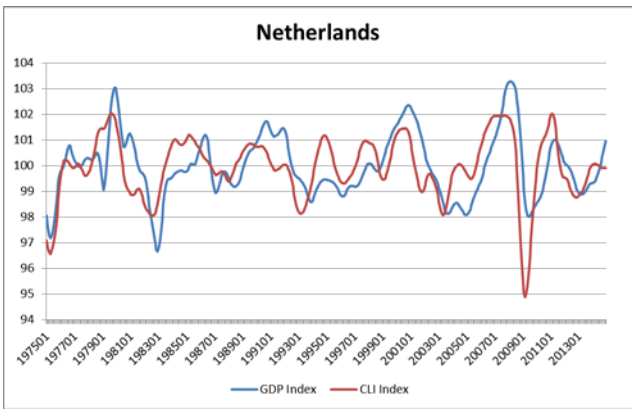
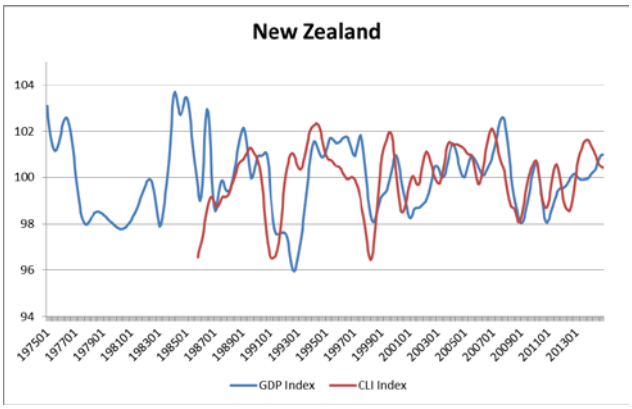

Italy
GDP Index
CLI Index


Japan
GDP Index
CLI Index


Netherlands
GDP Index
CLI Index

Appendix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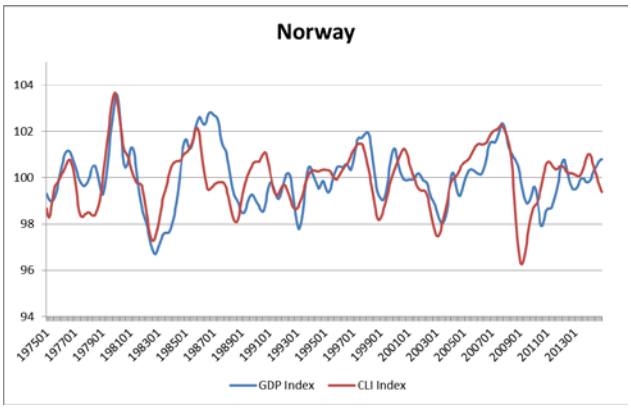
GDP Index
CLI Index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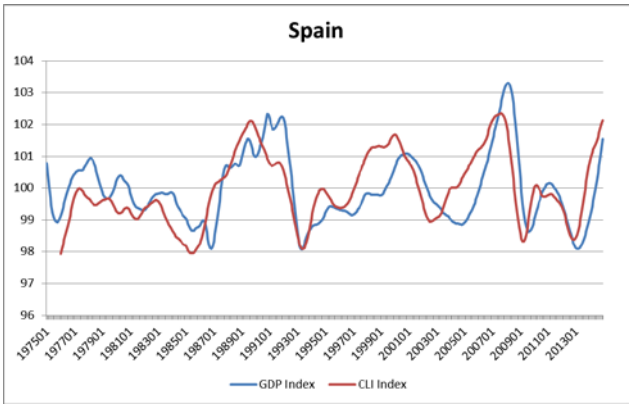
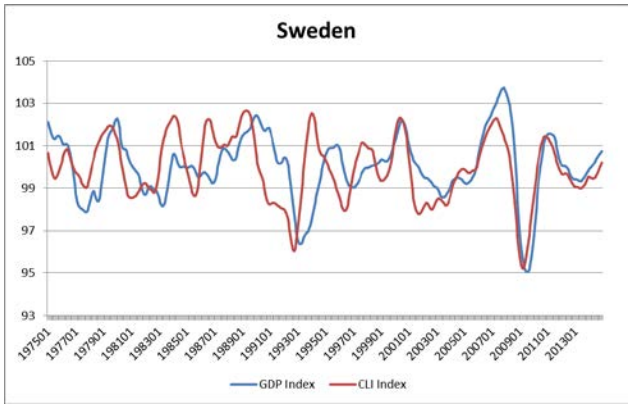
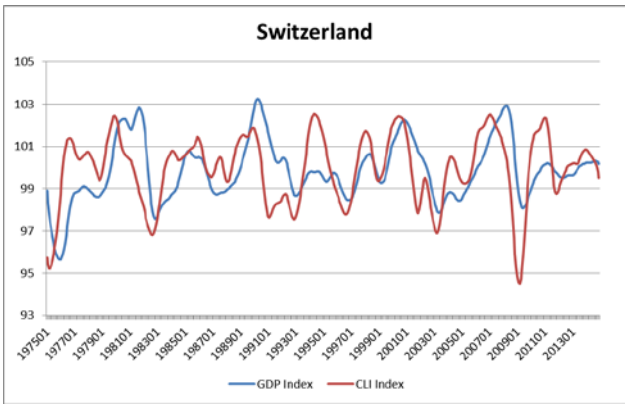
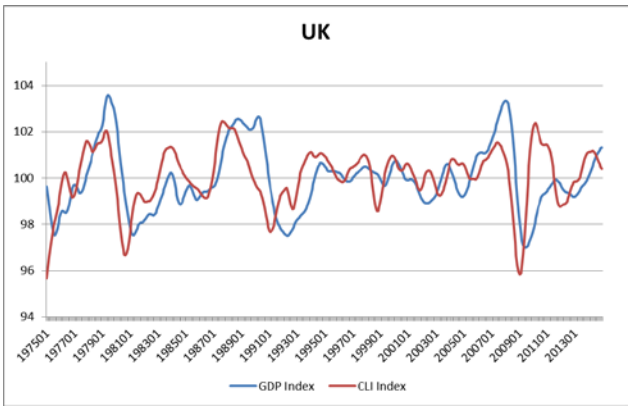
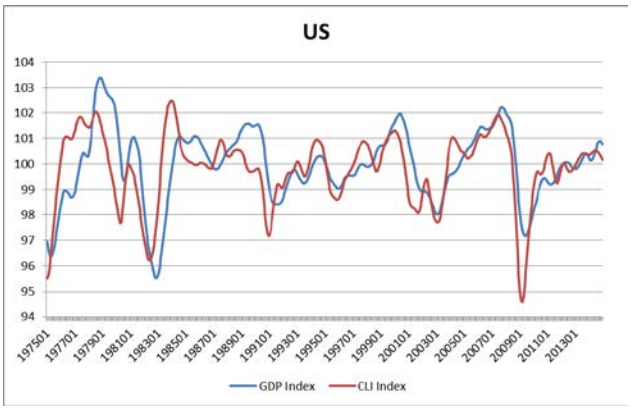
GDP Index
CLI Index


Spain
GDP Index
CLI Index


Sweden
GDP Index
CLI Index


Switzerland
GDP Index
CLI Index


UK
GDP Index
CLI Index


US
GDP Index
CLI Index

Appendix 7: Univariate Regressions for Economic Variable Selection (Continued from Text)

USA Value Portfolio - Industrial Production

Regression Statistics	
Multiple R	0,07
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,72
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	51,78	51,78	2,33	0,13
Residual	478	10627,03	22,23		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1,01	0,22	4,50	0,00	0,57	1,44	0,57	1,44
Industrial Production	-0,47	0,31	-1,53	0,13	-1,08	0,14	-1,08	0,14

USA Value Portfolio - GDP Growth Quarterly

Regression Statistics	
Multiple R	0,05
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,72
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	23,11	23,11	1,04	0,31
Residual	478	10655,70	22,29		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,72	0,29	2,50	0,01	0,16	1,28	0,16	1,28
GDP % Change	0,28	0,27	1,02	0,31	-0,26	0,82	-0,26	0,82

USA Value Portfolio - Export Growth

Regression Statistics	
Multiple R	0,00
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,73
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,13	0,13	0,01	0,94
Residual	478	10678,68	22,34		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,92	0,22	4,17	0,00	0,48	1,35	0,48	1,35
Export Growth	0,00	0,06	-0,08	0,94	-0,13	0,12	-0,13	0,12

USA Value Portfolio - Import Growth

Regression Statistics	
Multiple R	0,05
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,72
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	23,05	23,05	1,03	0,31
Residual	478	10655,76	22,29		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,88	0,22	4,02	0,00	0,45	1,31	0,45	1,31
Import Growth	0,05	0,05	1,02	0,31	-0,05	0,14	-0,05	0,14

USA Value Portfolio - Consumer Prices Growth

Regression Statistics	
Multiple R	0,02
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,73
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5,51	5,51	0,25	0,62
Residual	478	10673,30	22,33		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1,00	0,28	3,54	0,00	0,45	1,56	0,45	1,56
CPI Growth	-0,29	0,58	-0,50	0,62	-1,43	0,85	-1,43	0,85

USA Value Portfolio - Unemployment Growth

Regression Statistics	
Multiple R	0,01
R Square	0,00
Adjusted R Square	**0,00**
Standard Error	4,73
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1,74	1,74	0,08	0,78
Residual	478	10677,07	22,34		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,91	0,22	4,23	0,00	0,49	1,34	0,49	1,34
Unemployment %	0,02	0,08	0,28	0,78	-0,13	0,18	-0,13	0,18

USA Value Portfolio - Consumer Opinion Survey % Change

Regression Statistics	
Multiple R	0,27
R Square	0,07
Adjusted R Square	**0,07**
Standard Error	4,55
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	799,22	799,22	38,67	0,00
Residual	478	9879,59	20,67		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,85	0,21	4,09	0,00	0,44	1,26	0,44	1,26
Consumer Opinion	0,26	0,04	6,22	0,00	0,18	0,34	0,18	0,34

USA Value Portfolio - GDP Nominal Growth

Regression Statistics	
Multiple R	0,11
R Square	0,01
Adjusted R Square	**0,01**
Standard Error	4,70
Observations	480

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	118,24	118,24	5,35	0,02
Residual	478	10560,57	22,09		
Total	479	10678,81			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0,89	0,21	4,15	0,00	0,47	1,31	0,47	1,31
GDP N % Change	3,51	1,52	2,31	0,02	0,53	6,49	0,53	6,49

Appendix 8: Stepwise Regression – First Regression Output

Stepwise Regression - All Variables Included

Regression Statistics	
Multiple R	0,446
R Square	0,199
Adjusted R Square	**0,171**
Standard Error	4,299
Observations	480,000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	2122,62	132,66	7,18	0,00
Residual	463	8556,19	18,48		
Total	479	10678,81192			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-190,51	292,73	-0,65	0,52	-765,75	384,73	-765,75	384,73
Downturn	1,46	0,62	2,36	0,02	0,24	2,67	0,24	2,67
Slowdown	0,85	0,65	1,31	0,19	-0,43	2,13	-0,43	2,13
Recovery	-0,59	0,62	-0,95	0,34	-1,81	0,63	-1,81	0,63
CLI A %Change	11,91	1,99	5,99	0,00	8,00	15,82	8,00	15,82
GDP Ratio Index	-6,69	13,23	-0,51	0,61	-32,69	19,30	-32,69	19,30
GDP R % Change	120,74	90,67	1,33	0,18	-57,43	298,91	-57,43	298,91
GDP N Index	8,59	16,14	0,53	0,59	-23,13	40,31	-23,13	40,31
GDP N % Change	-149,24	110,49	-1,35	0,18	-366,36	67,87	-366,36	67,87
GDP Growth % Change (6 Month Lag)	0,20	0,42	0,48	0,63	-0,63	1,04	-0,63	1,04
Industrial Production % Change	-1,14	0,37	-3,09	0,00	-1,87	-0,42	-1,87	-0,42
Export % Change (6 Month Lag)	0,01	0,06	0,11	0,91	-0,12	0,13	-0,12	0,13
Import % Change (6 Month Lag)	0,04	0,05	0,87	0,39	-0,05	0,13	-0,05	0,13
BCI % Change	-2,16	1,05	-2,06	0,04	-4,23	-0,10	-4,23	-0,10
CCI % Change	2,32	1,51	1,54	0,12	-0,64	5,29	-0,64	5,29
Consumer Opinion Survey % Change	0,06	0,06	0,94	0,35	-0,06	0,18	-0,06	0,18
Unemployment Rate	0,16	0,17	0,90	0,37	-0,18	0,50	-0,18	0,50

Appendix 9: Excerpt of Datasheet with All Economic Variables (after Stepwise Regression)

USA — Eliminated Variables: Export, GDP Growth Rate, Unemployment Rate, Consumer Opinion Survey, Import, GDP Normalised, GDP Ratio (Index)

Year and Month	Return: Market Return	Return: Value Return	CLI A: Econ State	CLI A: Downturn	CLI A: Slowdown	CLI A: Recovery	CLI A: %Change	Industrial Production % Change	BCI % Change	CCI % Change	GDP % Change % Change	GDP Ratio % Change	Export % Change 6 Month Lag	GDP Growth Rate % Change 6 Month Lag	Unemployment Rate Index	Consumer Opinion Survey % Change	Import % Change 6 Month Lag	GDP Normalised % Change	GDP Normalised Index	GDP Ratio Index
197501	13,66	23,35	Slowdown	0	1	0	-0,555	-0,3805	-1,040	-0,186	-0,400	-0,484	7,1676	-1,2096	8,1	-1,088	6,5111	-0,356	97,462	96,949
197502	5,56	2,15	Slowdown	0	1	0	-0,468	-3,2786	-1,074	-0,122	-0,400	-0,487	-7,3	-1,2096	8,1	8,796	-19,5441	-0,281	97,189	96,625
197503	2,66	7,12	Slowdown	0	1	0	-0,314	-3,5398	-0,896	-0,026	-0,400	-0,473	-1,0132	-1,2096	8,6	8,085	-5,6017	-0,175	97,019	96,425
197504	4,23	5,2	Slowdown	0	1	0	-0,095	-1,3412	-0,333	0,155	-1,210	-0,424	-0,0207	0,7709	8,8	7,480	6,5993	-0,066	96,955	96,349
197505	5,19	2,31	Recovery	0	1	0	0,114	-2,4142	0,143	0,421	-1,210	-0,333	-5,4218	0,7709	9	1,328	-8,6761	0,035	96,989	96,389
197506	4,82	6,83	Recovery	0	1	0	0,290	-1,052	0,333	0,540	-1,210	-0,208	6,2362	0,7709	8,8	1,310	-2,0561	0,120	97,105	96,527
197507	-6,59	-4,21	Recovery	0	1	0	0,429	0,0582	0,723	0,479	0,771	-0,078	1,485	1,6538	8,6	1,293	9,9267	0,182	97,282	96,735
197508	-2,85	-4,51	Recovery	0	0	1	0,501	-0,1745	0,845	0,288	0,771	0,041	1,7277	1,6538	8,4	-0,044	0,7271	0,221	97,497	96,990
197509	-4,26	-4,19	Recovery	0	0	1	0,526	0,6745	0,819	0,148	0,771	0,143	0,8641	1,6538	8,4	-0,044	4,3972	0,245	97,736	97,273
197510	5,31	4	Recovery	0	0	1	0,518	1,0529	0,728	0,064	1,654	0,216	1,3734	1,3465	8,4	-0,044	-0,5606	0,261	97,991	97,577
197511	2,65	3,82	Recovery	0	0	1	0,484	0,956	0,681	0,015	1,654	0,263	1,9434	1,3465	8,3	3,968	0,4231	0,272	98,258	97,895
197512	-1,6	-0,26	Recovery	0	0	1	0,446	1,296	0,508	0,028	1,654	0,292	-1,5795	1,3465	8,2	3,817	3,7773	0,272	98,525	98,215
197601	12,16	20,44	Expansion	0	0	1	0,422	0,3683	0,263	0,113	1,347	0,312	-1,7752	2,2587	7,9	3,677	5,6829	0,250	98,771	98,510
197602	0,32	7,58	Expansion	0	0	1	0,413	0,2575	0,121	0,249	1,347	0,326	-1,9248	2,2587	7,7	-0,512	0,035	0,200	98,968	98,748
197603	2,33	1,65	Expansion	0	0	1	0,409	1,2501	0,226	0,297	1,347	0,327	1,0468	2,2587	7,6	-0,515	4,7206	0,130	99,097	98,903
197604	-1,49	-1,77	Expansion	0	0	0	0,388	1,4651	0,392	0,230	2,259	0,301	3,8922	0,7564	7,7	-0,518	2,0057	0,061	99,158	98,977
197605	-1,35	-2,22	Expansion	0	0	0	0,322	0,8647	0,294	0,081	2,259	0,241	2,0625	0,7564	7,4	2,561	-4,4298	0,004	99,161	98,981
197606	4,05	4,65	Expansion	0	0	0	0,220	0,0806	0,035	0,011	2,259	0,157	1,7042	0,7564	7,6	2,497	10,8355	-0,038	99,124	98,936
197607	-1,07	0,05	Expansion	0	0	0	0,125	0,6667	-0,015	0,048	0,756	0,074	2,6239	0,5087	7,8	2,436	4,9427	-0,060	99,065	98,864
197608	-0,56	-1,46	Expansion	0	0	0	0,047	0,3957	-0,169	0,154	0,756	0,004	-1,6288	0,5087	7,8	-1,003	-2,2344	-0,062	99,003	98,790
197609	2,06	2,22	Expansion	0	0	0	-0,004	-0,002	-0,262	0,197	0,756	-0,046	0,1333	0,5087	7,6	-1,013	1,8979	-0,048	98,956	98,733
197610	-2,42	-3,31	Downturn	0	0	0	-0,031	0,5535	-0,339	0,142	0,509	-0,072	-0,7013	0,7505	7,7	-1,024	-1,3264	-0,019	98,936	98,709
197611	0,36	2,32	Downturn	0	0	0	-0,042	0,721	-0,307	0,009	0,509	-0,076	-1,7226	0,7505	7,8	0,038	0,5786	0,020	98,956	98,734
197612	5,65	8,84	Expansion	0	0	0	-0,026	0,246	-0,212	-0,070	0,509	-0,058	8,8117	0,7505	7,8	0,038	3,6754	0,069	99,025	98,816
197701	-4,05	0,67	Expansion	1	0	0	0,013	0,1428	-0,091	-0,081	0,751	-0,023	-7,4808	1,1635	7,5	0,038	-4,0155	0,120	99,144	98,960
197702	-1,95	-1,52	Expansion	1	0	0	0,074	1,4905	0,041	-0,041	0,751	0,025	2,3897	1,1635	7,6	1,186	21,2477	0,171	99,313	99,165
197703	-1,37	0,01	Expansion	0	0	0	0,131	1,0312	0,241	0,001	0,751	0,083	2,6946	1,1635	7,4	1,172	-1,6681	0,212	99,524	99,420
197704	0,15	3,27	Expansion	0	0	0	0,161	-0,5622	0,142	0,045	1,164	0,146	-2,2058	1,9623	7,2	1,159	-5,1328	0,233	99,756	99,702
197705	-1,46	-1,09	Expansion	0	0	0	0,171	1,4953	0,175	0,093	1,164	0,207	5,9215	1,9623	7	-0,443	-5,4518	0,226	99,982	99,977
197706	4,71	5,25	Expansion	0	0	0	0,154	1,252	0,248	0,107	1,164	0,258	-4,1601	1,9623	7,2	-0,445	19,2666	0,191	100,173	100,211
197707	-1,69	-2,43	Expansion	0	0	0	0,105	0,9125	0,133	0,077	1,962	0,284	2,7917	1,769	6,9	-0,447	-7,1667	0,133	100,306	100,374
197708	-1,75	-2,95	Expansion	0	0	0	0,049	0,7789	0,074	0,010	1,962	0,276	-6,6437	1,769	7	-1,723	-1,0398	0,058	100,364	100,445
197709	-0,27	-0,69	Downturn	0	0	0	-0,008	0,6937	-0,136	-0,045	1,962	0,234	13,9974	1,769	6,8	-1,753	5,0859	-0,016	100,348	100,426
197710	-4,38	-3,13	Downturn	0	0	0	-0,055	0,2565	-0,192	-0,095	1,769	0,162	-15,2302	0,01	6,8	-1,784	-1,4336	-0,058	100,290	100,354
197711	4	5,45	Downturn	0	0	0	-0,082	0,1083	-0,256	-0,149	1,769	0,071	1,2878	0,01	6,8	-0,711	-1,9359	-0,055	100,235	100,287
197712	0,27	0,8	Downturn	1	0	0	-0,084	0,4551	-0,112	-0,168	1,769	-0,019	16,0489	0,01	6,4	-0,716	7,036	-0,001	100,234	100,286
197801	-6,01	-3,1	Downturn	1	0	0	-0,070	0,2915	0,124	-0,148	0,010	-0,071	-10,33	0,3489	6,4	0,601	-0,2269	0,095	100,330	100,403
197802	-1,38	-0,83	Downturn	1	0	0	-0,057	0,0241	0,237	-0,095	0,010	-0,067	0,7675	0,3489	6,3	0,717	7,0031	0,216	100,546	100,669
197803	2,85	4,55	Downturn	1	0	0	-0,038	0,1684	0,206	-0,051	0,010	-0,001	12,1155	0,3489	6,3	-6,524	-2,1837	0,327	100,875	101,075
197804	7,88	6,45	Expansion	1	0	0	-0,008	-1,3305	-0,079	-0,033	0,349	0,117	4,3598	3,8879	6,1	3,553	3,3726	0,393	101,272	101,565
197805	1,76	2,92	Expansion	1	0	0	0,031	0,4326	-0,161	-0,081	0,349	0,265	1,271	3,8879	6	1,593	-3,2946	0,392	101,669	102,059
197806	-1,69	-1,38	Expansion	1	0	0	0,106	1,8405	-0,005	-0,139	0,349	0,403	4,1389	3,8879	5,9	-3,498	-0,4056	0,336	102,011	102,486
197807	5,11	5,31	Expansion	0	0	0	0,153	2,0617	0,268	-0,001	3,888	0,485	-4,9578	0,977	6,2	3,000	4,8693	0,265	102,281	102,825
197808	3,75	3,12	Expansion	0	0	0	0,155	0,3229	0,354	0,024	3,888	0,486	5,4094	0,977	5,9	-4,854	-3,0785	0,198	102,483	103,079
197809	-1,43	-0,82	Expansion	0	0	0	0,118	0,7082	0,250	-0,036	3,888	0,418	8,0481	0,977	6	2,551	5,5389	0,139	102,626	103,258
197810	-11,91	-14,04	Expansion	0	0	0	0,058	-0,0337	0,123	-0,027	0,977	0,331	-2,8151	1,3417	5,8	-1,368	-1,1004	0,083	102,711	103,366
197811	2,71	2,63	Downturn	0	0	0	-0,013	0,3482	-0,048	-0,100	0,977	0,247	4,2353	1,3417	5,9	-5,422	0,8567	0,026	102,738	103,400
197812	0,88	-0,62	Downturn	0	0	0	-0,081	0,2195	-0,055	-0,096	0,977	0,174	-1,2292	1,3417	6	-11,867	0,8016	-0,030	102,707	103,362
197901	4,23	6,63	Downturn	0	0	0	-0,142	0,892	-0,037	-0,233	1,342	0,104	-0,131	0,1978	5,9	9,077	9,8255	-0,072	102,633	103,268
197902	-3,56	-3,38	Downturn	1	0	0	-0,183	0,751	-0,036	-0,393	1,342	0,033	2,6431	0,1978	5,9	2,497	-11,577	-0,098	102,533	103,141
197903	5,68	6,97	Downturn	1	0	0	-0,190	0,589	-0,143	-0,357	1,342	-0,037	5,0149	0,1978	5,8	-7,442	5,1069	-0,106	102,424	103,004
197904	-0,06	0,53	Downturn	1	0	0	-0,168	-0,6841	-0,160	-0,026	0,198	-0,091	-2,2331	0,1212	5,8	-3,509	2,669	-0,097	102,324	102,879
197905	-2,21	-1,67	Downturn	1	0	0	-0,162	0,607	-0,145	-0,016	0,198	-0,123	0,7483	0,1212	5,6	3,182	4,424	-0,077	102,245	102,780
197906	3,85	4,94	Downturn	1	0	0	-0,183	0,325	-0,181	-0,196	0,198	-0,132	5,2188	0,1212	5,7	-3,377	2,5307	-0,052	102,192	102,713
197907	0,82	2,24	Slowdown	1	0	0	-0,218	-0,9788	-0,271	-0,201	0,121	-0,122	5,896	0,7189	5,7	-8,207	-0,3184	-0,035	102,156	102,668
197908	5,53	5,01	Slowdown	1	0	0	-0,236	0,67	-0,338	-0,135	0,121	-0,096	0,158	0,7189	6	6,788	8,8789	-0,031	102,124	102,628
197909	-0,82	-1,66	Slowdown	1	0	0	-0,245	-0,0035	-0,350	-0,189	0,121	-0,065	0,6852	0,7189	5,9	3,411	-0,2442	-0,043	102,080	102,573
197910	-8,1	-9,8	Slowdown	0	1	0	-0,242	-0,1781	-0,317	-0,167	0,719	-0,044	5,4137	0,259	6	-6,897	3,2741	-0,069	102,010	102,485
197911	5,21	3,67	Slowdown	0	1	0	-0,230	-0,6823	-0,256	0,038	0,719	-0,039	1,4819	0,259	5,9	1,932	-1,2844	-0,108	101,900	102,347
197912	1,79	1,66	Slowdown	0	1	0	-0,226	0,0854	-0,163	0,042	0,719	-0,054	-1,1046	0,259	6	-3,634	5,9792	-0,164	101,733	102,138

Appendix 10: Summary of Regressions with GDP % Change – 1 Month Lag

Regression Model with GDP % Change (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,15	0,82	0,59	0,55	1,31	0,06	0,01	0,99	0,65	0,42	1,22	0,20	0,83	0,38	0,44	0,49	-1,50	0,23	-0,22	0,78
Downturn	2,01	0,05	1,04	0,51	-0,28	0,79	2,23	0,01	2,64	0,04	0,30	0,82	1,30	0,31	1,85	0,05	1,03	0,68	-0,93	0,50
Slowdown	1,61	0,09	2,13	0,11	0,74	0,45	1,62	0,05	0,79	0,50	-0,97	0,51	1,41	0,20	1,24	0,22	4,75	0,01	2,12	0,09
Recovery	-1,09	0,26	-3,23	0,02	-1,22	0,21	-0,62	0,48	-1,29	0,26	-0,06	0,96	-0,60	0,58	-0,97	0,32	0,08	0,96	0,75	0,49
CLI A %Change	10,55	0,00	28,49	0,00	2,76	0,33	10,35	0,00	10,85	0,00	8,75	0,00	14,06	0,00	5,69	0,03	7,47	0,02	10,12	0,04
Industrial Production % Change	1,14	0,08	0,35	0,14	0,03	0,83	-0,12	0,67	-0,03	0,83	0,02	0,92	0,09	0,74	-0,07	0,71	-0,08	0,50	0,18	0,43
BCI % Change	3,65	0,03	-12,67	0,02	4,33	0,12	-	-	2,39	0,16	-1,10	0,55	3,87	0,31	2,68	0,46	-0,92	0,48	-4,09	0,34
CCI % Change	1,85	0,20	2,74	0,46	2,61	0,28	1,67	0,29	-0,10	0,97	-3,73	0,05	-0,75	0,83	2,58	0,14	4,13	0,14	2,04	0,42
GDP % Change	-0,15	0,68	-0,27	0,70	-0,53	0,32	-0,28	0,53	-0,55	0,16	0,10	0,80	-0,86	0,33	-0,19	0,61	0,78	0,02	0,04	0,94
R2 & Standard Error	**0,07**	6,58	**0,10**	8,14	**0,01**	6,92	**0,09**	5,79	**0,06**	6,70	**0,06**	7,88	**0,04**	7,69	**0,05**	6,56	**0,05**	10,31	**0,03**	8,60
Number of Observations	480		336		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,88	0,13	0,65	0,33	-0,95	0,37	-0,02	0,97	0,63	0,49	-0,06	0,94	1,41	0,02	-0,12	0,86	0,45	0,33
Downturn	0,01	0,99	0,61	0,60	1,05	0,47	3,17	0,02	0,67	0,65	2,73	0,04	-0,17	0,85	1,16	0,22	1,93	0,00
Slowdown	0,00	1,00	0,88	0,36	0,43	0,78	0,96	0,40	0,29	0,81	2,21	0,04	-0,21	0,82	1,81	0,06	1,25	0,05
Recovery	0,73	0,44	0,23	0,82	0,22	0,90	0,89	0,44	-1,63	0,12	1,35	0,21	-2,49	0,01	-0,42	0,68	0,16	0,79
CLI A %Change	3,07	0,22	17,29	0,00	3,42	0,36	13,09	0,00	5,51	0,38	13,84	0,00	14,31	0,00	11,14	0,00	11,73	0,00
Industrial Production % Change	-0,28	0,13	-0,27	0,04	0,10	0,34	0,03	0,77	0,14	0,45	0,16	0,28	-0,11	0,80	0,23	0,38	0,17	0,62
BCI % Change	-2,77	0,33	-11,69	0,01	4,04	0,12	9,33	0,00	2,60	0,43	-3,97	0,05	-6,91	0,01	-2,58	0,27	-4,39	0,00
CCI % Change	10,31	0,00	0,67	0,81	-3,52	0,22	-	-	8,58	0,00	2,22	0,33	-3,18	0,02	0,80	0,61	0,66	0,54
GDP % Change	0,09	0,78	-0,29	0,37	0,51	0,44	-0,10	0,75	0,30	0,60	-0,18	0,58	-0,48	0,34	0,46	0,26	-0,56	0,08
R2 & Standard Error	**0,08**	6,39	**0,06**	7,45	**0,00**	8,76	**0,11**	8,60	**0,03**	7,98	**0,07**	7,83	**0,08**	6,25	**0,05**	6,83	**0,11**	4,46
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:
p > 0.1
p < 0.05
p < 0.01

Model with GDP % Change - 1 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,69	0,97	0,69	0,62	0,81	0,95	0,95	0,64	1,26	0,78	0,58	0,67	1,05	0,74	0,92	0,77	0,60	0,66	0,46
Downturn	1,02	1,59	1,08	0,85	1,30	1,37	1,28	0,95	2,51	1,39	0,95	1,15	1,45	1,35	1,49	1,32	0,93	0,94	0,62
Slowdown	0,95	1,34	0,97	0,83	1,17	1,48	1,11	1,00	1,85	1,23	1,03	0,96	1,54	1,13	1,20	1,07	0,91	0,95	0,62
Recovery	0,96	1,41	0,98	0,88	1,13	1,35	1,07	0,98	1,61	1,08	0,95	1,03	1,72	1,15	1,04	1,06	0,96	1,03	0,60
CLI A %Change	3,28	6,60	2,84	2,13	3,30	2,22	4,94	2,61	3,26	4,85	2,50	3,48	3,72	3,06	6,24	2,46	2,37	2,71	1,71
Industrial Production % Change	0,65	0,24	0,14	0,29	0,13	0,20	0,28	0,19	0,12	0,23	0,19	0,13	0,10	0,09	0,18	0,15	0,43	0,27	0,34
BCI % Change	1,70	5,29	2,77	-	1,71	1,82	3,82	3,61	1,31	4,25	2,87	4,45	2,58	3,08	3,30	2,05	2,59	2,34	1,06
CCI % Change	1,44	3,66	2,42	1,58	2,93	1,90	3,44	1,74	2,81	2,53	1,90	2,75	2,86	-	2,91	2,27	1,32	1,57	1,07
GDP % Change	0,37	0,69	0,52	0,44	0,40	0,40	0,88	0,37	0,33	0,58	0,31	0,33	0,66	0,31	0,56	0,33	0,51	0,42	0,32

Summary of Regressions with GDP R % Change – 1 Month Lag

Regression Model with GDP R % Change (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,05	0,94	0,28	0,75	0,95	0,12	-0,21	0,67	0,57	0,47	0,17	0,85	0,53	0,47	0,44	0,46	-1,14	0,37	-0,26	0,73
Downturn	1,99	0,06	1,01	0,53	-0,31	0,77	2,25	0,01	2,70	0,04	1,07	0,44	1,33	0,30	1,86	0,05	2,25	0,38	-0,93	0,50
Slowdown	1,54	0,11	2,52	0,07	1,05	0,29	1,74	0,04	0,59	0,63	1,36	0,39	1,14	0,32	1,01	0,33	5,49	0,00	2,32	0,07
Recovery	-1,08	0,25	-2,76	0,06	-1,09	0,27	-0,54	0,54	-1,54	0,19	1,66	0,23	-0,73	0,50	-1,18	0,24	0,43	0,80	0,78	0,47
CLI A %Change	10,91	0,00	27,16	0,00	2,34	0,43	10,39	0,00	12,00	0,00	10,58	0,00	15,59	0,00	5,91	0,02	8,24	0,01	9,59	0,05
Industrial Production % Change	1,19	0,07	0,32	0,18	0,02	0,86	-0,17	0,56	-0,03	0,84	-0,08	0,67	0,12	0,67	-0,05	0,77	-0,07	0,59	0,16	0,48
BCI % Change	3,75	0,03	-13,37	0,01	4,00	0,15	-	-	2,27	0,18	-2,74	0,14	4,55	0,24	3,37	0,36	-0,73	0,58	-4,49	0,30
CCI % Change	1,84	0,20	2,99	0,42	2,69	0,27	1,68	0,30	-0,09	0,97	-4,40	0,02	-1,13	0,74	2,60	0,13	3,84	0,18	2,34	0,37
GDP R % Change	-1,39	0,49	2,76	0,46	-0,07	0,98	-0,32	0,87	-3,68	0,13	7,05	0,00	-6,48	0,16	-2,35	0,31	3,24	0,21	1,49	0,65
R2 & Standard Error	**0,07**	6,58	**0,10**	8,13	**0,01**	6,93	**0,09**	5,80	**0,07**	6,70	**0,08**	7,76	**0,04**	7,68	**0,05**	6,56	**0,04**	10,38	**0,03**	8,60

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,79	0,17	0,81	0,21	-0,63	0,50	0,02	0,98	1,05	0,19	-0,19	0,80	1,12	0,04	0,13	0,83	0,12	0,76
Downturn	0,40	0,68	0,41	0,72	1,08	0,46	3,11	0,02	0,54	0,72	2,74	0,04	-0,10	0,91	1,18	0,21	1,94	0,00
Slowdown	0,26	0,80	0,33	0,74	0,40	0,81	0,64	0,58	-0,19	0,88	2,27	0,04	0,04	0,97	1,86	0,06	1,08	0,10
Recovery	0,54	0,57	-0,23	0,83	0,02	0,99	0,84	0,46	-2,02	0,05	1,41	0,19	-2,28	0,02	-0,48	0,64	0,15	0,81
CLI A %Change	4,79	0,08	19,82	0,00	3,51	0,35	14,00	0,00	7,27	0,26	13,77	0,00	14,31	0,00	10,94	0,00	12,49	0,00
Industrial Production % Change	-0,24	0,20	-0,26	0,04	0,10	0,34	0,03	0,71	0,16	0,40	0,15	0,30	-0,24	0,56	0,27	0,32	0,22	0,53
BCI % Change	-1,31	0,66	-11,60	0,01	3,77	0,14	8,97	0,00	2,99	0,37	-4,06	0,05	-7,59	0,00	-2,31	0,33	-4,47	0,00
CCI % Change	10,44	0,00	0,24	0,93	-3,33	0,24	-	-	8,00	0,01	2,26	0,32	-3,14	0,02	0,86	0,58	0,57	0,60
GDP R % Change	-2,46	0,20	-6,08	0,01	1,16	0,67	-2,68	0,26	-2,63	0,48	-0,24	0,91	0,25	0,92	1,36	0,55	-3,40	0,06
R2 & Standard Error	**0,08**	6,38	**0,07**	7,40	**0,00**	8,77	**0,11**	8,59	**0,03**	7,98	**0,07**	7,84	**0,08**	6,25	**0,05**	6,84	**0,11**	4,46

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - 1 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,59	0,86	0,60	0,50	0,78	0,92	0,73	0,60	1,26	0,73	0,58	0,65	0,93	0,68	0,80	0,74	0,54	0,60	0,39
Downturn	1,02	1,59	1,08	0,85	1,28	1,37	1,28	0,95	2,57	1,39	0,97	1,14	1,45	1,34	1,49	1,32	0,92	0,94	0,62
Slowdown	0,95	1,37	1,00	0,85	1,20	1,58	1,13	1,03	1,90	1,28	1,04	0,98	1,61	1,17	1,21	1,10	0,94	0,98	0,65
Recovery	0,94	1,47	0,98	0,88	1,17	1,39	1,07	1,00	1,68	1,08	0,95	1,04	1,69	1,15	1,04	1,08	0,97	1,04	0,60
CLI A %Change	3,32	6,80	2,97	2,18	3,41	2,25	5,15	2,59	3,29	4,97	2,69	3,62	3,73	3,16	6,39	2,52	2,40	2,70	1,82
Industrial Production % Change	0,66	0,24	0,14	0,29	0,13	0,20	0,28	0,19	0,12	0,23	0,19	0,13	0,10	0,09	0,18	0,15	0,42	0,27	0,35
BCI % Change	1,70	5,27	2,77	-	1,70	1,86	3,87	3,68	1,32	4,34	2,97	4,40	2,55	3,09	3,33	2,07	2,62	2,35	1,07
CCI % Change	1,44	3,68	2,44	1,60	2,91	1,88	3,46	1,73	2,88	2,61	1,90	2,73	2,85	-	2,91	2,28	1,33	1,57	1,08
GDP % Change	2,03	3,73	2,51	2,01	2,39	2,23	4,65	2,31	2,58	3,26	1,93	2,37	2,73	2,36	3,71	2,20	2,39	2,25	1,82

Summary of Regressions with GDP % Change – 3 Month Lag

Regression Model with GDP % Change (3 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,84	0,24	0,35	0,73	0,61	0,38	0,59	0,36	1,69	0,04	0,25	0,79	-0,52	0,58	1,04	0,11	-0,70	0,59	-0,32	0,68
Downturn	-0,58	0,58	0,03	0,99	-1,31	0,23	1,61	0,07	-0,24	0,86	0,65	0,64	1,94	0,13	0,23	0,81	-1,47	0,57	-2,14	0,13
Slowdown	0,53	0,59	1,99	0,15	0,94	0,34	0,90	0,30	-0,92	0,44	1,79	0,23	2,38	0,03	0,22	0,83	3,59	0,06	1,30	0,29
Recovery	0,46	0,65	-1,09	0,45	0,92	0,35	-0,40	0,66	-0,88	0,44	0,91	0,51	1,21	0,27	-1,23	0,22	0,41	0,81	2,05	0,06
CLI A %Change	1,58	0,64	23,14	0,00	-1,88	0,49	6,86	0,00	8,02	0,02	3,87	0,00	10,45	0,04	6,10	0,02	2,16	0,52	5,65	0,25
Industrial Production % Change	0,63	0,35	-0,27	0,27	-0,09	0,54	-0,05	0,86	-0,25	0,06	0,10	0,64	0,07	0,81	-0,10	0,60	0,00	1,00	-0,28	0,23
BCI % Change	3,34	0,06	-10,22	0,06	3,60	0,19	-	-	-1,04	0,56	2,93	0,12	2,23	0,56	-1,75	0,64	-1,13	0,40	-7,99	0,05
CCI % Change	-1,11	0,46	-4,34	0,24	0,32	0,90	-0,56	0,73	-2,02	0,50	-0,90	0,64	-6,91	0,05	-0,96	0,58	0,71	0,81	-0,22	0,93
GDP % Change	-0,16	0,68	0,29	0,69	0,46	0,38	-0,75	0,10	-0,63	0,12	-0,17	0,68	0,30	0,73	0,10	0,78	0,52	0,12	0,86	0,14
R2 & Standard Error	**0,01**	6,81	**0,04**	8,43	**0,00**	6,96	**0,02**	6,01	**0,02**	6,86	**0,02**	8,01	**0,01**	7,79	**0,00**	6,70	**0,01**	10,55	**0,02**	8,65
Number of Observations	480		336		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,04	0,94	0,90	0,19	-1,57	0,14	0,16	0,83	-0,34	0,71	0,33	0,68	2,11	0,00	0,36	0,60	0,15	0,76
Downturn	0,41	0,67	-1,09	0,35	2,08	0,16	0,76	0,59	0,50	0,73	0,27	0,84	-2,03	0,03	0,06	0,95	1,05	0,11
Slowdown	2,39	0,03	0,81	0,41	1,83	0,24	1,87	0,11	1,82	0,13	2,14	0,05	-1,25	0,18	1,64	0,09	1,11	0,08
Recovery	2,08	0,03	0,16	0,88	-0,76	0,65	0,81	0,50	-1,60	0,13	0,29	0,79	-1,34	0,17	-0,18	0,86	0,44	0,48
CLI A %Change	1,58	0,53	8,86	0,01	7,05	0,06	9,95	0,00	4,58	0,46	7,33	0,00	6,82	0,01	4,51	0,10	6,56	0,00
Industrial Production % Change	-0,33	0,00	-0,07	0,58	0,02	0,84	0,09	0,36	-0,02	0,91	0,01	0,94	0,72	0,10	0,13	0,63	-0,77	0,03
BCI % Change	2,72	0,35	-11,15	0,01	0,08	0,97	2,82	0,38	1,85	0,57	-3,40	0,11	-4,22	0,11	-0,74	0,76	-2,47	0,02
CCI % Change	4,47	0,02	2,70	0,33	-0,87	0,76	-	-	5,55	0,06	2,20	0,35	-1,45	0,28	-1,33	0,41	-2,28	0,04
GDP % Change	-0,08	0,79	-0,21	0,53	0,80	0,23	-0,22	0,50	1,26	0,03	0,35	0,30	-1,29	0,01	0,26	0,54	0,41	0,22
R2 & Standard Error	**0,03**	6,55	**0,02**	7,62	**0,00**	8,77	**0,03**	8,94	**0,02**	8,01	**0,02**	8,05	**0,04**	6,40	**0,00**	7,02	**0,03**	4,66
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:
p > 0.1
p < 0.05
p < 0.01

Model with GDP % Change - 3 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,72	1,01	0,69	0,65	0,83	0,96	0,95	0,65	1,30	0,78	0,59	0,69	1,05	0,77	0,92	0,79	0,60	0,67	0,48
Downturn	1,05	1,65	1,08	0,88	1,34	1,40	1,30	0,97	2,57	1,40	0,97	1,17	1,46	1,40	1,47	1,35	0,95	0,97	0,66
Slowdown	0,98	1,39	0,98	0,86	1,20	1,49	1,12	1,03	1,89	1,24	1,06	0,99	1,54	1,18	1,21	1,10	0,93	0,98	0,65
Recovery	1,00	1,46	0,98	0,91	1,14	1,37	1,09	1,00	1,66	1,08	0,97	1,05	1,68	1,20	1,04	1,10	0,98	1,05	0,63
CLI A %Change	3,40	6,81	2,72	2,21	3,40	2,26	4,96	2,66	3,33	4,88	2,53	3,56	3,72	3,16	6,22	2,53	2,42	2,77	1,79
Industrial Production % Change	0,67	0,25	0,14	0,30	0,13	0,20	0,29	0,19	0,13	0,23	0,19	0,13	0,10	0,10	0,18	0,15	0,44	0,27	0,35
BCI % Change	1,76	5,48	2,75	-	1,76	1,85	3,82	3,68	1,33	4,15	2,91	4,43	2,56	3,20	3,25	2,12	2,66	2,39	1,10
CCI % Change	1,48	3,68	2,43	1,64	3,00	1,94	3,49	1,76	2,89	2,55	1,95	2,79	2,86	-	2,93	2,37	1,35	1,62	1,13
GDP % Change	0,38	0,72	0,53	0,46	0,40	0,41	0,87	0,38	0,34	0,58	0,32	0,34	0,66	0,33	0,56	0,34	0,50	0,42	0,34

Summary of Regressions with GDP R % Change – 3 Month Lag

Regression Model with GDP R % Change (3 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,74	0,23	0,64	0,48	0,94	0,12	0,17	0,75	1,65	0,04	-0,08	0,93	-0,11	0,74	1,26	0,04	-0,68	0,60	-0,06	0,93
Downturn	-0,61	0,56	0,05	0,98	-1,28	0,24	1,67	0,06	-0,23	0,86	0,79	0,58	1,90	1,30	0,20	0,83	-0,23	0,93	-2,19	0,12
Slowdown	0,41	0,68	1,69	0,24	0,65	0,52	0,73	0,40	-1,26	0,31	2,32	0,15	1,79	1,15	-0,23	0,83	4,41	0,02	1,53	0,23
Recovery	0,43	0,66	-1,45	0,34	0,80	0,42	-0,48	0,60	-1,26	0,28	1,36	0,34	0,82	1,09	-1,60	0,12	1,01	0,56	2,11	0,05
CLI A %Change	2,08	0,55	24,10	0,00	-1,45	0,62	7,67	0,00	9,51	0,01	4,27	0,07	12,44	5,21	6,09	0,02	2,12	0,53	4,62	0,36
Industrial Production % Change	0,71	0,30	-0,25	0,31	-0,08	0,56	-0,02	0,95	-0,24	0,07	0,07	0,74	0,13	0,29	-0,05	0,80	0,00	0,98	-0,28	0,22
BCI % Change	3,46	0,05	-9,63	0,08	3,88	0,16	-	-	-1,14	0,52	2,59	0,18	2,95	3,86	-0,20	0,96	-1,18	0,38	-8,88	0,04
CCI % Change	-1,13	0,45	-4,54	0,22	0,23	0,93	-0,94	0,57	-2,13	0,47	-1,02	0,60	-7,56	3,51	-0,98	0,58	0,07	0,98	0,36	0,89
GDP R % Change	-1,86	0,37	-1,88	0,63	0,01	1,00	-3,92	0,06	-4,74	0,05	0,96	0,68	-3,81	4,55	-2,73	0,25	4,17	0,11	4,89	0,13
R2 & Standard Error	**0,01**	6,81	**0,04**	8,43	**0,00**	6,97	**0,02**	6,00	**0,02**	6,84	**0,02**	8,01	**0,01**	7,78	**0,01**	6,69	**0,01**	10,55	**0,02**	8,65

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,03	0,97	0,97	0,14	-1,06	0,26	0,11	0,87	0,77	0,34	0,59	0,44	1,55	0,00	0,40	0,52	0,49	0,23
Downturn	0,47	0,64	-1,20	0,30	2,13	0,15	0,74	0,59	0,40	0,79	0,28	0,84	-1,88	0,05	0,11	0,91	1,01	0,12
Slowdown	2,43	0,02	0,47	0,64	1,80	0,26	1,56	0,20	1,01	0,41	1,97	0,06	-1,18	0,22	1,87	0,06	0,87	0,20
Recovery	2,05	0,04	-0,11	0,92	-1,05	0,53	0,77	0,52	-2,26	0,03	0,15	0,89	-1,25	0,21	0,00	1,00	0,35	0,58
CLI A %Change	1,87	0,49	10,39	0,01	7,18	0,06	10,96	0,00	6,61	0,30	7,54	0,00	7,43	0,00	4,44	0,11	7,02	0,00
Industrial Production % Change	-0,33	0,08	-0,07	0,58	0,02	0,83	0,10	0,33	0,01	0,94	0,02	0,88	0,55	0,21	0,09	0,74	-0,57	0,12
BCI % Change	2,94	0,33	-11,04	0,01	-0,36	0,89	2,42	0,45	2,05	0,54	-3,18	0,14	-4,79	0,06	-1,09	0,65	-2,58	0,02
CCI % Change	4,51	0,02	2,42	0,39	-0,57	0,84	-	-	4,54	0,12	2,13	0,37	-1,53	0,26	-1,34	0,41	-2,35	0,04
GDP R % Change	-0,78	0,69	-3,72	0,13	1,91	0,48	-3,15	0,20	0,49	0,89	0,19	0,93	-3,75	0,12	2,76	0,23	-0,32	0,87
R2 & Standard Error	**0,03**	6,55	**0,02**	7,60	**0,00**	8,79	**0,04**	8,93	**0,01**	8,05	**0,02**	8,06	**0,03**	6,43	**0,00**	7,01	**0,02**	4,66

Legend:
p ≤ 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - 3 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,61	0,89	0,61	0,52	0,80	0,94	0,88	0,61	1,30	0,73	0,59	0,66	0,93	0,71	0,80	0,76	0,55	0,62	0,41
Downturn	1,05	1,65	1,08	0,88	1,33	1,42	0,14	0,97	2,62	1,40	0,99	1,17	1,47	1,39	1,49	1,36	0,95	0,97	0,66
Slowdown	0,99	1,42	1,01	0,88	1,23	1,63	0,12	1,06	1,93	1,29	1,07	1,01	1,61	1,22	1,22	1,13	0,96	1,00	0,68
Recovery	0,98	1,52	0,98	0,91	1,17	1,43	0,45	1,03	1,72	1,08	0,97	1,07	1,66	1,19	1,05	1,11	1,00	1,06	0,63
CLI A %Change	3,45	7,04	2,88	2,25	3,49	2,33	0,02	2,64	3,33	5,00	2,72	3,72	3,74	3,27	6,35	2,59	2,47	2,76	1,90
Industrial Production % Change	0,68	0,25	0,14	0,30	0,13	0,21	0,64	0,19	0,13	0,23	0,19	0,13	0,11	0,10	0,18	0,15	0,44	0,27	0,36
BCI % Change	1,76	5,46	2,74	-	1,75	1,92	0,44	3,75	1,34	4,26	3,01	4,39	2,53	3,21	3,32	2,14	2,69	2,40	1,10
CCI % Change	1,48	3,71	2,45	1,66	2,98	1,95	0,03	1,75	2,94	2,63	1,95	2,79	2,85	-	2,94	2,38	1,36	1,61	1,13
GDP % Change	2,09	3,86	2,53	2,08	2,42	2,30	0,40	2,36	2,62	3,25	1,97	2,44	2,73	2,46	3,70	2,26	2,40	2,30	1,90

Summary of Regressions with GDP % Change – 6 Month Lag

Regression Model with GDP % Change (6 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	1,45	0,04	2,92	0,00	1,27	0,07	1,57	0,02	1,67	0,04	1,68	0,07	0,16	0,86	2,20	0,00	1,18	0,35	-0,60	0,45
Downturn	-0,45	0,67	-3,70	0,03	-2,96	0,01	-0,37	0,68	-3,94	0,00	-0,68	0,63	0,45	0,73	-1,32	0,17	-7,51	0,00	-0,67	0,64
Slowdown	1,05	0,28	-0,86	0,53	0,56	0,56	-0,36	0,68	-0,81	0,50	-1,28	0,39	1,08	0,34	-0,55	0,59	1,51	0,41	1,66	0,18
Recovery	-0,01	0,99	-0,73	0,61	0,10	0,92	-0,34	0,71	-0,18	0,87	0,37	0,79	2,39	0,03	-2,09	0,03	2,01	0,21	2,74	0,01
CLI A %Change	0,92	0,78	9,42	0,17	-0,87	0,73	1,14	0,61	-3,52	0,30	4,57	0,05	-5,08	0,28	2,38	0,37	-6,47	0,04	-3,95	0,42
Industrial Production % Change	-0,28	0,68	-0,36	0,14	-0,09	0,53	0,07	0,82	0,11	0,40	0,49	0,02	-0,15	0,58	0,09	0,62	0,07	0,57	0,10	0,67
BCI % Change	-0,92	0,60	-11,51	0,04	-4,16	0,12	-	-	-1,23	0,49	-3,47	0,06	4,19	0,27	-2,95	0,42	-0,23	0,86	-1,06	0,80
CCI % Change	0,79	0,59	-1,71	0,64	-0,07	0,98	-2,28	0,17	5,99	0,04	-3,23	0,10	-0,35	0,92	0,28	0,87	-8,45	0,00	2,13	0,41
GDP % Change	-0,84	0,02	-1,66	0,02	0,17	0,74	-1,15	0,01	0,12	0,76	-0,65	0,12	-0,07	0,94	-0,98	0,01	-0,41	0,21	0,17	0,77
R2 & Standard Error	**0,01**	6,80	**0,05**	8,38	**0,02**	6,90	**0,01**	6,06	**0,02**	6,86	**0,03**	8,01	**0,00**	7,83	**0,01**	6,67	**0,10**	10,09	**0,01**	8,70
Number of Observations	480		336		480		456		312		324		480		480		288		480	

Legend:
p < 0.1
p < 0.05
p < 0.01

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,09	0,87	0,91	0,19	-0,74	0,48	0,44	0,57	0,92	0,33	0,97	0,22	0,80	0,19	0,61	0,36	0,81	0,10
Downturn	0,15	0,87	-2,64	0,02	0,16	0,91	-1,30	0,36	-2,75	0,06	-1,73	0,20	-1,35	0,16	-0,54	0,58	-0,06	0,92
Slowdown	2,15	0,04	0,14	0,89	1,06	0,49	2,22	0,07	0,11	0,93	1,63	0,14	0,90	0,34	0,94	0,33	0,53	0,42
Recovery	1,68	0,09	1,38	0,19	-1,62	0,32	0,31	0,80	-0,78	0,46	0,81	0,47	0,73	0,46	1,28	0,22	0,87	0,17
CLI A %Change	-0,66	0,79	-4,46	0,21	5,01	0,18	2,72	0,40	-5,98	0,34	1,67	0,51	-0,84	0,73	-5,99	0,03	-1,91	0,29
Industrial Production % Change	0,00	0,99	0,10	0,47	-0,15	0,16	0,09	0,34	-0,08	0,63	-0,08	0,59	0,70	0,12	-0,56	0,04	0,48	0,18
BCI % Change	0,22	0,94	-3,69	0,41	-3,16	0,22	-1,95	0,55	0,73	0,82	-2,47	0,25	1,41	0,60	4,09	0,00	-0,28	0,80
CCI % Change	-0,78	0,69	1,35	0,63	0,04	0,99	-	-	1,72	0,57	-0,48	0,84	0,14	0,92	0,51	0,75	0,23	0,84
GDP % Change	0,39	0,22	0,22	0,50	1,05	0,11	-0,16	0,63	0,49	0,39	-0,03	0,92	-0,67	0,18	0,18	0,67	-0,44	0,19
R2 & Standard Error	**0,00**	6,64	**0,02**	7,62	**0,00**	8,75	**0,01**	9,07	**0,00**	8,10	**0,01**	8,09	**0,00**	6,51	**0,01**	6,97	**0,00**	4,71
Number of Observations	480		480		324		480		480		480		480		480		480	

Model with GDP % Change - 6 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,70	1,00	0,69	0,66	0,82	0,94	0,95	0,65	1,27	0,79	0,59	0,69	1,05	0,78	0,94	0,79	0,61	0,67	0,49
Downturn	1,04	1,66	1,08	0,89	1,36	1,41	1,30	0,97	2,48	1,41	0,97	1,16	1,47	1,41	1,47	1,35	0,97	0,97	0,66
Slowdown	0,97	1,38	0,97	0,87	1,19	1,48	1,13	1,02	1,82	1,25	1,07	0,99	1,54	1,20	1,22	1,10	0,95	0,97	0,66
Recovery	1,00	1,45	0,97	0,92	1,13	1,36	1,09	0,98	1,60	1,09	0,98	1,05	1,64	1,21	1,06	1,12	1,00	1,04	0,63
CLI A %Change	3,29	6,77	2,53	2,23	3,42	2,28	4,73	2,65	3,19	4,87	2,48	3,52	3,71	3,20	6,27	2,54	2,40	2,68	1,80
Industrial Production % Change	0,67	0,24	0,14	0,30	0,13	0,20	0,28	0,19	0,12	0,23	0,20	0,13	0,10	0,10	0,17	0,15	0,45	0,27	0,36
BCI % Change	1,74	5,46	2,69	-	1,78	1,85	3,78	3,65	1,27	4,13	2,83	4,44	2,55	3,26	3,18	2,14	2,68	2,35	1,11
CCI % Change	1,46	3,65	2,42	1,65	2,95	1,97	3,49	1,74	2,78	2,58	1,97	2,78	2,86	-	3,00	2,39	1,36	1,60	1,14
GDP % Change	0,37	0,71	0,52	0,46	0,39	0,41	0,86	0,38	0,32	0,58	0,31	0,33	0,66	0,33	0,57	0,34	0,49	0,42	0,34

Summary of Regressions with GDP R % Change – 6 Month Lag

Regression Model with GDP R % Change (6 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,71	0,25	2,17	0,02	1,30	0,03	0,92	0,08	1,93	0,02	1,62	0,08	0,20	0,79	1,77	0,00	1,05	0,41	-0,69	0,35
Downturn	-0,56	0,59	-3,45	0,04	-2,97	0,01	-0,28	0,75	-4,16	0,00	-1,00	0,48	0,45	0,73	-1,20	0,21	-8,26	0,00	-0,70	0,62
Slowdown	1,20	0,23	-1,15	0,42	0,73	0,47	-0,62	0,48	-1,15	0,35	-1,77	0,27	0,92	0,43	-0,61	0,57	1,04	0,58	2,25	0,08
Recovery	0,52	0,59	-1,28	0,40	0,16	0,87	-0,46	0,62	-0,48	0,68	0,16	0,91	2,29	0,04	-2,24	0,03	1,73	0,30	2,84	0,01
CLI A %Change	0,75	0,82	12,93	0,07	-1,44	0,60	2,40	0,29	-3,03	0,39	4,08	0,08	-4,38	0,39	3,37	0,20	-6,75	0,04	-5,60	0,26
Industrial Production % Change	-0,39	0,57	-0,36	0,14	-0,09	0,50	0,12	0,68	0,12	0,36	0,50	0,02	-0,14	0,63	0,05	0,81	0,06	0,61	0,05	0,83
BCI % Change	-0,86	0,62	-11,89	0,03	-4,18	0,12	-	-	-1,09	0,54	-3,02	0,12	4,38	0,25	-3,17	0,40	-0,28	0,83	-2,54	0,55
CCI % Change	0,91	0,54	-2,88	0,44	0,08	0,97	-2,87	0,08	5,56	0,06	-2,96	0,14	-0,56	0,87	0,32	0,85	-8,19	0,00	3,06	0,25
GDP R % Change	-1,82	0,39	-8,71	0,02	1,69	0,50	-6,12	0,00	-1,40	0,56	-3,52	0,13	-1,69	0,71	-4,03	0,08	-2,18	0,39	4,74	0,15
R2 & Standard Error	**0,00**	6,83	**0,05**	8,38	**0,02**	6,90	**0,01**	6,04	**0,02**	6,85	**0,02**	8,01	**0,00**	7,83	**0,01**	6,70	**0,09**	10,10	**0,01**	8,68

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,05	0,93	1,09	0,10	-0,16	0,86	0,38	0,60	1,37	0,09	0,89	0,25	0,56	0,31	0,61	0,32	0,50	0,23
Downturn	0,40	0,68	-2,63	0,02	0,20	0,89	-1,29	0,36	-2,80	0,06	-1,75	0,19	-1,25	0,20	-0,48	0,62	-0,05	0,95
Slowdown	2,29	0,03	0,01	0,99	1,32	0,41	2,06	0,10	-0,24	0,85	1,77	0,12	0,78	0,42	1,17	0,24	0,61	0,38
Recovery	1,54	0,12	1,26	0,24	-1,92	0,24	0,30	0,80	-1,07	0,31	0,92	0,42	0,62	0,54	1,48	0,16	0,92	0,15
CLI A %Change	0,38	0,89	-4,13	0,27	4,89	0,19	3,27	0,32	-5,04	0,43	1,38	0,59	-0,27	0,91	-6,02	0,02	-1,89	0,33
Industrial Production % Change	0,05	0,79	0,10	0,44	-0,15	0,15	0,10	0,33	-0,07	0,68	-0,09	0,54	0,68	0,12	-0,60	0,03	0,39	0,28
BCI % Change	1,09	0,71	-3,29	0,46	-3,65	0,15	-2,15	0,51	0,85	0,79	-2,63	0,22	1,54	0,57	3,68	0,12	-0,24	0,83
CCI % Change	-0,62	0,75	1,23	0,66	0,36	0,90	-	-	1,27	0,67	-0,54	0,82	0,01	1,00	0,49	0,76	0,23	0,84
GDP R % Change	-0,66	0,74	-0,36	0,88	4,01	0,14	-1,74	0,49	-0,05	0,99	0,93	0,68	-3,27	0,16	2,55	0,26	-1,10	0,57
R2 & Standard Error	**0,00**	6,65	**0,02**	7,62	**0,00**	8,76	**0,01**	9,07	**0,00**	8,11	**0,01**	8,08	**0,00**	6,51	**0,01**	6,96	**0,00**	4,72

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - 6 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,61	0,89	0,60	0,53	0,80	0,93	0,74	0,61	1,27	0,73	0,58	0,66	0,93	0,72	0,81	0,76	0,55	0,61	0,42
Downturn	1,04	1,66	1,08	0,88	1,36	1,43	1,30	0,97	2,53	1,40	0,99	1,16	1,47	1,41	1,48	1,35	0,97	0,97	0,67
Slowdown	0,99	1,41	1,00	0,89	1,23	1,62	1,16	1,06	1,87	1,29	1,08	1,03	1,60	1,24	1,23	1,13	0,97	0,99	0,69
Recovery	0,98	1,51	0,97	0,92	1,16	1,42	1,09	1,02	1,67	1,09	0,99	1,07	1,61	1,21	1,05	1,13	1,01	1,06	0,64
CLI A %Change	3,33	7,00	2,71	2,27	3,51	2,34	5,10	2,64	3,19	4,99	2,66	3,71	3,72	3,31	6,33	2,60	2,46	2,67	1,92
Industrial Production % Change	0,68	0,24	0,14	0,30	0,13	0,21	0,28	0,19	0,12	0,23	0,20	0,13	0,10	0,10	0,17	0,15	0,44	0,27	0,37
BCI % Change	1,75	5,44	2,67	-	1,77	1,92	3,79	3,74	1,28	4,25	2,92	4,41	2,52	3,27	3,26	2,15	2,70	2,35	1,11
CCI % Change	1,47	3,68	2,43	1,67	2,96	1,98	3,52	1,74	2,84	2,64	1,98	2,79	2,85	-	2,98	2,39	1,37	1,59	1,15
GDP % Change	2,10	3,84	2,50	2,09	2,43	2,30	4,56	2,37	2,52	3,25	1,97	2,46	2,72	2,50	3,71	2,25	2,31	2,29	1,92

Summary of Regressions with GDP % Change – 12 Month Lag

Regression Model with GDP % Change (12 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,14	0,84	0,12	0,91	-0,40	0,57	1,30	0,06	0,39	0,64	-0,84	0,39	-0,34	0,72	0,30	0,64	0,99	0,48	0,28	0,73
Downturn	0,75	0,47	-0,54	0,75	1,78	0,10	-1,49	0,06	-0,99	0,48	1,29	0,37	-1,47	0,25	0,02	0,98	0,36	0,89	-2,99	0,03
Slowdown	1,13	0,25	1,10	0,43	2,15	0,03	-0,02	0,98	0,43	0,72	3,90	0,01	1,85	0,10	1,52	0,14	-0,55	0,78	0,74	0,56
Recovery	0,86	0,38	3,27	0,03	1,11	0,26	-0,43	0,64	2,18	0,06	1,96	0,16	1,49	0,17	0,78	0,43	0,10	0,95	1,91	0,06
CLI A %Change	-2,41	0,46	-18,10	0,01	0,18	0,94	-2,77	0,21	-7,86	0,02	1,52	0,51	-6,12	0,19	-5,10	0,06	-5,40	0,11	-7,49	0,11
Industrial Production % Change	-0,34	0,62	0,17	0,51	0,00	1,00	0,80	0,01	-0,06	0,65	0,38	0,06	0,29	0,29	0,03	0,88	0,04	0,77	0,28	0,21
BCI % Change	-0,14	0,94	14,37	0,01	1,71	0,53	-	-	3,32	0,07	-0,12	0,95	1,63	0,66	6,25	0,09	0,16	0,91	3,14	0,44
CCI % Change	-1,28	0,38	4,00	0,27	-0,06	0,98	-0,97	0,55	2,85	0,34	0,60	0,77	-1,28	0,71	1,68	0,34	4,72	0,11	-1,63	0,53
GDP % Change	0,39	0,29	-0,10	0,89	0,54	0,31	-0,68	0,13	-0,09	0,81	0,14	0,74	1,38	0,11	0,21	0,58	-0,02	0,96	-0,05	0,93
R2 & Standard Error	**0,00**	6,83	**0,02**	8,49	**0,00**	6,99	**0,02**	6,01	**0,01**	6,90	**0,01**	8,07	**0,01**	7,79	**0,00**	6,72	**-0,01**	10,65	**0,02**	8,63
Number of Observations	480		336		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,32	0,59	-0,79	0,26	-0,34	0,67	-0,34	0,67	-0,73	0,44	0,80	0,32	0,84	0,17	0,38	0,57	1,07	0,03
Downturn	-1,19	0,21	3,54	0,00	0,70	0,62	0,70	0,62	0,34	0,81	0,93	0,48	-0,38	0,70	-0,02	0,98	-0,80	0,23
Slowdown	2,51	0,02	1,92	0,06	1,14	0,35	1,14	0,35	1,60	0,19	0,65	0,56	0,30	0,75	2,39	0,01	-0,28	0,67
Recovery	2,56	0,01	2,01	0,06	2,60	0,03	2,60	0,03	1,07	0,32	2,30	0,04	0,92	0,36	-0,36	0,73	0,23	0,72
CLI A %Change	-4,06	0,07	-4,87	0,17	-6,56	0,04	-6,56	0,04	-3,17	0,61	-1,76	0,49	-0,25	0,92	-2,91	0,25	-1,22	0,49
Industrial Production % Change	0,10	0,62	-0,11	0,42	-0,01	0,94	-0,01	0,94	0,12	0,48	0,17	0,25	-0,28	0,54	-0,32	0,21	-0,26	0,47
BCI % Change	5,56	0,04	4,89	0,27	-2,06	0,52	-2,06	0,52	0,75	0,81	0,21	0,92	1,74	0,52	3,34	0,14	-1,04	0,35
CCI % Change	-1,97	0,32	3,56	0,20			-	-	-5,94	0,05	-0,30	0,90	-1,05	0,44	0,37	0,82	1,75	0,12
GDP % Change	-0,29	0,34	0,16	0,63	0,33	0,31	0,33	0,31	0,86	0,13	-0,62	0,07	-0,46	0,35	-0,02	0,96	0,10	0,77
R2 & Standard Error	**0,04**	6,53	**0,01**	7,63	**0,02**	9,03	**0,02**	9,03	**0,01**	8,07	**0,01**	8,11	**-0,01**	6,54	**0,02**	6,95	**0,00**	4,73
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - 12 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,68	1,04	0,71	0,67	0,84	0,97	0,95	0,65	1,39	0,81	0,58	0,70	0,79	0,79	0,95	0,80	0,62	0,67	0,50
Downturn	1,04	1,71	1,09	0,88	1,41	1,43	1,29	0,98	2,61	1,40	0,96	1,15	1,40	1,40	1,45	1,33	0,98	0,98	0,67
Slowdown	0,98	1,40	0,99	0,87	1,19	1,51	1,13	1,02	1,97	1,25	1,05	1,01	1,21	1,21	1,22	1,11	0,96	0,96	0,67
Recovery	0,97	1,48	0,98	0,92	1,14	1,39	1,09	0,98	1,72	1,09	0,96	1,06	1,21	1,21	1,07	1,14	1,00	1,04	0,64
CLI A %Change	3,24	6,87	2,54	2,21	3,45	2,30	4,61	2,66	3,35	4,73	2,20	3,53	3,18	3,18	6,27	2,55	2,41	2,55	1,79
Industrial Production % Change	0,68	0,25	0,14	0,30	0,13	0,20	0,28	0,19	0,13	0,23	0,19	0,13	0,10	0,10	0,17	0,15	0,45	0,25	0,36
BCI % Change	1,74	5,56	2,72	-	1,85	1,86	3,72	3,61	1,33	4,10	2,75	4,43	3,23	3,23	3,08	2,15	2,69	2,28	1,11
CCI % Change	1,45	3,62	2,45	1,64	2,98	2,00	3,46	1,74	2,94	2,58	1,97	2,75	-	-	3,01	2,40	1,36	1,58	1,13
GDP % Change	0,36	0,72	0,52	0,45	0,39	0,42	0,85	0,38	0,34	0,57	0,30	0,34	0,33	0,33	0,57	0,34	0,49	0,40	0,34

Summary of Regressions with GDP R % Change – 12 Month Lag

Regression Model with GDP R % Change (12 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,51	0,41	0,56	0,54	0,09	0,88	0,93	0,00	0,43	0,60	-0,60	0,94	0,58	0,44	0,52	0,40	1,67	0,23	0,23	0,75
Downturn	0,71	0,50	-0,33	0,84	1,86	0,01	-1,42	0,11	-1,04	0,46	1,20	1,45	-1,61	0,21	0,00	1,00	-0,58	0,82	-2,99	0,03
Slowdown	0,91	0,36	0,08	0,96	1,49	0,15	-0,24	0,79	0,31	0,80	3,54	1,63	1,38	0,23	1,23	0,25	-1,49	0,45	0,85	0,51
Recovery	0,66	0,50	1,91	0,21	0,85	0,39	-0,54	0,56	2,08	0,08	1,65	1,43	1,18	0,28	0,55	0,59	-1,01	0,57	1,92	0,08
CLI A %Change	-1,62	0,62	-13,86	0,05	1,39	0,61	-1,88	0,40	-7,54	0,03	1,27	2,37	-6,06	0,22	-5,24	0,05	-3,86	0,24	-7,71	0,11
Industrial Production % Change	-0,15	0,83	0,24	0,34	0,02	0,90	0,86	0,00	-0,06	0,66	0,40	0,21	0,34	0,23	0,07	0,71	0,06	0,66	0,27	0,23
BCI % Change	-0,04	0,98	16,01	0,00	2,30	0,39	-	-	3,35	0,07	0,09	1,93	2,28	0,54	7,36	0,05	0,58	0,66	2,91	0,49
CCI % Change	-1,37	0,35	3,04	0,40	-0,41	0,87	-1,41	0,40	2,71	0,37	0,66	2,02	-1,52	0,66	1,67	0,34	6,24	0,04	-1,49	0,58
GDP R % Change	-1,24	0,55	-10,07	0,01	-1,94	0,44	-4,13	0,05	-1,07	0,66	-0,52	2,31	2,30	0,61	-1,30	0,59	-6,13	0,02	0,53	0,87
R2 & Standard Error	**0,00**	6,84	**0,04**	8,41	**-0,01**	6,99	**0,02**	6,00	**0,01**	6,90	**0,01**	8,07	**0,01**	7,81	**0,00**	6,72	**0,01**	10,53	**0,02**	8,63

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,14	0,80	-0,42	0,53	0,20	0,83	-0,15	0,84	0,19	0,82	0,65	0,39	0,69	0,22	0,36	0,56	1,17	0,01
Downturn	-1,16	0,24	3,47	0,00	0,65	0,67	0,66	0,64	0,12	0,94	1,10	0,41	-0,32	0,75	-0,02	0,98	-0,81	0,23
Slowdown	2,52	0,02	1,33	0,20	-0,34	0,83	1,34	0,28	0,80	0,51	0,24	0,83	0,18	0,85	2,40	0,02	-0,42	0,54
Recovery	2,55	0,01	1,54	0,15	-1,88	0,24	2,59	0,03	0,41	0,69	1,97	0,09	0,81	0,43	-0,34	0,74	0,18	0,78
CLI A %Change	-3,85	0,11	-2,71	0,46	0,71	0,85	-7,44	0,02	-0,97	0,88	-0,66	0,80	0,23	0,93	-2,91	0,25	-0,84	0,66
Industrial Production % Change	0,09	0,64	-0,09	0,48	-0,13	0,23	-0,01	0,92	0,14	0,39	0,20	0,18	-0,28	0,53	-0,33	0,20	-0,16	0,65
BCI % Change	5,71	0,04	5,52	0,21	-1,87	0,46	-1,73	0,59	1,11	0,73	0,60	0,78	1,89	0,48	3,29	0,15	-1,10	0,32
CCI % Change	-1,96	0,32	3,06	0,27	1,58	0,58	-	-	-6,84	0,02	0,15	0,95	-1,17	0,39	0,36	0,82	1,69	0,14
GDP R % Change	-1,36	0,48	-4,26	0,08	-1,49	0,57	2,83	0,26	-1,48	0,69	-5,49	0,01	-2,46	0,28	0,09	0,97	-0,71	0,71
R2 & Standard Error	**0,03**	6,53	**0,02**	7,60	**-0,01**	8,81	**0,02**	9,02	**0,00**	8,09	**0,01**	8,09	**0,00**	6,54	**0,02**	6,95	**0,00**	4,73

Legend:
p > 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - 12 Month Lag: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,61	0,91	0,62	0,53	0,82	0,52	0,74	0,62	1,37	0,74	0,57	0,67	0,93	0,73	0,80	0,76	0,56	0,62	0,42
Downturn	1,04	1,69	1,08	0,88	1,41	0,41	1,29	0,98	2,59	1,40	0,98	1,14	1,50	1,40	1,46	1,33	0,98	0,98	0,67
Slowdown	0,99	1,42	1,02	0,89	1,23	0,03	1,16	1,06	1,98	1,29	1,06	1,03	1,55	1,24	1,22	1,13	0,98	0,99	0,69
Recovery	0,98	1,53	0,99	0,92	1,17	0,25	1,10	1,02	1,76	1,09	0,96	1,07	1,61	1,21	1,05	1,16	1,02	1,05	0,64
CLI A %Change	3,28	6,99	2,73	2,25	3,53	0,59	4,98	2,64	3,31	4,84	2,39	3,70	3,72	3,29	6,33	2,61	2,47	2,55	1,92
Industrial Production % Change	0,69	0,25	0,14	0,30	0,13	0,05	0,28	0,19	0,13	0,23	0,19	0,13	0,11	0,10	0,17	0,15	0,45	0,26	0,37
BCI % Change	1,75	5,48	2,70	-	1,84	0,96	3,74	3,70	1,32	4,23	2,84	4,39	2,53	3,24	3,16	2,16	2,70	2,30	1,11
CCI % Change	1,45	3,60	2,46	1,66	2,99	0,74	3,50	1,74	2,97	2,66	1,97	2,75	2,86	-	3,02	2,40	1,37	1,58	1,14
GDP R % Change	2,06	3,82	2,53	2,07	2,45	0,82	4,55	2,38	2,52	3,20	1,93	2,45	2,62	2,49	3,72	2,25	2,27	2,26	1,91

Appendix 11: Summary of Regressions with GDP % Change – CEP-Sorting

Regression Model with GDP % Change - CEP-Sorting

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,56	0,42	0,25	0,81	0,43	0,54	-0,29	0,62	0,35	0,68	0,97	0,31	-0,03	0,97	-0,32	0,60	-0,36	0,80	-1,36	0,07
Downturn	0,55	0,59	1,78	0,26	1,06	0,31	2,82	0,00	2,39	0,08	1,15	0,39	1,17	0,36	3,05	0,00	1,96	0,47	1,20	0,36
Slowdown	0,71	0,46	2,53	0,09	1,84	0,05	2,01	0,01	0,86	0,49	-0,27	0,85	2,00	0,09	2,45	0,01	4,01	0,05	4,51	0,00
Recovery	-0,21	0,83	-1,44	0,33	0,08	0,93	-1,98	0,01	-0,42	0,73	-0,92	0,50	-0,27	0,79	-1,10	0,23	-0,93	0,60	0,52	0,61
CLI A %Change	8,11	0,01	20,26	0,00	0,21	0,94	13,18	0,00	8,98	0,01	6,53	0,00	8,65	0,07	5,75	0,02	9,58	0,01	10,99	0,02
Industrial Production % Change	-0,27	0,68	-0,07	0,77	0,11	0,41	-0,46	0,06	0,10	0,49	0,02	0,91	-0,13	0,64	0,02	0,92	-0,14	0,29	-0,02	0,92
BCI % Change	2,99	0,08	-3,90	0,47	5,13	0,06	-	-	1,44	0,43	-0,19	0,91	5,22	0,16	3,44	0,30	0,75	0,60	-1,27	0,76
CCI % Change	4,87	0,00	4,58	0,22	9,64	0,00	1,27	0,37	8,43	0,01	2,32	0,21	7,05	0,04	4,10	0,01	7,38	0,02	4,78	0,04
GDP % Change	0,39	0,29	0,91	0,23	-0,05	0,92	0,56	0,16	-0,12	0,78	-0,02	0,96	0,70	0,38	0,21	0,52	0,42	0,24	1,12	0,03
R2 & Standard Error	**0,10**	6,66	**0,09**	7,99	**0,06**	6,64	**0,14**	5,16	**0,09**	7,28	**0,08**	7,66	**0,06**	7,51	**0,08**	6,07	**0,05**	11,27	**0,06**	8,11
Number of Observations	480		312		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,87	0,13	0,45	0,54	0,16	0,88	1,21	0,07	0,17	0,85	0,17	0,82	1,17	0,04	-0,44	0,48	0,69	0,11
Downturn	-0,49	0,59	1,98	0,11	-0,29	0,84	0,06	0,96	0,48	0,75	1,59	0,21	-0,58	0,50	2,04	0,02	1,20	0,04
Slowdown	0,01	0,99	0,49	0,65	-1,80	0,23	-2,02	0,05	0,78	0,53	1,32	0,21	-1,19	0,16	2,38	0,01	0,53	0,36
Recovery	0,69	0,44	-0,64	0,57	0,36	0,83	0,96	0,35	-1,96	0,06	0,39	0,70	-1,42	0,11	-0,67	0,50	-0,93	0,09
CLI A %Change	3,67	0,11	18,31	0,00	-2,63	0,47	4,65	0,09	8,64	0,16	12,08	0,00	8,42	0,00	14,32	0,00	8,40	0,00
Industrial Production % Change	0,25	0,16	-0,07	0,62	-0,01	0,96	0,17	0,04	-0,24	0,18	-0,08	0,58	-0,66	0,09	-0,04	0,87	-1,03	0,00
BCI % Change	-2,49	0,37	-12,23	0,01	6,48	0,01	7,90	0,00	4,18	0,21	-3,71	0,06	-3,10	0,19	-3,06	0,16	-1,19	0,24
CCI % Change	6,34	0,00	7,60	0,01	-0,12	0,97	-	-	9,30	0,00	5,39	0,01	-0,26	0,83	1,86	0,21	2,36	0,02
GDP % Change	-0,17	0,55	-0,29	0,39	1,48	0,02	-0,08	0,78	1,13	0,04	0,56	0,07	0,56	0,24	0,71	0,06	0,26	0,35
R2 & Standard Error	**0,06**	6,11	**0,08**	8,03	**0,04**	8,51	**0,09**	7,75	**0,06**	7,98	**0,09**	7,47	**0,09**	5,72	**0,10**	6,46	**0,13**	4,10
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:

p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - CEP-Sorting: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,70	1,06	0,70	0,58	0,85	0,95	0,96	0,60	1,41	0,76	0,57	0,74	1,04	0,67	0,94	0,75	0,56	0,63	0,43
Downturn	1,03	1,59	1,04	0,77	1,37	1,34	1,27	0,88	2,73	1,31	0,90	1,24	1,41	1,22	1,50	1,26	0,85	0,89	0,57
Slowdown	0,96	1,47	0,97	0,76	1,26	1,44	1,17	0,94	2,02	1,21	0,98	1,06	1,50	1,03	1,24	1,04	0,84	0,91	0,58
Recovery	0,97	1,48	0,95	0,79	1,22	1,37	1,04	0,91	1,77	1,02	0,90	1,11	1,71	1,04	1,03	1,02	0,88	0,99	0,56
CLI A %Change	3,30	6,78	2,81	1,98	3,58	2,21	4,83	2,49	3,52	4,61	2,31	3,76	3,60	2,78	6,18	2,33	2,18	2,57	1,56
Industrial Production % Change	0,66	0,24	0,13	0,25	0,15	0,19	0,27	0,17	0,13	0,22	0,18	0,14	0,10	0,08	0,18	0,14	0,39	0,25	0,31
BCI % Change	1,72	5,45	2,69	-	1,84	1,76	3,71	3,33	1,42	4,11	2,79	4,92	2,55	2,78	3,31	1,94	2,37	2,18	1,02
CCI % Change	1,45	3,72	2,33	1,41	3,12	1,85	3,37	1,62	3,07	2,37	1,83	2,97	2,77	-	2,87	2,16	1,21	1,49	0,98
GDP % Change	0,37	0,75	0,49	0,40	0,41	0,40	0,79	0,33	0,35	0,50	0,28	0,34	0,65	0,28	0,55	0,31	0,47	0,38	0,27

Summary of Regressions with GDP R % Change – CEP-Sorting

Regression Model with GDP R % Change - CEP-Sorting

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,92	0,13	0,66	0,44	0,47	0,42	0,08	0,85	0,57	0,50	0,15	0,87	0,96	0,18	0,01	0,98	0,30	0,83	-0,67	0,33
Downturn	0,56	0,59	1,38	0,38	1,08	0,29	2,64	0,00	2,17	0,12	1,71	0,20	0,91	0,46	2,99	0,00	1,78	0,52	0,94	0,47
Slowdown	0,60	0,54	2,68	0,00	1,66	0,08	2,08	0,01	0,47	0,72	1,46	0,35	0,61	0,58	1,88	0,05	3,77	0,07	3,75	0,00
Recovery	-0,43	0,65	-0,65	0,68	0,02	0,99	-1,94	0,01	-0,81	0,52	0,39	0,77	-1,08	0,30	-1,54	0,10	-1,44	0,43	0,30	0,77
CLI A %Change	8,00	0,02	15,04	0,03	0,81	0,78	11,69	0,00	10,05	0,01	7,89	0,00	10,66	0,03	5,36	0,03	10,54	0,00	8,44	0,07
Industrial Production % Change	-0,21	0,75	-0,11	0,64	0,12	0,39	-0,54	0,04	0,11	0,45	-0,06	0,78	-0,03	0,92	0,06	0,75	-0,13	0,32	-0,01	0,97
BCI % Change	2,91	0,09	-3,81	0,48	5,24	0,05	-	-	1,56	0,40	-1,39	0,45	7,08	0,06	5,24	0,12	0,67	0,64	-0,06	0,99
CCI % Change	4,87	0,00	5,71	0,12	9,51	0,00	1,55	0,28	7,86	0,01	1,84	0,32	6,52	0,05	4,10	0,01	7,74	0,01	5,38	0,03
GDP R % Change	0,64	0,75	7,58	0,05	-1,41	0,56	3,08	0,09	-2,74	0,29	4,92	0,02	-7,79	0,10	-2,91	0,18	-1,11	0,69	2,08	0,50
R2 & Standard Error	**0,09**	6,66	**0,10**	7,96	**0,06**	6,64	**0,14**	5,15	**0,09**	7,27	**0,09**	7,60	**0,06**	7,50	**0,09**	6,07	**0,05**	11,30	**0,05**	8,15

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,66	0,23	0,63	0,37	1,21	0,18	1,40	0,02	1,48	0,06	0,75	0,29	1,38	0,01	0,14	0,81	0,81	0,03
Downturn	-0,18	0,85	1,75	0,16	-0,25	0,86	-0,11	0,92	0,14	0,93	1,50	0,24	-0,66	0,44	2,04	0,02	1,06	0,07
Slowdown	0,22	0,83	-0,05	0,96	-2,04	0,19	-2,69	0,01	-0,54	0,65	0,68	0,51	-1,14	0,19	2,05	0,03	0,57	0,31
Recovery	0,58	0,52	-1,16	0,30	-0,48	0,78	0,83	0,42	-2,84	0,01	-0,01	1,00	-1,37	0,12	-1,21	0,22	-0,60	0,31
CLI A %Change	4,94	0,06	21,66	0,00	-2,38	0,51	6,57	0,02	10,30	0,11	12,21	0,00	8,02	0,00	13,89	0,00	9,29	0,00
Industrial Production % Change	0,27	0,13	-0,05	0,70	-0,01	0,93	0,19	0,02	-0,25	0,18	-0,06	0,69	-0,62	0,10	0,01	0,96	-0,99	0,00
BCI % Change	-1,87	0,51	-12,18	0,01	5,25	0,04	7,17	0,01	4,42	0,19	-3,46	0,06	-3,12	0,19	-2,26	0,31	-1,43	0,14
CCI % Change	6,54	0,00	6,94	0,02	0,15	0,96	-	-	8,66	0,00	5,32	0,01	-0,17	0,89	1,72	0,25	2,27	0,02
GDP R % Change	-2,06	0,27	-6,73	0,01	2,46	0,36	-5,22	0,01	-2,97	0,43	-0,93	0,66	2,36	0,29	-0,79	0,71	2,44	0,07
R2 & Standard Error	**0,06**	6,11	**0,10**	7,98	**0,02**	8,57	**0,10**	7,71	**0,05**	8,01	**0,08**	7,49	**0,09**	5,72	**0,09**	6,48	**0,13**	4,09

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - CEP-Sorting: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,60	0,86	0,58	0,45	0,85	0,90	0,72	0,56	1,36	0,69	0,55	0,70	0,91	0,61	0,80	0,70	0,50	0,57	0,36
Downturn	1,03	1,57	1,03	0,76	1,38	1,34	1,25	0,88	2,79	1,31	0,93	1,23	1,42	1,20	1,51	1,27	0,85	0,89	0,57
Slowdown	0,97	1,41	0,96	0,75	1,31	1,55	1,11	0,95	2,07	1,21	0,99	1,06	1,57	1,04	1,21	1,05	0,86	0,93	0,57
Recovery	0,95	1,56	0,94	0,79	1,28	1,36	1,04	0,93	1,82	1,02	0,91	1,12	1,67	1,03	1,04	1,03	0,89	0,99	0,59
CLI A %Change	3,35	6,81	2,87	1,94	3,70	2,20	5,02	2,39	3,59	4,72	2,59	3,92	3,65	2,86	6,48	2,41	2,20	2,57	1,62
Industrial Production % Change	0,67	0,24	0,13	0,26	0,15	0,20	0,28	0,17	0,14	0,22	0,18	0,14	0,10	0,08	0,18	0,14	0,38	0,25	0,30
BCI % Change	1,72	5,39	2,66	-	1,84	1,82	3,79	3,41	1,44	4,14	2,85	4,88	2,50	2,78	3,35	1,97	2,39	2,23	0,98
CCI % Change	1,45	3,69	2,34	1,42	3,16	1,84	3,38	1,61	3,13	2,47	1,82	2,96	2,78	-	2,91	2,17	1,22	1,50	0,98
GDP % Change	2,05	3,91	2,42	1,79	2,60	2,19	4,66	2,14	2,81	3,11	1,85	2,56	2,67	2,11	3,76	2,11	2,22	2,14	1,33

Summary of Regressions with GDP % Change – CEP-Sorting – 1 Month Lag

Regression Model with GDP % Change - CEP-Sorting (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,21	0,77	0,62	0,53	1,17	0,08	0,35	0,54	-0,08	0,93	1,05	0,26	1,12	0,23	0,62	0,31	-0,81	0,56	-0,04	0,96
Downturn	1,41	0,18	1,15	0,47	0,18	0,87	1,98	0,01	3,28	0,02	1,13	0,40	1,31	0,30	1,69	0,06	0,87	0,75	-1,76	0,19
Slowdown	1,33	0,17	2,35	0,08	1,37	0,15	1,11	0,15	1,59	0,22	0,01	0,99	1,01	0,36	0,89	0,35	4,76	0,02	2,62	0,03
Recovery	-0,19	0,85	-1,76	0,24	-0,69	0,47	-0,68	0,40	0,19	0,88	-1,23	0,35	-0,92	0,39	-0,97	0,29	-0,31	0,86	1,11	0,28
CLI A %Change	9,00	0,01	22,95	0,00	2,65	0,34	7,80	0,00	11,99	0,00	9,48	0,00	14,71	0,00	5,32	0,03	8,96	0,01	8,95	0,05
Industrial Production % Change	0,61	0,37	0,18	0,46	-0,06	0,66	0,17	0,53	-0,09	0,56	-0,02	0,94	-0,01	0,98	-0,11	0,54	-0,19	0,16	0,32	0,15
BCI % Change	3,78	0,03	-9,66	0,08	5,54	0,04	-	-	1,49	0,43	-1,85	0,30	2,21	0,56	2,37	0,49	-0,26	0,85	-4,89	0,23
CCI % Change	1,31	0,38	3,63	0,33	2,61	0,27	2,85	0,06	2,50	0,44	-1,71	0,36	-0,45	0,90	2,03	0,22	3,01	0,33	1,01	0,68
GDP % Change	0,17	0,66	0,44	0,57	-0,65	0,20	-0,26	0,53	-0,02	0,96	-0,10	0,80	-0,95	0,28	-0,19	0,60	0,67	0,06	-0,11	0,84
R2 & Standard Error	**0,06**	6,81	**0,08**	8,04	**0,02**	6,78	**0,09**	5,32	**0,06**	7,37	**0,06**	7,74	**0,03**	7,63	**0,04**	6,21	**0,05**	11,32	**0,04**	8,21
Number of Observations	480		312		480		456		312		324		480		480		288		480	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,46	0,41	0,81	0,27	0,08	0,94	0,90	0,18	1,17	0,21	0,39	0,60	1,12	0,05	-0,22	0,72	0,86	0,05
Downturn	0,33	0,72	0,93	0,46	0,48	0,74	1,64	0,18	-0,27	0,86	1,95	0,13	-0,27	0,75	0,74	0,40	1,41	0,02
Slowdown	0,26	0,79	0,20	0,85	-0,65	0,67	-0,33	0,75	-0,53	0,66	1,60	0,12	-0,62	0,46	1,72	0,05	0,82	0,16
Recovery	1,10	0,22	-0,81	0,47	0,09	0,96	0,40	0,70	-1,76	0,10	0,23	0,82	-1,98	0,02	-0,39	0,68	0,10	0,86
CLI A %Change	2,77	0,25	18,60	0,00	0,77	0,83	7,77	0,01	4,36	0,49	11,97	0,00	12,35	0,00	8,73	0,00	9,82	0,00
Industrial Production % Change	-0,23	0,20	-0,30	0,04	0,02	0,87	-0,11	0,20	0,04	0,84	0,13	0,36	-0,18	0,65	0,11	0,66	0,31	0,33
BCI % Change	-2,43	0,37	-13,04	0,01	4,95	0,06	7,31	0,01	2,99	0,37	-3,18	0,11	-6,58	0,01	-2,60	0,23	-3,91	0,00
CCI % Change	8,61	0,00	2,13	0,48	-0,90	0,75	-	-	7,17	0,02	2,70	0,22	-2,18	0,07	0,42	0,77	0,62	0,54
GDP % Change	0,16	0,58	-0,32	0,37	0,81	0,21	-0,41	0,15	0,19	0,74	-0,16	0,62	0,18	0,71	0,44	0,25	-0,80	0,01
R2 & Standard Error	**0,06**	6,10	**0,06**	8,15	**0,01**	8,61	**0,07**	7,85	**0,02**	8,14	**0,06**	7,59	**0,08**	5,75	**0,03**	6,32	**0,09**	4,20
Number of Observations	480		480		324		480		480		480		480		480		480	

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - CEP-Sorting (1 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,72	1,00	0,68	0,57	0,90	0,93	0,94	0,60	1,38	0,74	0,55	0,74	1,03	0,67	0,93	0,74	0,56	0,61	0,44
Downturn	1,05	1,58	1,05	0,78	1,43	1,35	1,27	0,90	2,75	1,33	0,91	1,25	1,43	1,23	1,52	1,28	0,85	0,87	0,59
Slowdown	0,98	1,40	0,95	0,76	1,29	1,45	1,10	0,95	2,03	1,18	0,98	1,05	1,52	1,04	1,23	1,03	0,84	0,88	0,59
Recovery	1,00	1,49	0,96	0,81	1,24	1,33	1,06	0,92	1,76	1,03	0,90	1,13	1,69	1,05	1,05	1,03	0,88	0,95	0,56
CLI A %Change	3,39	6,65	2,78	1,95	3,63	2,18	4,90	2,47	3,58	4,63	2,39	3,81	3,65	2,79	6,36	2,38	2,18	2,50	1,61
Industrial Production % Change	0,67	0,24	0,14	0,26	0,15	0,20	0,28	0,18	0,14	0,22	0,18	0,14	0,10	0,09	0,19	0,14	0,39	0,25	0,32
BCI % Change	1,75	5,45	2,72	-	1,88	1,79	3,79	3,42	1,44	4,06	2,74	4,88	2,54	2,81	3,36	1,99	2,38	2,17	1,00
CCI % Change	1,49	3,71	2,37	1,45	3,22	1,87	3,42	1,64	3,08	2,42	1,81	3,01	2,81	-	2,97	2,20	1,21	1,46	1,01
GDP % Change	0,38	0,76	0,51	0,41	0,44	0,40	0,87	0,35	0,36	0,55	0,30	0,36	0,65	0,29	0,57	0,32	0,47	0,38	0,30

Summary of Regressions with GDP R % Change – CEP-Sorting – 1 Month Lag

Regression Model with GDP R % Change - CEP-Sorting (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,40	0,51	0,67	0,43	0,76	0,20	0,12	0,79	0,31	0,72	0,20	0,83	0,80	0,27	0,66	0,25	-0,42	0,76	-0,15	0,83
Downturn	1,41	0,18	1,03	0,51	0,14	0,89	2,00	0,01	2,96	0,04	1,66	0,22	1,34	0,29	1,69	0,06	1,79	0,53	-1,75	0,19
Slowdown	1,19	0,23	2,75	0,05	1,66	0,09	1,29	0,10	0,94	0,48	1,75	0,27	0,69	0,54	0,58	0,55	5,29	0,01	2,87	0,02
Recovery	-0,35	0,72	-1,17	0,46	-0,56	0,56	-0,56	0,49	-0,42	0,74	0,09	0,95	-1,08	0,31	-1,26	0,19	-0,14	0,94	1,14	0,27
CLI A %Change	9,22	0,01	20,77	0,00	2,38	0,41	7,73	0,00	13,37	0,00	10,83	0,00	16,48	0,00	5,55	0,02	9,83	0,01	8,34	0,08
Industrial Production % Change	0,70	0,30	0,16	0,52	-0,06	0,64	0,10	0,71	-0,07	0,61	-0,10	0,63	0,02	0,93	-0,09	0,63	-0,17	0,20	0,30	0,18
BCI % Change	3,80	0,03	-9,93	0,07	5,20	0,06	-	-	1,64	0,38	-3,04	0,10	3,00	0,44	3,34	0,34	-0,04	0,98	-5,34	0,20
CCI % Change	1,31	0,38	4,10	0,27	2,65	0,27	2,92	0,05	1,72	0,59	-2,18	0,24	-0,90	0,79	2,06	0,21	2,92	0,36	1,36	0,59
GDP R % Change	-0,67	0,75	5,19	0,19	-0,74	0,77	0,17	0,93	-3,79	0,15	4,67	0,04	-7,36	0,11	-2,91	0,18	2,08	0,46	1,31	0,67
R2 & Standard Error	**0,05**	6,81	**0,08**	8,02	**0,02**	6,79	**0,09**	5,32	**0,07**	7,35	**0,07**	7,68	**0,03**	7,62	**0,04**	6,20	**0,04**	11,37	**0,04**	8,21

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,47	0,39	0,98	0,17	0,55	0,55	0,71	0,25	1,49	0,07	0,32	0,65	1,11	0,03	0,03	0,96	0,11	0,76
Downturn	0,55	0,55	0,72	0,57	0,52	0,72	1,68	0,17	-0,39	0,80	1,96	0,13	-0,29	0,73	0,76	0,39	1,36	0,02
Slowdown	0,40	0,69	-0,41	0,71	-0,54	0,73	-0,67	0,53	-0,93	0,45	1,56	0,14	-0,39	0,65	1,75	0,05	1,41	0,02
Recovery	0,99	0,27	-1,31	0,25	-0,19	0,91	0,38	0,71	-2,09	0,05	0,21	0,84	-1,79	0,05	-0,45	0,64	0,65	0,29
CLI A %Change	3,72	0,15	21,34	0,00	0,78	0,83	9,05	0,00	5,89	0,37	12,09	0,00	11,99	0,00	8,53	0,00	9,95	0,00
Industrial Production % Change	-0,20	0,26	-0,29	0,04	0,01	0,89	-0,10	0,22	0,05	0,79	0,13	0,35	-0,25	0,53	0,14	0,57	-0,05	0,87
BCI % Change	-1,60	0,57	-12,95	0,01	4,56	0,07	6,78	0,02	3,35	0,32	-3,16	0,11	-7,07	0,00	-2,33	0,28	-3,75	0,00
CCI % Change	8,68	0,00	1,67	0,58	-0,64	0,82	-	-	6,69	0,02	2,77	0,21	-2,08	0,09	0,49	0,74	0,63	0,54
GDP R % Change	-0,96	0,60	-6,59	0,01	2,61	0,33	-4,13	0,06	-2,57	0,50	-0,89	0,68	2,36	0,28	1,25	0,55	2,30	0,09
R2 & Standard Error	**0,06**	6,10	**0,07**	8,11	**0,01**	8,62	**0,07**	7,83	**0,02**	8,13	**0,06**	7,59	**0,08**	5,74	**0,03**	6,33	**0,08**	4,22

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - CEP-Sorting (1 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,61	0,86	0,59	0,46	0,86	0,91	0,73	0,57	1,38	0,70	0,55	0,71	0,92	0,62	0,81	0,71	0,50	0,56	0,37
Downturn	1,05	1,58	1,05	0,78	1,41	1,36	1,27	0,90	2,81	1,33	0,93	1,25	1,43	1,22	1,52	1,28	0,85	0,87	0,59
Slowdown	0,99	1,42	0,98	0,78	1,32	1,57	1,13	0,98	2,08	1,22	0,99	1,08	1,58	1,06	1,23	1,06	0,86	0,90	0,58
Recovery	0,97	1,57	0,96	0,81	1,28	1,37	1,06	0,95	1,84	1,03	0,91	1,14	1,66	1,05	1,06	1,04	0,89	0,96	0,61
CLI A %Change	3,44	6,86	2,91	2,00	3,74	2,23	5,11	2,45	3,60	4,75	2,57	3,96	3,67	2,88	6,51	2,44	2,20	2,50	1,67
Industrial Production % Change	0,68	0,24	0,14	0,27	0,15	0,20	0,28	0,18	0,14	0,22	0,18	0,14	0,10	0,09	0,19	0,14	0,39	0,25	0,30
BCI % Change	1,76	5,43	2,71	-	1,86	1,84	3,84	3,49	1,45	4,14	2,84	4,82	2,50	2,82	3,39	2,00	2,40	2,17	1,01
CCI % Change	1,49	3,72	2,39	1,47	3,20	1,87	3,43	1,64	3,16	2,49	1,82	3,00	2,80	-	2,97	2,20	1,22	1,46	1,02
GDP % Change	2,10	3,94	2,46	1,85	2,63	2,21	4,61	2,19	2,83	3,11	1,84	2,59	2,68	2,15	3,78	2,13	2,20	2,08	1,37

Appendix 12: Summary of Regressions with GDP % Change – Out-of-Sample Analysis

Regression Model with GDP % Change - Out-of-Sample Analysis

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,09	0,92	3,54	0,06	1,81	0,04	-0,39	0,62	2,08	0,08	1,44	0,41	0,29	0,82	-0,16	0,83	0,92	0,66	-1,75	0,10
Downturn	1,96	0,14	-6,79	0,02	-2,07	0,13	2,13	0,05	1,49	0,49	-0,36	0,88	0,53	0,73	1,94	0,08	-5,86	0,21	2,88	0,11
Slowdown	1,98	0,15	-3,90	0,08	-1,36	0,26	1,26	0,25	-2,47	0,15	-1,79	0,45	1,93	0,19	1,70	0,16	0,13	0,95	3,55	0,03
Recovery	-0,34	0,78	-2,72	0,18	-0,76	0,50	-1,53	0,13	-2,27	0,16	-1,11	0,62	-0,57	0,69	-0,01	0,99	-1,07	0,63	0,51	0,71
CLI A %Change	12,70	0,00	-2,06	0,84	-5,28	0,12	11,24	0,00	6,92	0,13	6,89	0,06	6,04	0,33	1,06	0,75	5,89	0,15	0,71	0,91
Industrial Production % Change	0,20	0,77	-0,11	0,70	-0,13	0,45	-0,46	0,15	0,12	0,48	0,29	0,30	-0,38	0,28	0,02	0,93	-0,45	0,05	-0,07	0,78
BCI % Change	0,42	0,86	-6,87	0,44	-1,88	0,58			-4,36	0,14	-0,09	0,98	3,76	0,41	3,50	0,42	-0,47	0,77	5,22	0,33
CCI % Change	3,86	0,05	7,93	0,17	9,43	0,00	1,73	0,36	1,15	0,80	-4,71	0,15	6,98	0,12	6,15	0,00	4,28	0,50	8,78	0,01
GDP % Change	-0,01	0,98	0,34	0,78	0,16	0,77	0,77	0,12	-0,72	0,13	0,47	0,51	0,59	0,57	0,60	0,12	0,38	0,40	1,21	0,07
R2 & Standard Error	**0,08**	6,67	**0,03**	7,91	**0,02**	6,47	**0,11**	5,45	**0,01**	6,18	**0,03**	8,05	**0,01**	7,60	**0,04**	5,89	**0,04**	7,81	**0,03**	8,55
Number of Observations	300		156		300		276		132		144		300		300		108		300	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,39	0,67	0,54	0,50	-2,88	0,09	0,51	0,60	-0,63	0,63	0,12	0,90	2,23	0,00	0,34	0,71	0,52	0,40
Downturn	0,26	0,85	1,72	0,19	2,24	0,37	1,18	0,53	1,67	0,41	1,60	0,31	-1,49	0,19	1,31	0,32	1,37	0,07
Slowdown	2,40	0,12	0,44	0,70	0,49	0,87	-2,59	0,06	1,89	0,24	1,10	0,40	-1,89	0,09	1,87	0,14	0,86	0,26
Recovery	1,94	0,16	0,61	0,61	1,78	0,54	3,41	0,01	-2,37	0,08	1,41	0,35	-0,76	0,50	-1,33	0,32	-0,44	0,55
CLI A %Change	3,95	0,24	14,03	0,00	0,72	0,92	5,88	0,10	5,93	0,52	14,14	0,00	4,50	0,16	15,34	0,00	6,74	0,00
Industrial Production % Change	0,08	0,81	0,15	0,26	-2,11	0,31	-0,07	0,51	-0,28	0,18	0,01	0,96	-0,60	0,18	-0,03	0,91	-1,07	0,01
BCI % Change	3,11	0,48	-12,48	0,01	2,14	0,69	5,38	0,21	5,76	0,14	0,93	0,81	-3,18	0,28	-5,46	0,09	-2,50	0,06
CCI % Change	9,39	0,01	9,13	0,01	1,48	0,80			11,01	0,02	-6,22	0,31	0,44	0,77	1,74	0,36	5,01	0,00
GDP % Change	-0,48	0,26	-0,27	0,38	1,06	0,27	0,33	0,35	1,36	0,05	0,90	0,02	-0,43	0,38	0,13	0,78	0,25	0,46
R2 & Standard Error	**0,05**	6,98	**0,05**	6,66	**-0,03**	10,15	**0,11**	8,20	**0,05**	8,13	**0,11**	7,53	**0,03**	5,76	**0,05**	7,12	**0,13**	4,09
Number of Observations	300		300		144		300		300		300		300		300		300	

Legend:

p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - Out-of-Sample Analysis: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,90	1,84	0,89	0,80	1,19	1,74	1,28	0,77	2,07	1,06	0,92	0,79	1,71	0,98	1,30	0,91	0,72	0,91	0,63
Downturn	1,34	2,83	1,38	1,09	2,14	2,31	1,53	1,12	4,62	1,80	1,38	1,30	2,49	1,87	2,03	1,57	1,13	1,32	0,76
Slowdown	1,37	2,18	1,22	1,09	1,70	2,37	1,48	1,19	2,34	1,63	1,54	1,14	2,89	1,38	1,60	1,30	1,11	1,26	0,77
Recovery	1,19	2,04	1,11	1,01	1,60	2,21	1,44	1,07	2,19	1,35	1,39	1,18	2,92	1,34	1,37	1,52	1,12	1,32	0,72
CLI A %Change	4,41	9,98	3,37	2,69	4,49	3,61	6,24	3,37	4,10	6,62	3,37	4,85	6,77	3,54	9,20	2,88	3,23	3,90	2,29
Industrial Production % Change	0,71	0,29	0,17	0,32	0,17	0,28	0,35	0,20	0,22	0,26	0,32	0,14	2,07	0,10	0,21	0,16	0,44	0,31	0,40
BCI % Change	2,37	8,83	3,37		2,95	2,96	4,52	4,35	1,65	5,40	4,38	4,86	5,28	4,26	3,86	3,89	2,95	3,22	1,31
CCI % Change	1,93	5,73	3,22	1,88	4,50	3,30	4,48	2,04	6,32	3,58	3,44	3,23	5,69		4,77	6,12	1,49	1,89	1,42
GDP % Change	0,41	1,23	0,55	0,49	0,47	0,72	1,04	0,39	0,46	0,67	0,42	0,31	0,95	0,36	0,68	0,37	0,49	0,48	0,33

Summary of Regressions with GDP R % Change – Out-of-Sample Analysis

Regression Model with GDP R % Change - Out-of-Sample Analysis

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,09	0,91	3,40	0,01	2,17	0,00	0,26	0,69	1,94	0,09	0,98	0,56	1,39	0,13	0,50	0,48	1,84	0,30	-0,75	0,41
Downturn	1,95	0,14	-6,87	0,02	-2,20	0,11	1,93	0,08	0,53	0,80	0,04	0,98	0,19	0,90	1,84	0,10	-5,38	0,25	2,53	0,16
Slowdown	1,95	0,16	-3,36	0,11	-2,04	0,09	1,05	0,34	-2,70	0,12	-0,43	0,87	0,34	0,81	0,89	0,47	-0,25	0,91	2,54	0,12
Recovery	-0,34	0,76	-1,95	0,35	-0,97	0,38	-1,68	0,10	-2,54	0,12	-0,14	0,95	-1,66	0,26	-0,47	0,67	-1,26	0,56	0,38	0,78
CLI A %Change	12,75	0,00	-5,10	0,61	-4,79	0,15	9,95	0,00	7,73	0,09	6,71	0,06	9,19	0,16	0,01	1,00	5,66	0,17	-2,26	0,73
Industrial Production % Change	0,21	0,77	-0,14	0,64	-0,11	0,50	-0,48	0,16	0,16	0,34	0,25	0,36	-0,27	0,43	0,00	0,99	-0,44	0,05	-0,07	0,80
BCI % Change	0,44	0,85	-7,11	0,42	-1,48	0,66			-3,58	0,22	-0,24	0,93	5,37	0,24	5,36	0,24	-0,99	0,56	6,98	0,20
CCI % Change	3,86	0,05	9,24	0,11	9,15	0,00	1,63	0,39	-0,39	0,93	-4,18	0,21	5,91	0,19	5,61	0,01	4,47	0,48	9,86	0,01
GDP R % Change	-0,20	0,93	9,09	0,17	-2,71	0,30	2,22	0,32	-5,64	0,06	5,30	0,20	-10,48	0,08	-2,13	0,49	2,71	0,46	0,68	0,86
R2 & Standard Error	**0,08**	6,67	**0,04**	7,86	**0,03**	6,46	**0,10**	5,46	**0,02**	6,15	**0,04**	8,01	**0,02**	7,56	**0,04**	5,91	**0,04**	7,82	**0,02**	8,59

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,05	0,95	0,51	0,50	-2,23	0,17	1,21	0,16	1,00	0,36	0,70	0,43	1,96	0,00	0,60	0,47	0,82	0,10
Downturn	0,51	0,71	1,64	0,21	2,36	0,35	0,90	0,63	1,08	0,60	1,63	0,30	-1,40	0,22	1,22	0,36	1,30	0,09
Slowdown	2,51	0,10	0,21	0,85	0,33	0,91	-3,51	0,01	0,60	0,70	0,78	0,57	-1,58	0,16	1,58	0,23	0,61	0,42
Recovery	1,19	0,43	0,36	0,76	1,32	0,65	3,07	0,02	-3,46	0,01	0,96	0,54	-0,58	0,61	-1,68	0,21	-0,56	0,43
CLI A %Change	6,23	0,09	17,81	0,00	1,27	0,85	7,46	0,05	9,31	0,32	13,58	0,00	5,29	0,08	14,95	0,00	6,81	0,00
Industrial Production % Change	0,05	0,88	0,16	0,23	-1,95	0,37	-0,05	0,61	-0,32	0,13	0,00	0,99	-0,66	0,14	0,02	0,96	-0,99	0,02
BCI % Change	3,60	0,41	-13,41	0,01	0,93	0,86	5,61	0,19	5,49	0,16	0,01	1,00	-3,84	0,19	-4,69	0,17	-2,75	0,03
CCI % Change	9,32	0,01	8,63	0,01	2,36	0,68			11,63	0,02	-4,77	0,44	0,47	0,75	1,81	0,34	5,01	0,00
GDP R % Change	-5,17	0,10	-4,96	0,05	0,54	0,90	-4,00	0,15	-2,85	0,54	1,89	0,51	-0,28	0,91	-1,95	0,53	-0,28	0,88
R2 & Standard Error	**0,05**	6,97	**0,06**	6,63	**-0,04**	10,20	**0,11**	8,18	**0,04**	8,18	**0,09**	7,60	**0,03**	5,77	**0,05**	7,12	**0,13**	4,10

Legend:
p < 0.10
p < 0.05
p < 0.01

Model with GDP R % Change - Out-of-Sample Analysis: Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,78	1,37	0,73	0,64	1,15	1,69	0,90	0,72	1,76	0,91	0,85	0,75	1,62	0,87	1,08	0,89	0,66	0,84	0,49
Downturn	1,34	2,80	1,36	1,09	2,13	2,32	1,51	1,12	4,67	1,80	1,39	1,29	2,53	1,85	2,04	1,59	1,13	1,33	0,76
Slowdown	1,39	2,08	1,20	1,10	1,70	2,66	1,43	1,23	2,29	1,64	1,54	1,14	2,95	1,41	1,55	1,36	1,12	1,30	0,77
Recovery	1,14	2,08	1,10	1,01	1,62	2,31	1,46	1,11	2,15	1,36	1,49	1,18	2,91	1,34	1,32	1,55	1,14	1,32	0,71
CLI A %Change	4,45	9,90	3,28	2,64	4,50	3,59	6,50	3,31	4,11	6,48	3,66	5,20	6,83	3,74	9,33	2,91	3,11	3,93	2,40
Industrial Production % Change	0,72	0,29	0,17	0,33	0,17	0,28	0,35	0,21	0,22	0,26	0,32	0,14	2,17	0,10	0,21	0,17	0,45	0,32	0,43
BCI % Change	2,37	8,72	3,35	1,89	2,93	2,94	4,54	4,58	1,69	5,46	4,38	4,85	5,21	4,25	3,90	3,91	2,93	3,38	1,28
CCI % Change	1,92	5,68	3,22	2,23	4,51	3,29	4,50	2,08	6,32	3,61	3,43	3,21	5,68		4,79	6,15	1,49	1,89	1,43
GDP % Change	2,32	6,60	2,59		3,01	4,11	6,05	3,05	3,67	3,97	3,14	2,51	4,19	2,76	4,59	2,85	2,49	3,14	1,90

Summary of Regressions with GDP % Change – Out-of-Sample Analysis (1 Month Lag)

Regression Model with GDP % Change - Out-of-Sample Analysis (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,60	0,51	2,52	0,13	2,59	0,00	0,00	1,00	2,62	0,04	2,88	0,10	1,13	0,38	0,74	0,34	-1,83	0,32	0,06	0,95
Downturn	3,93	0,00	-5,84	0,03	-2,56	0,05	2,33	0,03	0,38	0,86	-0,65	0,77	0,85	0,58	1,21	0,29	-5,70	0,21	-0,81	0,66
Slowdown	2,81	0,04	-1,83	0,36	-1,92	0,10	0,71	0,52	-3,17	0,07	-2,91	0,22	1,12	0,43	0,23	0,85	2,54	0,25	1,10	0,50
Recovery	-0,38	0,75	-4,23	0,03	-1,47	0,19	-0,53	0,61	-2,44	0,12	-2,27	0,31	-0,11	0,94	0,34	0,75	0,67	0,75	1,77	0,20
CLI A %Change	14,05	0,00	-2,14	0,82	-3,37	0,29	8,23	0,00	6,23	0,16	11,69	0,00	6,86	0,28	-1,26	0,71	6,88	0,09	1,42	0,83
Industrial Production % Change	1,33	0,06	0,50	0,09	-0,01	0,95	-0,06	0,85	0,10	0,54	-0,19	0,50	0,37	0,30	0,28	0,18	0,01	0,96	0,24	0,36
BCI % Change	1,90	0,42	-8,88	0,30	-2,39	0,48			-4,95	0,10	-3,22	0,27	3,31	0,47	5,33	0,24	0,32	0,85	-1,82	0,73
CCI % Change	1,20	0,53	15,51	0,01	5,10	0,12	1,82	0,34	-0,62	0,90	-12,00	0,00	-0,39	0,93	2,67	0,20	-11,74	0,05	2,49	0,49
GDP % Change	-0,15	0,71	0,63	0,59	-0,56	0,31	-0,03	0,95	-0,83	0,09	-0,12	0,87	-0,80	0,49	-0,13	0,76	1,06	0,02	-0,17	0,82
R2 & Standard Error	**0,07**	6,69	**0,08**	7,67	**0,01**	6,53	**0,08**	5,55	**0,03**	6,13	**0,07**	7,86	**-0,01**	7,68	**0,01**	5,98	**0,08**	7,63	**-0,01**	8,73
Number of Observations	300		156		300		276		132		144		300		300		108		300	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,44	0,62	0,78	0,32	-2,48	0,14	-0,39	0,70	1,37	0,30	-0,27	0,76	1,68	0,02	0,66	0,48	0,28	0,65
Downturn	0,60	0,66	0,63	0,63	2,87	0,27	3,16	0,10	-0,46	0,82	3,33	0,04	-0,37	0,74	0,29	0,83	1,92	0,01
Slowdown	2,35	0,12	0,05	0,96	1,99	0,49	0,35	0,81	-0,67	0,67	1,95	0,13	-0,80	0,46	1,67	0,19	1,05	0,18
Recovery	3,58	0,01	0,93	0,44	-1,10	0,71	2,11	0,13	-2,79	0,05	2,23	0,14	-0,85	0,46	-1,50	0,26	1,19	0,10
CLI A %Change	-0,24	0,94	12,06	0,02	8,06	0,26	9,65	0,01	-0,50	0,96	14,42	0,00	8,32	0,01	9,59	0,02	9,06	0,00
Industrial Production % Change	-0,24	0,44	-0,10	0,46	-2,11	0,43	0,08	0,43	0,25	0,24	0,06	0,71	-0,13	0,78	0,14	0,67	-0,04	0,92
BCI % Change	2,46	0,56	-12,32	0,01	-1,46	0,78	7,84	0,07	4,86	0,22	-0,92	0,81	-5,43	0,06	-2,40	0,48	-5,58	0,00
CCI % Change	14,47	0,00	3,77	0,25	1,19	0,84			4,64	0,35	-7,92	0,21	-1,54	0,30	0,60	0,75	2,12	0,15
GDP % Change	0,38	0,38	-0,04	0,90	0,13	0,92	0,24	0,51	0,16	0,81	0,23	0,54	-0,51	0,34	0,26	0,62	-0,31	0,42
R2 & Standard Error	**0,08**	6,87	**0,01**	6,78	**-0,03**	10,16	**0,06**	8,40	**0,00**	8,34	**0,09**	7,60	**0,02**	5,81	**0,01**	7,27	**0,09**	4,20
Number of Observations	300		300		144		300		300		300		300		300		300	

Legend:

p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - Out-of-Sample Analysis (1 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,91	1,66	0,85	0,80	1,26	1,74	1,29	0,77	1,84	1,07	0,89	0,79	1,67	0,99	1,30	0,91	0,73	0,93	0,63
Downturn	1,35	2,74	1,37	1,10	2,14	2,23	1,54	1,13	4,53	1,83	1,37	1,32	2,57	1,91	2,05	1,58	1,14	1,35	0,78
Slowdown	1,38	2,01	1,18	1,10	1,71	2,38	1,42	1,18	2,22	1,62	1,52	1,14	2,90	1,40	1,60	1,30	1,08	1,28	0,78
Recovery	1,19	1,97	1,12	1,03	1,58	2,22	1,47	1,09	2,09	1,38	1,39	1,21	2,96	1,38	1,41	1,52	1,14	1,33	0,73
CLI A %Change	4,43	9,43	3,21	2,65	4,44	3,52	6,38	3,39	4,04	6,58	3,39	5,00	7,11	3,59	9,57	2,91	3,12	4,00	2,36
Industrial Production % Change	0,71	0,29	0,17	0,34	0,17	0,27	0,35	0,21	0,22	0,26	0,32	0,14	2,68	0,10	0,21	0,16	0,46	0,33	0,42
BCI % Change	2,37	8,51	3,40		3,00	2,88	4,56	4,56	1,64	5,34	4,25	4,85	5,14	4,36	3,93	3,90	2,92	3,42	1,30
CCI % Change	1,93	5,45	3,23	1,91	4,79	3,22	4,54	2,08	5,84	3,63	3,37	3,28	5,74		4,92	6,28	1,50	1,93	1,46
GDP % Change	0,41	1,16	0,55	0,51	0,49	0,74	1,15	0,42	0,44	0,75	0,43	0,33	1,26	0,37	0,70	0,36	0,53	0,52	0,37

Summary of Regressions with GDP R % Change – Out-of-Sample Analysis (1 Month Lag)

Regression Model with GDP R % Change - Out-of-Sample Analysis (1 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,61	0,44	2,55	0,06	2,25	0,00	-0,05	0,94	2,16	0,06	1,68	0,31	0,92	0,31	0,85	0,24	-0,39	0,83	-0,06	0,95
Downturn	3,91	0,00	-5,86	0,03	-2,63	0,05	2,33	0,03	0,31	0,88	-0,22	0,92	0,80	0,60	1,16	0,31	-3,78	0,42	-0,77	0,67
Slowdown	2,39	0,09	-1,20	0,55	-1,86	0,13	0,80	0,47	-3,21	0,06	-0,88	0,73	0,54	0,71	-0,19	0,88	2,99	0,19	1,21	0,47
Recovery	-0,52	0,65	-3,52	0,08	-1,39	0,21	-0,48	0,64	-2,67	0,09	-0,36	0,87	-0,52	0,73	0,01	0,99	1,18	0,59	1,74	0,21
CLI A %Change	14,87	0,00	-4,84	0,61	-3,24	0,32	8,19	0,00	7,65	0,09	11,60	0,00	9,16	0,17	-1,10	0,74	7,41	0,08	1,31	0,84
Industrial Production % Change	1,52	0,04	0,48	0,10	-0,01	0,97	-0,09	0,80	0,13	0,43	-0,24	0,39	0,42	0,23	0,30	0,14	0,02	0,93	0,23	0,38
BCI % Change	2,18	0,36	-8,94	0,29	-2,68	0,43			-5,74	0,05	-3,20	0,26	4,13	0,37	6,62	0,15	0,67	0,69	-1,88	0,73
CCI % Change	1,19	0,53	16,71	0,00	5,10	0,12	1,86	0,33	1,03	0,82	-11,53	0,00	-1,13	0,80	2,29	0,28	-12,38	0,05	2,59	0,48
GDP R % Change	-3,18	0,17	9,75	0,13	-1,77	0,50	0,35	0,88	-6,34	0,03	5,41	0,18	-8,78	0,14	-3,38	0,27	4,57	0,21	0,02	1,00
R2 & Standard Error	**0,08**	6,67	**0,10**	7,62	**0,00**	6,54	**0,08**	5,55	**0,04**	6,09	**0,08**	7,81	**0,00**	7,66	**0,02**	5,97	**0,04**	7,79	**-0,01**	8,73

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,13	0,87	0,91	0,23	-2,43	0,13	0,04	0,96	1,62	0,14	-0,30	0,73	1,37	0,04	1,01	0,24	0,07	0,88
Downturn	0,95	0,49	0,62	0,64	2,97	0,24	3,00	0,12	-0,62	0,76	3,35	0,03	-0,21	0,85	0,18	0,90	1,96	0,01
Slowdown	2,49	0,10	-0,27	0,81	1,97	0,50	-0,13	0,93	-0,93	0,56	2,29	0,09	-0,55	0,63	1,38	0,30	0,87	0,27
Recovery	2,69	0,07	0,64	0,60	-1,22	0,67	1,92	0,17	-3,02	0,03	2,50	0,11	-0,64	0,58	-1,89	0,16	1,16	0,11
CLI A %Change	2,21	0,54	15,50	0,00	8,34	0,23	10,72	0,01	0,67	0,94	14,25	0,00	8,61	0,01	8,96	0,03	9,87	0,00
Industrial Production % Change	-0,24	0,45	-0,09	0,49	-1,87	0,39	0,09	0,40	0,26	0,23	0,04	0,79	-0,25	0,58	0,23	0,49	0,08	0,86
BCI % Change	3,81	0,37	-12,91	0,01	-1,46	0,78	7,95	0,07	5,10	0,20	-0,80	0,84	-5,95	0,05	-1,24	0,72	-5,68	0,00
CCI % Change	14,41	0,00	3,46	0,29	1,11	0,85			4,30	0,38	-8,17	0,19	-1,58	0,29	0,79	0,68	2,05	0,16
GDP R % Change	-3,75	0,23	-4,50	0,08	-0,39	0,93	-1,95	0,49	-2,02	0,66	3,02	0,29	-0,36	0,88	-1,90	0,55	-2,65	0,17
R2 & Standard Error	**0,08**	6,86	**0,02**	6,74	**-0,03**	10,16	**0,06**	8,40	**0,01**	8,33	**0,10**	7,59	**0,01**	5,82	**0,01**	7,27	**0,09**	4,19

Legend:
p < 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - Out-of-Sample Analysis (3 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,78	1,34	0,74	0,65	1,15	1,63	0,91	0,72	1,77	0,93	0,84	0,76	1,61	0,90	1,11	0,89	0,66	0,86	0,50
Downturn	1,34	2,72	1,37	1,10	2,12	2,24	1,53	1,13	4,65	1,82	1,36	1,31	2,51	1,90	2,06	1,58	1,14	1,36	0,78
Slowdown	1,39	2,03	1,22	1,12	1,69	2,57	1,44	1,24	2,26	1,66	1,51	1,15	2,94	1,44	1,59	1,35	1,12	1,33	0,79
Recovery	1,14	2,00	1,12	1,03	1,58	2,25	1,48	1,13	2,17	1,39	1,47	1,21	2,84	1,38	1,35	1,55	1,15	1,35	0,72
CLI A %Change	4,46	9,55	3,29	2,67	4,44	3,49	6,58	3,34	4,12	6,59	3,59	5,31	6,95	3,80	9,43	2,92	3,12	4,00	2,45
Industrial Production % Change	0,72	0,29	0,17	0,34	0,17	0,27	0,35	0,21	0,22	0,27	0,32	0,14	2,17	0,10	0,21	0,16	0,45	0,33	0,43
BCI % Change	2,37	8,43	3,38		2,90	2,86	4,59	4,63	1,68	5,51	4,29	4,81	5,14	4,36	3,96	3,90	2,96	3,45	1,30
CCI % Change	1,92	5,47	3,25	1,92	4,47	3,21	4,55	2,10	6,21	3,66	3,37	3,26	5,74		4,89	6,27	1,50	1,92	1,46
GDP % Change	2,32	6,32	2,60	2,27	2,96	4,01	5,88	3,07	3,65	3,97	3,10	2,54	4,18	2,83	4,60	2,84	2,47	3,19	1,95

Summary of Regressions with GDP % Change – Out-of-Sample Analysis (3 Month Lag)

Regression Model with GDP % Change - Out-of-Sample Analysis (3 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,33	0,34	1,41	0,42	0,94	0,27	0,06	0,94	0,89	0,51	-1,06	0,55	-0,14	0,91	0,75	0,33	0,47	0,81	-0,36	0,73
Downturn	0,68	0,48	-3,14	0,28	-2,00	0,15	1,59	0,16	1,36	0,55	0,71	0,75	1,48	0,33	0,71	0,53	-4,39	0,36	-0,82	0,64
Slowdown	1,11	0,76	-1,33	0,53	-0,53	0,66	1,36	0,23	-0,50	0,78	3,35	0,17	1,00	0,48	0,25	0,84	0,21	0,93	0,14	0,93
Recovery	0,92	0,74	-0,34	0,87	0,66	0,56	-0,76	0,48	0,22	0,89	0,26	0,91	3,09	0,04	-0,29	0,79	-1,67	0,46	2,48	0,07
CLI A %Change	4,33	0,94	7,54	0,45	-4,68	0,12	8,30	0,00	1,37	0,76	-1,73	0,64	-4,38	0,49	2,21	0,52	3,51	0,41	4,48	0,49
Industrial Production % Change	0,85	1,15	-0,29	0,36	-0,07	0,68	0,16	0,64	-0,21	0,21	0,14	0,62	0,32	0,37	0,03	0,87	0,13	0,58	-0,36	0,17
BCI % Change	1,84	0,74	-7,99	0,37	2,52	0,46			0,43	0,89	7,40	0,01	5,24	0,24	1,51	0,74	-2,22	0,20	-9,23	0,07
CCI % Change	-0,84	-0,42	-0,72	0,89	0,85	0,79	-1,16	0,55	-0,21	0,97	1,45	0,66	-3,56	0,43	-1,18	0,57	6,65	0,28	-3,92	0,28
GDP % Change	-0,10	-0,23	0,83	0,50	0,75	0,18	-0,20	0,70	-0,43	0,40	0,82	0,28	0,58	0,60	0,35	0,41	0,43	0,35	1,16	0,11
R2 & Standard Error	**0,00**	6,95	**-0,02**	8,09	**0,00**	6,56	**0,02**	5,71	**-0,03**	6,33	**0,01**	8,12	**0,00**	7,67	**-0,01**	6,07	**-0,01**	8,01	**0,01**	8,64
Number of Observations	300		156		300		276		132		144		300		300		108		300	

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,52	0,56	1,05	0,19	-3,32	0,05	-0,82	0,42	-0,23	0,86	0,15	0,87	2,37	0,00	1,32	0,16	0,40	0,53
Downturn	0,95	0,49	0,18	0,89	2,87	0,28	2,14	0,27	0,23	0,91	0,99	0,54	-1,75	0,12	-0,35	0,80	0,67	0,41
Slowdown	3,80	0,01	0,30	0,79	1,18	0,69	1,77	0,22	0,75	0,64	2,24	0,10	-1,79	0,09	1,71	0,18	0,64	0,43
Recovery	3,83	0,01	-0,32	0,79	1,58	0,58	1,90	0,18	-1,90	0,18	-0,45	0,78	-0,64	0,58	-0,86	0,52	1,28	0,09
CLI A %Change	0,19	0,96	7,15	0,15	3,25	0,66	8,96	0,01	-2,70	0,77	9,22	0,00	4,31	0,16	-4,90	0,22	4,56	0,06
Industrial Production % Change	-0,04	0,91	-0,03	0,83	-1,77	0,51	0,16	0,14	-0,07	0,73	-0,10	0,55	0,58	0,20	-0,02	0,96	-0,19	0,66
BCI % Change	5,83	0,17	-8,58	0,08	1,17	0,82	4,19	0,34	4,20	0,27	-5,56	0,17	-3,01	0,30	7,49	0,03	-3,28	0,01
CCI % Change	5,30	0,12	0,67	0,84	0,32	0,96			0,85	0,86	1,81	0,78	-2,08	0,16	-0,73	0,71	-2,35	0,12
GDP % Change	-0,26	0,55	-0,08	0,81	1,20	0,34	0,39	0,30	1,61	0,02	0,69	0,07	-1,14	0,03	-0,27	0,60	0,13	0,73
R2 & Standard Error	**0,03**	7,06	**-0,01**	6,87	**-0,03**	10,17	**0,03**	8,53	**0,02**	8,29	**0,03**	7,86	**0,02**	5,80	**0,00**	7,29	**0,02**	4,35
Number of Observations	300		300		144		300		300		300		300		300		300	

Legend:

p < 0.1
p < 0.05
p < 0.01

Model with GDP % Change - Out-of-Sample Analysis (3 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,96	1,75	0,85	0,83	1,35	1,79	1,25	0,78	1,96	1,04	0,91	0,80	1,70	1,01	1,31	0,94	0,70	0,94	0,65
Downturn	1,41	2,89	1,37	1,12	2,24	2,27	1,53	1,14	4,75	1,77	1,39	1,31	2,62	1,93	2,00	1,62	1,12	1,36	0,81
Slowdown	1,45	2,12	1,18	1,14	1,81	2,43	1,41	1,20	2,33	1,59	1,54	1,15	2,94	1,42	1,60	1,34	1,06	1,28	0,81
Recovery	1,24	2,08	1,13	1,06	1,62	2,30	1,47	1,11	2,24	1,37	1,43	1,23	2,83	1,41	1,42	1,58	1,14	1,33	0,76
CLI A %Change	4,59	9,87	3,02	2,73	4,57	3,65	6,27	3,44	4,29	6,51	3,40	5,00	7,26	3,62	9,40	3,03	3,08	3,97	2,44
Industrial Production % Change	0,74	0,31	0,17	0,34	0,17	0,28	0,35	0,21	0,23	0,26	0,33	0,14	2,68	0,10	0,21	0,17	0,46	0,33	0,43
BCI % Change	2,48	8,96	3,40		3,09	2,97	4,48	4,59	1,72	5,08	4,26	4,81	5,07	4,42	3,84	4,06	2,92	3,38	1,33
CCI % Change	2,00	5,39	3,24	1,96	5,05	3,32	4,53	2,08	6,14	3,59	3,43	3,31	5,89		4,91	6,55	1,49	1,93	1,51
GDP % Change	0,43	1,22	0,56	0,52	0,50	0,76	1,11	0,43	0,46	0,73	0,44	0,33	1,27	0,38	0,69	0,38	0,51	0,52	0,39

Summary of Regressions with GDP R % Change – Out-of-Sample Analysis (3 Month Lag)

Regression Model with GDP R % Change - Out-of-Sample Analysis (3 Month Lag)

	Australia		Austria		Belgium		Canada		Denmark		Finland		France		Germany		Ireland		Italy	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	0,43	0,60	1,90	1,34	1,57	0,04	-0,04	0,96	0,72	0,56	-1,15	0,49	0,40	0,66	1,10	0,13	1,05	0,57	0,35	0,70
Downturn	0,64	0,65	-3,17	-1,10	-1,95	0,16	1,60	0,15	1,22	0,58	1,08	0,64	1,40	0,36	0,66	0,57	-3,70	0,44	-1,02	0,56
Slowdown	0,50	0,73	-1,21	-0,56	-1,09	0,37	1,23	0,28	-0,61	0,73	4,40	0,10	0,50	0,73	-0,10	0,93	0,37	0,87	0,15	0,93
Recovery	0,66	0,58	-0,22	-0,10	0,39	0,73	-0,79	0,45	0,01	0,99	0,85	0,72	2,72	0,07	-0,60	0,60	-1,51	0,51	2,48	0,07
CLI A %Change	5,33	0,25	6,37	0,63	-3,93	0,21	8,51	0,00	2,29	0,62	-1,55	0,67	-2,76	0,67	1,77	0,60	3,74	0,39	4,51	0,49
Industrial Production % Change	1,10	0,14	-0,29	-0,93	-0,06	0,72	0,20	0,57	-0,19	0,25	0,12	0,66	0,36	0,31	0,09	0,67	0,14	0,56	-0,37	0,16
BCI % Change	2,18	0,38	-7,75	-0,87	3,11	0,36			0,14	0,96	7,20	0,02	5,40	0,23	3,36	0,47	-2,02	0,25	-10,54	0,05
CCI % Change	-0,86	0,67	-0,11	0,02	0,44	0,89	-1,28	0,52	0,41	0,93	1,75	0,60	-4,15	0,36	-1,68	0,43	6,64	0,30	-3,79	0,30
GDP R % Change	-4,10	0,09	4,76	0,72	-0,13	0,96	-1,50	0,52	-4,60	0,13	6,12	0,14	-1,56	0,78	-1,41	0,65	1,40	0,71	4,95	0,20
R2 & Standard Error	**0,01**	6,92	**-0,02**	8,09	**-0,01**	6,59	**0,02**	5,70	**-0,02**	6,29	**0,02**	8,09	**0,00**	7,67	**-0,01**	6,07	**-0,02**	8,04	**0,01**	8,66

	Japan		Netherlands		New Zealand		Norway		Spain		Sweden		Switzerland		UK		US	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Intercept	-0,70	0,41	1,05	0,17	-2,95	0,08	-0,30	0,74	1,24	0,27	0,41	0,66	1,92	0,00	1,11	0,20	0,64	0,22
Downturn	0,88	0,53	0,17	0,90	3,76	0,15	1,93	0,32	0,09	0,97	1,04	0,52	-1,55	0,17	-0,34	0,81	0,62	0,44
Slowdown	3,78	0,01	0,20	0,86	1,25	0,67	1,43	0,33	0,14	0,93	2,43	0,09	-1,75	0,11	1,76	0,19	0,14	0,86
Recovery	3,83	0,01	-0,42	0,74	0,65	0,81	1,72	0,22	-2,78	0,04	-0,38	0,81	-0,53	0,64	-0,72	0,60	1,12	0,14
CLI A %Change	0,14	0,97	8,34	0,12	5,63	0,43	9,40	0,01	1,05	0,91	9,14	0,00	5,07	0,10	-4,67	0,24	5,69	0,03
Industrial Production % Change	-0,04	0,90	-0,03	0,83	0,22	0,92	0,16	0,13	-0,05	0,80	-0,12	0,50	0,43	0,34	-0,06	0,87	0,13	0,77
BCI % Change	5,78	0,18	-8,84	0,07	1,16	0,82	4,27	0,34	3,68	0,35	-5,63	0,17	-3,32	0,26	7,05	0,04	-3,42	0,01
CCI % Change	5,33	0,12	0,57	0,86	-0,45	0,94			-0,41	0,93	1,92	0,77	-2,23	0,14	-0,82	0,67	-2,62	0,08
GDP R % Change	-1,01	0,75	-1,67	0,52	-2,18	0,61	-0,34	0,91	4,00	0,38	3,76	0,20	-3,70	0,12	-0,16	0,96	-2,75	0,17
R2 & Standard Error	**0,03**	7,06	**-0,01**	6,87	**-0,04**	10,20	**0,03**	8,54	**0,00**	8,36	**0,02**	7,88	**0,01**	5,82	**0,00**	7,29	**0,03**	4,33

Legend:
t > 0.1
p < 0.05
p < 0.01

Model with GDP R % Change - Out-of-Sample Analysis (1 Month Lag): Standard Errors

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
Intercept	0,83	1,42	0,74	0,67	1,23	1,66	0,91	0,73	1,86	0,91	0,85	0,77	1,65	0,91	1,12	0,93	0,65	0,87	0,52
Downturn	1,40	2,89	1,37	1,12	2,21	2,28	1,53	1,14	4,81	1,77	1,38	1,31	2,59	1,93	2,03	1,63	1,12	1,37	0,80
Slowdown	1,46	2,16	1,23	1,15	1,79	2,63	1,43	1,26	2,34	1,63	1,54	1,16	2,96	1,47	1,60	1,41	1,10	1,34	0,81
Recovery	1,19	2,12	1,13	1,06	1,62	2,33	1,48	1,15	2,30	1,37	1,51	1,24	2,73	1,42	1,37	1,62	1,15	1,36	0,75
CLI A %Change	4,60	10,10	3,14	2,74	4,55	3,63	6,54	3,40	4,30	6,53	3,60	5,37	7,14	3,84	9,32	3,05	3,10	3,97	2,53
Industrial Production % Change	0,74	0,31	0,17	0,35	0,17	0,28	0,35	0,21	0,23	0,26	0,33	0,14	2,17	0,10	0,21	0,17	0,45	0,33	0,44
BCI % Change	2,47	8,94	3,39		2,99	2,95	4,50	4,69	1,75	5,32	4,30	4,79	5,09	4,43	3,93	4,08	2,96	3,42	1,33
CCI % Change	1,98	5,51	3,27	1,97	4,70	3,32	4,56	2,11	6,41	3,63	3,43	3,31	5,92		4,91	6,57	1,50	1,93	1,50
GDP % Change	2,39	6,63	2,60	2,32	3,02	4,15	5,59	3,11	3,76	3,88	3,19	2,58	4,24	2,89	4,52	2,94	2,39	3,18	2,01

Appendix 13: Example of Portfolio Redistribution Calculations

OECD Country-Weights

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
201401	4,7	4,4	5,3	4,7	6,4	4,4	5,0	5,9	6,7	4,2	6,0	4,8	5,7	6,0	4,0	5,4	5,2	5,1	5,9
201402	4,7	4,3	5,3	4,8	6,7	4,4	5,0	5,9	7,0	4,3	5,6	4,8	5,7	5,9	3,9	5,4	5,2	5,1	5,8
201403	4,8	4,1	5,4	4,9	6,7	4,4	5,0	5,7	7,0	4,4	5,5	4,8	5,9	6,0	3,9	5,5	5,2	5,0	5,9
201404	4,8	4,1	5,5	4,9	6,7	4,3	5,1	5,7	6,9	4,5	5,4	4,8	5,8	6,0	4,0	5,5	5,2	4,9	5,9
201405	4,7	4,0	5,6	4,9	6,8	4,4	5,1	5,7	6,7	4,4	5,3	4,8	5,8	6,3	4,0	5,5	5,2	5,0	5,9
201406	4,6	4,0	5,6	4,9	6,8	4,4	5,0	5,7	6,5	4,4	5,5	4,8	5,6	6,5	4,1	5,5	5,2	4,9	5,9
201407	4,7	3,9	5,5	5,0	6,9	4,4	4,9	5,6	6,4	4,3	5,7	4,8	5,6	6,5	4,0	5,5	5,2	4,9	6,0
201408	4,9	3,8	5,5	5,2	6,9	4,4	4,9	5,4	6,4	4,1	5,8	4,8	5,7	6,4	4,0	5,5	5,2	5,0	6,1
201409	4,7	3,7	5,6	5,0	7,0	4,4	4,9	5,5	6,6	4,2	5,9	4,9	5,7	6,4	4,1	5,4	5,3	4,9	6,0
201410	4,8	3,7	5,6	5,0	7,0	4,4	4,8	5,4	6,6	4,1	5,9	4,9	5,9	6,2	4,0	5,5	5,3	4,9	6,0
201411	4,7	3,6	5,6	4,9	6,9	4,5	4,8	5,5	6,7	4,0	6,2	4,9	5,9	6,1	3,9	5,6	5,4	4,9	6,0
201412	4,6	3,6	5,5	4,7	6,9	4,5	4,8	5,7	7,0	3,9	6,3	4,9	6,0	5,8	3,9	5,7	5,4	4,8	6,0

Example of Calculation of changes in Portfolio Weights:

201401: Countries with a negative predicted return are: Australia, Austria, and Japan.
The total weights of these 3 countries are:
4,7 + 4,4 + 6 = 15,1% of global portfolio investments

Sum of positive predicted returns: 1,2 (BE) + 0,2 (CAN) + 0,4 (DEN) + … + 2,9 (US) = 23,3

Redistribution of 15,1% in weights: Using indiv. predicted returns proportional to the sum of positive predicted returns:
e.g.: USA: (2,9/23,3) = 12,4%
--> 15,1% x 12,4% = **+ 1,9%**

Predicted Returns - All-variables Prediction

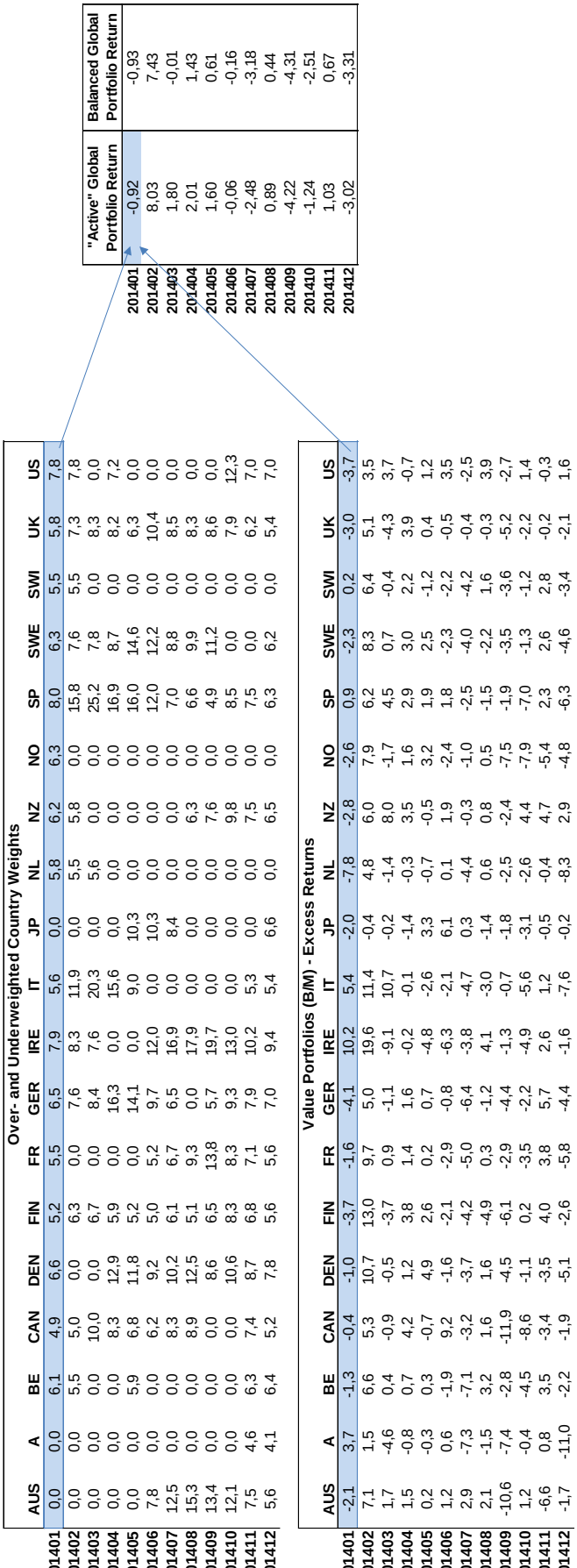
	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US	Total
201401	-2,0	-0,1	1,2	0,2	0,4	1,2	0,8	1,0	1,9	2,2	-2,3	1,5	0,7	0,5	6,1	1,4	0,4	1,0	2,9	19,0
201402	-2,5	-0,6	0,1	0,1	-0,4	0,8	-0,3	0,7	0,6	3,1	-4,0	0,3	0,0	-0,7	4,9	0,9	0,1	0,9	0,8	4,9
201403	-2,2	-0,9	-1,0	1,3	-1,1	0,6	-0,4	0,7	0,2	4,1	-2,8	0,2	-0,4	-1,7	5,4	0,6	-0,3	0,9	-0,5	2,6
201404	-1,7	-1,8	-0,8	1,0	1,8	0,5	-1,0	3,1	-2,7	3,2	-1,5	0,0	-0,2	-2,3	3,7	1,0	-1,3	0,9	0,4	2,2
201405	-1,0	-1,0	0,1	0,6	1,5	0,2	-0,1	2,4	-1,4	1,3	1,4	-0,2	-0,4	-1,0	3,4	2,6	-1,3	0,4	-0,5	6,9
201406	1,1	-1,1	-0,1	0,4	0,8	0,2	0,1	1,3	1,8	-1,3	1,6	-0,5	-0,3	-2,0	2,6	2,2	-1,2	1,8	-0,7	6,9
201407	2,6	-1,8	-0,8	1,1	1,1	0,6	0,6	0,3	3,6	-2,1	0,9	-1,1	-0,2	-2,8	1,0	1,1	-0,6	1,2	-0,7	4,1
201408	3,0	-2,8	-0,7	1,1	1,6	0,2	1,3	-0,8	3,3	-2,6	-0,2	-1,4	0,2	-6,6	0,8	1,3	-0,9	1,0	-0,1	-2,6
201409	2,2	-2,1	-0,8	-0,7	0,4	0,5	2,2	0,0	3,3	-1,1	-0,5	-1,8	0,5	-6,4	0,2	1,5	-1,4	0,9	-0,5	-3,6
201410	2,2	-0,1	0,0	-0,9	1,1	1,1	1,0	1,2	1,9	-0,3	-0,9	-2,1	1,2	-5,8	1,3	0,0	-3,3	0,9	1,9	0,3
201411	2,3	0,8	0,6	2,1	1,5	1,9	1,9	2,0	3,0	1,1	-0,7	-1,6	1,3	-5,3	3,0	-0,3	-4,0	1,1	0,8	11,5
201412	2,2	1,2	1,9	1,1	2,0	2,3	1,8	2,8	5,4	3,2	0,7	-0,4	1,1	-5,0	5,2	1,0	-4,3	1,4	2,3	25,9

Weights of negative countries	Total of positive predict. Returns
15,1	23,3
32,3	13,3
54,5	13,9
53,5	15,6
48,5	13,9
42,0	14,0
41,9	14,1
47,2	13,6
46,9	11,7
46,1	13,8
28,2	23,3
16,1	35,5

Changes in Country Portfolio-Weights

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
201401	-4,7	-4,4	0,8	0,1	0,2	0,7	0,5	0,6	1,2	1,4	-6,0	1,0	0,4	0,3	4,0	0,9	0,3	0,6	**1,9**
201402	-4,7	-4,3	0,2	0,2	-6,7	1,9	-5,0	1,7	1,4	7,6	-5,6	0,7	0,1	-5,9	11,8	2,2	0,3	2,3	1,9
201403	-4,8	-4,1	-5,4	5,1	-6,7	2,4	-5,0	2,7	0,7	15,9	-5,5	0,8	-5,9	-6,0	21,3	2,3	-5,2	3,3	-5,9
201404	-4,8	-4,1	-5,5	3,4	6,2	1,6	-5,1	10,6	-6,9	11,0	-5,4	-4,8	-5,8	-6,0	12,9	3,3	-5,2	3,3	1,2
201405	-4,7	-4,0	0,3	1,9	5,0	0,8	-5,1	8,4	-6,7	4,6	5,0	-4,8	-5,8	-6,3	12,0	9,1	-5,2	1,3	-5,9
201406	3,2	-4,0	-5,6	1,3	2,4	0,6	0,2	4,0	5,5	-4,4	4,7	-4,8	-5,6	-6,5	7,9	6,7	-5,2	5,5	-5,9
201407	7,8	-3,9	-5,5	3,3	3,3	1,7	1,8	0,9	10,5	-4,3	2,7	-4,8	-5,6	-6,5	3,0	3,3	-5,2	3,6	-6,0
201408	10,4	-3,8	-5,5	3,7	5,5	0,7	4,4	-5,4	11,5	-4,1	-5,8	-4,8	0,6	-6,4	2,6	4,4	-5,2	3,4	-6,1
201409	8,7	-3,7	-5,6	-5,0	1,7	2,1	8,9	0,2	13,1	-4,2	-5,9	-4,9	1,9	-6,4	0,8	5,8	-5,3	3,7	-6,0
201410	7,3	-3,7	-5,6	-5,0	3,6	3,8	3,4	3,9	6,4	-4,1	-5,9	-4,9	3,8	-6,2	4,5	-5,5	-5,3	3,1	6,3
201411	2,8	1,0	0,8	2,5	1,8	2,4	2,3	2,5	3,6	1,3	-6,2	-4,9	1,5	-6,1	3,6	-5,6	-5,4	1,3	1,0
201412	1,0	0,5	0,9	0,5	0,9	1,1	0,8	1,3	2,4	1,4	0,3	-4,9	0,5	-5,8	2,3	0,4	-5,4	0,6	1,0

Appendix 14: Excerpt of Return Calculation of Global Active Value Portfolio



	"Active" Global Portfolio Return	Balanced Global Portfolio Return
201401	-0,92	-0,93
201402	8,03	7,43
201403	1,80	-0,01
201404	2,01	1,43
201405	1,60	0,61
201406	-0,06	-0,16
201407	-2,48	-3,18
201408	0,89	0,44
201409	-4,22	-4,31
201410	-1,24	-2,51
201411	1,03	0,67
201412	-3,02	-3,31

Over- and Underweighted Country Weights

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
201401	0,0	0,0	6,1	4,9	6,6	5,2	5,5	6,5	7,9	5,6	0,0	5,8	6,2	6,3	8,0	6,3	5,5	5,8	7,8
201402	0,0	0,0	5,5	5,0	0,0	6,3	0,0	7,6	8,3	11,9	0,0	5,5	5,8	0,0	15,8	7,6	5,5	7,3	7,8
201403	0,0	0,0	0,0	10,0	0,0	6,7	0,0	8,4	7,6	20,3	0,0	5,6	0,0	0,0	25,2	7,8	0,0	8,3	0,0
201404	0,0	0,0	0,0	8,3	12,9	5,9	0,0	16,3	0,0	15,6	0,0	0,0	0,0	0,0	16,9	8,7	0,0	8,2	7,2
201405	0,0	0,0	5,9	6,8	11,8	5,2	0,0	14,1	0,0	9,0	10,3	0,0	0,0	0,0	16,0	14,6	0,0	6,3	0,0
201406	7,8	0,0	0,0	6,2	9,2	5,0	5,2	9,7	12,0	0,0	10,3	0,0	0,0	0,0	12,0	12,2	0,0	10,4	0,0
201407	12,5	0,0	0,0	8,3	10,2	6,1	6,7	6,5	16,9	0,0	8,4	0,0	0,0	0,0	7,0	8,8	0,0	8,5	0,0
201408	15,3	0,0	0,0	8,9	12,5	5,1	9,3	0,0	17,9	0,0	0,0	0,0	6,3	0,0	6,6	9,9	0,0	8,3	0,0
201409	13,4	0,0	0,0	0,0	8,6	6,5	13,8	5,7	19,7	0,0	0,0	0,0	7,6	0,0	4,9	11,2	0,0	8,6	0,0
201410	12,1	0,0	0,0	0,0	10,6	8,3	8,3	9,3	13,0	0,0	0,0	0,0	9,8	0,0	8,5	0,0	0,0	7,9	12,3
201411	7,5	4,6	6,3	7,4	8,7	6,8	7,1	7,9	10,2	5,3	0,0	0,0	7,5	0,0	7,5	0,0	0,0	6,2	7,0
201412	5,6	4,1	6,4	5,2	7,8	5,6	5,6	7,0	9,4	5,4	6,6	0,0	6,5	0,0	6,3	6,2	0,0	5,4	7,0

Value Portfolios (B/M) - Excess Returns

	AUS	A	BE	CAN	DEN	FIN	FR	GER	IRE	IT	JP	NL	NZ	NO	SP	SWE	SWI	UK	US
201401	-2,1	3,7	-1,3	-0,4	-1,0	-3,7	-1,6	-4,1	10,2	5,4	-2,0	-7,8	-2,8	-2,6	0,9	-2,3	0,2	-3,0	-3,7
201402	7,1	1,5	6,6	5,3	10,7	13,0	9,7	5,0	19,6	11,4	-0,4	4,8	6,0	7,9	6,2	8,3	6,4	5,1	3,5
201403	1,7	-4,6	0,4	-0,9	-0,5	-3,7	0,9	-1,1	-9,1	10,7	-0,2	-1,4	8,0	-1,7	4,5	0,7	-0,4	-4,3	3,7
201404	1,5	-0,8	0,7	4,2	1,2	3,8	1,4	1,6	-0,2	-0,1	-1,4	-0,3	3,5	1,6	2,9	3,0	2,2	3,9	-0,7
201405	0,2	-0,3	0,3	-0,7	4,9	2,6	0,2	0,7	-4,8	-2,6	3,3	-0,7	-0,5	3,2	1,9	2,5	-1,2	0,4	1,2
201406	1,2	0,6	-1,9	9,2	-1,6	-2,1	-2,9	-0,8	-6,3	-2,1	6,1	0,1	1,9	-2,4	1,8	-2,3	-2,2	-0,5	3,5
201407	2,9	-7,3	-7,1	-3,2	-3,7	-4,2	-5,0	-6,4	-3,8	-4,7	0,3	-4,4	-0,3	-1,0	-2,5	-4,0	-4,2	-0,4	-2,5
201408	2,1	-1,5	3,2	1,6	1,6	-4,9	0,3	-1,2	4,1	-3,0	-1,4	0,6	0,8	0,5	-1,5	-2,2	1,6	-0,3	3,9
201409	-10,6	-7,4	-2,8	-11,9	-4,5	-6,1	-2,9	-4,4	-1,3	-0,7	-1,8	-2,5	-2,4	-7,5	-1,9	-3,5	-3,6	-5,2	-2,7
201410	1,2	-0,4	-4,5	-8,6	-1,1	0,2	-3,5	-2,2	-4,9	-5,6	-3,1	-2,6	4,4	-7,9	-7,0	-1,3	-1,2	-2,2	1,4
201411	-6,6	0,8	3,5	-3,4	-3,5	4,0	3,8	5,7	2,6	1,2	-0,5	-0,4	4,7	-5,4	2,3	2,6	2,8	-0,2	-0,3
201412	-1,7	-11,0	-2,2	-1,9	-5,1	-2,6	-5,8	-4,4	-1,6	-7,6	-0,2	-8,3	2,9	-4,8	-6,3	-4,6	-3,4	-2,1	1,6

Eigenständigkeitserklärung

„Hiermit bestätige ich, dass ich die vorliegende Arbeit selbständig verfasst und keine anderen als die angegebenen Hilfsmittel benutzt habe. Die Stellen der Arbeit, die dem Wortlaut oder dem Sinn nach anderen Werken (dazu zählen auch Internetquellen) entnommen sind, wurden unter Angabe der Quelle kenntlich gemacht."

Ebikon, 28.12.2015 Remo Kyburz