STUDY OF THE RELATIONSHIP BETWEEN CONSUMER SENTIMENT AND STOCK MARKET RETURNS

Bachelor thesis
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ABSTRACT

This bachelor thesis written by me, Joost de Rijk for the study program “bedrijfseconomie”\footnote{Business Economics} at Tilburg University studies the relationship between consumer sentiment and stock returns. The first half of this thesis studies previous research done on the topic trying to find evidence for the characteristics of this link. The second half is a quantitative analysis of consumer sentiment indexes by both Statistics Netherlands and the European Commission and stock market returns from the Amsterdam Exchange Index, the Amsterdam Mid-kap Index and the Amsterdam Small Cap Index. Results show that the relationship between consumer confidence and stock market is positive and clearly present for both measures of consumer confidence and all three stock markets. Almost all evidence indicates that causality runs from stock returns to consumer sentiment.
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1 INTRODUCTION

Consumer sentiment is the feel that consumers have about the state of their current financial situation and the economy as a whole. Consumer sentiment is measured by consumer confidence indices (CCI), which are indicators designed to measure consumer confidence as a degree of optimism or pessimism. Research done on the relationship between consumer sentiment and stock returns includes Maria Otoo (1999) who found that the two share a strong contemporaneous relationship and also sought to examine whether the increase in stock prices raise aggregate sentiment because people are wealthier or because they use movements in stock prices as an indicator of future economic activity and potential labor income growth. She found results more consistent with the latter although her findings do not rule out the former. Similar research done by Jansen and Nahuis (2003) studied the (short-run) relationship between stock market developments and consumer confidence in eleven European countries for the years 1986 through 2001 and found that stock returns and changes in sentiment were positively related for nine countries. They also found that the stock market-confidence relationship is driven by expectations about economy-wide conditions rather than personal finances, which coincides with Otoo’s findings. Schmeling (2009) examined whether consumer confidence – as a proxy for individual investor sentiment – affects stock returns internationally in 18 industrialized countries from 1985 to 2005 and found that sentiment negatively forecasts aggregate stock returns on average across countries. Finally, Chen (2011) investigated the link between the lack of consumer confidence and stock returns during market fluctuations. The evidence found suggests that market pessimism has larger impacts on stock returns during bear markets and that the lack of consumer confidence leads to a higher probability of switching to a bear market regime. This thesis will contribute to previous research by investigating the link between consumer confidence and stock returns in the Netherlands during the last seventeen years.

This paper will consist of two parts. The first part is a literature review with the goal of studying the economic interpretation of the link between consumer sentiment and stock market returns. The second part of this paper will be a quantitative study to find out whether there was a correlation between consumer sentiment in the Netherlands and returns of the Dutch stock markets for the years 1995 through 2011.
In this chapter, previous research conducted on the relationship between consumer sentiment and stock returns will be studied. The goal is to find out whether previous researchers found a link between consumer confidence and stock returns, whether this link was positive or negative, and whether there is causality.

Several papers have actually studied the link between consumer sentiment and stock market returns. Otoo (1999), Fisher & Statman (2003), Jansen & Nahuis (2003), Lemmon & Portniaguina (2006), Chen (2011), Akhtar et al. (2011), Fair (1971), Gulley & Sultan (1998), Kalotay et al. (2007), Schmeling (2009) and Throup (1992) have all studied consumer sentiment and its relationship with stock returns and have all concluded that there is in fact a link between consumer sentiment and stock market returns. To my knowledge, there is no research that denies the existence of this link.

From previous research the conclusion can be drawn that there is a link between consumer sentiment and stock returns. The research varies somewhat however, on whether this link is positive or negative.

Otoo (1999) is one of the most cited papers on the link between consumer sentiment and stock market returns. Otoo’s paper examined the relationship between movements in consumer sentiment and stock prices by using the University of Michigan’s Consumer Sentiment Index data and the Wilshire 5000 total market index. Otoo found that an increase in equity values boosts sentiment. She states that the relationship between the two seems to be fairly robust, even though only 10 per cent of the variation in consumer sentiment is explained by stock prices. Otoo also examined whether consumer sentiment and stock prices were reacting to each other directly or through other common factors. For example, movements in interest rates may cause movements in both sentiment and stock returns. Causality tests suggested that movements in stock price cause movements in consumer sentiment but changes in sentiment had no explanatory power for stock returns. Otoo also conducted a VAR analysis to examine what effect shocks in either consumer sentiment or stock returns

---

2 The Wilshire 5000 Total Market Index is a market-capitalization-weighted index of the market value of all stocks actively traded in the United States.
had on the other variable and once again found that shocks in stock returns had effect on consumer sentiment but shocks in sentiment had no effect on stock returns.

Fisher and Statman (2003) found that consumer confidence increases with S&P500 Index returns. They found a positive and statistically significant link between S&P 500 Index returns and changes in consumer confidence. They also found the relationship between S&P 500 Index returns and changes in the expectations component of consumer confidence to be especially strong. The relationship between S&P 500 Index and the present conditions component of consumer confidence was found to be positive as well but not always statistically significant. These results are similar to the results found by Otoo. Fisher and Statman also examined whether low consumer confidence predicts high stock returns. They found that consumer confidence predicts some returns. In particular, Nasdaq and small cap stock returns. They found a statistically significant negative relationship between the levels of the expectations component of the Conference Board consumer confidence in one month and small cap stock returns in the next month. They also found a negative relationship between consumer confidence and S&P500 returns however this relationship was not statistically significant. In summary, consumer confidence rises when stock returns go up. Consumer confidence declines when stock returns go down, but low consumer confidence does not lead to decreasing stock returns. Low consumer confidence more often leads to higher stock returns than to lower stock returns.

Jansen and Nahuis (2003) studied the relationship between stock market developments and consumer confidence in Europe. They used data for eleven EU countries over the years 1986-2001. Consumer confidence data was obtained from the Consumer Confidence Index published by the European Commission. They found that in general, rising stock prices go hand in hand with rises in consumer confidence. Germany is the only country for which this positive link was not statistically significant. Statistically significant correlations between stock market returns and consumer sentiment lie between 0.13 and 0.29. Like Otoo did in her 1999 paper, Jansen and Nahuis also investigated whether stock returns and consumer confidence directly relate to each other or if there is a third factor that influences both these variables. They used Granger causality tests to gain more insight on the relationship and found that for the majority of countries there was no statistically significant Granger causality running from stock returns to next month’s consumer sentiment.
However, when the gap between stock market returns and consumer sentiment was reduced to two weeks, Jansen and Nahuis did find statistically significant granger causality for seven of the eleven countries. For nine out of the eleven countries investigated no statistically significant granger causality was found from consumer confidence to stock returns. This was probably because stock returns react much quicker than the two or four weeks used in the Granger causality tests.

Chen (2011) used markov-switching models to examine what effect a negative shock to consumer confidence has on stock returns. Markov-switching models are asset return models that are able to identify stock market fluctuations and the effect that pessimism has on stock market returns. Chen found strong and robust evidence that suggests that a lack of consumer confidence has asymmetric effects on stock returns. This effect is greater in bear markets than it is in bull markets. Chen also found that the more pessimistic consumers are, the more likely markets are to switch from a bull to a bear regime. Furthermore, Chen found that greater pessimism also causes the markets to stay in bear territory longer.

Akhtar et al. (2011) examined the market’s reaction to the monthly release of consumer sentiment news. Their results show that the used Westpac-Melbourne Institute of Applied Economic and Social Research Consumer Sentiment Index, which is similar to the University of Michigan’s Consumer Confidence Index and is regarded as Australia’s main CCI has valuable information content. They also found that when consumer sentiment data is released that is lower than last months consumer sentiment data the Australian All Ordinaries Index suffers a significant negative announcement day effect. The market does recover pretty quickly from this shock. Higher than last month consumer sentiment data releases had no significant market impact.

Schmeling (2009) examined whether consumer confidence affects expected stock returns in 18 industrialized countries. He found that sentiment is a significant negative predictor of expected returns on average across countries. He found that this predictive power was strongest when looking at one to six month horizons and disappears when looking at longer horizons up to 24 months. When looking at countries individually, sentiment sometimes does not contain any predictive power at all. Further investigation into why this might be Schmeling found that the impact that
consumer sentiment has on stock returns is higher in countries that are more culturally
prone to herd-like behavior and for countries whose regulatory institutions is less
efficient or countries that have less market integrity.

To summarize, Otoo found a positive relationship between consumer sentiment and
stock returns when using the Wilshire 5000 total market index for stock returns.
Fisher and Statman’s research had similar results when using the S&P500 returns.
However, they also found a significant negative relationship between the expectations
component of consumer sentiment and small cap stock returns. Jansen and Nahuis
also found a positive relationship between consumer sentiment and stock returns for
seventeen out of eighteen investigated European countries. Chen found that a lack of
confidence causes the market returns to go from bullish to bearish but also stay
bearish for a longer period of time. This somewhat contradicts Fisher and Statman
who found that when the expectation component of consumer sentiment goes down
stock returns go up more often than they go down. However this contradiction can
easily come from the fact that they used different periods and variables, and most
importantly Chen used total consumer sentiment and not just the expectations
component. Akhtar et al. found that when lower than last month consumer sentiment
data are released stock returns will suffer a loss. This to some extent indicates a
positive relationship between consumer sentiment and stock returns. Lastly,
Schmeling found that consumer sentiment negatively forecasts stock returns. This
contradicts most other research. Direction of causality is still not completely clear.
While most research found that consumer sentiment is influenced by stock returns,
some researchers found causality may somehow go both ways and consumer
sentiment could even have some predictive power for stock market returns. Several
researchers also investigated whether the link found between consumer sentiment and
stock returns could be explained by a third common factor, such as GDP or interest
rates but found no such evidence, indicating that changes in consumer sentiment and
stock returns are actually directly linked.
3  EMPIRICAL ANALYSIS

A lot has happened to the Dutch economy from 1995 to 2011. Some of the largest sudden declines in the Amsterdam Exchange Index have happened during this period. In this section I will use Dutch consumer sentiment data and AEX, AMX and AScX return data to investigate the relationship between sentiment and stock returns in the Netherlands during this, as figure 1 shows, highly volatile period.

FIGURE 1: AEX RETURNS FROM 1995-2011

3.1 DEFINITIONS

Before any quantitative research on the link between consumer sentiment and stock market returns can be done the meaning of the consumer confidence variables must first be defined more clearly.

Consumer sentiment or confidence is an economic indicator which measures the degree of optimism or pessimism that consumers have on the state of the economy overall but also on their personal financial situation. Consumer sentiment is measured because it is thought to forecast consumer expenditure. Meaning, if the economy expands consumers will be more optimistic about the state of the economy and their personal financial situation and so they are likely to make more purchases. On the other hand, if the economy contracts consumers will be more pessimistic and are probable to save more and spend less. A Consumer Confidence Index (CCI), as
previously mentioned, measures consumer sentiment. Many countries measure consumer confidence through a CCI. The most notable CCI’s in the United States are the Conference Board’s Consumer Confidence Index and the University of Michigan’s Consumer Sentiment Index. In the Netherlands, both Statistics Netherlands\(^3\) and the European Commission measure consumer sentiment. These consumer indices measure consumer sentiment monthly by interviewing adults and asking them a series of questions concerning their feel on the current state of the economy, the state of the economy in the near future, and their personal financial situation. The quantitative research in this paper will use Dutch consumer sentiment data; appendix 1 goes further into the methods Statistics Netherlands and the European Commission use to measure consumer sentiment.

Large-cap market returns, mid-cap market returns and small-cap market returns are represented by the AEX, AMX and AScX indexes’ returns respectively.

### 3.2 Data

Data was gathered from several sources. Appendix 2 describes exactly where data was found and how all variables were calculated. Table 1 shows the descriptive statistics for all variables in the dataset.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(^{(SN)}CC)</td>
<td>203</td>
<td>-0.06511818</td>
<td>0.04830468</td>
<td>-0.000923306</td>
<td>0.018369291</td>
</tr>
<tr>
<td>(^{(SN)}EC)</td>
<td>203</td>
<td>-0.15336645</td>
<td>0.16694789</td>
<td>-0.002055147</td>
<td>0.042740863</td>
</tr>
<tr>
<td>(^{(SN)}CWB)</td>
<td>203</td>
<td>-0.034239803</td>
<td>0.023245387</td>
<td>-0.000282526</td>
<td>0.010684462</td>
</tr>
<tr>
<td>(^{(EC)}CC)</td>
<td>203</td>
<td>-0.04439663</td>
<td>0.041936915</td>
<td>-0.000653774</td>
<td>0.015414222</td>
</tr>
<tr>
<td>(^{(EC)}FSH)</td>
<td>203</td>
<td>-0.03259902</td>
<td>0.027409377</td>
<td>-0.0003549</td>
<td>0.0100768</td>
</tr>
<tr>
<td>(^{(EC)}GES)</td>
<td>203</td>
<td>-0.09525915</td>
<td>0.1341097</td>
<td>-0.001442991</td>
<td>0.031492139</td>
</tr>
<tr>
<td>(^{(EC)}UE)</td>
<td>203</td>
<td>-0.17294255</td>
<td>0.17497626</td>
<td>-0.001344834</td>
<td>0.05176071</td>
</tr>
<tr>
<td>(^{(EC)}S)</td>
<td>203</td>
<td>-0.03327637</td>
<td>0.024990588</td>
<td>-0.00011856</td>
<td>0.010984127</td>
</tr>
<tr>
<td>AEX</td>
<td>203</td>
<td>-0.3482387</td>
<td>0.0632719</td>
<td>-0.000571275</td>
<td>0.03655502</td>
</tr>
<tr>
<td>AMX</td>
<td>155</td>
<td>-0.11931726</td>
<td>0.071055783</td>
<td>-0.00081967</td>
<td>0.029449999</td>
</tr>
<tr>
<td>AScX</td>
<td>82</td>
<td>-0.08807153</td>
<td>0.053046608</td>
<td>0.00084765</td>
<td>0.026350777</td>
</tr>
</tbody>
</table>

Interesting numbers to look at are the differences between similar variables like the two complete measures of consumer sentiment \(^{(SN)}CC\) and \(^{(SN)}EC\) and the three

---

\(^3\) Known as ‘Centraal Bureau voor de Statistiek’ in the Netherlands
stock market’s returns $^\text{AEX}$, $^\text{AMX}$ and $^\text{AScX}$. The descriptive statistics of the stock market variables differs quite a bit. This can easily be explained however by the measured period. The AEX data spans from 1995 to 2011 while AMX data spans from 1999 to 2011 and AScX data only spans from 2005 to 2011. Interestingly, the smaller cap stock markets have a lower standard deviation than the AEX has. Usually smaller cap stock is seen as being more risky. This probably also has to do with the span of the data. More interesting is to look at the difference in descriptive statistics between the variables for Statistics Netherlands and European Commission consumer sentiment. These are calculated for the same period and should measure the same construct. However, Statistics Netherlands consumer sentiment shows a lower minimum and a higher maximum. It makes sense then that the standard deviation is also higher for Statistics Netherlands consumer sentiment. The average change in sentiment is also substantially lower for the Statistics Netherlands index than it is for the European Commission index. The differences between these indexes could be caused the difference in focus on the past or the present in questions used in the surveys. The Statistics Netherlands index uses questions on both the last and next 12 months while the European Commission’s index focuses only on the next 12 months. This is described in further detail in appendix 1. Still, as the Statistics Netherlands consumer sentiment index and the European Commission’s consumer sentiment index both measure the same thing, consumer confidence in the Netherlands, the variables $(\text{SN})\text{CC}$ and $(\text{EC})\text{CC}$ should be very closely related.

**FIGURE 2: STATISTICS NETHERLANDS AND EUROPEAN COMMISSION CONSUMER SENTIMENT**

```
0,05

0,03

0,01

-0,01 1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201

-0,03

-0,05

-0,07  -  $(\text{SN})\text{CC}$  -  $(\text{EC})\text{CC}$
```
Figure 2 shows changes in both consumer confidence indexes for all 203 months. Figure 3 shows a closer look for just the randomly chosen years 2010 and 2011. Both measures of consumer sentiment do seem to rise and fall at the same time. A correlation test confirms this. The two consumer confidence indexes have a correlation of 0.765 significant at the 0.01 level. The Cronbach’s alpha of the two variables is 0.859 showing the two variables do in fact measure the same construct.

3.3 CORRELATIONS

Table 2 shows the correlations between the two measures of consumer confidence and the returns of the three stock markets.

<table>
<thead>
<tr>
<th></th>
<th>^AEX</th>
<th>^AMX</th>
<th>^AScX</th>
</tr>
</thead>
<tbody>
<tr>
<td>^(SN)CC</td>
<td>0.163*</td>
<td>0.272**</td>
<td>0.255*</td>
</tr>
<tr>
<td>^(EC)CC</td>
<td>0.139*</td>
<td>0.327**</td>
<td>0.344**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

Rises in consumer sentiment seem to go hand in hand with rises in returns for all three stock markets and all correlations are statistically significant at the 0.05 level at least.
However, because most research suggests causality runs from stock returns to consumer sentiment, I suspect that these correlations might be higher when consumer sentiment is lagged one month so that stock return data precedes consumer sentiment data. Table 3 shows the correlations between the same variables when this lag is introduced.

**TABLE 3: CORRELATIONS BETWEEN LAGGED CONSUMER SENTIMENT AND STOCK MARKET RETURNS**

<table>
<thead>
<tr>
<th></th>
<th>^AEX</th>
<th>^AMX</th>
<th>^AScX</th>
</tr>
</thead>
<tbody>
<tr>
<td>^SNCC</td>
<td>0.301**</td>
<td>0.365**</td>
<td>0.403**</td>
</tr>
<tr>
<td>^ECCC</td>
<td>0.301**</td>
<td>0.416**</td>
<td>0.436**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

The now introduced lag greatly improved the results, with some correlations now being twice as high as before and all correlations being significant at the 0.01 level. Correlations are higher for smaller-cap stock markets than they are for larger-cap stock markets. Which is surprising because you would expect consumer to pay more attention to the returns of the major stock market. This does however coincide with Fisher and Statman’s research, which also suggested the relationship to be stronger for small-cap stock returns. The height of correlation between consumer sentiment and AEX stock returns is exactly the same for both Statistics Netherlands and the European Commission Indexes. Both the AMX and AScX have higher correlations with the European Commissions consumer confidence index. I am unsure of the reasons for this. Next we’ll look at the correlations between sub-indexes of Statistics Netherlands and European Commission consumer confidence.

**TABLE 4: CORRELATIONS BETWEEN LAGGED STATISTICS NETHERLANDS SUB-INDEXES AND STOCK MARKET RETURNS**

<table>
<thead>
<tr>
<th></th>
<th>^AEX</th>
<th>^AMX</th>
<th>^AScX</th>
</tr>
</thead>
<tbody>
<tr>
<td>^SNEC</td>
<td>0.315**</td>
<td>0.418**</td>
<td>0.395**</td>
</tr>
<tr>
<td>^SNCWB</td>
<td>0.163*</td>
<td>0.134</td>
<td>0.292**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
Table 4 shows correlations between the still lagged Statistics Netherlands sub-indexes economical climate and consumer willingness to buy and stock market returns. Correlations between the economical climate sub-index and stock returns seem similar to the correlation between total Statistics Netherlands consumer sentiment index and stock returns. The sub-index for consumer willingness to buy however has much lower correlation to stock returns and is only statistically significant for AEX and AScX returns, correlations between consumer willingness to buy and AMX returns are non-significant. Meaning consumers do not generally intend to buy more or less when stock markets move in a certain direction.

**Table 5: Correlations between lagged European Commission sub-indexes and stock market returns**

<table>
<thead>
<tr>
<th></th>
<th>AEX</th>
<th>AMX</th>
<th>AScX</th>
</tr>
</thead>
<tbody>
<tr>
<td>(EC)FSH</td>
<td>0.156*</td>
<td>0.199*</td>
<td>0.304**</td>
</tr>
<tr>
<td>(EC)GES</td>
<td>0.265**</td>
<td>0.337**</td>
<td>0.303**</td>
</tr>
<tr>
<td>(EC)UE</td>
<td>0.299**</td>
<td>0.475**</td>
<td>0.454**</td>
</tr>
<tr>
<td>(EC)S</td>
<td>0.010</td>
<td>-0.051</td>
<td>0.006</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level  
** Correlation is significant at the 0.01 level

Table 5 shows correlations between lagged European Commission sub-indexes and stock returns. The sub-indexes for household financial situation, general economic situation and unemployment expectations are significantly correlated to all three stock returns at the 0.05 level at least. Unsurprisingly, the correlation between stock returns and the sub-index for general economic situation is quite large. But the correlation between unemployment expectations and stock returns is especially large. A probable explanation for this would be that consumers expect that low stock returns will cause a loss of jobs and high stock returns will cause an increase in jobs. The sub-index for savings expectations is not significantly correlated to any of the three stock indexes. Meaning consumers generally do not intend to save more or less when stock markets go either up or down.
3.4 REGRESSIONS

At this point it is established that consumer sentiment and stock returns are positively correlated and that most evidence suggests that causality runs from stock returns to consumer sentiment. Therefore now regression models can be created using the same one-month lag for consumer sentiment data as in the correlations section. All regressions have consumer confidence as the dependent variable and stock returns as the independent variable.

**TABLE 6: REGRESSION MODELS**

<table>
<thead>
<tr>
<th></th>
<th>Independent variable</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>^AEX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent variable</td>
<td>Coeff.</td>
<td>Sig.</td>
<td>R²</td>
<td>Coeff.</td>
</tr>
<tr>
<td>^ (SN) CC</td>
<td>.150</td>
<td>,000**</td>
<td>.091</td>
<td>.245</td>
</tr>
<tr>
<td></td>
<td>^ (EC) CC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.127</td>
<td>,000**</td>
<td>.091</td>
<td>.233</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0,05 level
** Correlation is significant at the 0,01 level

Table 6 shows the coefficients, statistical significance and coefficient of determination (R²) for six regression models explaining consumer sentiment with stock returns. The regressions show a positive link between both consumer confidence indexes and all three stock markets. All regressions are statistically significant at the 0,0005 level at least. As was the case in the correlations, the link with consumer sentiment is more prominent for smaller-cap stock market returns. The regressions models are also able to explain more of the variance, up to 19,1%, in consumer sentiment when the independent variable is a smaller-cap stock market’s return. The coefficients are higher for regressions with Statistics Netherlands consumer sentiment as the dependent variable, while the models with European Commission consumer sentiment as the dependent variable are able to explain more of the variance in this consumer sentiment index. Building a regression model with all three stock market’s returns as independent variables and consumer sentiment as the dependent would result in a very high level of multicollinearity making results unreliable.
3.5 **ROBUSTNESS CHECKS**

Most previous research has found causality running from stock returns to consumer sentiment i.e. stock returns affect the feel consumer have on the economy. In this section a Granger causality test will be used to try to confirm the direction of causality in our data. Figure 4 shows a Granger causality test testing whether there is causality running from stock returns to consumer sentiment.

**FIGURE 4: GRANGER CAUSALITY TEST**

```
> grangertest(SNCC ~ AEX, order = 1)

Model 1: SNCC ~ Lags(SNCC, 1:1) + Lags(AEX, 1:1)
Model 2: SNCC ~ Lags(SNCC, 1:1)
  Res.Df Df      F    Pr(>F)
1    199
2    200 -1 18.981 2.113e-05 ***
```

The results of this test show with a 0.0001 level of significance that this causality exists. Just to be sure, and because some previous papers have found causality may somehow run both ways, the opposite direction of causality is also Granger tested. This test is shown in figure 5.

**FIGURE 5: GRANGER TEST FOR REVERSE CAUSALITY**

```
> grangertest(AEX ~ SNCC, order = 1)

Model 1: AEX ~ Lags(AEX, 1:1) + Lags(SNCC, 1:1)
Model 2: AEX ~ Lags(AEX, 1:1)
  Res.Df Df      F Pr(>F)
1    199
2    200 -1 0.1659 0.6842
```

The results of this test show this causality not to be statistically significant. Therefore it can be concluded with a very high level of confidence that causality runs from stock returns to consumer sentiment.
Almost all of the papers that studied the link between consumer sentiment and stock returns find that there is a positive relationship between the two. A common third factor like GDP growth or interest rates cannot explain this relationship meaning the two variables are directly related. The research done in this bachelor thesis found the two variables to be positively linked in the Netherlands for the period of 1995-2011. Correlations show a positive link between consumer confidence measured by both Statistics Netherlands and the European Commission and stock returns from the Amsterdam Exchange Index, the Amsterdam Mid-kap Index and the Amsterdam Small Cap Index. This correlation is much larger when stock return data precedes consumer sentiment data. The link is also larger for smaller cap stock markets. I was able to make a highly statistically significant regression model that explains variance in consumer sentiment up to 19.1% by using stock returns as the only independent variable. Both the previous researchers and myself find causality running from stock returns to consumer sentiment. There is however also evidence coming from some previous researchers that suggests consumer sentiment data is somewhat able to predict future stock returns, I have not found any evidence supporting this. The next step in research on the link between Dutch consumer sentiment and stock returns would be to examine what causes the difference in correlations with stock market returns between the Statistics Netherlands index and the European Commissions index and what causes correlations to be higher for smaller-cap stock markets. This thesis provided a very brief theory for the reasons for this but no actual explanation, as I was unable to find it.
BIBLIOGRAPHY


APPENDIX

APPENDIX 1: MEASURING CONSUMER SENTIMENT

Statistics Netherlands’ consumer confidence index measures consumer sentiment by conducting a monthly telephone survey for a thousand randomly chosen Dutch adults. Statistics Netherlands separates consumer sentiment into three dimensions: the perception of the past and future overall economic situation, the perception of the past and future personal financial situation, and the perception of the current prices and the market of durable goods. In the survey, respondents answer five questions⁴. Per question a balance is made between the positive (clearly improved, somewhat improved, good time) and the negative (clearly worsened, somewhat worsened, bad time) answers. Neutral answers (stayed the same, neither good nor bad, don’t know) are ignored. These per question balances are then added to the balance of other questions that are used to determine a specific index. The answers on the first two questions are used to determine the index of economical climate. The answers for the last three questions are used to determine the index of consumer willingness to buy. For the index of consumer confidence all five questions are used. The index’ minimum value is -100; meaning nobody has a positive perception. The maximum value is +100 meaning everybody has a positive perception. When the same amount of people are positive as are negative the index’ value is 0. The European Commission employs a consumer survey for every country in the European union and even candidate countries. Their method is the same for every country. The sample size does vary across countries according to their heterogeneity and population size. In the Netherlands 1500 consumers are interviewed every month. The European Commission measures consumer sentiment from four questions out of the twelve questions in their consumer survey⁵. These questions are on the financial situation of households, the general economic situation, unemployment expectations and savings, all over the next 12 months. These four questions have either six possible answers, these answers are either “very positive” (“get a lot better”, “increase sharply”, “very likely”), “positive” (“get a little better”, “increase slightly”, “fairly likely”) “neutral” (“stay/remain the same”), “negative” (“get a little worse”, “fall slightly”, “not

⁴ See appendix 3 for the complete questionnaire
⁵ See appendix 4 for these questions
likely”), “very negative” (“get a lot worse”, “fall sharply”, “not at all likely”) or “don’t know”. Balances are calculated by taking the weighted average of the answers to these questions. If PP, P, E, M, MM and N denote the percentage of respondents having chosen respectively “very positive”, “positive”, “neutral”, “negative”, “very negative” and “don’t know” (so that PP+P+E+M+MM+N=100), balances are calculated as

\[ B = \left( PP + \frac{1}{2} P \right) - \left( \frac{1}{2} M + MM \right) \]

Just like for Statistics Netherlands, balance values range from -100, when all respondents chose the “very negative” option to +100, when all the respondents chose the “very positive” option. Consumer confidence is then measured by taking the average of the balances of the four questions. The major difference between the Statistics Netherlands index of consumer sentiment and the European Commission index of consumer sentiment is the difference in focus on future or past. The Statistics Netherlands asks questions on both the past 12 months and the next 12 months while the European Commission only asks questions on the next 12 months. This could lead to a large difference between the two indexes if the economy is recovering from a poor period or falling after a good period. The Statistics Netherlands index would then be either lower after a bad period or higher after a good period because of the impact of questions on the past 12 months while the European Commission’s index would only focus on the future. Another difference between the two indexes is the inclusion of a question on unemployment in the calculation of the European Commission’s index.
APPENDIX 2: CREATING THE VARIABLES

Historical AEX prices were gathered from the Yahoo Finance website\. Monthly close prices were downloaded for the period of January 1995 to December 2011. Returns were then calculated as:

\[ R_{AEX} = \log \left( \frac{AEX_t}{AEX_{t-1}} \right) \]

where \( AEX_t \) is the close price of the Amsterdam Exchange Index in month \( t \). This results in 203 observations as no return can be calculated for January 1995. Historical AMX prices were downloaded from marketratesonline\. Data was available from 1999 onwards. Only the last close prices of the month were kept. Returns were calculated the same as AEX returns. This resulted in 155 observations. Historical AScX prices were also downloaded from marketratesonline and treated the same as AMX data. Data was available from March 2005 onwards as that was the month that the AScX was instated. Returns were also calculated the same as AEX returns resulting in 82 observations. Consumer confidence figures were obtained from the Statistics Netherlands Statline website and the European Commission’s website. Selected figures from Statistics Netherlands were the seasonally adjusted consumer confidence indicator and all five of its sub questions. The selected period was January 1995 to December 2011. The average for the first two questions was taken to create the index of economic climate and the answers for the last three questions were averaged for the index of consumer willingness to buy. The monthly change in Statistics Netherlands consumer confidence was then calculated as:

\[ \Delta (SN)CC = \log \left( \frac{100 + (SN)CC_t}{100 + (SN)CC_{t-1}} \right) \]

where \((SN)CC_t\) is the consumer confidence as measured by Statistics Netherlands in month \( t \). The same was done for both the index of econical climate and the index of consumer willingness to buy. For the European Commission seasonally adjusted data from the entire consumer survey was downloaded for all European union countries.

6 http://finance.yahoo.com/
7 http://marketratesonline.com/
8 http://statline.cbs.nl/
9 http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm
Everything but data for questions 2, 4, 7 and 11 for the Netherlands from January December 2011 was then thrown out since it is not used in calculating consumer confidence. The average of questions 2, 4, 7 and 11 was then taken to calculate consumer confidence. The monthly change for the complete index and the four sub questions was then calculated using the same formula as for Statistics Netherlands.

APPENDIX 3: STATISTICS NETHERLANDS CONSUMER SENTIMENT INDEX SURVEY QUESTIONS

1. *What do you think of the development of the economy as a whole?* Has the current Dutch economic situation improved, worsened or has it stayed the same in the last 12 months? Possible answers:
   a) Clearly improved
   b) Somewhat improved
   c) Stayed the same
   d) Somewhat worsened
   e) Clearly worsened
   f) Don’t know

2. *What do you think will happen to the Dutch economy as a whole in the next 12 months?* Possible answers:
   a) Clearly improve
   b) Somewhat improve
   c) Stay the same
   d) Somewhat worsen
   e) Clearly worsen
   f) Don’t know
3. *Has your personal financial situation improved or worsened over the last 12 months?* Possible answers:

   a) Clearly improved  
   b) Somewhat improved  
   c) Stayed the same  
   d) Somewhat worsened  
   e) Clearly worsened  
   f) Don’t know  

4. *What do you think will happen to your personal financial situation in the next 12 months?*

   a) Clearly improve  
   b) Somewhat improve  
   c) Stay the same  
   d) Somewhat worsen  
   e) Clearly worsen  
   f) Don’t know  

5. *What about furniture, washing machines, television sets and other durable goods?* Do you think now is a good or a bad time to make those kinds of large purchases?  

   a) Good time  
   b) Neither good nor bad  
   c) Bad time  
   d) Don’t know
APPENDIX 4: EUROPEAN COMMISSION CONSUMER SENTIMENT INDEX SURVEY QUESTIONS

2. How do you expect the financial position of your household to change over the next 12 months? It will...

+ +  Get a lot better

+   Get a little better

=  Stay the same

−   Get a little worse

− −  Get a lot worse

N  Don’t know.

4. How do you expect the general economic situation in this country to develop over the next 12 months? It will...

+ +  Get a lot better

+   Get a little better

=  Stay the same

−   Get a little worse

− −  Get a lot worse

N  Don’t know.
7. How do you expect the number of people unemployed in this country to change over the next 12 months? The number will...

++ Increase sharply
+
= Remain the same
− Fall slightly
−− Fall sharply
N Don’t know.

11. Over the next 12 months, how likely is it that you save any money?

++ Very likely
+
− Not likely
−− Not at all likely
N Don't know.