Ape or Art

Investment Strategies

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To Peter and Ria

Preface

It must have been early on in 1987 that three guys in my class - Jan Bart Brockhuis, Elwin de Groot and Gerard van der Krogt - began to enthuse more and more about the easy money to be made on the stock market. Attractive graphs with lines from bottom left to top right made me wonder increasingly about the astuteness of keeping my money in a savings account. Fortunately, the October 1987 crash made me feel a little less foolish. However, only a few months later the guys' smiles were back. On 23 February 1988, I could stand their grins no longer and I bought my first shares: 11 Rolinco mutual fund shares at 81.10 Dutch guilders apiece. Thank you, guys, for introducing me to the financial market. I have ever enjoyed it since, with the exception of a while during the aftermath of the NASDAQ implosion which turned me from a yup into a yupp (young urban pennyless professional).

This book is the result of my personal and professional interest in investment strategies. A fundamental analysis can be helpful in the portfolio-construction process, but personally I believe that some rule-of-thumb thinking to take advantage of possible anomalies is at least as important.

This book would never have materialized without the help of my colleagues at IRIS and Robeco. I have been lucky enough to work in a highly professional and inspiring environment with sparring partners, academic journals and databases within easy reach. I have been able to benefit from a great working atmosphere and from the expertise of my colleagues at IRIS, to whom I will always be grateful. My special thanks go to Léon Cornelissen, whose constant pushing to improve our knowledge and skills and whose support for my writing allowed this book to take shape. Next, I would like to thank my colleague Steef Bergakker, an investment fanatic, for sharing with me his thoughts about stock-market phenomena. My appreciation also goes to my colleagues in the Robeco Quantitative Strategies department, who were always willing to help. One of them, David Blitz, deserves a special mention for his econometric know-how and broad experience with quantitative investment models, which have been invaluable to me over the years. Finally, I would like to thank Robeco's portfolio managers for the many useful discussions.

Several chapters of this book are based on co-authored articles, as indicated. Obviously, I have benefited from the hard work and acumen of my co-authors, and I would therefore like to thank Mathijs Biesta, Han Donker,

Hemmo Hemmes and Roland Venekamp. Further sources of support varied from (research) assistance and English editing over data downloading to helpful comments and suggestions from Tom Arends, Nicolas Baker, Jeroen Blokland, Jornt Beetstra, Adriaan Floor, Masud Wagid Hosain, Paul van Homelen, Marco Lavooi, Iwan Peters, Thomas Pistorius, Nico van der Sar, Pim van Vliet, Cornelis Vlooswijk, Glenn Young-On and Gerben de Zwart.

I owe special thanks to my thesis supervisor, Marno Verbeek. I was extremely gratified when he agreed to supervise my work. His useful remarks and suggestions were a source of inspiration to me. During the research work into the 'Sell-in-May' effect, in particular, he nudged me in the right direction and suggested several useful robustness checks for my results. He also pressed me to present the results in a more accessible way. I would further like to thank the other members of this committee for evaluating this thesis.

Finally, my gratitude goes to my ever-supportive family and friends.

Ronald Doeswijk
December 2006

Contents

Chapter 1

Introduction

1.1 The predictability of stock returns

The knowledge about stock markets has changed significantly over the last decades. Although the benefits of value investing can be traced back to a long time ago (see e.g. Graham and Dodd (1934)), up to and including the seventies stock prices were predominantly supposed to follow a random walk around a long term upward trend due to the structural growth of both the economy and earnings. Fama et al. (1969) state "There is an impressive body of empirical evidence which indicates that successive price changes in individual common stocks are very nearly independent.", while Malkiel (1981) writes in his bestseller 'A Random Walk Down Wall Street' "... past movements in stock prices cannot be used to foretell future movements. The stock market has no memory."[1]. In other words, whether you hire a monkey throwing darts at the financial pages of a newspaper or an investment professional making thorough analyses, they both will not help you to predict changes in stock prices as these are unpredictable. However, from the late seventies and early eighties onwards, academic evidence for the predictability of stock prices has accumulated.

Empirical studies show that stock returns are positively correlated to valuation ratios like the earnings-to-price ratio (Basu (1977)), the dividend yield (Fama and French (1988)), the cash flow-to-price ratio (Chan, Hamao and Lakonishok (1991)) and the book-to-market ratio (Fama and French (1992)). Returns also appear to be correlated to firm size. Banz (1981) shows small caps to realize higher returns than large caps. The predictive power of valuation and size leads to the well known Fama and French (1992) three factor model which attributes the cross-section of individual stock returns to a stock's sensitivity to the market's excess return, a stock's valuation as measured by the book-to-market ratio and the market capitalization of a stock. To take value and size into account has become standard in today's investment practice. For example, Morningstar, the well known rating

[1] The eighth edition of 2003 contains an adjusted view as it states "... past movements in stock prices cannot be used reliably to foretell future movements. The stock market has little, if any, memory.". Next, there is an additional chapter 'Potshots at the Efficient-Market Theory and Why They Miss' in which he describes, among others, momentum and mean reversion in stock prices. Lo and MacKinlay (1999) document the predictability in stock markets in their book 'A Non-Random Walk Down Wall Street'.

agency of mutual investment funds, has employed an equity style box with these two dimensions to classify funds since 1992.

Next to valuation and size, stock returns also appear to be correlated to prior returns. DeBondt and Thaler (1985) document a negative correlation between future stock returns and their prior return over the last three to five years, which they call mean reversion. The mean reversion phenomenon seems to be captured by the value effect as Fama and French (1996) suggest. Jegadeesh and Titman (1993) and Rouwenhorst (1998) show a positive correlation between returns and the return, or so called momentum, over the last three to twelve months. With these new findings, Carhart (1997) extends the Fama and French (1992) three factor model to a four factor model that also includes one-year month momentum as an explanatory variable for the cross section of stock returns.

There are still several other patterns in stock market returns. As will appear later on, we focus on five patterns that seem to be anomalies. These are the 'Sell in May' investors' rule of thumb based on the traditional summer weakness in the stock markets in the period from May to October, the attractive first-day returns on Initial Public Offerings (IPOs) as well as their frequently supposed long term underperformance, the price reversal around mergers and acquisitions, the predictive power of insider trades and the remarkable price pattern around index revisions.

By the nineties, the predictability of stock returns has been widely accepted. However, this does not necessarily mean that one can get a free lunch at the stock market. Next to return, there is risk. For returns, one normally does not go far beyond a choice between arithmetic and geometric returns, normal versus logarithmic returns, before or after transaction costs or pre-tax and after-tax returns. Risk is subjective, but necessary to calculate the abnormal return, i.e. that part of the return that we cannot attribute to the level of risk. Adding complexity, time varying risk-premia can also lead to predictability in stock returns. So, risk is the difficult part to judge whether one can benefit from predictable patterns in the stock market, as it is harder to capture than return.

1.2 Risk

1.2.1 The definition of risk

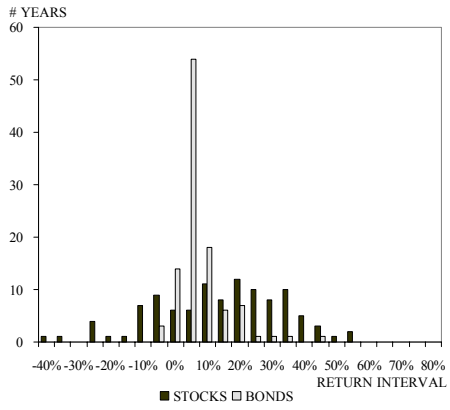
Risk can be defined in many different ways. For example, the risk that your return does not keep up with the unaudited return of your colleagues or

neighbours. Underperforming your peers might make you look like a fool, blind for all the great opportunities that stock markets offer us every day. This definition of risk is rather unconventional and might be more of a personal concern. Even more unconventional is defining risk as the joy derived from a hazardous trip with stocks. This might sound ridiculous, but remind 'pay-out statistics' for stock markets beat those for casinos by a wide margin while in the same time there is a huge(!) gambling industry around the world[2]. But, for now, we will take a traditional risk definition as a starting point and return to psychological factors later on.

Risk is linked to uncertainty. It is the chance that the final return differs from the expected return, which can be read from a probability plot. Figure 1.1 illustrates the different return characteristics for broad stock and bond indices for the 106-years period 1900-2005. Whether it is for the United States or the Netherlands, there is a huge dispersion in the annual stock

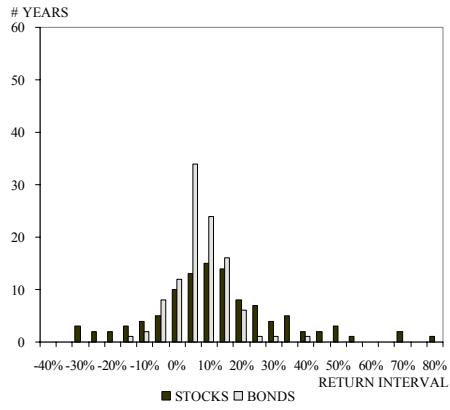
FIGURE 1.1

FREQUENCY DISTRIBUTION ANNUAL RETURNS UNITED STATES (1900-2005)



SOURCE: GLOBAL FINANCIAL DATA, THOMSON FINANCIAL

FREQUENCY DISTRIBUTION ANNUAL RETURNS THE NETHERLANDS (1900-2005)



SOURCE: CBS, UVM, EICHHOLTZ/KOEDIJK/OTTEN, THOMSON FINANCIAL

[2] PricewaterhouseCoopers estimates worldwide revenues from *legalized gambling* to growth from USD 68.5 billion in 2004 to 100.3 billion in 2009 in their report 'PricewaterhouseCoopers' Global Entertainment and Media Outlook: 2005-2009'. This number excludes sport betting and internet gambling, and concerns the gross gaming revenue, which is the difference between the money wagered minus the money returned. Supposing a pay out ratio of 96%, the money wagered is 25 times the gross gaming revenue. Hereby, the money wagered in 2005 will be around USD 1850 billion. For *online gambling* we can add another USD 300 billion, based on data from www.researchandmarkets.com and Party Gaming. To put these numbers into perspective, the turnover in equities at Euronext's cash market amounted to EUR 1829 billion in 2005.

returns compared to bond returns. As a compensation for the higher uncertainty, stock investors on average receive an equity premium. These data are based on total return indices from Global Financial Data for the United States while we extend the data for the Netherlands from Eichholtz, Koedijk and Otten (2000) with data from JP Morgan for bonds and data from MSCI for stocks.

As shown in Table 1.1, the equity premium depends on the market and the calculation method of returns. Using the geometric calculation method, which is usual for long term perspectives, the equity risk premium over bonds has been around 5% for the United States and 4% for the Netherlands over the period 1900 through 2005. In both countries stocks deliver positive returns in around 72% of the years while the standard deviation of their returns is approximately 20%. Bonds generate positive returns in 84% of the years in the United States and 78% in the Netherlands. Standard deviations vary from 7.5% to 8.0%.

TABLE 1.1
RETURN STATISTICS FOR THE UNITED STATES AND THE NETHERLANDS (1900-2005)

	STOCKS	BONDS	CASH	INFLATION
PANEL A: UNITED STATES				
GEOMETRIC AVERAGE	9.8%	4.7%	4.0%	3.1%
MEDIAN	13.3%	3.3%	4.1%	2.7%
ARITHMETIC AVERAGE	11.7%	5.0%	4.0%	3.3%
STANDARD DEVIATION	19.9%	7.5%	2.8%	4.9%
PERCENTAGE OF POSITIVE YEARS	71.7%	84.0%	100.0%	84.9%
PANEL B: THE NETHERLANDS				
GEOMETRIC AVERAGE	8.6%	4.6%	3.8%	2.9%
MEDIAN	8.5%	4.0%	3.2%	2.7%
ARITHMETIC AVERAGE	10.5%	4.9%	3.8%	3.0%
STANDARD DEVIATION	20.5%	8.0%	2.5%	4.9%
PERCENTAGE OF POSITIVE YEARS	72.6%	78.3%	100.0%	69.8%

SOURCE: GLOBAL FINANCIAL DATA, THOMSON FINANCIAL, CBS, UVM, EICHHOLTZ/KOEDIJK/OTTEN

1.2.2 The Capital Asset Pricing Model (CAPM)

At the level of individual stocks, the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) links individual expected stock returns to their sensitivity for the market, or the so-called bèta. The higher (lower) their sensitivity to the market, the higher (smaller) the dispersion in returns, the higher (lower) the risk compensation for holding the stock and the higher (lower) the expected return for that stock. This is logical given the assumption of investors' risk aversion. Empirically, the CAPM held up well up to the eighties.

Patterns like the size and value effect suggest that the CAPM is not a good description of the cross-section of expected stock returns. Two technical explanations still leave room for the CAPM. First, one could argue in line with Roll (1977) that we can not test the CAPM model as we do not observe the universal market return. Wealth is more than a common proxy for the market like the MSCI World index, the S&P 500 or the AEX index. Think about art or the present value of labour income. Without a correct estimate for the market return it is impossible to reject the CAPM. Second, one could interpret the evidence against the CAPM as data mining (Lo and MacKinley (1990)) or as results derived from incomplete data as bankrupt companies might be underrepresented due to the loss of their data, the so called survivorship bias (Banz and Breen (1986)). Within a database you will always find remarkable patterns under the condition you torture the data long enough, especially when the data base misses dead firms. Or as Black (1993) writes, "Most of the so-called anomalies that have plagued the literature on investments seem likely to be the result of data-mining. The researcher who finds [a profit opportunity] writes it up, and we have a new anomaly. But it generally vanishes as soon it's discovered.".

These technical explanations do not seem appealing. The first explanation of untestability is rather extreme and is out of line with the current consensus among academics. Moreover, from a practical point of view it does not matter whether the model is incorrect or that it is correct but fails to explain the cross-section of expected stock because we can not observe the universal market return. The second explanation of data mining could be applicable for some studies, but probably not to a whole range of studies. For example, the size, value, momentum and mean reversion patterns have been documented in many studies for a whole array of countries. Moreover, one could also argue that there might be predictable patterns in the stock market known by a single investor or small group investors who have no incentive to publish. As soon as such a pattern would become public knowledge, it might disappear and so goes the free lunch.[3]

3 The seasonal sector investment strategy documented in Chapter 2 of this book seems so profitable to me that I can hardly imagine that it would be offered for publication in case I would have been employed at a money manager in stead of a research institute with multiple stakeholders. In fact, it is so simple that I neither can imagine that it is new to everyone in the investment industry. Of course, another explanation is that I am overlooking something still unkown to me that explains the documented abnormal returns.

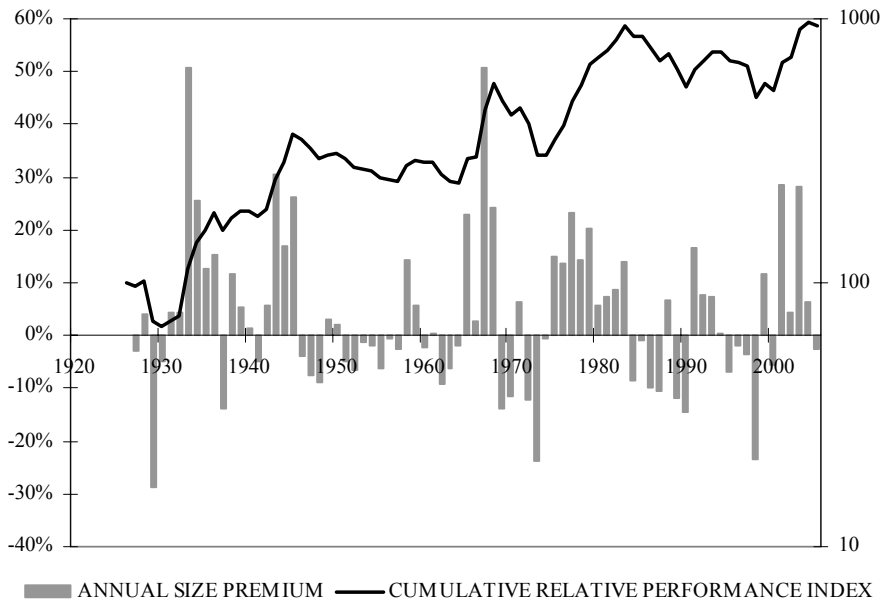
1.2.3 The Fama and French model with size and value factors

As mentioned before, Fama and French (1992) add two other factors, value and size, to the CAPM and thereby capture a large part of the predictability of stock returns into their three factor pricing model. Here is where the efficient markets adepts clash with the behavioural finance school of thinking. The question is, are size and value risk factors? If yes, size and value based investment strategies do not offer abnormal returns but returns in line with the risk characteristics of the portfolio. If not, these investment strategies offer abnormal returns and are an opportunity for investors to beat the market.

According to the efficient market adepts, the value and size factors represent non-market linked risks. They argue that there are more risk factors than just bèta. For size the reasoning seems rather simple. Small firms typically have lower analyst coverage and are illiquid. Analyst coverage and the chance of wrong asset pricing are positively correlated. This risk can be diversified and should not be priced. However, indirect trading costs for small caps compared to large caps are larger for institutional investors. Their order can move the market price substantially. This justifies a liquidity premium for small caps. Now comes the striking part. After an intense discussion among academics and practitioners about the size effect, a few years ago it seemed to have disappeared.

Almost 20 years after Banz (1981) documented the size effect, Dimson and Marsh (1999) write an article, titled 'Murphy's Law and Market Anomalies', about it. They wonder whether it has disappeared. But, suppose it would have disappeared completely, *that* would be a case against market efficiency. Actually, it reversed for a long period, but recently came back strongly. Figure 1.2 shows a graph with the relative performance of American small caps versus large caps as measured by the Fama and French (1992) 'Small Minus Big' (SMB) factor. Possibly, the attention that Banz's (1981) publication has put on the size effect resulted in extra demand for small caps, thereby pushing up their returns to far above large caps. Subsequently, there was a prolonged period of inferior performance compared to large caps. However, this might also have been coincidence as from the mid forties to the mid sixties small caps also lagged large caps in most years.

FIGURE 1.2
PERFORMANCE OF AMERICAN SMALL CAPS VERSUS LARGE CAPS FOR THE PERIOD 1927-2005 AS MEASURED BY THE FAMA AND FRENCH (1992) FACTOR 'SMALL MINUS BIG'



SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU/PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

As Table 1.2 shows, according to Fama and French data for the American market, the size premium is a compounded average of 2.8%, the median is 2.0% and in 54.4% of the years in the period 1927-2005 small caps yield more than large caps. The arithmetic mean is 3.9% and has a standard deviation of 14.6%, which translates into a highly significant t-value of 2.35. In all three subperiods that we distinguish we find statistically insignificant

TABLE 1.2
THE SIZE PREMIUM FOR THE AMERICAN STOCK MARKET BASED ON ANNUAL DATA FROM FAMA AND FRENCH (1992) OVER THE PERIOD 1927-2005

	1927-1952	1953-1978	1979-2005	1927-2005
ARITHMETIC AVERAGE	5.1%	3.8%	2.7%	3.9%
STANDARD DEVIATION	16.0%	15.4%	12.5%	14.6%
T-VALUE (FOR ZERO MEAN)	1.62	1.25	1.12	2.35
COMPOUNDED AVERAGE	3.8%	2.7%	1.9%	2.8%
MEDIAN	3.6%	-0.6%	4.4%	2.0%
HIT RATIO	61.5%	46.2%	55.6%	54.4%
NUMBER OF YEARS	26	26	27	79

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU//PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

positive average size premiums. For the middle subperiod 1953-1978 results are the weakest, as the median premium is a negative 0.6% and the hit ratio falls below 50%.

Unquestionable, the higher returns for small caps are, at least partly, a compensation for their illiquidity and riskier profile. As appears from Table 1.3, the standard deviation of small caps is higher than for large caps. This applies to all three categories of value, neutral and growth stocks. Moreover, small caps tend to underperform large caps during bad states of the world as measured by the equity premium, see Table 1.4. In the worst 5% months at the stock market during the period 1927-2005 the equity premium was on average a negative 12.5%. In those months, small caps underperformed large caps by on average 2.5%. Combined with the higher standard deviation this supports the view that small caps deserve a premium over large caps. One might discuss whether the premium has been right, too high or too low. However, this is not the whole story as the size effect is heavily biased towards January. Van Dijk (2006) concludes that, based on a review of 25 years on the size effect in international equity returns, there is little consensus about the source of the size effect and that any theoretical explanation should address why it is especially pronounced in January.

TABLE 1.3
ANNUALIZED STANDARD DEVIATIONS BASED ON MONTHLY RETURNS FOR THE PERIOD 1927-2005 FOR THE FAMA AND FRENCH (1992) MARKET CAPITALIZATION WEIGHTED SIZE AND VALUE PORTFOLIOS

	GROWTH	NEUTRAL	VALUE	AVERAGE
SMALL	27.3	24.9	29.1	27.1
LARGE	18.8	20.3	25.4	21.5
AVERAGE	23.0	22.6	27.3	24.3

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU/PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

TABLE 1.4
MONTHLY EQUITY, SIZE AND VALUE PREMIUMS DURING DIFFERENT STOCK MARKET CLIMATES ACCORDING TO FAMA AND FRENCH (1992) DATA FOR THE PERIOD 1927-2005

	R_M-R_F	SMB	HML
WORST 5% MONTHS	-12.52%	-2.47%	-0.91%
NEXT 30%: BAD MONTHS	-3.32%	-0.55%	0.44%
NEXT 30%: NORMAL MONTHS	0.97%	0.54%	0.48%
NEXT 30%: GOOD MONTHS	4.55%	0.81%	0.13%
BEST 5% MONTHS	12.43%	2.71%	2.90%
AVERAGE	0.64%	0.25%	0.41%

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU/PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

Intuitively, the size premium seems rather high at first sight. Abstracting from covariances with bonds or cash, we note that the size premium has

been a compounded annual average of 2.8%, compared to an equity premium of 6.3% over the same period as Table 1.5 indicates. The difference in risk between cash and equity seems to be of another dimension than between two categories of stocks, as in the case with small caps and large caps. But, as mentioned before, small caps tend to underperform the market at the moment that this is the least desired, namely during falling stock markets. This is a serious disadvantage for small caps.

The predictability of returns resulting from the size effect enables investors to achieve above average returns, but after taking risk into account most, if not all, of the profitability disappears. Given the low hit ratios of a size based investment strategy and the prolonged periods of low returns for small caps compared to large caps, we can at least state that the size effect is not an easy money opportunity for investors.

TABLE 1.5
THE EQUITY PREMIUM OVER CASH FOR THE AMERICAN STOCK MARKET BASED ON ANNUAL DATA FROM FAMA AND FRENCH (1992) OVER THE PERIOD 1927-2005

	1927-1952	1953-1978	1979-2005	1927-2005
ARITHMETIC AVERAGE	10.0%	6.8%	8.5%	8.4%
STANDARD DEVIATION	25.2%	20.3%	15.9%	20.6%
T-VALUE (FOR ZERO MEAN)	2.01	1.72	2.78	3.65
COMPOUNDED AVERAGE	6.6%	4.7%	7.1%	6.3%
MEDIAN	13.8%	9.4%	10.8%	10.7%
HIT RATIO	69.2%	61.5%	70.4%	67.1%
NUMBER OF YEARS	26	26	27	79

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU//PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

The arguments to label the value factor as a risk factor are far less convincing then for the size factor. Fama and French (1992, 1993) argue that size and value capture leverage. In other words, they can be seen as financial distress indicators, or risk factors. Next, Fama and French (1995) document that the profitability, as measured by the common equity income as a percentage of the book value of common equity, for value stocks is less than for growth stocks in the four years before and five years after the split date of value versus growth[4]. This all seems to be rather straightforward, but why is it that value stocks practically always beat growth stocks, wonders behavioural finance. Moreover, there is no direct evidence that the value premium can be attributed to financial distress.

[4] They also document that size is related to profitability.

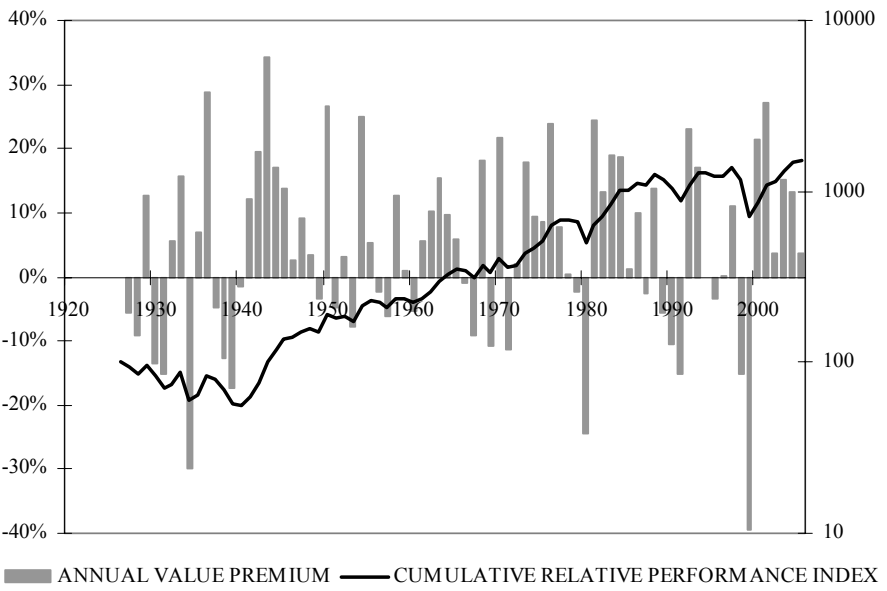
TABLE 1.6
THE VALUE PREMIUM FOR THE AMERICAN STOCK MARKET BASED ON ANNUAL DATA FROM FAMA AND FRENCH (1992) OVER THE PERIOD 1927-2005

	1927-1952	1953-1978	1979-2005	1927-2005
ARITHMETIC AVERAGE	3.6%	5.6%	4.3%	4.5%
STANDARD DEVIATION	15.4%	10.7%	15.9%	14.1%
T-VALUE (FOR ZERO MEAN)	1.18	2.69	1.42	2.85
COMPOUNDED AVERAGE	2.4%	4.9%	2.9%	3.5%
MEDIAN	3.2%	5.7%	3.7%	5.4%
HIT RATIO	57.7%	69.2%	63.0%	63.3%
NUMBER OF YEARS	26	26	27	79

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU//PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

As shown in Table 1.6, the value premium is a compounded average of 3.5%, the median is 5.4% and in 63.3% of the years in the period 1927-2005 value stocks return more than growth stocks. The arithmetic mean is 4.5% and has a standard deviation of 14.1%, which translates into a highly significant t-value of 2.85. In all three subperiods that we distinguish, we find economically interesting positive average value premiums, whether these are measured by the arithmetic mean, the compounded mean or the

FIGURE 1.3
PERFORMANCE OF AMERICAN VALUE STOCKS VERSUS GROWTH STOCKS FOR THE PERIOD 1927-2005 AS MEASURED BY THE FAMA AND FRENCH (1992) FACTOR 'HIGH MINUS LOW'



SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU//PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

median. Although these results are only statistically significant for the middle period from 1953-1978, hit ratios are well above 50% for each sub period. Figure 1.3 shows the gradual rise of the cumulative value premium over time.

As becomes clear from Table 1.4, the value premium materializes during almost all stock market conditions. Only in the worst 5% months during the period 1927-2005 growth stocks return more than value stocks. However, the lagging performance of 0.91% hardly can be labeled as serious compared to the average monthly 'value drift' of 0.41%. Roughly speaking, during extreme negative stock market movements value stocks turn back the premium they earned in the ten weeks before the crash. During this time span, value stocks on average realize around 91 basis points outperformance over growth stocks. Note that during mild stock market corrections, which we label 'bad months' in Table 1.4, the value premium of 0.44% is approximately equal to the average of 0.41%. The value premium is also present in high as well as low volatility market environments. For the United States from 1987-2001, Lee and Song (2003) document higher returns for value stocks than for growth stocks after periods of high and low volatility, although this pattern is stronger following a high volatility period.

In case one is willing to accept that the price of distress risk is rather high relative to market risk, i.e. a value premium of 3.5% and an equity premium for stocks over cash 6.3% based on the before mentioned Fama and French data, Post and van Vliet (2006) offer support for the efficient market school. Provided investors are loss-averse and the market portfolio is dominated by fixed-income assets, the value premium is a compensation for the lagging performance of value stocks during periods with a steep rise of real interest rates and declining bond prices.

1.3 Behavioural finance

1.3.1 Irrationality and emotions

Behavioural finance supposes psychology to play an important role in investment decisions. People, in forming their expectations, do not follow the normative principles of statistics. They rely on a limited number of heuristics and are prone to their emotions which sometimes lead to severe and systematic errors. Behavioural finance rests on the assumption that, in general, investors are irrational and that there is limited arbitrage. Behavioural finance argues that people deviate from rationality in a similar way instead of randomly. Random irrationality would be irrelevant for

financial markets as irrational trades would cancel each other out. The presence of rational investors does not rule out the persistent presence of irrational investors as pointed out by De Long et al. (1990). Before discussing investors' deviations from economic rationality and linking behavioural finance to the predictability in the returns of stocks, we first present some psychological studies as we enter an area with interesting experiments.

Yellot (1969) and Wolford, Miller and Gazzaniga (2000) demonstrate humans typically show frequency matching behaviour. In a random event with two possible outcomes with frequency p and 1-p, humans tend to match the frequency of previous occurrences in their guesses. However, this is a not the optimal strategy as long p is not equal to 50%. If, for example, a green light occurs in 80% of the cases and a red light in 20% of the cases, the optimal strategy is to predict a green light in all cases. This maximizing behaviour would be right in 80% of the time. However, frequency matching will only be right in 68% of the time, i.e. 100(0.8x0.8 + 0.2x0.2). Humans search for causal sequences, even in random events. This is rather surprising, as most animals follow the maximizing strategy, see Hinson and Staddon (1983). Who told humans to be superior?

Another experiment from Shiv e.a. (2005) suggests that patients with focal lesions in brain regions related to emotion are superior investors. In other words, people who are not hindered by emotions like fear and greed outperform people without damage in the emotional brain area or people without brain damage. For this experiment they used a risky decision-making task, simulating real life investment decisions in terms of uncertainties, rewards and punishments. Individuals with a deficient emotional circuitry experience less myopic loss aversion and make more advantageous decisions than individuals with an intact emotional circuitry, supporting the idea that emotions play an important role in risk taking and risk aversion.

Based on the observed neural activity during an investment game, Kuhnen and Knutson (2005) conclude that risk-seeking choices and risk-averse choices may be driven by two distinct neural circuits involving the nucleus accumbens and the anterior insula. The nucleus accumbens is a part of the brain that is driven primarily by dopamine, a chemical that is believed to produce pleasure and euphoria. In the populair psychological literature this part of the brain is called the pleasure center, originating from a study of Olds and Milner (1954) who notice that rats with electrodes in some parts of their brain like to stimulate themselves, while other parts cause pain (in this

study, rats were able to press a lever that causes an electric shock in their brain). Like the nucleus accumbens is linked to the chemical dopamine and a feeling of pleasure, the anterior insula is linked to other chemicals and a feeling of anxiety. The description of risk as the joy derived from a risky investment, seems not to be total nonsense.

1.3.2 Biases in judgment or perception and errors in preference

We group decision-making into two elements, beliefs and preferences, following Kahneman and Riepe (1998) and Montier (2002). First, we will discuss a selection of errors in judgment or perception. These are over-optimism, over-confidence, the representative heuristic, the availability bias and anchoring. For an extensive overview we refer to Plous (1993). Next, we discuss errors in preferences as decisions are dependent on the framing of choices. We pay attention to loss aversion and mental accounting.

The first error in judgment derives from over-optimism. People tend to be biased towards optimism. A well known example is that 80% of the drivers believe that they are above average compared to other drivers on the road, see Svenson (1981) for example. Over-optimism applies to professionals as well as laymen. Weiman (1980) documents that the optimism bias increases when people feel they are in control.

The second bias is over-confidence. In general, people trust their estimates too much. According to Feynman (1988), NASA's official estimated space shuttle launch risk was 1 failure in 100.000 launches before the Challenger exploded on its twenty-fifth mission, the seventy-eighth flight of a shuttle. Notice that it takes almost three centuries to launch 100.000 shuttles at a launch rate of one shuttle per day. Confidence tends to increase when people are given more information, although accuracy may not. Overconfidence is greatest when accuracy is near chance levels and reduces when accuracy increases to 80%. To put it simply, increased difficulty is associated with increased overconfidence, see for example Lichenstein and Fischhoff (1977). Once accuracy exceeds 80%, people become under-confident**.** Lichenstein e.a. (1982) point out that overconfidence (underconfidence) may arise from a failure to recognize how difficult (easy) a task may be. Barber and Odean (2001) report that men on average are more overconfident than women. According to Montier (2002), over-optimism and over-confidence may well be part of the human condition as he notes that in virtually every language there are five to six times more optimistic than pessimistic adjectives.

Third, it appears that people order future outcomes by the similarity of the present evidence of these outcomes, in other words, they predict by representativeness, see Kahneman and Tversky (1973). One aspect of representativeness is the law of the small numbers, despising the statitical law of the large numbers. People tend to see patterns in random sequences of events, they draw conclusions on too little statistical information. The hot hand fallacy, documented by Gilovich, Vallone and Tversky (1985), is a classic example. They demonstrate that, at least in professional basketball, the hot hand is an illusion, contrary to the popular belief that players sometimes have 'hot' or 'cold' hands relative to their long-term average.

Fourth, the availability bias leads people to asses the probability of an event with the ease that such an occurrence can be brought to mind, see Kahneman and Tversky (1973). Plous (1993) notices that most people rate shark attacks as a more likely cause of death than a falling air plane part, while Death Odds from 1990 show that the chance of dying by a falling airplane part is 30 times greater than being killed by a shark. Remind the success of the shark movies Jaws I to Jaws IV which were released from 1975 to 1987.

Fifth, Kahneman and Tversky (1974) show that people, when making decisions, make insufficient adjustment up or down from a starting value that they call an anchor. Investors frequently use their purchase price as a reference point while specifically their price is of no importance to future prices of the stock. A person's assessment can be influenced by suggestions. The wheel of fortune from Kahneman and Tversky (1974) or a part of a person's social security number (Ariely e.a. (2003)) can serve as uninformative anchors that people use in forming their assessment.

People also make mistakes in evaluating the probability information of outcomes and thereby show errors in preference relative to the expected utility theory. From the prospect theory of Kahneman and Tversky (1979) it follows that people are loss averse. Given a choice between risky outcomes we are about two times as averse to losses than to comparable gains. In other words, losses give us more pain than gains make us happy. Next, people are subject to context sensitivity, see for example Kahneman and Riepe (1998). Here, mental accounting is a familiar phenomenon. People maintain multiple mental accounts, for example saving for holiday, saving for education and saving for retirement. They make decisions account by account, which can be sub-optimal. Moreover, their decision making process can differ from account to account.

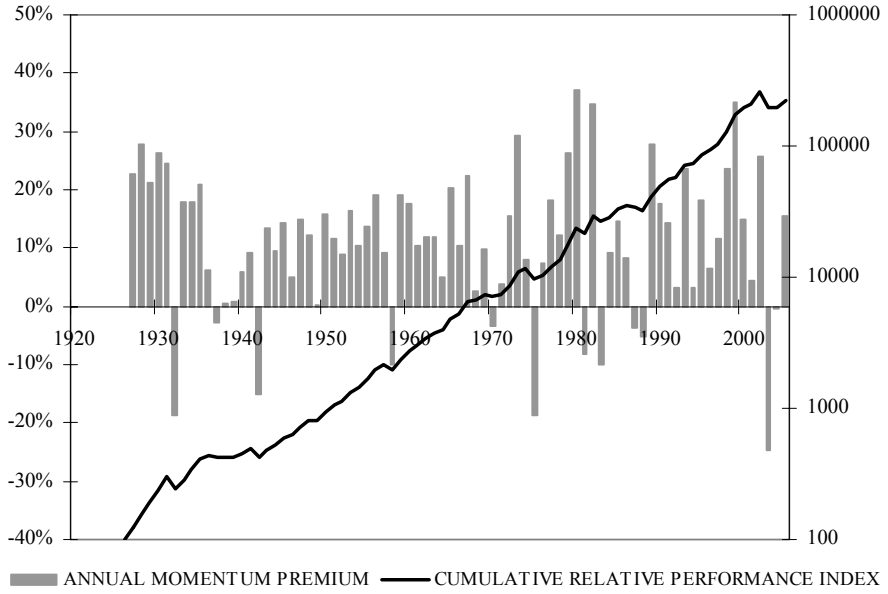
1.3.3 Behavioural explanation for predictability in stock returns

According to behavioural finance, the value effect is the result from extrapolation behaviour of investors. Due to the representative heuristic, they expect good earnings figures to continue and forget about the possibility that due to (for example) changing market conditions the earnings development will not hold on to be extraordinary. Hereby, (growth) stocks with a string of good earnings figures become expensive while (value) stocks with a string of bad earnings figures become cheap, see Lakonishok, Shleifer and Vishny (1994) for this reasoning. Buy low, sell high and mean reverting earnings development will result in the value premium. Obviously, risk does not matter here. Studies from La Porta (1996) and La Porta e.a. (1997) support this view as earnings expectations of equity analysts fit this pattern and a significant portion of the return difference between value and glamour stocks is attributable to earnings surprises at the earnings announcement date.

The extrapolation behaviour of analysts also could explain the observed mean reversion in stock prices, first documented by DeBondt and Thaler (1985). For the momentum effect, shown in Figure 1.4 and Table 1.7 for the American stock market, anchoring plays a role. Investors get fear of heights for stocks that perform (relatively) good as they use previous prices as an anchor. They have some reserves in pushing up the price of winners even further, even if the news flow is good. These reserves, on average, secure a continuing outperformance. For losers, the reverse applies. Too early, investors think the price is too low as previous high prices serve as an anchor. This makes it difficult to say goodbye in stead of good buy, even with a flow of bad news. In other words, in the long term there is overreaction and in the short term there is underreaction. The study of George and Hwang (2004) supports the view that anchoring is involved in the momentum effect as the '52-week high' investment strategy is superior to a simple sort on returns as a momentum indicator. The '52-week high' strategy explicitly links to a previous high in the stock price that might serve as an anchor, as it defines momentum as the distance from the current price to the previous high. For the losing stocks that do not only underperform the market but also decline in price, mental accounting seems to play a role next to anchoring. Odean (1998) suggests that investors are reluctant to realize their losses.

Fama and French (1996) call the short term continuation the "main embarrassment of the three-factor model". However, they do not exclude the possibility that it is the result of data snooping. Hong e.a. (2000) argue that the profitability of momentum stocks declines sharply with firm size.

FIGURE 1.4
PERFORMANCE OF AMERICAN WINNER STOCKS VERSUS LOSER STOCKS FOR THE PERIOD 1927-2005 AS MEASURED BY THE FAMA AND FRENCH (1996) FACTOR 'UPS MINUS DOWN'



SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU/PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

TABLE 1.7
THE MOMENTUM PREMIUM FOR THE AMERICAN STOCK MARKET BASED ON ANNUAL DATA FROM FAMA AND FRENCH (1996) OVER THE PERIOD 1927-2005

	1927-1952	1953-1978	1979-2005	1927-2005
ARITHMETIC AVERAGE	10.4%	10.5%	12.0%	11.0%
STANDARD DEVIATION	11.6%	10.1%	15.0%	12.3%
T-VALUET (FOR ZERO MEAN)	4.60	5.30	4.13	7.93
COMPOUNDED AVERAGE	9.4%	9.6%	10.5%	10.1%
MEDIAN	12.0%	11.2%	14.4%	11.9%
HIT RATIO	88.5%	88.5%	77.8%	84.8%
NUMBER OF YEARS	26	26	27	79

SOURCE: WWW.MBA.TUCK.DARTMOUTH.EDU/PAGES/FACULTY/KEN.FRENCH/DATA_LIBRARY.HTML

The well known 'Sell in May'-effect, extensively documented by Bouman and Jacobsen (2002), might derive from investors psychology as well. It refers to the pattern that stock markets tend to show attractive returns in the 'winter' period November through April, while the 'summer' period from May through October generally is rather lacklustre. In the next chapter we will present support for the hypothesis that this seasonal effect is due to investors' overoptimism. Investors usually look forward to a new year full of

optimism, but most of the times reality is not as rosy as expected. This becomes clear after a few months in the new year. The adjusting of rosy expectations to 'though' reality subsequently leads to the lacklustre summer period at the stock markets.

1.4 Purpose of this book

From a social economic point of view it is desirable that prices reflect true values, as pricing guides the economic activities in our society. Mispricing can lead to inefficient allocation, thereby depressing our prosperity. Moreover, a lack of public confidence in the efficiency of the capital markets may undermine their functioning. Therefore, research into investment opportunities, whether it is performed from an academic point of view or simply a search for risk free profits, serves society.

Here, we concentrate on the question whether the stock market is efficient or leaves room for exploitable investment strategies. We limit our focus to five possible anomalies apart from the size, value and momentum effect documented above, as we discuss the seasonal 'Sell in May'-effect in the stock market and four cross-sectional patterns which involve IPO's, mergers and acquisitions, insider trading and index revisions.

For an investor this question has practical relevance. In an efficient market it makes no sense to hire an active manager. Net of fees, only monkeys do it for peanuts, the manager will probably underperform. However, in a market that leaves room for investment strategies that deliver economically meaningful profits it makes sense to select an active manager who tries to exploit these opportunities as long as the fee is smaller than the expected benefit. From a purely theoretical point of view, it does not matter in a situation of complete market equilibrium whether you choose between active or passive management, as the fee equals the return difference between an actively managed portfolio and a passively managed portfolio. Obviously, not all investors can be passive investors. At least a part of them has to be active managers to reach a state of market efficiency.

1.5 Outline

In the subsequent chapters we discuss five patterns that seem to be anomalies, as we mentioned before. The choice to examine these anomalies follows personal interest as well as practical relevance to investors. These patterns do not require high frequency trading and therefore might offer an

opportunity to investors after including transaction costs. We will first summarize the patterns here, starting with the one that seems to have the highest economic significance.

1.5.1 'Sell in May'-effect

The market maxim "Sell in May and go away" is a simple but profitable one. On average, stocks deliver close to zero returns in the six month period from May through October, only giving a risk premium from November through April. This effect, however, has not been widely covered in academic literature. In Chapter 2 we examine the hypothesis that the seasonal pattern is caused by an optimism cycle. Towards year end, investors start to look towards next year, often with overly optimistic expectations. This results in attractive returns for stocks. Several months into the year, this initial optimism becomes hard to maintain and the stock market experiences a summer lull. A zero-investment global sector-rotation strategy based on this theory appears to be highly profitable. Global earnings growth revisions also follow a seasonal pattern parallel to that of the stock market. Finally, in a separate analysis for the US stock market, investors' optimism as measured by the initial returns on IPOs almost completely capture the results of the sector-rotation strategy. All these findings support the optimism-cycle hypothesis.

1.5.2 IPOs

The research into IPOs centers around three issues. The initial underpricing, the long-term relative performance and the difference between hot and cold issue markets. Especially the initial underpricing offers an attractive opportunity for investors. In Chapter 3 we examine the Dutch IPO market between 1977 and 2001. It concerns a relatively large and survivorship bias free dataset. Using a sector-specific reference portfolio to calculate the relative performance of the IPOs, we find an average initial underpricing level of 17.6%. The median initial return is 5.0%, while there are negative initial returns in only 17% of the IPOs. After the first trading day, during their first three years of listing, IPOs on average underperform their benchmark by a cumulative 10.0%, but this result is statistically insignificant. The period 1997 – mid 2000 was a true hot-issue period for growth stocks: their level of initial underpricing was 35.8%, compared to 9.2% during cold-issue periods. These growth IPOs also significantly underperform their benchmark by 38.4% after three years.

1.5.3 Mergers and acquisitions

Agrawal and Jaffe (2000) conclude, based on an extensive literature study, that many papers using different methodologies and different samples for both the United States and the United Kingdom document negative long term abnormal performance for mergers. In Chapter 4 we examine the short-term reaction of stock prices and analysts' earnings estimates to the announcement of a merger or acquisition for a global sample of mergers and acquisitions. Targets and merging firms outperform the market in the period before and on the day of the announcement. However, merging firms show a significant underperformance immediately thereafter. Moreover, we find a lack of upward revisions in consensus earnings estimates for the post-announcement years. This suggests that synergies are hard to find. Combined with the frequently documented long run underperformance, this suggests avoiding merging stocks in a portfolio.

1.5.4 Insider trading

Several studies document that insider trades have superior returns, see for example Lakonishok and Lee (2001) and Seyhun (1998). In general, insider purchases precede outperformance while insider selling predicts (marginal) underperformance. Exception to this rule, according to Scott and Xu (2004), are small sales that account for small percentages of shares owned. In Chapter 5 we examine the profitability of insider trading on Euronext Amsterdam. To improve market transparency, disclosure of insider trading has been required in the Netherlands since April 1999. Both a short-term event study and a 6-month buy-and-hold strategy reveal that insiders as well as outsiders mirroring insiders are able to realize abnormal returns. We report outperformances for insider purchase portfolios of between 8.9% and 9.3% over 6 months, after correcting for possible size and value/growth effects in our sample.

1.5.5 Index revisions

To date, six hypotheses have been offered to explain the effect of index revisions on stock prices. These vary from temporary price pressure due to index-related trading to permanent price effects due to a variety of reasons. Despite the growing amount of literature documenting several aspects of index revisions, results and conclusions differ widely. In Chapter 6 we examine the annual revision of the AEX index in the Netherlands. This particular index is interesting, since the revision rules enable investors to anticipate changes in both constituents and index weights long in advance.

Our results suggest that attention and temporary price pressure play a role in the observed revision effect. A portfolio containing those stocks expected to benefit from the index revision is showing an outperformance of up to 7% in the weeks before the revision, while losers are unaffected. Around the revision day we find indications of temporary price pressure for winners as well as losers.

Chapter 2

The Optimism Cycle: Sell in May

2.1 Introduction

The market maxim "Sell in May and go away" is a simple but profitable one. On average, stocks deliver close to zero returns in the six-month period from May through October, only giving a risk premium from November through April. This pattern is evident in almost every country in the world. Although this seasonal indicator is a very powerful stock market timing tool which has been known for decades[5], it has not been widely covered in academic literature. This may be due to the fact that there is, as yet, no well established consensus about the underlying causes for this remarkable pattern.

Recently, two explanations have been put forward for the seasonal cycle. Firstly, Bouman and Jacobsen (2002) find that the size of the effect is significantly related to both the length and the timing of vacations. However, they conclude "… history and practice tell us that the old saying is right, while stock market logic tells us it is wrong. It seems that we have not yet solved this new puzzle.". Secondly, Kamstra, Kramer and Levi (2003) and Garret, Kamstra and Kramer (2005) attribute the seasonal pattern to a time-varying equity premium influenced by the Seasonal Affective Disorder (SAD) effect, the so-called winter depression. Evidence taken from psychological literature shows that depression lowers one's willingness to take risk.

We examine the hypothesis that the seasonal pattern results from an optimism cycle in which, in the last quarter of the year, investors start looking forward to the next calendar year[6]. At first they are usually too optimistic about the economic outlook and this optimism results initially in

[5] Bouman and Jacobsen (2002) note that a written reference to the Sell in May effect can be traced back as far as the Financial Times of May 30, 1964, page 2.

[6] Implicitly we assume that investors think in calendar years instead of twelve-month forward-rolling periods. As far as we know there is no academic evidence (yet) for calendar-year framing. However, this phenomenon seems likely to us and also appealed to psychologists we contacted. For example, budgeting, performance targets and promotions are frequently tied to calendar years, and a number of people are inclined to make New Year's resolutions on the first of January. Moreover, psychological experimental research suggests that people anchor on particular cycles in the calendar when they attempt to recall a memory, see Anderson (2005) for an overview of calendar effects in autobiographical memory.

attractive returns on stocks[7]. However, several months into the year, reality catches up with them, they become more pessimistic and the stock market experiences a summer lull. In this way, psychological factors repeatedly make a fool of investors. So in the six-month period from November through April investors should overweight equities and during the summer period from May through October they should be underweight.

The optimism-cycle hypothesis assumes that the perceived outlook for the economy and earnings varies during the year. As year end approaches, market participants start looking forward to the next year and are overly optimistic about the growth prospects for the economy and earnings. Cyclical companies benefit the most in such an anticipated macro-economic environment. Their turnover and earnings are heavily dependent on the economy. The reverse applies to defensive companies whose growth is relatively stable and less affected by fluctuations in the economic cycle. So, during the winter, the outlook for cyclical stocks would be relatively good while the outlook for defensive stocks would be relatively bad. As the year progresses, this reverses around the time of the summer lull in the stock market. Therefore, according to the optimism-cycle hypothesis, investors' preferences are biased towards cyclicals during winter and towards defensives during summer.

To test the optimism-cycle hypothesis we employ the MSCI World sector indices and examine a global zero-investment strategy that is long in cyclical stocks and short in defensive stocks during the winter period, and short cyclicals and long defensives during the summer. Such a strategy stems from the seasonal optimism-cycle hypothesis. So, in contrast to previous research, we distinguish a seasonal pattern for the asset class equities as well as for sectors.

The global zero-investment seasonal sector-rotation strategy yields an average monthly log performance of 0.56% during our sample period from 1970 through 2003 which translates into an annualized simple return of 7%. These results are impressive and highly significant. The strategy works during both up and down and low and high volatility markets. Regression analyses support these results. After correction for the market timing capabilities of the strategy, we estimate alpha to be between 0.30% and

[7] Specifically the optimism of analysts and strategists is well-known and documented by for example Easterwood and Nutt (1999) and Chung and Kryzanowski (2000).

0.40% a month, with the remainder of the performance coming from timely beta (de)leveraging.

The performance of cyclical versus defensive stocks could originate from a change in the perceived economic outlook. We suppose that, during the last quarter, investors start to focus on the next calendar year. There is then more room for traditional optimism as, according to the optimism hypothesis, they begin to look forward over a longer time period. This could also result in a seasonal cycle in analysts' revisions of the expected earnings growth rate. As the reference frame primarily concerns calendar-year periods, they may feel increasing pressure to start revising their overly optimistic estimates from the summer onwards to coincide with the release of first-quarter earnings figures. Therefore, we examine whether there is a seasonal cycle in earnings revisions. If such an earnings revisions cycle does appear to exist, this would also support the hypothesis that an optimism cycle exists.

We document a seasonal pattern in the change of the expected global earnings growth rate, as well as a link between these changes and both the performance of the stock market and the relative performance of cyclicals versus defensives.

In a separate analysis for the US stock market we check the robustness of our results in a Fama and French (1993) context by correcting for size and value factors. Next, as a more direct test of the link between the seasonality and the hypothesized optimism cycle, we add an investors' optimism variable into our analysis. We will show that the spectacular results of the sector-rotation strategy are parallel to investor's optimism as measured by the initial returns of IPOs.

The "Sell in May"-effect for the stock market as a whole, the existence of a seasonal sector cycle, a parallel pattern in earnings growth revisions and the seasonality in investors' optimism as measured by initial returns on IPOs support the hypothesis that the 'Sell in May'-effect is caused by a seasonal cycle in investors' optimism, which we call the optimism cycle. As far as we know we are the first to document a seasonal sector effect, a seasonality in earnings growth revisions and a seasonality in initial returns on IPOs.

The remainder of this chapter is organized as follows: in the next section we give a more extended review of the literature on this subject. We then present our results in the third section and round off in section four with a summary and our conclusions.

2.2 Literature

Despite the fact that the 'Sell in May'-effect has been very profitable - it lowers risk for free during the six-month summer period from May to October - and persists over time and markets, the seasonal pattern has received relatively little attention. The pattern is clearly evident in historical returns, but explanations vary and there is no agreement at all about the underlying causes. Here, we discuss the two main contributions on this subject. They focus on summer vacations and winter depression as possible explanations for the seasonal cycle.

In their extensive study, Bouman and Jacobsen (2002) show that the 'Sell in May'-effect exists in 36 of the 37 countries they cover. Their sample includes both developed and emerging markets. Their results suggest that this seasonal pattern has existed for a very long time. In the United Kingdom they find evidence to support the theory going back to 1694. As they aptly remark, the case for data mining is weak as the maxim is well-known and has existed for decades. Investors have also been able to take advantage of this anomaly for many years. The 'Sell in May'-effect is not related to risk and robust to the January effect. The relative strength of the effect in different countries appears to be related to the timing and length of summer vacations. This suggests that vacations bring about changes in risk aversion. However, in their subgroup of southern-hemisphere countries, where summer vacations are at a different time to those in the northern hemisphere, they also find higher returns in the November-April period. At the end, they leave the seasonal anomaly unexplained.

Kamstra, Kramer and Levi (2003) link the seasonal nature of stock market returns to Seasonal Affective Disorder (SAD). SAD is defined as a form of major depressive disorder, caused by the shorter days in the fall and winter. According to Dilsaver (1990), SAD symptoms can occur from September onwards and they may include sadness, fatigue, loss of interest in sex and social withdrawal. Experimental psychological research links a decreased willingness to take risk, including financial risk, to depression. Therefore, market participants with varying degrees of SAD can influence overall market returns. In the fall they become increasingly risk averse, resulting in a higher risk premium. As the days get longer, their risk tolerance improves and the risk premium decreases again. This leads to lower returns in the fall and higher returns in the winter.

Garret, Kamstra and Kramer (2005) explore the SAD effect in the context of a conditional CAPM framework. They study returns for the United States, Japan, the United Kingdom and Sweden in the northern hemisphere and New Zealand and Australia in the southern hemisphere. Their results suggest that the SAD effect is fully captured in a model which allows for time variation in market risk and the market price of risk. They state that "… trying to exploit the SAD effect would not represent a profitable trading strategy in the sense of earning abnormal risk-adjusted returns since a changing market risk premium accommodates the seasonality…".

The link between the weather and stock market returns is not a new one. Saunders (1993) shows that returns on Wall Street are positively correlated to the amount of sunshine. Hirshleifer and Shumway (2003) confirm this theory on an international level. Cao and Wei (2004) find evidence for an inverse relationship between temperature and stock market returns.

However, the assumption that the weather affects stock market returns by causing mood changes has been criticized. The correlation between weather variables and stock market returns might be a spurious one. Goetzman and Zhu (2005) find no difference in individuals propensity to buy or sell equities on cloudy days as opposed to sunny days. Moreover, the study of Kamstra, Kramer and Levi (2003) has been specifically criticized by Kelly and Meschke (2004) who note that medical literature documents time-series evidence of seasonal patterns in depression and suggests a link between depression and risk aversion, but that there is no evidence for a time-series relationship between changes in depression and changes in risk aversion. They also highlight other studies that find that depression peaks between December and February.

One basic shortcoming of the SAD-based explanation for the seasonal cycle is that it does not allow for the attractive stock market returns which have historically occurred in November. Even in October stock market returns have been slightly above average, while unattractive returns start as early as May.

The summer holiday and the SAD-based explanation for the seasonal pattern in the stock market share a common disadvantage. Both embroider on a pattern that is known in advance to have a cycle parallel to the seasonal pattern in the stock market. Therefore, they have appearances of data mining against them.

We put forward the optimism-cycle hypothesis as an explanation for the seasonal pattern in the stock markets. People are optimistic by nature. For example, Weinstein (1980) documents that people overestimate their chance of getting old whereas they underestimate their chance of getting fired. In general, there is a tendency for people to overestimate the likelihood of good things happening more than bad things. The optimism bias is derived from the illusion of control and the self-attribution bias. The illusion of control refers to the tendency for people to believe that they can control or at least influence the way things turn out which they actually cannot. The self attribution-bias or self-serving bias is the inclination of people to attribute positive results to internal factors like skill but negative ones to external factors. These biases are widely known and documented in articles like Daniel, Hirshleifer and Subrahmanyam (1998) and Gervais and Odean (2001) or behavioral finance books like Shefrin (2002).

We suggest that, in general, investors and analysts are too optimistic about the prospects for the economy and for the earnings' outlook. As all human beings, they demonstrate an optimism bias. As earnings figures and analysts' earnings estimates primarily concern calendar-year periods, a time will come during the year when it will become more difficult to maintain the initial optimism. For example, first quarter earnings figures might serve as a catalyst for analysts and investors to start facing reality. Towards year end, the level of optimism decreases while investors start focusing on (too optimistic) expectations for the next calendar year. In contrast to the SAD-effect, the optimism-cycle hypothesis leaves room for attractive returns in November.

We note that the optimism-cycle hypothesis fundamentally differs from the SAD effect. The SAD effect is a risk-based explanation that assumes a seasonal cycle in the discount rate used to estimate the current value of future earnings. The SAD-based explanation assumes rather large swings in investors' risk appetite. They are risk neutral in summer and risk averse in winter. The optimism-cycle hypothesis assumes that the perceived outlook for earnings has a seasonal cycle, which results in an anomaly in the stock market.

To examine the optimism-cycle hypothesis we test a global zero-investment strategy that is long in cyclical stocks and short in defensive stocks during the winter period, and short in cyclicals and long in defensives during the summer. As previously mentioned, such a strategy stems from the hypothesized seasonal optimism cycle and if such a strategy were to perform well this would support the optimism-cycle hypothesis. Next, we examine

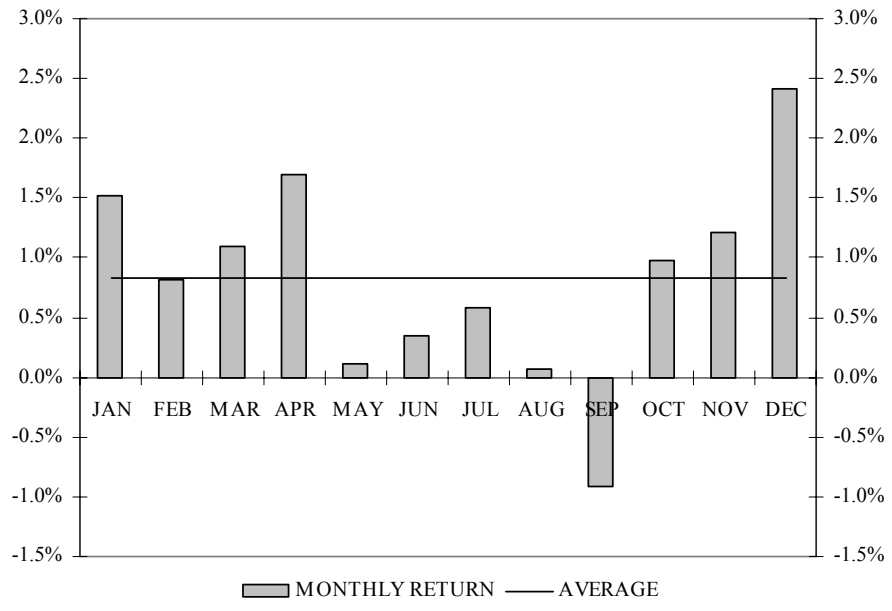
analysts' global earnings growth revisions to check for seasonality. In a separate analysis for the US stock market we examine the robustness of our results, as well as the link between the returns from our sector-rotation strategy and investors' optimism. In the next section, we will present our empirical results.

2.3 Empirical results

2.3.1 The seasonal pattern in the global stock market

As can be seen from Figure 2.1, for the period 1970-2003, global stock returns as measured by the MSCI World index in US dollars have, on average, been low or negative from May through September. The best months of the year are December, April and January, in this order. Table 2.1, panel A shows the returns for the 'Sell in May'-strategy, comparing the six-month November through April return with that of May through October. We label these six-month periods as winter and summer. On average, the return differs a highly significant 7.6%. We calculate a success ratio to indicate the frequency that returns during winter are higher than during

FIGURE 2.1
MONTHLY AVERAGE TOTAL LOG RETURN ON THE MSCI WORLD INDEX IN US DOLLARS (1970-2003)



summer. The success ratio of 64.7% indicates that this strategy works every two out of three calendar years.

TABLE 2.1
TOTAL LOG RETURN FOR THE MSCI WORLD INDEX FOR THE TWO SIX-MONTH PERIODS 'WINTER' AND 'SUMMER'

	WINTER	SUMMER	DIFFERENCE	T-VALUE	SUCC. RATIO
PANEL A					
NOVEMBER THROUGH APRIL AND MAY THROUGH OCTOBER					
1970-2003	8.8%	1.2%	7.6%	3.14 ***	64.7%
1970-1986	9.5%	2.0%	7.5%	2.06 **	64.7%
1987-2003	8.0%	0.3%	7.7%	2.34 **	64.7%
PANEL B					
DECEMBER THROUGH MAY AND JUNE THROUGH NOVEMBER					
1970-2003	7.7%	2.3%	5.4%	2.35 **	76.5%
1970-1986	7.2%	4.4%	2.8%	0.80	64.7%
1987-2003	8.1%	0.2%	8.0%	2.73 **	88.2%
PANEL C					
OCTOBER THROUGH MARCH AND APRIL THROUGH SEPTEMBER					
1970-2003	8.0%	1.9%	6.2%	2.14 **	61.8%
1970-1986	9.3%	2.2%	7.1%	1.71 *	70.6%
1987-2003	6.8%	1.6%	5.2%	1.27	52.9%

*, ** AND *** DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY

When we divide our sample into two seventeen year subperiods, the results hardly change. From 1970 to 1986 the return between winter and summer differs 7.5% while this is 7.7% for the second subperiod from 1987 to 2003. Both subperiods give significant results with t-statistics above 2 and a success ratio of 64.7%.

When we move the six-month period one month forwards or backwards (see Table 2.1, panels B and C) the results are somewhat weaker. When December is the starting month for the winter period, the difference between winter and summer is 5.4%. This is obviously below the 7.6% recorded in panel A, but still very high. In addition, the success ratio increases to 76.5%. The two subperiods both show an outperformance for the winter period, but for the first subperiod the results are statistically insignificant although the sign and success ratios are on the right side. When October is the starting month, winter outperforms summer by a significant 6.2% on average. The success ratio equals 61.8%. For both subperiods results are statistically insignificant, but again, sign and success ratios are on the right side.

2.3.2 The seasonal pattern for global cyclicals vs defensives

In this section we will examine the zero-investment seasonal sector-rotation strategy that is long in cyclical stocks and short in defensive stocks during the winter period, and short in cyclicals and long in defensives during the summer. As mentioned above, such a strategy stems from the hypothesized seasonal optimism cycle. We will discuss the returns from this strategy and then move on to discuss risk. We also check whether the strategy is just timing the market or whether there also is a proper sector selection. In other words, whether the sector strategy is just mirroring seasonal effects on the global stock market at a sector level, or whether it adds value over and above the well-known 'Sell in May'-effect.

We use the MSCI 38 industry price indices in US dollars from the old industry classification, which are available from 1970 to 2001 and the 24 industry-group indices from the new Global Industry Classification Standard (GICS) which was co-developed by MSCI and Standard & Poor's. The latter are available from 1995 onwards. All MSCI data have been downloaded from Thomson Financial Datastream.

For this study, we have assigned all industries to one of four main sectors: cyclicals, defensives, growth stocks and financials[8]. The category growth stocks is perhaps the least obvious. We define information-related industries (content and processing) like telecom, media and information technology as growth. The subjective idea behind this classification rule is that, during the period our study covers, the importance of information for the economy has gradually been increasing. Cyclicals are made up of energy, materials, capital goods (excluding information technology), services and cyclical consumer good stocks. Defensives are defensive consumer goods, pharmaceuticals and utilities. Finally, financials include real estate stocks in addition to banks and insurers. Table 2.10 in the appendix provides a detailed overview of the classification we use. For the purpose of this paper we only examine cyclicals versus defensives, which are traditionally known respectively for their high and low exposure to the economy.

We calculate monthly month-end market capitalization weighted price return indices for the period 1970 to 2003 for each of the four main sectors. From 1995 onwards, we use the new GICS industry group indices in our

[8] The categorization into cyclicals, defensives, growth stocks and financials is not uncommon in daily investment practice. A practitioner's book like Taylor (1998) also contains a categorization like this.

calculations. Subsequently, we calculate monthly log returns from these main sector indices, which we also use in our regression analyses.

Like the analysis for the stock market as a whole, we use a seasonal cycle with two six-month periods (instead of, for example, a five-month and a seven-month period). In this way we are able to prevent a structural bias towards the asset class equities or towards either cyclical or defensive stocks. So, over a period of a year there is no net exposure in equities or in cyclicals versus defensives.

As Table 2.2 panel A shows, the zero-investment strategy is highly profitable. On average, the monthly performance is 0.56% with a t-statistic of 4.09 and a monthly success ratio of 58.1%. On an annual basis the success ratio increases to 76.5%. So, in approximately 3 out of 4 years the sector-rotation strategy is successful. For both subperiods results appear to be significant, with the second subperiod delivering the strongest performance. For the first subperiod from 1970 to 1986, the strategy earns 38 basis points a month and has an annual success ratio of 70.6%. From 1987 to 2003, the strategy yields 74 basis points a month with a success ratio of 82.4%. When

TABLE 2.2
MONTHLY PERFORMANCE OF A ZERO-INVESTMENT STRATEGY WHICH IS LONG CYCLICALS AND SHORT DEFENSIVES DURING WINTER, AND SHORT CYCLICALS AND LONG DEFENSIVES DURING SUMMER. RESULTS ARE MEASURED BY THE DIFFERENCE IN PRICE RETURN, EXCEPT FOR THE 1995-2003 PERIOD FOR WHICH WE HAVE TOTAL RETURN DATA AVAILABLE

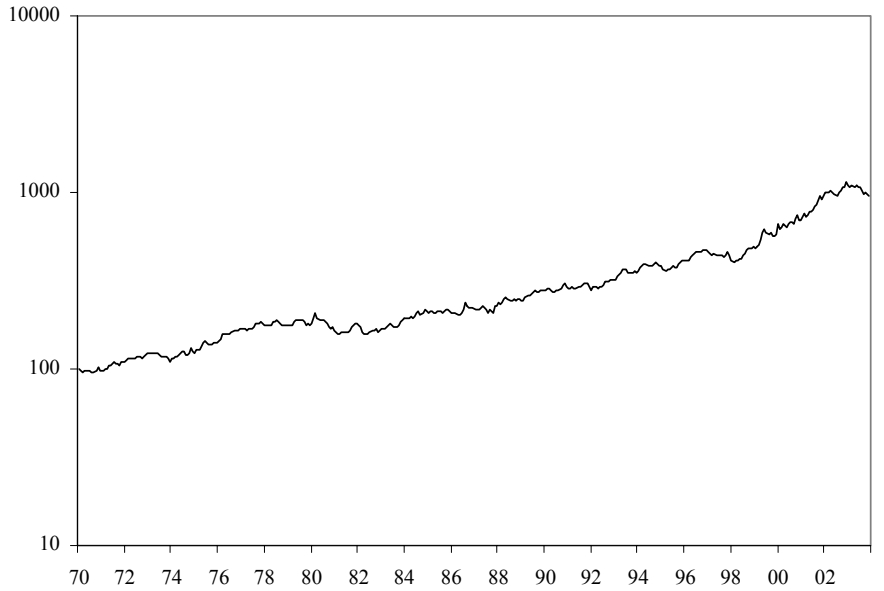
	AVERAGE MONTHLY RETURN	T-VALUE	SUCCESS RATIO MONTHLY	SUCCESS RATIO ANNUAL
PANEL A				
NOVEMBER THROUGH APRIL AND MAY THROUGH OCTOBER				
1970-2003	0.56%	4.09 ***	58.1%	76.5%
1970-1986	0.38%	2.34 **	55.4%	70.6%
1987-2003	0.74%	3.36 ***	60.8%	82.4%
1995-2003 (TOTAL RETURN)	0.88%	2.53 **	60.2%	77.8%
PANEL B				
DECEMBER THROUGH MAY AND JUNE THROUGH NOVEMBER				
1970-2003	0.56%	4.05 ***	58.6%	79.4%
1970-1986	0.29%	1.77 *	53.4%	70.6%
1987-2003	0.82%	3.76 ***	63.7%	88.2%
1995-2003 (TOTAL RETURN)	0.67%	1.91 *	60.2%	77.8%
PANEL C				
OCTOBER THROUGH MARCH AND APRIL THROUGH SEPTEMBER				
1970-2003	0.09%	0.66	51.7%	52.9%
1970-1986	-0.04%	-0.26	49.5%	47.1%
1987-2003	0.23%	1.01	53.9%	58.8%
1995-2003 (TOTAL RETURN)	0.46%	1.29	56.5%	66.7%

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

we include dividends into our analysis, results are very similar. Even for the very short nine year period of 1995-2003 for which we have total return data available, results are already highly significant with a monthly performance of no less than 88 basis points.

Figure 2.2 shows the cumulative performance index. As can be seen, the performance gradually rises over the course of the 34-year sample period. The largest drop from a previous high is a negative log return of 27%, which occurs 26 months after the high of February 1980. But, 52 months later, in July 1984, a new high in the performance index is set.

FIGURE 2.2
CUMULATIVE LOG PERFORMANCE INDEX OF THE ZERO-INVESTMENT STRATEGY WHICH IS LONG CYCLICALS AND SHORT DEFENSIVES DURING WINTER AND SHORT CYCLICALS AND LONG DEFENSIVES DURING SUMMER. RESULTS ARE MEASURED BY THE DIFFERENCE IN PRICE RETURN



When we move the six-month period forwards by one month, the results are hardly affected, see Table 2.2, panel B. For the whole period they actually become even stronger as the success ratio increases slightly. However, the difference between the first and second subperiods also increases. The first subperiod results weaken to a 0.29% monthly performance, which is only marginally statistically significant. In contrast, the second subperiod results improve with a highly significant monthly performance of 0.82%. By

moving the six-month period backwards by one month, as shown in Table 2.2, panel C, the sector-rotation strategy loses its economic and statistical significance.

November seems to be the best starting month for the seasonal sector-rotation strategy based on the strength of the results for both subperiods. This is in line with our results for the MSCI World Index and is also the same month that Bouman and Jacobsen (2002) start their winter period. Therefore, in the remainder of this paper we focus on the results for which positions in cyclicals and defensives are reversed at the end of October and at the end of April.

The sector-rotation strategy appears to be highly profitable, but it may also involve more risk. Therefore, we check the performance of the strategy during high volatility and down markets. These are the states of the world in which negative performance is least desirable. In order to do this we calculate the market volatility during the last 20 trading days of the current month and then rank the whole sample based on this volatility measure. We then split the sample into two parts, one with low volatility and one with high volatility. As we only have daily data available from 1973 onwards, we dropped the first three years from this analysis. As shown in Table 2.3, panel A, the investment strategy delivers a significant performance in low as well as high volatility markets. In fact, the performance in high volatility markets is 14 basis points a month higher than in low volatility markets.

Table 2.3, panel B contains the results for months with positive and negative excess returns, which we label as up and down markets. In both market conditions the strategy delivers a positive performance. For months in which the MSCI World Index delivers more than the risk free rate[9], the strategy, on average, returns 0.63% with a t-statistic of 3.50. In months with a negative realized risk premium the average performance is 0.47% with a t-statistic of 2.26. Whether we take volatility or risk premium, monthly success ratios are well above 50%. In fact, they vary between 56.5% and 58.8%.

[9] We use the three month Eurodollar LIBOR interest rate from the Financial Times as the risk free interest rate. The London Interbank Offered Rate (LIBOR) is the interest rate banks charge each other on short term money in England's Eurodollar market. These data have been downloaded from Thomson Financial Datastream.

TABLE 2.3
ZERO-INVESTMENT SECTOR-ROTATION STRATEGY PERFORMANCE DURING HIGH AND LOW VOLATILITY MARKETS AND DURING UP AND DOWN MARKETS

	AVERAGE MONTHLY RETURN	T-VALUE	SUCCESS RATIO	NUMBER OF MONTHS
PANEL A				
1973-2003				
LOW VOLATILITY	0.49%	2.76 ***	56.5%	186
HIGH VOLATILITY	0.63%	2.65 ***	58.6%	186
PANEL B				
1970-2003				
UP (POSITIVE RISK PREMIUM)	0.63%	3.50 ***	58.8%	221
DOWN (NEGATIVE RISK PREMIUM)	0.47%	2.26 **	57.2%	187

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

A more sophisticated approach to judging the characteristics of the strategy involves regression analyses to estimate Jensen's (1968) alpha, see Table 2.4, panel A. In panel B we use the Treynor and Mazuy (1966) model to assess the effect of market timing, which we will call gamma. They assume that beta depends linearly on the market excess return. Hereby we can measure how much of the strategy's performance is attributable to an increase in beta during a period of positive excess returns and vice-versa. For this purpose, we estimate the following regression equation,

$$R_t = \alpha + \beta(R_{m,t}-R_{f,t}) + \gamma(R_{m,t}-R_{f,t})^2 + \varepsilon_t$$

where
R_t is the (excess) return for the zero-investment strategy in month t,
$R_{m,t}$ is the market return in month t,
$R_{f,t}$ is the risk free rate of return in month t, and
ε_t is the error term.

The regression results for the whole sample period, as reflected in Table 2.4 panel A, are exactly in line with those reported in Table 2.2 panel A. Alpha equals 0.56% a month while the strategy had very little market exposure as measured by beta. The results are once again robust with both subperiods producing significant alphas of 0.39% and 0.74% a month. In the first subperiod the beta is 0.08, statistically significant, but of minor importance as the beta effect is relatively small compared to alpha. For example, the market excess return would have to be -5% to eliminate the monthly 0.39% return implied by alpha.

From Table 2.4, panel B we can see that alpha almost halves when we isolate the market timing capabilities of the investment strategy from the

performance. It is not surprising that gamma appears to be significant. Alpha decreases from 0.56% to 0.30%, but remains significant. In other words, roughly half of the performance is attributable to market timing and half is due to a 'truely' seasonal sector effect. The results between the subperiods differ. Both subperiods have a positive alpha, but in the second subperiod alpha has dropped to 0.23% a month, which is statistically insignificant. This suggests that between 1987 and 2003 most of the performance is attributable to market timing and less than half of the performance derives from sector selection.

TABLE 2.4
REGRESSION RESULTS FOR MONTHLY RETURNS OF THE ZERO-INVESTMENT SECTOR-ROTATION STRATEGY AS THE DEPENDENT VARIABLE. BETA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN AND GAMMA IS THE REGRESSION COEFFICIENT FOR THE QUADRATIC EXCESS MARKET RETURN. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS

	α	β	γ
PANEL A			
1970-2003	0.0056	0.03	
	(4.09) ***	(0.89)	
1970-1986	0.0039	0.08	
	(2.40) **	(1.94) *	
1987-2003	0.0074	-0.01	
	(3.36) ***	(-0.26)	
PANEL B			
1970-2003	0.0030	0.07	1.42
	(1.97) **	(1.96) **	(3.39) ***
1970-1986	0.0046	0.07	-0.44
	(2.47) **	(1.68) *	(-0.78)
1987-2003	0.0023	0.07	2.51
	(0.93)	(1.35)	(4.21) ***

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

To make a final judgement about the link between the 'Sell in May'-effect and the sector-rotation strategy, we estimate the following regression equation:

$$R_t = \alpha + \beta(R_{m,t}-R_{f,t}) + \gamma D_t(R_{m,t}-R_{f,t}) + \varepsilon_t$$

where D_t is a dummy variable that equals 1 for the six-month winter period and 0 for the six-month summer period. Hereby we make an explicit correction for the general 'Sell in May'-effect. With this equation we check whether the sector-rotation strategy is spanned by the market and by a simple "Sell in May" strategy, corresponding to an alpha that equals zero. As Table 2.5 illustrates, the regression's results are in line with the Treynor and Mazuy model. For the whole period, alpha is 0.40% while part of the performance comes from the 'Sell in May'-effect. Now, we find negative

betas. Surprisingly, in contrast to the Treynor and Mazuy model results, this analysis suggests that the first subperiod has a lower alpha. In general, non-zero alphas indicate that the zero-investment sector-rotation strategy cannot be replicated by a simple "Sell in May" market-timing strategy.

TABLE 2.5
REGRESSION RESULTS FOR MONTHLY RETURNS OF THE ZERO-INVESTMENT SECTOR-ROTATION STRATEGY AS THE DEPENDENT VARIABLE. BETA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN AND GAMMA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN MULTIPLIED WITH A DUMMY VARIABLE THAT EQUALS 1 IN WINTER AND 0 IN SUMMER. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS

	α	β	γ
1970-2003	0.0040	-0.21	0.52
	(3.11) ***	(-5.14) ***	(8.64) ***
1970-1986	0.0028	-0.10	0.35
	(1.79) *	(-1.82) *	(4.45) ***
1987-2003	0.0052	-0.28	0.66
	(2.63) ***	(-4.85) ***	(7.25) ***

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

To summarize, during our sample period from 1970 to 2003 there has been a global seasonal sector effect. Traditionally, cyclical stocks perform relatively well during winter, while defensive stocks' best period is the summer. On average, a zero-investment seasonal sector-rotation strategy that is long in cyclical stocks and short in defensive stocks during the winter period, and short in cyclicals and long in defensives during the summer delivers a log performance of 0.56% a month. This equals an annualized normal return of 7.0%, more than enough to compensate for the transaction costs involved, which we estimate at around 1%. Less than half of the investment strategy's performance stems from the general 'Sell in May'-effect. After corrections for the strategy's market timing capabilities we estimate alpha to be between 0.30% and 0.40% a month.

The cyclical pattern in stock returns could be caused by seasonal movements in the market risk premium, as Garret, Kamstra and Kramer (2005) suggest, but this cannot explain the abnormal returns of the zero-investment seasonal sector-rotation portfolio. Another explanation for the seasonal pattern is the variation in the expected cash flows rather than the discount rate used to calculate the present value of the future cash flows. This would explain the seasonal nature of the market as a whole as well as that of cyclicals and defensives. According to the optimism-cycle hypothesis, as the end of the year approaches, market participants start looking forward to next year and are overly optimistic about the growth prospects for the economy and earnings. As a result of this, the outlook for cyclical stocks is relatively good

during the winter and bad during the summer while the reverse is true of defensive stocks. For this reason, we will examine the analyst earnings growth revisions in the next section. If the optimism cycle does play a role, we might see a seasonal pattern in the earnings growth revisions for the stock market.

2.3.3 Analysts' earnings growth revisions

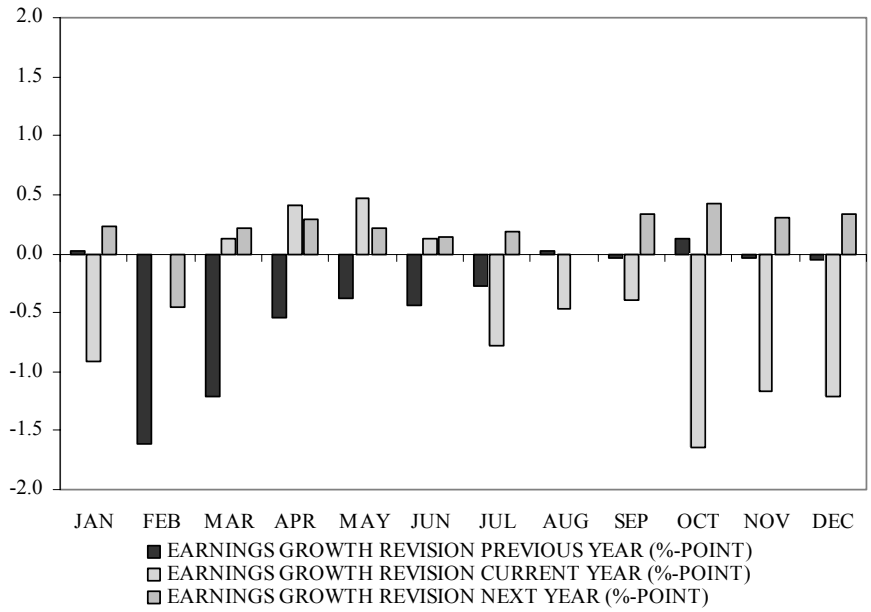
Prior research has shown that analysts make biased forecasts and misinterpret new information. Easterwood and Nutt (1999) demonstrate that analysts underreact to negative information and overreact to positive information. In short, they are overly optimistic. It is unclear whether this optimism stems from (1) sell-side incentives, e.g. Womack (1996), (2) analysts' need to access top executives' information, which is easier if they are positively biased towards the company, see e.g. McNichols and O'Brien (1996), or (3) the typical optimism of investors in general. We refer to Richardson, Teoh and Wysocki (2005) for a description of 'the earnings guidance game' in which management guides analysts' over optimistic expectations so that they are revised to beatable estimates just before the earnings announcement is made.

The optimism bias also applies to (top down) strategists, albeit to a lesser extent, as demonstrated by Chung and Kryzanowski (2000) and Darrough and Russel (2002). The findings are consistent with the theory described by Kahneman and Lovallo (1993) that analysts need a good relationship with management and that they act as insiders, assigning too much weight to positive news on the company's prospects and too little weight to negative information from the outside world. So, at least part of the analysts' optimism bias is not necessarily present in all investors. It is, however, unclear whether the rest is due to sell-side incentives (for analysts as well as strategists) or simply a case of general investor optimism. This is an essential question for the optimism-cycle hypothesis but not relevant for our quantitative analysis. We will focus on the question whether revisions in analysts' earnings growth estimates contain a seasonal cycle. From Thomson Financial Datastream we downloaded the monthly global aggregate data series from IBES which are available from 1988 onwards. These figures are released every third Thursday of the month, and are based on data up to and including the Tuesday before the third Thursday.

Figure 2.3 shows the changes in the earnings growth estimates for the MSCI World index. The dark bars illustrate that the earnings estimates for the previous calendar year are adjusted downward during the first half of the

year. Then, the earnings figures for the previous calendar year are released and analysts' estimates finally meet reality. The white bars indicate the changes in the earnings growth rate for the current year. During the first half of the year, analysts cut their earnings estimate for the previous year more than for the current year. By doing this they raise the estimated earnings growth rate for most months in the first half of the year. In other words, analysts fail to properly adjust their estimates for the current year. Initially, they stick to a 'this-year-growth-will-be-higher-scenario'. Their optimism about the earnings growth for the current year decreases from the second half of the year onwards. The further away their horizon, the more optimistic estimates become. The growth rate for the next year increases almost every month, as in general, earnings estimate revisions for the next year are less negative than for the current year.

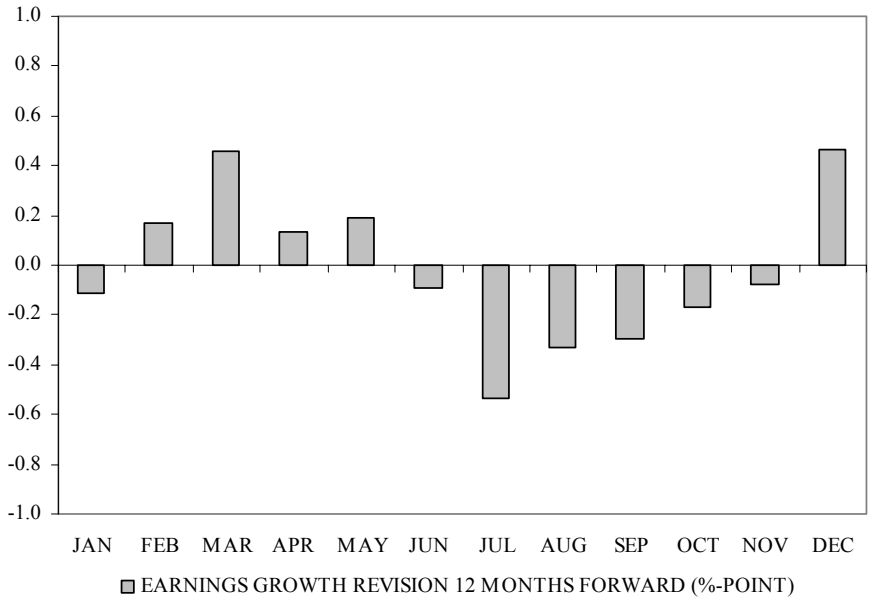
FIGURE 2.3
THE AVERAGE MONTHLY CHANGE IN THE EXPECTED EARNINGS GROWTH RATE FOR THE MSCI WORLD INDEX. THE DATA COVER THE PERIOD FROM 1988 TO 2003, CHANGES ARE IN PERCENTAGE POINTS



The analysts' behavior results in a nice seasonal cycle for changes in the twelve-month forward expected earnings growth rate, as shown in Figure 2.4. This growth rate is based on the twelve-month forward earnings estimates and the twelve-month trailing earnings estimates, and is also derived from IBES. The cycle of the expected earnings growth is pretty

much parallel to the seasonal cycle in the stock market. During the winter the expected twelve-month rolling forward earnings growth rate generally increases whereas it decreases during the summer. The earnings revision cycle lags the market-return cycle by roughly one month. But, remember that the earnings revisions data are released every third Thursday of the month. This means that revisions are compiled partly using data from the previous calendar month. It might also reflect the possibility that analysts incorporate prior price performance into their estimates, or that they are slow to factor new information into their estimates. Finally, it could also reflect a delay in information processing before revisions arrive in the database.

FIGURE 2.4
THE AVERAGE MONTHLY CHANGE IN THE TWELVE-MONTH ROLLING FORWARD EXPECTED EARNINGS GROWTH RATE FOR THE MSCI WORLD INDEX. THE DATA COVER THE PERIOD FROM 1988 TO 2003, CHANGES ARE IN PERCENTAGE POINTS



We checked whether the expected earnings growth rates play a role in the stock market. We examined whether changes in the expected earnings growth rate can provide any explanation for the market's excess return and for the relative performance of cyclical versus defensive stocks. Table 2.6 contains the regression results. Panel A shows that the change in the twelve-month forward expected earnings growth rate can explain neither the stock market's return nor the relative performance of cyclicals versus defensives. But we hypothesized that investors are inclined to focus on calendar years

instead of a twelve-month rolling forward period. Therefore, we composed a series in which we use the change in the current year estimates up to October. For November and December we take the change in the expected earnings growth rate for next year as we hypothesize that investors shift their attention to the next calendar year. The change in the expected earnings growth rate now appears to have a significant effect on the performance of the stock market and on the relative performance of cyclicals versus defensives, as shown in panel B of Table 2.6. Thus, changes in the twelve-month forward rolling earnings growth estimate do not provide any explanation, but a series that incorporates the hypothesized calendar-year thinking does yield significant results. This supports the theory that investors focus on the current year and look forward to the coming year when year end approaches.

TABLE 2.6
REGRESSION RESULTS FOR THE EXCESS MONTHLY RETURNS ON THE MSCI WORLD INDEX AND FOR THE RELATIVE PERFORMANCE OF CYCLICALS VERSUS DEFENSIVES AS DEPENDENT VARIABLES. BETA IS THE REGRESSION COEFFICIENT FOR THE PERCENTAGE POINT CHANGES IN THE EXPECTED EARNINGS GROWTH RATE. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS. THE RESULTS COVER THE SIXTEEN YEARS FROM 1988 THROUGH 2003

	α	β
PANEL A		
CHANGES IN THE TWELVE MONTH FORWARD ROLLING EARNINGS GROWTH RATE AS DEPENDENT VARIABLE		
EXCESS RETURN FOR THE MSCI WORLD INDEX	0.0006	0.0006
	(0.20)	(0.21)
CYCLICALS VERSUS DEFENSIVES	-0.0023	-0.0001
	(-0.99)	(-0.05)
PANEL B		
CHANGES IN THE EARNINGS GROWTH RATE FOR THE CURRENT YEAR FROM JANUARY THROUGH OCTOBER AND FOR NEXT YEAR FOR NOVEMBER AND DECEMBER AS DEPENDENT VARIABLE		
EXCESS RETURN FOR THE MSCI WORLD INDEX	0.0022	0.0054
	(0.70)	(2.51) **
CYCLICALS VERSUS DEFENSIVES	-0.0009	0.0044
	(-0.43)	(2.77) ***

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

In short, we documented a seasonal pattern in the change of the expected earnings growth rate, as well as a link between these changes and both the performance of the stock market and the relative performance of cyclicals versus defensives. In the next section we will perform a separate analysis for the US market for which we have size and value factors available, as well as a proxy for investors' optimism, the initial return on IPOs. This enables us to perform an extra robustness check as well as a more direct test to see

whether there is a link between the Sell-in-May effect and investors' optimism.

2.3.4 The seasonal pattern in the US

For the American stock market we use the monthly sector data from the website of Fama and French at the 30 industry portfolios level, as well the monthly data series for the benchmark factors R_m-R_f, SMB and HML which represent respectively the excess return of the market over the one-month Treasury bill rate, the size factor and the value factor as described by Fama and French (1993). Next, from Jay Ritter's website we use the monthly average initial returns of public offerings as a proxy for investors' optimism. As for the global analysis, we examine the 34 year period of 1970-2003 .

First, we examine whether the sector-rotation strategy in the United States mirrors the results for the MSCI World index. We use the definitions for cyclicals and defensive stocks that is comparable to the previous analysis for the MSCI World index. We refer to Table 2.12 in the appendix for classification details. As can be seen from Table 2.7 panel A, the results are in line with those for the MSCI World index which we reported in Table 2.4. Alpha equals 0.61% a month compared to 0.56% in our previous analysis. Again, the strategy has no market exposure as measured by beta. As in the case of the MSCI World index, roughly half of alpha derives from market timing. Table 2.7, panel B shows that alpha decreases to a significant 0.36%. These results are comparable to those for the MSCI World index.

TABLE 2.7
REGRESSION RESULTS FOR THE UNITED STATES FROM 1970 TO 2003 WITH MONTHLY RETURNS OF THE ZERO-INVESTMENT SECTOR-ROTATION STRATEGY AS THE DEPENDENT VARIABLE. BETA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN AND GAMMA IS THE REGRESSION COEFFICIENT FOR THE QUADRATIC EXCESS MARKET RETURN. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS

	α	β	γ
PANEL A			
	0.0061	0.04	
	(3.69) ***	(1.18)	
PANEL B			
	0.0036	0.06	1.11
	(1.90) *	(1.58)	(2.81) ***

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

Second, contrary to our global analysis, we now include the Fama and French factors 'size' and 'value' into our analysis for the American stock market. These factors capture the well-documented deviations from the one

factor CAPM, and these data are available for the United States. As Table 2.8 panel A shows, the sector rotation has a significant but small factor loading on value. Thereby, alpha decreases from 0.61% to 0.49%, but remains highly significant. These results suggest that the good performance of the sector-rotation strategy cannot be attributed to its exposure to small caps or value stocks, as in a Fama and French setting alpha also appears to be rather robust.

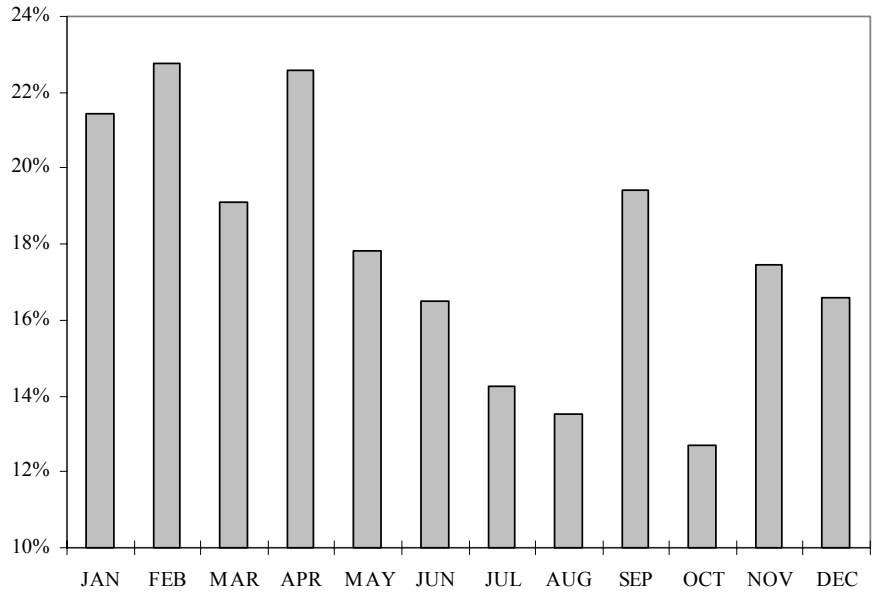
TABLE 2.8
REGRESSION RESULTS FOR THE UNITED STATES FROM 1970 TO 2003 WITH MONTHLY RETURNS OF THE ZERO-INVESTMENT SECTOR-ROTATION STRATEGY AS THE DEPENDENT VARIABLE. BETA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN, SMB IS THE SIZE FACTOR, HML IS THE VALUE FACTOR AND IPO IS THE AVERAGE INITIAL RETURN ON IPOS. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS

	α	β	SMB	HML	IPO
PANEL A					
	0.0049	0.0738	-0.0370	0.1496	
	(2.92) ***	(1.95) *	(-0.68)	(2.96) ***	
PANEL B					
	0.0010	0.0597	-0.0447	0.1337	0.0138
	(0.56)	(1.83) *	(-0.96)	(3.07) ***	(2.16) ***

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

Third, as a more direct test of our hypothesis that the returns of our sector rotation-strategy derive from an optimism cycle, we add the average return on initial public offerings to our set of independent variables. We interpret this variable as a proxy for investors' optimism. If alpha would be the result of an optimism cycle, we expect alpha to disappear when we include an optimism variable. In fact, the remaining alpha would be the original alpha corrected for optimism, which we expect to be absent. Table 2.8, panel B reports the regression results. With the inclusion of the average return for IPO's, alpha drops from a highly significant 0.49% in a Fama and French context to an insignificant 0.10%. The initial IPO return appears to be significant and captures practically the whole of the performance of the sector-rotation strategy. Figure 2.5 shows the remarkable seasonal pattern in the initial returns for IPOs. During the six-month winter period the initial return is 20.0% while in the summer this equals 15.7%, a difference of no less than 4.3% which is statistically significant. Neither this seasonality nor the sector seasonality has, to our knowledge, been documented before. To us, it seems hard to find a risk-based explanation that justifies such a difference in initial returns.

FIGURE 2.5
THE AVERAGE INITIAL RETURN ON IPOS IN THE US STOCK MARKET FOR THE PERIOD 1970-2003



While the sector classification obviously has some subjective elements, the results are robust for the use of alternative (tighter or loosened) definitions of cyclicals and defensives. To check, in a tightened definition for cyclicals and defensives, we no longer define energy stocks as cyclicals (one could argue that this industry is the least cyclical due to the oligopolistic nature of the market) and we remove pharmaceuticals from our defensive category (one could argue that they are growth stocks because of their above average long-term growth rates in turnover and earnings). We also use a loosened definition of cyclicals and defensives, including IT and media stocks in cyclicals and telecom in defensives. IT and media stocks can be seen as cyclical growth stocks while telecoms can be qualified as defensive utilities. Under this loosened definition, we only disregard financials in our analysis.

Table 2.9 shows the results for the different kind of main sector definitions. With the tightened definition, alpha in the Fama and French context increases from 0.49% tot 0.70% and remains unchanged in the loosened definition. Again, in both cases alpha is insignificant with the optimism proxy in the regression analysis, while the IPO return itself is a significant variable (results not reported here).

TABLE 2.9
REGRESSION RESULTS FOR THE UNITED STATES FROM 1970 TO 2003 WITH MONTHLY RETURNS OF THE ZERO-INVESTMENT SECTOR-ROTATION STRATEGY AS THE DEPENDENT VARIABLE. BETA IS THE REGRESSION COEFFICIENT FOR THE EXCESS MARKET RETURN, SMB IS THE SIZE FACTOR AND HML IS THE VALUE FACTOR. ALPHA IS THE CONSTANT. THE T-STATISTICS ARE GIVEN IN PARENTHESES BELOW THE COEFFICIENTS

	α	β	SMB	HML
PANEL A. STANDARD DEFINITION OF CYCLICALS VS DEFENSIVES				
	0.0049	0.0738	-0.0370	0.1496
	(2.92) ***	(1.95) *	(-0.68)	(2.96) ***
PANEL B. TIGHTENED DEFINITION OF CYCLICALS VS DEFENSIVES				
	0.0070	0.0167	-0.0271	0.1589
	(3.42) ***	(0.37)	(-0.41)	(2.60) ***
PANEL C. LOOSENED DEFINITION OF CYCLICALS VS DEFENSIVES				
	0.0049	0.0423	-0.0338	0.0976
	(3.00) ***	(1.16)	(-0.65)	(2.00) **

, ** AND * DENOTE SIGNIFICANCE AT THE 10%, 5% OR 1% LEVEL, RESPECTIVELY*

The results for the US market are in line with those reported for the global stock market. An extended analysis, corrected for size and value factors did not alter our previous findings, neither did a different definition for cyclicals and defensives. However, the seasonal pattern in the initial returns for IPOs, which we interpret as investors' optimism, appeared to be parallel to the stock market's seasonal cycle and explained the highly attractive returns achieved by our seasonal sector-rotation strategy. All the results for the US market support the hypothesized optimism cycle.

2.4 Summary and conclusions

The market maxim "Sell in May and go away" is a very powerful stock market timing tool which has been known for decades. Investors should overweight equities in the six-month winter period from November through April and be underweight during the summer period from May through October. This strategy works every two out of three years. To date, there is no well-established consensus about the cause for this remarkable pattern.

We put forward the optimism-cycle hypothesis as a possible explanation for the seasonal cycle. In the last quarter of the year, investors start looking forward to the next year, but because of an optimism bias they usually overstate the economic outlook. This optimism results initially in attractive returns on stocks but a few months into the year reality catches up with investors and they become more pessimistic resulting in a summer lull on the stock market. In this way, the psychology of investors repeatedly makes a fool of them.

Four factors support the optimism-cycle hypothesis. First, the fact that psychology is involved explains why investors would fall repeatedly into the same trap. Second, an investment strategy based on the optimism cycle realizes an impressive performance. A zero-investment global sector-rotation strategy based on this theory yields 0.56% a month and an annual success ratio of 76.5% during our 1970-2003 sample period. Less than half of this performance is attributable to the strategy's stock-market timing capabilities. We estimate pure alpha to have been between 0.30% and 0.40% a month. Third, earnings growth revisions show a seasonal cycle parallel to that of the stock market. Fourth, a separate analysis for the US market shows that size and value factors do not play a role, but investors' optimism as measured by initial returns on IPOs does. These initial returns show a seasonal pattern similar to the one in the stock market. Moreover, the initial returns on IPOs almost completely explain the highly attractive returns in the seasonal sector-rotation strategy that we documented. The existence of a seasonal sector cycle, apart from the 'Sell in May'-effect for the stock market as a whole, a parallel pattern in earnings growth revisions and in investors' optimism as measured by initial returns on IPOs support the hypothesis that the 'Sell in May'-effect is caused by a seasonal cycle in investors' optimism. To our knowledge, we are the first to document the seasonality in sector returns, earnings growth revisions and initial returns on IPOs.

It seems hard to find a risk-based explanation to justify the 7.6% winter versus summer premium in the stock market, the 7.0% annualized return for the zero-investment global sector-rotation strategy and the 4.3% difference in initial returns between winter and summer IPOs. To put these premiums into perspective we refer to the risk premium of stocks over bonds. According to Dimson, Marsh and Staunton (2002), the world equity premium was a geometric mean of 4.6% over the period 1900-2000, and 1.7% over the period 1970-2000, a period that comes close to our examination period of 1970-2003.

The optimism-cycle hypothesis is inconsistent with the efficient market hypothesis. If the optimism-cycle hypothesis were to become a generally accepted explanation for the seasonal cycle in the stock market, sectors and initial returns on IPOs, the seasonal cycle would probably disappear in the years to come. If this occurs, the psychological hurdle of basing a decision on a rule rather than on one's over optimistic expectations may delay this. Until such time, our findings suggest that there is a free lunch.

2.5 Appendix

This section provides the main sector classification schemes that we used in this study. Table 2.10 shows the assignment of the 38 old MSCI industries to

TABLE 2.10
OLD MSCI INDUSTRY CLASSIFICATION SYSTEM AND THE ASSIGNMENT TO ONE OUT OF OUR FOUR MAIN SECTORS

MSCI SECTOR	MSCI INDUSTRY	MAIN SECTOR
ENERGY		
	ENERGY SOURCES	CYCLICALS
	UTILITIES - ELECTRICAL & GAS	DEFENSIVES
MATERIALS		
	BUILDING MATERIALS & COMPONENTS	CYCLICALS
	CHEMICALS	CYCLICALS
	METALS - NON FERROUS	CYCLICALS
	METALS - STEEL	CYCLICALS
	FOREST PRODUCTS & PAPER	CYCLICALS
	MISC. MATERIALS & COMMODITIES	CYCLICALS
CAPITAL EQUIPMENT		
	AEROSPACE & MILITARY TECHNOLOGY	CYCLICALS
	CONSTRUCTION AND HOUSING	CYCLICALS
	DATA PROCESSING & REPRODUCTION	GROWTH
	ELECTRICAL & ELECTRONICS	GROWTH
	ELECTRONIC COMPONENTS INSTRUMENTS	GROWTH
	ENERGY EQUIPMENT & SERVICES	CYCLICALS
	INDUSTRIAL COMPONENTS	CYCLICALS
	MACHINERY & ENGINEERING	CYCLICALS
CONSUMER GOODS		
	APPLIANCES & HOUSEHOLD DURABLES	CYCLICALS
	AUTOMOBILES	CYCLICALS
	BEVERAGES & TOBACCO	DEFENSIVES
	FOOD & HOUSEHOLD PRODUCTS	DEFENSIVES
	HEALTH & PERSONAL CARE	DEFENSIVES
	RECREATION, OTHER CONSUMER GOODS	CYCLICALS
	TEXTILES & APPAREL	CYCLICALS
SERVICES		
	BROADCASTING & PUBLISHING	GROWTH
	BUSINESS & PUBLIC SERVICES	CYCLICALS
	LEISURE & TOURISM	CYCLICALS
	MERCHANDISING	CYCLICALS
	TELECOMMUNICATIONS	GROWTH
	TRANSPORTATION - AIRLINES	CYCLICALS
	TRANSPORTATION - ROAD & RAIL	CYCLICALS
	TRANSPORTATION - SHIPPING	CYCLICALS
	WHOLESALE & INTERNATIONAL TRADE	CYCLICALS
FINANCE		
	BANKING	FINANCIALS
	FINANCIAL SERVICES	FINANCIALS
	INSURANCE	FINANCIALS
	REAL ESTATE	FINANCIALS
MULTI-INDUSTRY		
	MULTI-INDUSTRY	CYCLICALS
GOLD MINES		
	GOLD MINES	CYCLICALS

SOURCE:MSCI

one of our four main sectors. Table 2.11 contains the 24 new industry groups and their main sectors from the Global Industry Classification Standard (GICS) developed by MSCI and Standard & Poor's. Finally, Table 2.12 shows the categorization of the 30 Fama and French industries into our four main sectors using three different definitions.

TABLE 2.11
NEW MSCI/S&P INDUSTRY GROUP CLASSIFICATION SYSTEM AND THE ASSIGNMENT TO ONE OUT OF OUR FOUR MAIN SECTORS

SECTOR	INDUSTRY GROUP	MAIN SECTOR
ENERGY		
	ENERGY	CYCLICALS
MATERIALS		
	MATERIALS	CYCLICALS
INDUSTRIALS		
	CAPITAL GOODS	CYCLICALS
	COMMERCIAL SERVICES & SUPPLIES	CYCLICALS
	TRANSPORTATION	CYCLICALS
CONSUMER DISCRETIONARY		
	AUTOMOBILES & COMPONENTS	CYCLICALS
	CONSUMER DURABLES & APPAREL	CYCLICALS
	HOTELS RESTAURANTS & LEISURE	CYCLICALS
	MEDIA	GROWTH
	RETAILING	CYCLICALS
CONSUMER STAPLES		
	FOOD & STAPLES RETAILING	DEFENSIVES
	FOOD BEVERAGE & TOBACCO	DEFENSIVES
	HOUSEHOLD & PERSONAL PRODUCTS	DEFENSIVES
HEALTH CARE		
	HEALTH CARE EQUIPMENT & SERVICES	DEFENSIVES
	PHARMACEUTICALS & BIOTECHNOLOGY	DEFENSIVES
FINANCIALS		
	BANKS	FINANCIALS
	DIVERSIFIED FINANCIALS	FINANCIALS
	INSURANCE	FINANCIALS
	REAL ESTATE	FINANCIALS
INFORMATION TECHNOLOGY		
	SOFTWARE & SERVICES	GROWTH
	TECHNOLOGY HARDWARE & EQUIPMENT	GROWTH
	SEMICONDUCTORS & SEMICONDUCTOR EQUIPMENT	GROWTH
TELECOMMUNICATION SERVICES		
	TELECOMMUNICATION SERVICES	GROWTH
UTILITIES		
	UTILITIES	DEFENSIVES

SOURCE: MSCI

TABLE 2.12
CATEGORIZATION OF 30 FAMA AND FRENCH INDUSTRIES INTO MAIN SECTORS USING THREE DIFFERENT DEFINITIONS

F&F INDUSTRY	MAIN SECTOR DEFINITION		
	NEUTRAL	TIGHT	LOOSENED
FOOD	DEFENSIVES	DEFENSIVES	DEFENSIVES
BEER	DEFENSIVES	DEFENSIVES	DEFENSIVES
SMOKE	DEFENSIVES	DEFENSIVES	DEFENSIVES
GAMES	CYCLICALS	CYCLICALS	CYCLICALS
BOOKS	GROWTH	GROWTH	CYCLICALS
HSHLD	CYCLICALS	CYCLICALS	CYCLICALS
CLTHS	CYCLICALS	CYCLICALS	CYCLICALS
HLTH	DEFENSIVES	NONE	DEFENSIVES
CHEMS	CYCLICALS	CYCLICALS	CYCLICALS
TXTLS	CYCLICALS	CYCLICALS	CYCLICALS
CNSTR	CYCLICALS	CYCLICALS	CYCLICALS
STEEL	CYCLICALS	CYCLICALS	CYCLICALS
FABPR	CYCLICALS	CYCLICALS	CYCLICALS
ELCEQ	CYCLICALS	CYCLICALS	CYCLICALS
AUTOS	CYCLICALS	CYCLICALS	CYCLICALS
CARRY	CYCLICALS	CYCLICALS	CYCLICALS
MINES	CYCLICALS	CYCLICALS	CYCLICALS
COAL	CYCLICALS	CYCLICALS	CYCLICALS
OIL	CYCLICALS	NONE	CYCLICALS
UTIL	DEFENSIVES	DEFENSIVES	DEFENSIVES
TELCM	GROWTH	GROWTH	DEFENSIVES
SERVS	CYCLICALS	CYCLICALS	CYCLICALS
BUSEQ	GROWTH	GROWTH	CYCLICALS
PAPER	CYCLICALS	CYCLICALS	CYCLICALS
TRANS	CYCLICALS	CYCLICALS	CYCLICALS
WHLSL	CYCLICALS	CYCLICALS	CYCLICALS
RTAIL	CYCLICALS	CYCLICALS	CYCLICALS
MEALS	CYCLICALS	CYCLICALS	CYCLICALS
FIN	FINANCIALS	FINANCIALS	FINANCIALS
OTHER	NONE	NONE	NONE

SOURCE: MSCI

Chapter 3

25 Years of Dutch IPOs

An examination of frequently cited IPO anomalies within main sectors and during hot- and cold-issue periods[10]

3.1 Introduction

This paper presents the results of a study into the existence of the initial underpricing and the long-term underperformance anomalies in the Dutch initial public offering (IPO) market between 1977 and 2001. The study also examines whether the strength of these patterns differs during hot-issue and cold-issue periods. The difference between this study and previous research on Dutch IPOs is the use a sector-specific reference portfolio for each IPO to ensure a benchmark portfolio that has return characteristics close to the IPO itself. Next, we use a relatively large dataset with all Dutch IPOs over the 25-year period 1977-2001. To calculate benchmark returns we use a survivorship bias free dataset. Finally, we extend the international research into hot versus cold issue markets to the Dutch market, as we also capture the internet stocks related IPO peak from 1997 until mid 2000.

For this study, we identify four main sectors, that is, growth stocks, cyclicals, defensives and interest rate sensitive stocks. The division of IPOs into these four main sectors also enables us to examine the difference between each group in the extent of the initial underpricing and the long-term underperformance. Research into hot-issue and cold-issue periods points to the benefit of distinguishing sectors. Already in 1984, Ritter shows that most of the underpricing in the hot-issue market of 1980-1981 in the USA could be attributed to IPOs in the natural resources sector. Recently, Helwege and Liang (2004) examined IPO firms in hot-issue and cold-issue periods to determine whether the firms that launched IPOs in these periods were very different in terms of the nature of their business or the newness of their industry. A study by Lowry (2003) reports that industry dynamics play an important role in the decision by firms to go public.

These findings suggest that hot-issue markets might be characterized by IPOs from specific industries. This particularly applies to our IPO sample, in which more than 60% of the issues launched in the two hot-issue periods that we distinguish came from one specific main sector. By dividing IPOs into

[10] This chapter is based on Doeswijk, Hemmes and Venekamp (2006).

sector groups, we were able to examine whether the extreme levels of initial underpricing and long-term underperformance during hot-issue periods particularly apply to the sector that dominates a hot-issue period. Hence, we examine whether frequently cited anomalies in the IPO market were general or whether they were limited to sector-specific and period-specific circumstances for IPOs on the Dutch stock market from 1977 to 2001.

To summarize, for the Dutch IPO market, we examine whether the initial underpricing anomaly exists and whether IPOs underperform their benchmark in the long run. Next, we check for a relation between initial return and long-term underperformance that suggests initial over-optimism among investors. Subsequently, we look at the level of initial underpricing during hot-issue periods and cold-issue periods and examine whether the performance of IPOs in the long run differs between hot and cold issue periods.

In short, we find an average initial underpricing level of 17.6%. The median initial return was 5.0%, while there were negative initial returns in only 17% of the IPOs. During their first three years of listing, IPOs on average underperform their benchmark by a cumulative 10.0%, but this result is statistically insignificant. We do not find a significant relationship between initial returns and long-term performance. The period 1997 – beginning of 2000 was a true hot-issue period for growth stocks: their level of initial underpricing was 35.8%, compared to 9.2% during cold-issue periods. These growth IPOs also significantly underperformed their benchmark by 38.4% after three years.

In the following, we discuss previous research, present the data and methodology we use in our study, and provide the empirical results. We close with a summary and our conclusions.

3.2 Literature

3.2.1 Underpricing

Underpricing is the difference between the offer price and the closing price on the first day an IPO trades. Underpricing is a subject that has been regularly covered in previous research. Ibbotson, Sindelar and Ritter (1994) find an underpricing level of 15.3% for the US market in the period 1960-1992. In an updated version (2001), this had risen to a level of 18.6% for firms that had gone public between 1960 and 2000.

Many of the early theories developed to explain this underpricing phenomenon state that the underpricing is either deliberate or a result of information asymmetry between the parties involved during the process of going public[11], resulting in ex-ante uncertainty for some of those parties. These theories – among which are the winner's curse hypothesis, the market feedback hypothesis, the signalling hypothesis and the ownership dispersion hypothesis – give different reasons why underpricing is done deliberately. For interested readers, we refer to an extensive overview by Ritter (1998).

Aggarwal (2000) finds support for an alternative explanation: price support by the underwriter causes an average high level of first-day returns for IPOs. IPOs that would have shown a negative first-day return in normal trading are supported by the underwriter, which results in a positive first-day return.

Another possible explanation for the initial underpricing is irrational behaviour on the part of over-optimistic investors. Tiniç (1988) examined the possibility of a speculative bubble in the IPO market. He states that the excess initial returns on IPOs occur because of the speculative appetite of investors who could not get shares at the offering due to oversubscription of the IPO. The irrational over-optimism in the early trading days of the IPO implies that this bubble will eventually burst, leading to negative excess returns in the long run. However, Tiniç (1988) found no empirical support for this pattern. Ritter (1991), on the other hand, did find such support. He concluded that the IPOs in his data set significantly underperformed three years after going public.

3.2.2 Long-term underperformance

Ritter (1991) documents that firms that went public between 1975 and 1984 in the United States perform significantly worse in the three years following their first trading day than a set of comparable firms matched by size and industry does. He finds that the performance of the offerings over three years was 34.5% compared to a return of 61.9% for the group of similar firms that did not have an IPO. The underperformance is measured based on the closing price on the first trading day. Loughran and Ritter (1995) report that underperformance in the long term occurs primarily in the stocks of firms that had gone public during a hot-issue period. Firms that had gone public

[11] The parties involved are the issuer, the underwriter and the investors. Many theories are based on information asymmetry between two of these parties.

during years when there was little issuing activity do not underperform at all. This finding suggests that issuers use windows of opportunity.

A recent paper by Schultz (2003) presents a different view on the timing abilities of issuing firms. Schultz refers to it as 'pseudo market timing'. He shows that underperformance is likely to be observed ex-post in an efficient market. The premise is that more firms go public when they can receive a higher price for their shares. When examining IPO activity, he states that ex-post issuers seem to time the market because IPOs cluster at market peaks. The issuing companies did not know prices were at a peak when they issued stock. If prices had kept rising, even more companies would have issued equity until prices eventually fell and offerings dried up. In a simulation based on 1973 through 1997, he reveals that when ex-ante expected abnormal returns are zero, median ex-post underperformance is significantly negative in event time. The solution he gives for this 'pseudo market timing bias' is to use calendar-time returns instead of event-time returns. Calendar-time returns average the average return by calendar year while event-returns average returns from all individual events. So, calendar-time returns are based on an IPO portfolio with an equal amount invested in an annual equally weighted basket of all IPOs in a year. Both calculations would deliver the same result if the number of IPOs is equal for each year. His simulation shows that excess returns are zero in calendar-time. As a result of this finding, we will also examine calendar-time returns next to event-time returns.

Brav and Gompers (1997) argue that the underperformance is not an IPO effect. The underperformance documented in Ritter (1991) and Loughran and Ritter (1995) comes primarily from small, non-venture-backed IPOs. Their results indicate that the underperformance is not unique to firms issuing equity, but is a small, low book-to-market effect. Several studies show superior returns for "value stocks" with favourable valuation multiples such as the book-to-market equity ratio, see for instance Fama and French (1992), as well as superior returns for "small stocks" with low market capitalizations, first documented by Banz (1981). Brav and Gompers (1997) report that, using the Fama and French (1993) three factor asset pricing model, only the smallest nonventure-backed firms underperform within their IPO sample. However, as they argue, this is not an IPO-effect. Similar size and book-to-market firms that have not issued equity perform as poorly as IPOs. This would mean that one should look more broadly at types of firms that underperform and not treat IPO firms as a different group.

Next, Miller (1977) argues that the most optimistic investors in an IPO are the buyers. When the value of an IPO is shrouded in uncertainty, the valuation of optimistic investors is higher than that of pessimistic investors. In the long run, the divergence of opinion between optimistic and pessimistic investors narrows, as more information about the IPO becomes available. Consequently, the market price drops.

3.2.3 Hot-issue markets

In the IPO market there is a distinct cyclical pattern in the returns of IPOs and in the number of IPOs brought to the market. Periods of rising initial returns and increasing numbers of IPOs can be defined as hot-issue markets. Ritter (1998) explains that both in the US and in other countries the volume of IPOs shows a strong tendency to be high following periods of high stock market returns. Ritter (1984) found that 1980 was a hot-issue market in the United States. The average initial return on IPOs in the 15-month period starting in January 1980 was 48.4%. This is much higher than the returns in other ('normal') IPO periods.

Lowry (2003) also examines the causes of fluctuations in the number of IPOs. She finds two reasons that are of importance in explaining when firms choose to issue their stock. First, she finds that IPO volume is higher when the economy is strong and the possibility for real investment opportunities is greater. The second reason Lowry finds is that of investor demand. A disproportionate number of firms issue stock when stocks are especially highly valued by the market. Furthermore, she finds that firms that issue stock during a hot market do not seem to be overvalued relative to other comparable firms. The firms issue stock at a time when their whole sector is overvalued. These factors may explain the existence of the hot-issue market phenomenon.

If one expects underpricing to take place especially in hot-issue markets, more underperformance should occur in the long run. Both Ritter (1991) and Loughran and Ritter (1995) argue that companies that went public in a hot market perform worse in the long run than do IPOs that went public during a normal period.

3.2.4 Previous research into the Dutch IPO market

Numerous studies have found support for the existence of the underpricing anomaly in the Dutch IPO market. For example, Eijgenhuijsen (1989) reports an average level of underpricing of 7.9% for 53 IPOs between 1982

and 1987. Huygen and Tourani (1993) document an average underpricing of 2.2% for 34 IPOs in the 1987-1992 period. Van Hoeijen and van der Sar (1999) report 7.8% underpricing for their sample of 81 IPOs in the period 1980-1996.

One of the first Dutch papers to discuss the longer-term aftermarket performance of IPOs is that by Buijs and Eijgenhuijsen (1992). They examine the long-term performance after 1, 12 and 24 months and find an insignificant negative performance after 1 and 12 months, and no underperformance after 24 months. Van Hoeijen and van der Sar (1999) examine the performance after longer periods of 3 and 5 years. They report an outperformance of 17.1% after three years, but an underperformance of 17.9% after 5 years. Although these figures are quite large, they are statistically insignificant.

Not all previous research has labelled the same period as a hot-issue period. Buijs and Eijgenhuijsen (1992) label the years 1985 and 1986 as a hot-issue market, while Huygen and Tourani (1993) suggest that 1989 had some of the characteristics of a hot-issue period, with above average initial returns. Van der Goot (1997) states that the year 1986 and the first half of 1987 can be considered a hot-issue period. He notes that the stock market boom of 1982-1985 can be viewed as the reason for it.

3.3 Data and methodology

3.3.1 Data

We collect data on the IPO date, offering price and the first day closing price from the Officiële Prijscourant van de Amsterdamse Effectenbeurs (Official Price Journal of the Amsterdam Stock Exchange) and the annual Gids bij de Officiële Prijscourant van de Amsterdamse Effectenbeurs (Guide to the Official Price Journal of the Amsterdam Stock Exchange). Both are available in the Royal Library in The Hague. For more recent years, we use Thomson Financial Datastream (TFD) and Bloomberg. We find 183 companies that started trading on the Dutch stock exchange between 1977 and 2001[12]. A filtering[13] of these IPOs resulted in a data set comprising 154 IPOs, 22 of

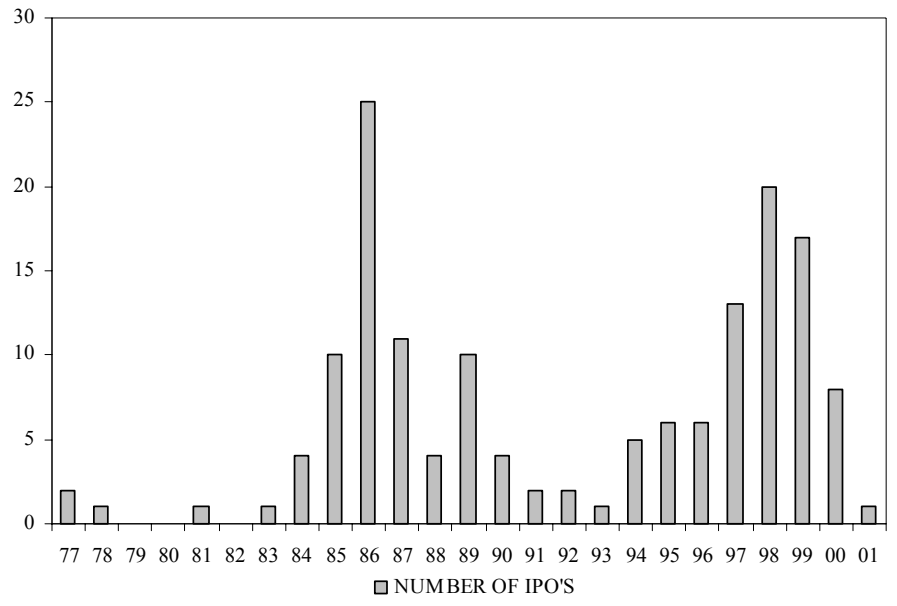
[12] This covers IPOs on the official market, the parallel market (which existed between 1982 and 1993 and then merged with the official market) and the NMAX (New Market Amsterdam Exchange), which started in 1996.

[13] The 183 IPOs were filtered to remove IPOs for which the data are incomplete and could not be found, IPOs that were introduced with a warrant and IPOs that were introduced via trading.

which were introduced via claim. This sample of 154 IPOs is the sample that we use in this study. For the construction of the benchmarks, we collect total return data for all stocks that traded on the Dutch stock market during the examination period. TFD is the source for the time series total return data. We limit ourselves to this sample period as we have no reliable IPO data in combination with daily electronic price data available before 1977. After 2000, the Dutch IPO market becomes quiet, similar to that in other countries, due to a lacklustre stock market climate. Even in 2005, there are no more than three IPOs in Amsterdam.

Figure 3.1 shows the number of IPOs per year. There are clearly two peaks during the sample period. The first IPO peak occurs from 1986 to mid 1987 and is dominated by cyclical stocks. Van der Goot (1997) characterizes this period as hot for IPOs. The second peak occurred from 1997 until mid 2000. This period is characterized by a large number of IPOs of growth stocks. Another feature that these two periods have in common is that at the end of both periods there was a stock market crash. These two periods appear to have been hot-issue periods. Ex-ante, based on the number of IPOs, we therefore label these two periods as hot-issue markets. According to Figure 3.1, other periods seem not to have been hot.

FIGURE 3.1
ANNUAL NUMBER OF IPOS ON THE DUTCH STOCK MARKET



3.3.2 Methodology

One of the differences between our study and previous research into Dutch IPOs is that we use a sector-specific reference portfolio to calculate the relative performance of the IPOs. For this, we use a benchmark with risk and return characteristics that come closer to each specific IPO than a general benchmark. This makes sense as sectors can show quite different returns during some periods (e.g. the internet bubble at the end of last century). We do not use standard sector-specific benchmarks as these do not exist for our entire sample period. Consequently, we use self-constructed benchmarks for the measurement of the relative performance of IPOs. These benchmarks are equally weighted; otherwise they would have been dominated by a few large caps.

In our study, we classify all 24 industry groups of the Global Industry Classification Standard (GICS) into four main sectors to ensure that each of the corresponding benchmarks is made up of enough individual stocks. These four main sectors are growth stocks, cyclicals, defensives and interest rate sensitive stocks[14]. Within the 'growth' sector, we include information-related industries (content and processing), such as telecom, media and information technology. Cyclicals is made up of energy, raw materials, capital goods (excluding information technology), business services and cyclical consumer goods. Defensives are defensive consumer goods and utilities. Finally, the interest rate sensitive group contains financials like banks and insurers, and real estate. We applied this classification to both the constructed benchmarks and our IPO sample.

Previous research shows the existence of biases in the calculation of the return of reference portfolios and in the measurement of relative performances. The first bias is the rebalancing bias (Blume and Stambaugh (1983)), which – as Barber and Lyon (1997) explain – arises because the returns of a reference portfolio assume a frequent portfolio rebalancing (e.g. once a month)[15], while the returns of the sample IPOs are compounded without rebalancing. Frequent rebalancing introduces an upward bias into the measured returns of the benchmarks. The upward bias is due to short-term negative autocorrelation in individual stock returns, which can likely be

[14] The categorization into cyclicals, defensives, growth stocks and interest rate sensitive is not uncommon in daily investment practice. A practitioner's book like Taylor (1998) also contains a categorization like this.

[15] At the rebalancing date, all portfolio weights are reset and all stocks get an equal weight. Due to performance differences, portfolio weights will start to differ, until the next rebalancing date.

attributed to bid-ask bounce and nonsynchronous trading. This gives the measured abnormal returns of IPOs a downward bias. The second bias that arises is the new listing bias (see Lyon, Barber and Tsai (1999)), which arises because the sample IPOs are compared to a benchmark that typically includes firms that begin trading subsequent to the IPO date of each IPO in the sample. Third, the survivorship bias arises because in the case of a bankruptcy, takeover or merger, firms become hard to track in databases. Without bankrupt companies, benchmark returns get an upward bias. The fourth and final bias is the skewness bias (again, see Lyon, Barber and Tsai (1999)). This bias arises because the distribution of long-run abnormal stock returns is positively skewed. Although this does not affect the calculation of returns, it does contribute to a misspecification of standard test statistics.

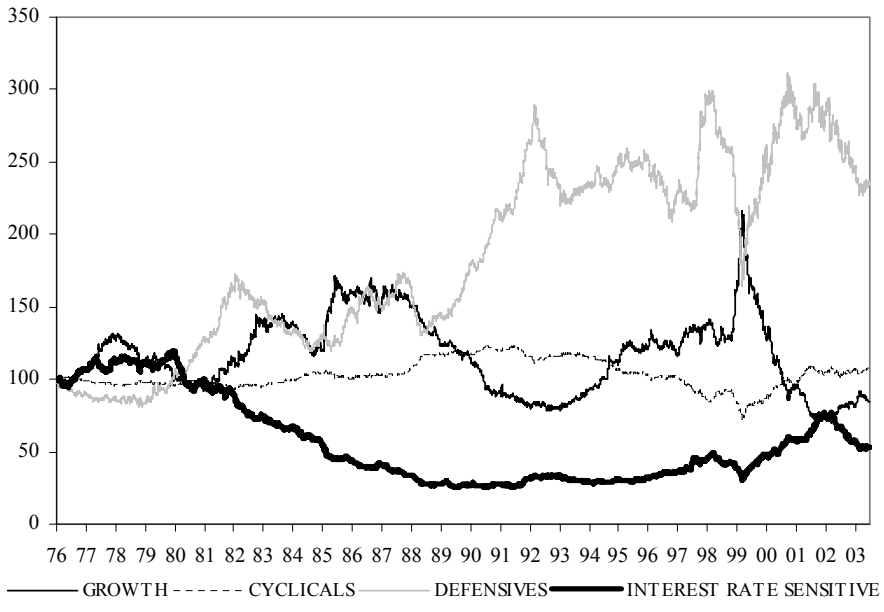
In this paper, we evaluate the relative performance of IPOs using an approach that controls for most of these biases. The benchmarks we use to calculate the abnormal returns are constructed with annual rebalancing to reduce the rebalancing bias. Controlling for the new listing bias introduces a number of complications. First of all, this means that each IPO, seen as a separate event, must be compared with a specially constructed benchmark for each specific IPO. This means that 154 separate benchmarks must be created. Second, for each IPO we examine the abnormal return in the long run over different horizons. This creates a further need for specific benchmarks, multiplying the number of benchmarks needed already. Hence, we do not control for the new listing bias, nor has any research of which we are aware. The implication that this bias might cause is a downward estimate of the benchmark returns, as most of the new listings are IPOs. Earlier research – such as that by Ritter (1991) and that by Loughran and Ritter (1995) – suggests that IPOs (hence a great part of the new listings) underperform an equally weighted market index. However, Brav and Gompers (1997) report that underperformance is not an IPO effect. By comparing IPOs with similar non-IPO firms, their results show no significant difference in performance. Therefore, it might be that IPOs create no new listing bias at all. But, should a new listing bias exist, it would depress benchmark returns. When examining the long-term abnormal performance of IPOs this might create a positive bias in the long-term abnormal performances (only in the case of depressed benchmark returns). For the construction of the benchmark returns, we correct for a survivorship bias, as we took all previously listed firms into account. We also correct for the skewness bias by using significance tests that correct for this bias.

Before constructing the benchmark, we screened all stocks that were traded on the Dutch stock market during the examination period. The stocks used

for the benchmarks were filtered for the following criteria in the same order as they are stated. First, we corrected the delisting date after bankruptcy, takeover or merger. Mostly, these stocks had been deleted from TFD much later than the date that the bankruptcy, takeover or merger took place. In these cases, the delisting date was corrected. We then deleted penny stocks before delisting. To prevent penny stocks from having a great, not beneficial, influence on the benchmark return, they were not taken into account. Finally, we deleted highly illiquid stocks. If after the first two corrections stocks showed zero returns in (on average) three or more out of five trading days, they were not taken into account. All stocks traded at the beginning of each calendar year were taken into account for the formation of a benchmark for that year.

In short, all benchmarks were carefully constructed and corrected as much as possible for possible biases that might arise when determining benchmark returns. The final result was five equally weighted total return indices, with annual rebalancing, for each of the four main sectors as well as for the market as a whole. If stocks were deleted during a year, the daily benchmark returns were used for the remaining days of that year. The four main sector

FIGURE 3.2
PERFORMANCE INDICES OF THE FOUR MAIN SECTORS GROWTH, CYCLICALS, DEFENSIVES AND INTEREST RATE SENSITIVE, RELATIVE TO THE TOTAL EQUALLY WEIGHTED MARKET INDEX



benchmarks we constructed show very different returns. Defensives had the best performance during our sample period. Furthermore, our results show that the bull market of 1998 to 2000 was primarily due to the performance of growth stocks. Figure 3.2 illustrates the performance of each main sector relative to the total market. Note that an upward slope indicates an outperformance relative to the market and vice versa for a downward slope. The difference in the performance of each main sector benchmark supports the use of sector-specific benchmarks to calculate the abnormal performance of the IPOs.

A comparison[16] of our benchmark for the total market and the CBS reinvestment index[17] reveals an average annual return of 15.3% and 13.5%, respectively. The 1.8% difference might be explained by the size effect, i.e. small firms (on average) outperforming large stocks. Previous research by Doeswijk (1997) suggests an annual size premium of 1.6% between the smallest and largest quintile during 1973 and 1995 for the Dutch stock market.

The initial return (i.e. the first-day return) of each IPO was calculated according to the market-adjusted method:

$$AIR_1^i = R_1^i - R_1^{BM}$$

In this equation AIR_1^i is the initial market-adjusted return for IPO i on day 1, the first trading day. R_1^i is the return of IPO i on the first trading day. Here the first day return of an IPO is calculated as the difference between the first day closing price of the IPO and the offer price. R_1^{BM} is the return of the benchmark on the first trading day of IPO i.

To examine the long-term performance of our IPO sample, we use the reinvested indexed prices[18] of the IPOs from the IPO date to three years after the IPO. For the calculation of the long-run abnormal returns, we use the buy-and-hold abnormal return (BHAR) approach, as did Barber and Lyon (1997). First, we calculate a buy-and-hold return (BHR). The buy-and-hold

[16] For the period 1980 until 2003. This is the period for which daily returns are available for the CBS all share general index.
[17] Mostly, previous research uses the CBS reinvestment index ex Royal Dutch. This is a value-weighted index.
[18] All these prices have been adjusted for dividends, bonuses and stock splits.

return measures the return on an ex-ante implementable trading strategy and is calculated as follows:

$$BHR_T^i = \left(\prod_{t=close1}^{T} (1 + R_{it}) \right) - 1,$$

where R_{it} denotes the return of IPO i on trading day t. T stands for the period over which the BHR is calculated. As shown in the formula, the return in the long term is calculated starting from the closing price of the IPO on the first trading day. If a stock becomes delisted within the examination period, the daily benchmark returns are used for the remaining period.

We use the same method for the calculation of the IPO-related benchmark return:

$$BHR_T^m = \left(\prod_{t=close1}^{T} (1 + R_{mt}) \right) - 1,$$

where R_{mt} denotes the return of the benchmark on trading day t.

Finally, we measure the abnormal returns of each IPO as:

$$BHAR_T^i = 100 * \left((1 + BHR_T^i) / (1 + BHR_T^m) \right) - 100$$

When examining the market-adjusted returns for IPOs, we implicitly assume that the systematic risk of the IPOs is similar to that of the benchmark.

As mentioned, we control for the skewness bias in the significance tests by applying a skewness-adjusted t-test that adjusts for a positively skewed underlying distribution (see Johnson (1978), or Lyon, Barber and Tsai (1999)). We find that our sample's BHAR and AIR results show a positive skewness in the underlying distributions[19]. In order to test whether the mean AIR and BHAR differs significantly from zero, we calculate the following skewness-adjusted t-statistic:

[19] Examination of our AIR and three-year BHAR show a skewness of respectively 4.2 and 2.9, indicating a positive skewness.

$$t_{sa} = \sqrt{N}(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6N}\hat{\gamma})$$

where

$$S = \frac{\overline{AIR}}{s_{AIR}} \text{ and } \hat{\gamma} = \frac{\sum_{i=1}^{N}(AIR_i - \overline{AIR})^3}{(N-1)*s_{AIR}^3}$$

Here, $\hat{\gamma}$ is an estimate of the coefficient of skewness and s_{AIR} is the standard deviation. N is the number of IPOs in the sample or sample group. We apply the same method for BHAR, except that AIR in the calculations above is replaced by BHAR.

3.4 Empirical results

3.4.1 Initial underpricing

Table 3.1 shows the average benchmark-adjusted underpricing in the Dutch market between 1977 and 2001. Our results confirm the presence of underpricing in the Dutch IPO market, with an average initial return of 17.6% (excluding claims). We note that the average first-day return might be overestimated due to the rationing of the most successful IPOs, in line with the winner's curse hypothesis (see Rock, 1986). There is a large difference in underpricing for introductions via the claim method[20] compared to non-claim introductions. A problem associated with the claim method is that of estimating the exact offering price. Basically, it makes no sense to measure first-day abnormal returns for claim introductions as they are 'gradually introduced'. This causes the difference with non-claim introductions. Therefore, we excluded the claim IPOs from the calculation of the average initial return per main sector. The average underpricing is in line with results from Ibbotson, Sindelar and Ritter (1994/2001), who report an average underpricing of 18.6% between 1960 and 2000 for IPOs in the United States. Compared to previous research into Dutch IPOs, our initial returns seem rather high. But, when we limit our sample period from 1980 to 1996, the same as in van Hoeijen and van der Sar (1999), we find an average

[20] In this method, shares are offered for a fixed price. However, only investors that own rights (i.e. claims) are entitled to subscribe. These rights or claims may originate from the issuing company or from existing shareholders and are traded a few weeks before the introduction date.

underpricing of 7.7%, similar to their 7.8%. Here, our methodology does not differentiate, as the choice for a benchmark does not matter much for the calculation of one day abnormal returns.

TABLE 3.1
AVERAGE LEVELS OF ADJUSTED INITIAL UNDERPRICING (AIR)

	NUMBER OF IPOS	INITIAL RET.
ALL IPOS	154	14.9% ***
ALL IPOS EXCLUDING CLAIM	132	17.6% ***
CLAIM	22	-1.2%
GROWTH	59	25.2% ***
CYCLICAL	56	9.3% ***
DEFENSIVE	5	24.5%
INTEREST RATE SENSITIVE	12	16.1% **

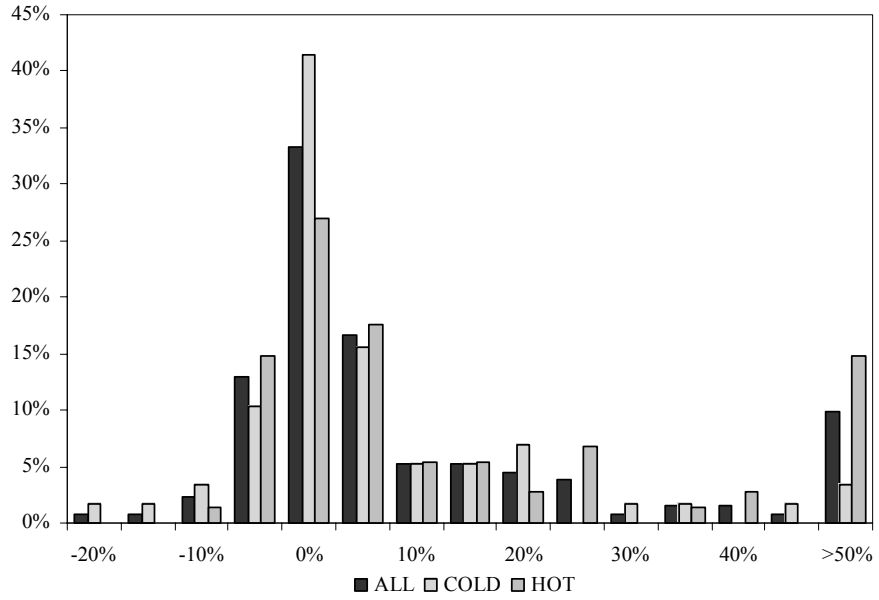
*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

The underpricing levels differ between the four groups of IPOs. Growth IPOs show the highest level of underpricing. The level of underpricing for interest rate sensitive IPOs is in line with the level of underpricing for all IPOs. This is quite remarkable, considering that most of these IPOs were for financial companies, which one would expect to have a better understanding of valuation. The relatively high level of underpricing suggests that they do not have this understanding, because if they did the offering price would be a more accurate reflection of the IPOs valuation by the market and the initial performance would not be so strong. The low number of defensive IPOs causes the high level of underpricing for defensive IPOs to be statistically insignificant. Nevertheless, they all have a positive initial adjusted return.

As can be seen in Figure 3.3, initial returns are positively skewed. When measured by return intervals of 5%, the most frequent return interval is 0-5%. The median initial return of 5.0% is also low compared to the average of 17.6%[21]. In 17% of the IPOs we observe a negative initial return. We discuss the performance of hot and cold markets, also displayed in Figure 3.3, later on.

[21] The average return indicates the return for an investor who invested an equal amount in all IPOs, while the median return shows the return on the IPO for which there are as many IPOs with higher returns as IPOs with lower returns. In this paper, we report average returns in line with other studies.

FIGURE 3.3
FREQUENCY DISTRIBUTION OF INITIAL RETURNS ON IPOS WITH RETURN INTERVALS OF 5%. CHART ALSO DISPLAYS A SPLIT BETWEEN HOT AND COLD MARKETS. ALL BARS ADD UP TO 100%



3.4.2 Long-term underperformance

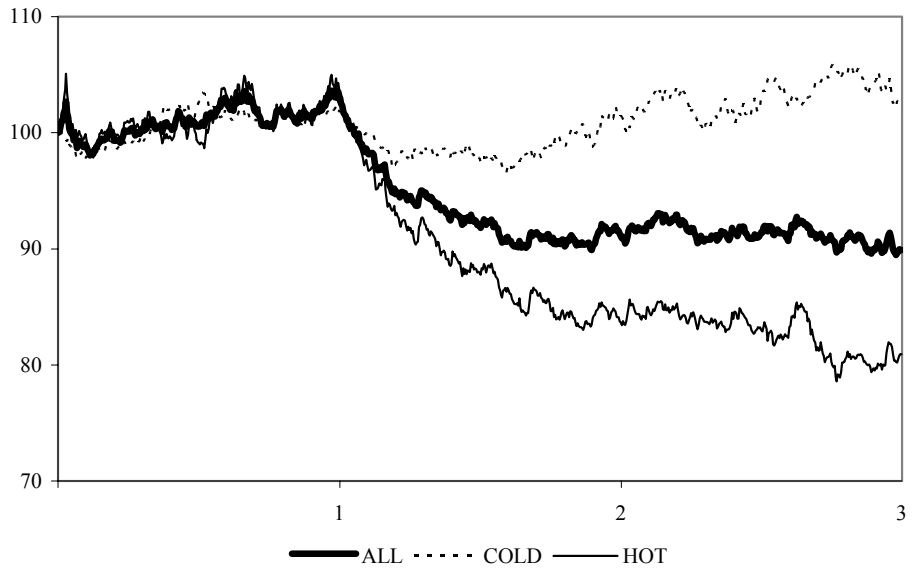
Table 3.2 presents the abnormal long-term performance of Dutch IPOs between 1977 and 2001. The results show a worsening relative performance of our total IPO sample during their first three years of listing. However, the 10.0% underperformance is statistically insignificant. The results for each main sector IPO sample show that after a period of 2 and 3 years, the growth IPOs significantly underperformed their benchmark while the other groups hardly show an underperformance. Although not found within our total IPO sample, significant long-term underperformance does exist within the growth IPO segment. Figure 3.4 shows the indexed average abnormal performance of all IPOs, starting at the close of each IPO's first trading day and continuing until three years after listing. Figure 3.5 shows the frequency distribution for the three-year abnormal returns. Long-term abnormal returns are negatively skewed; in 67% of the cases they are below zero. The median three-year abnormal return is -29.0%. We discuss the performance of hot and cold markets, also displayed in Figure 3.4 and 3.5, later on.

TABLE 3.2
AVERAGE ABNORMAL LONG-TERM PERFORMANCE OF IPOS (BHAR). THE RELATIVE PERFORMANCE OF EACH IPO WAS MEASURED FOR A PERIOD OF 1, 2 AND 3 YEARS OR, IF DELISTED WITHIN 3 YEARS, UP TO THE DELISTING DATE

	NUMBER OF IPOS	1 YEAR	2 YEAR	3 YEAR
ALL IPOS	154	2.9%	-8.7%	-10.0%
GROWTH	64	-2.2%	-18.5% *	-24.0% **
CYCLICAL	70	10.1%	0.9%	-1.6%
DEFENSIVE	6	1.8% -	5.0%	0.4%
INTEREST RATE SENSITIVE	14	-9.1% -	13.8%	7.9%

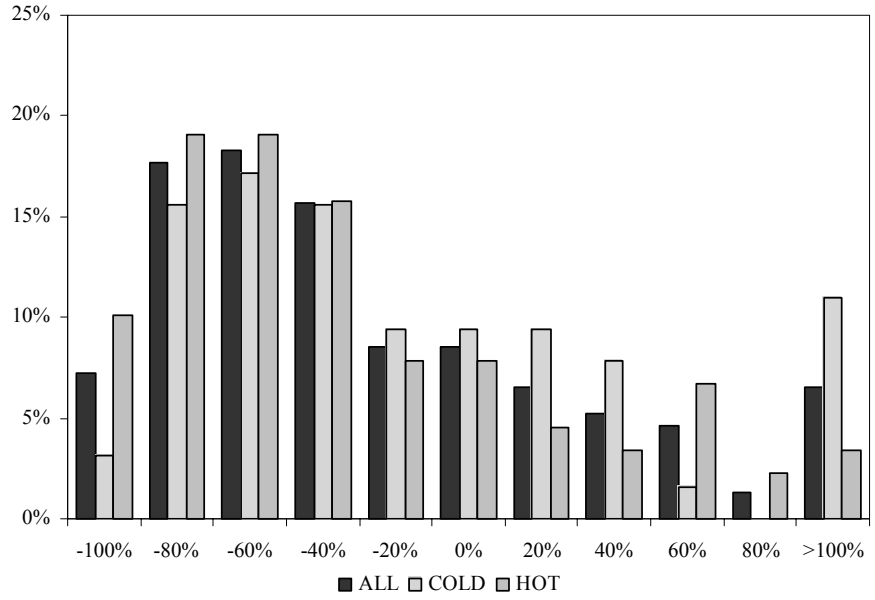
*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

FIGURE 3.4
AVERAGE ABNORMAL LONG-TERM PERFORMANCE INDEX OF IPOS DURING THE THREE YEARS FOLLOWING THE FIRST TRADING DAY. THE CHART ALSO DISPLAYS A SPLIT BETWEEN HOT AND COLD MARKETS



Contrary to Ritter (1991) for the US stock market, we did not find a significant long-run underperformance for Dutch IPOs. Our results also differ from those of van Hoeijen and van der Sar (1999), who found an insignificant outperformance of 17.1% after three years. This difference can only partially be attributed to the sample period and therefore derives primarily from the different methodology with sector-specific benchmark portfolios. With an insignificant underperformance, our results seem to be

FIGURE 3.5
FREQUENCY DISTRIBUTION OF THREE-YEAR ABNORMAL PERFORMANCE OF IPOS WITH RETURN INTERVALS OF 20%. THE CHART ALSO DISPLAYS A SPLIT BETWEEN HOT AND COLD MARKETS. ALL BARS ADD UP TO 100%



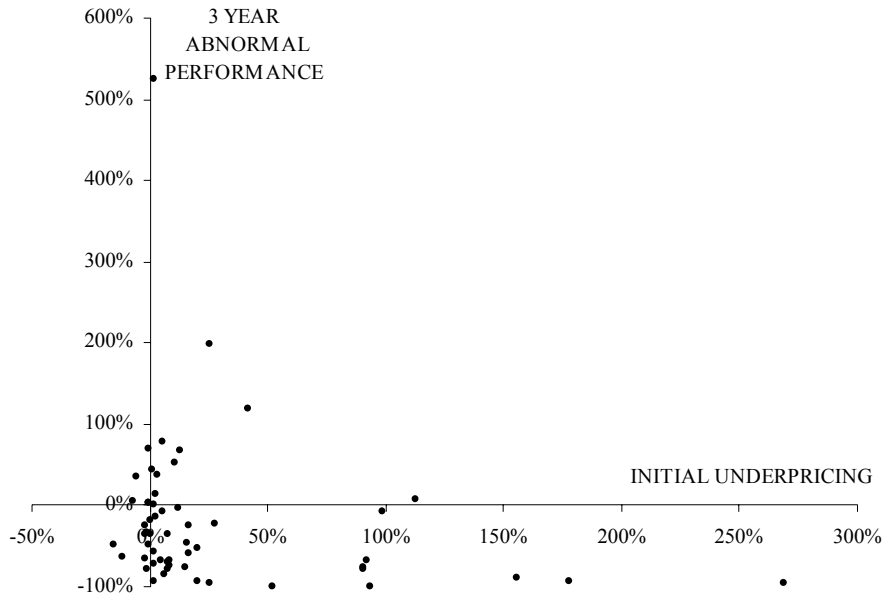
the most in line with those of Brav and Gompers (1997), who argue that IPO companies do not underperform their peers.

As mentioned in the literature section, Schultz (2003) states that long-term underperformance is found ex-post because of using event-time returns. He refers to his explanation as the pseudo market-timing explanation. He states that when calendar-time returns are used to calculate the ex-post long-term underperformance, researchers can avoid biases from pseudo market-timing. When we use calendar-time returns for the calculation of our IPO sample, we do indeed find a different long-term performance. After 1, 2 and 3 years the long-term relative performance is 6.8%, 6.0% and 12.9%, respectively. These returns are obviously better and even positive, but once again not significant. The small number of IPOs on the Dutch market in some years creates the problem that these IPOs have a relatively large influence on the average calendar-time calculation of IPOs' long-term performance. Next, calendar-time returns are based on an IPO portfolio with an equal amount invested in an annual equally weighted basket of all IPOs in a year. If an investor has to invest the same amount every year in a basket of all IPOs that year, he must know the number of IPOs within each year before a year starts.

This, of course, is impossible, as investors cannot predict the number of IPOs in a year.

We examined the relation between initial returns and the long-term performance. In the case of over-optimism amongst investors, a significant positive initial return should be followed by a significant negative long-term performance. Figure 3.6 displays a scatter diagram of initial returns and long-term performance. Neither the scatter diagram nor regression analyses reveals a significant relationship between initial returns and long-term performance.

FIGURE 3.6
SCATTER DIAGRAM OF INITIAL RETURNS AND THREE-YEAR ABNORMAL PERFORMANCE OF IPOS



3.4.3 Hot-issue periods

Table 3.3 shows the levels of initial underpricing in the first hot-issue period (i.e. 1986 – mid 1987) for all IPOs as well as for the main group of cyclical IPOs and the other IPOs (labelled as non-cyclical IPOs). The results confirm the existence of the initial underpricing anomaly for Dutch IPOs during the first hot-issue period and during cold-issue periods, but the difference in the levels of underpricing between the first hot-issue period and cold-issue periods is not significant. The difference between cyclical IPOs in the first

hot-issue period and cyclical IPOs during cold-issue periods is also insignificant. In fact, ex-post the first hot-issue period (1986 – mid 1987) seems not to have been a true hot-issue period after all. In addition to the large volume of IPOs in hot-issue periods, these periods are normally also characterized by an extremely high level of underpricing compared to IPOs in a cold-issue period. We did not find this for the first hot-issue period.

TABLE 3.3
AVERAGE INITIAL RETURNS OF IPOS DURING THE FIRST HOT-ISSUE PERIOD FROM 1986 UNTIL MID 1987

	ALL IPOS	CYCLICAL	NON-CYCL.
FIRST HOT-ISSUE PERIOD IPOS	10.8% ***	10.4% *	11.6% *
NUMBER OF IPOS	19	12	7
COLD-ISSUE PERIOD IPOS	8.3% ***	5.6% ***	11.5% ***
NUMBER OF IPOS	58	31	27
HOT MINUS COLD	2.5%	4.5%	0.1%

*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

Table 3.4 shows the results for the long-term performance of IPOs during the first hot-issue period and during cold-issue periods. Although we did not find a significant long-term underperformance for our entire sample, the results do show such underperformance for IPOs during the first hot-issue period. There is a 22.1% difference in long-term performance between IPOs

TABLE 3.4
AVERAGE LONG-TERM ABNORMAL PERFORMANCE OF IPOS DURING FIRST HOT-ISSUE PERIOD FROM 1986 UNTIL MID 1987. THE RELATIVE PERFORMANCE OF EACH IPO WAS MEASURED FOR A PERIOD OF 1, 2 AND 3 YEARS OR, IF DELISTED WITHIN 3 YEARS, UP TO THE DELISTING DATE

	ALL IPOS	CYCLICAL	NON-CYCL.
FIRST HOT-ISSUE PERIOD IPOS			
AFTER 1 YEAR	-10.3% **	-4.35%	-19.3% **
AFTER 2 YEARS	-20.6% **	-11.50%	-34.3% ***
AFTER 3 YEARS	-19.7% **	-10.01%	-34.2% ***
NO. OF IPOS	35	21	14
COLD-ISSUE PERIOD IPOS			
AFTER 1 YEAR	2.0%	1.1%	3.1%
AFTER 2 YEARS	1.8%	1.3%	2.4%
AFTER 3 YEARS	2.4%	-4.8%	11.6%
NO. OF IPOS	64	36	28
HOT MINUS COLD			
AFTER 1 YEAR	-12.3% *	-5.5%	-22.4% *
AFTER 2 YEARS	-22.4% **	-12.8%	-36.7% **
AFTER 3 YEARS	-22.1% *	-5.2%	-45.8% **

*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

during the first hot-issue period and IPOs during cold-issue periods, which is significant at the 10%-level. So, IPOs during the first hot-issue period performed worse in the long run than did IPOs during cold-issue periods. Surprisingly, when we distinguish between the dominating group of cyclical IPOs during this period and the other IPOs, this is true only for the non-cyclical IPOs. Again, this raises doubts about whether the first hot-issue period was actually a hot-issue period after all. Finally, the results clearly show that the long-term performance of IPOs in a cold-issue period hardly differs from their benchmarks.

Table 3.5 presents the results for the second hot-issue period. This period was dominated by growth IPOs. The results show that, as opposed to IPOs in the first hot-issue period, IPOs during the second hot-issue period did indeed have a significantly higher initial return than did IPOs during cold-issue periods. IPOs issued in this period delivered an average initial return of 29.5% compared to 8.3% in cold-issue periods. The difference (21.2%) is highly significant. Differentiation between the dominant group of growth IPOs and other IPOs reveals that there only is a difference between hot and cold-issue periods for the dominant group of growth IPOs. The IPOs from the main sector growth yielded an initial return of 35.8% compared to 9.2% for growth IPOs in cold-issue periods, a difference (26.6%) that is highly significant. So, besides the fact that there was a large volume of growth IPOs during this hot-issue period, these growth IPOs were also characterized by an extremely high level of underpricing compared to growth IPOs in a cold-issue period.

TABLE 3.5
AVERAGE INITIAL RETURNS OF IPOS DURING THE SECOND HOT-ISSUE PERIOD FROM 1997 UNTIL MID 2000

	ALL IPOS	GROWTH	NON-GROWTH
SECOND HOT-ISSUE PERIOD IPOS	29.5% ***	35.8% ***	17.4% ***
NUMBER OF IPOS	55	36	19
COLD-ISSUE PERIOD IPOS	8.3% ***	9.2% **	7.8% ***
NUMBER OF IPOS	58	21	37
HOT MINUS COLD	21.2% ***	26.6% **	9.6%

*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

We refer again to Figure 3.3 – the frequency distribution of initial returns. It shows that cold-issue IPOs are over-represented in the left-hand part of the frequency distribution, while hot-issue IPOs are over-represented in the right-hand part. This basically illustrates the results of Table 3.5, which

shows extra high initial returns for hot-issue IPOs in the period 1997 – mid 2000.

Table 3.6 presents our findings for the long-term performance of IPOs during the second hot-issue period compared to IPOs during cold-issue periods. Although there is a large difference (20.6%) in the long-term performance after three years between all IPOs during the second hot-issue period and during cold-issue periods, this difference is statistically insignificant because of the very high variance in the long-term performance of all IPOs in the second hot-issue period. Only the growth IPOs significantly underperformed their benchmark after two and three years (by almost 40% after three years). They also performed much worse than growth IPOs during cold-issue periods. On the other hand, the performance of the non-growth IPOs in the second hot-issue period is not significantly different from that of their benchmark. With respect to the long-term underperformance of all growth IPOs (which we reported in Table 3.2), we can now conclude that this is true only for growth IPOs during the second hot-issue period.

TABLE 3.6
AVERAGE LONG-TERM ABNORMAL PERFORMANCE OF IPOS DURING THE SECOND HOT-ISSUE PERIOD FROM 1997 UNTIL MID 2000. THE RELATIVE PERFORMANCE FOR EACH IPO WAS MEASURED FOR A PERIOD OF 1, 2 AND 3 YEARS OR, IF DELISTED WITHIN 3 YEARS, UP TO THE DELISTING DATE

	ALL IPOS	GROWTH	NON-GROWTH
SECOND HOT-ISSUE PERIOD IPOS			
AFTER 1 YEAR	12.4%	-2.7%	0.2%
AFTER 2 YEARS	-13.3%	-28.3% ***	15.0%
AFTER 3 YEARS	-18.2%	-38.4% ***	20.1%
NO. OF IPOS	55	36	19
COLD-ISSUE IPOS			
AFTER 1 YEAR	2.0%	3.9%	1.0%
AFTER 2 YEARS	1.8%	3.7%	0.8%
AFTER 3 YEARS	2.4%	4.0%	1.6%
NO. OF IPOS	64	21	43
HOT MINUS COLD			
AFTER 1 YEAR	10.4%	-6.6%	-0.9%
AFTER 2 YEARS	-15.1%	-32.0% *	14.2%
AFTER 3 YEARS	-20.6%	-42.4% **	18.5%

*THE 1%, 5% AND 10% SIGNIFICANCE LEVELS ARE DENOTED BY ***, ** AND * RESPECTIVELY. THE SIGNIFICANCE WAS TESTED WITH A SKEWNESS-ADJUSTED T-TEST*

The main finding regarding the long-term performance for hot and cold IPOs is summarized in Figure 3.4. IPOs issued in a cold market performed roughly in line with their peers, while the results for hot IPOs are mixed. For the first hot-issue period, the results are insignificant for the dominating

group of cyclical IPOs, while growth stocks that started trading in the hot-issue period 1997 – mid 2000 show a significant underperformance. Although the results are mixed, Figure 3.5 (the frequency distribution of the three-year abnormal returns) shows that hot-issued IPOs are over-represented on the left of the chart.

3.5 Summary and conclusions

In this study we focus on the existence of the initial underpricing and the long-term underperformance anomalies in the Dutch Initial Public Offering (IPO) market between 1977 and 2001. The difference between our study and previous research on Dutch IPOs is that we compared the performance of each IPO with its sector-specific benchmark to ensure a benchmark portfolio that has return characteristics close to the IPO itself. For this purpose, we identified four main sectors – namely growth stocks, cyclicals, defensives and interest rate sensitive stocks – for which we calculated equally weighted benchmarks. The use of sector-specific benchmarks leads to different results for the relative long-term performance of Dutch IPOs compared to a previous study into the performance of Dutch IPOs. Next, we use a relatively large dataset with all Dutch IPOs over the 25-year period 1977-2001. To calculate benchmark returns we use a survivorship bias free dataset. Finally, we extend the international research into hot versus cold issue markets to the Dutch market, as we also capture the internet stocks related IPO peak from 1997 until mid 2000.

We document the existence of the underpricing anomaly in the Dutch IPO market. We find an average initial underpricing level of 17.6%, measured relative to a sector-specific benchmark. The median initial return is 5.0%, while we observe negative initial returns in only 17% of the IPOs. The level of underpricing for IPOs is in line with the results of Ibbotson, Sindelar and Ritter (1994/2001), who report an average underpricing of 18.6% between 1960 and 2000 for IPOs in the United States. Compared to previous research into Dutch IPOs, our initial returns seem rather high. This is due to the fact that we used an extensive sample that includes the late 1990s. In those years, initial returns were extraordinary high.

During their first three years of listing, IPOs on average underperformed their benchmark by a cumulative 10.0%, but this result is statistically insignificant. The frequency distribution for the three-year abnormal returns is negatively skewed; in 67% of the cases they are below zero. But, the long-term abnormal performance does not significantly differ from zero. When we use calendar-time returns for the calculation of our IPO sample, we do

indeed find a different long-term performance. After 1, 2 and 3 years the long-term relative performance is 6.8%, 6.0% and 12.9%, respectively. These returns are obviously better and even positive, but once again not significant. Our results are more supportive of the findings of Brav and Gompers (1997) – who suggested that IPO companies do not underperform their peers – than of those of Ritter (1991), who found a significant long-term underperformance.

We also examine the performance of IPOs during hot- and cold-issue periods. Ex-ante, on the basis of the number of IPOs, we labelled two periods as hot-issue periods. The first period is 1986 – mid 1987, and the second is 1997 – mid 2000. Both periods show a large number of IPOs and both end with a stock market crash. Next, we found that each period was dominated (by 60% or more) by one single main sector. The first period was dominated by cyclical IPOs, and the second by growth IPOs. Our results for the first hot-issue period raise doubts about whether the first hot-issue period was actually a hot-issue period. The level of underpricing was not significantly higher than in cold-issue periods. In the second hot-issue period, we observe an average initial return of 29.5%, which is significantly higher than the 8.3% in cold-issue periods. During this period, the initial return of the dominating group of growth IPOs was, on average, a staggering 35.8%. Regarding the long-term performance, IPOs issued in a cold market performed roughly in line with their peers, while the results for hot IPOs were mixed. For the first hot-issue period, the results are insignificant for the dominating group of cyclical IPOs. However, the dominating group of growth stocks that started trading in the hot-issue period 1997 – mid 2000 underperformed significantly, showing some support for the hypothesis that issuers use windows of opportunity.

We do not find a significant link between the initial returns and the long-term performance of IPOs. Therefore, our study does not provide support for the over-optimism hypothesis of Tiniç (1988), which states that the optimism at early trading of IPOs should be corrected by a negative long-term relative performance.

Our results suggest that investors should always subscribe to an IPO. For the Dutch stock market, we found an 83% chance of a positive initial return. We find an average initial return of 17.6% and a median of 5.0%. Note that the average of 17.6% might be an overestimation due to the rationing of the most successful IPOs, in line with the winner's curse hypothesis (see Rock (1986)). For the long-term perspective, we lack evidence to support the

hypothesis that IPOs perform worse than their peers. Therefore, our results suggest that there is no need for investors to sell immediately after listing.

Chapter 4

Mergers and Acquisitions in a Global Context: Reaction of Price and Earnings Estimates[22]

"When somebody says synergy, feel for your wallet." - Berman (1984)

4.1 Introduction

The benefits of mergers and acquisitions are questioned in several studies that examine the price reaction of the stocks involved. For the long-run, studies like Jensen and Ruback (1983), Magenheim and Mueller (1988), Agrawal et al. (1992) and Sirower (1997) report an underperformance in the years after the merger or acquisition. For example, Sirower (1997) shows that acquiring firms underperform the S&P 500 by 21% in the 36 months after the announcement. For the short-term, results are mixed. Some studies report significant, but limited negative returns for the shareholders of acquirers during the days just before and just after the announcement, see Asquith et al. (1987) and Morck et al. (1990). However, Higson and Elliot (1998) and Parrino and Harris (1999) do not find returns significantly different from zero for acquirers, while targets show significant outperformance.

In this study our objective is two-fold. First, we will focus on the short-term stock price performance of firms involved in a merger or acquisition. Second, we look at the reaction of equity analysts by examining the change in consensus earnings estimates for the post-announcement years. With this new approach we have tried to gain additional insight into the presence of potential synergies. Contrary to previous research, we use a global sample for the relatively short time-period of one year, whereas other studies have used longer samples of national markets. Given the ongoing globalization, this is a logical extension of previous research.

In an efficient market we expect a price reaction on an announcement and a normal price pattern afterwards. Moreover, if there are any synergies to be gained from the merger or acquisition, it seems reasonable to expect that analysts will raise their earnings estimates for the post-announcement years.

[22] This chapter is based on Doeswijk and Hemmes (2000).

If changes in price are not justified by changes in fundamentals, there could be opportunities for investors to exploit such anomalies.

We have organized this chapter as follows. In the next section we discuss the data and the methodology. Subsequently, we present the empirical results. The last section contains our conclusions.

4.2 Data and methodology

We have collected data on all announced mergers and acquisitions worldwide in 1998 where the value of the deal exceeded 1 billion US dollars, as far as we could establish from Bloomberg. Subsequently, we have downloaded price data, market values and I/B/E/S earnings estimates in US dollars from Datastream. Obviously, companies that were not listed were excluded from the empirical research. We examined the price pattern from 20 trading days before the announcement through 20 trading days after the announcement, a total of 41 days. Therefore, the price data for the period December 1997 through January 1999 were collected. For the changes in analysts' earnings estimates we examined data from 20 days before the announcement date through 60 days after the announcement, a total of 81 days. We take a longer post-announcement period for the earnings data so as to ensure that analysts had enough time to adjust their estimates and I/B/E/S had time to collect and process these data. Therefore, we collected the consensus earnings per share for all stocks covered by analysts for the fiscal years 1998, 1999 and 2000, for the period December 1997 through March 1999.

Table 4.1 shows that our database consists of 258 firms, while Datastream contains data for 207 of these. The majority is American, from either North or South America, with 138 firms. Next comes Europe with 116, while only

TABLE 4.1
DESCRIPTIVE STATISTICS

	ALL	MERGERS	ACQUIRERS	TARGETS
ALL FIRMS IN DATABASE	258	48	105	105
AMERICA	138	17	52	69
EUROPE	116	31	51	34
FAR EAST & AFRICA	4	0	2	2
# OF STOCKS WITH DATASTREAM DATA	207	42	92	73
MARKET VALUE (MEDIAN; BLN. USD)	7808	8092	12479	3710
P/E 1998	20.3	18.9	20.5	20.6
P/E 1998 -20 DAYS	18.9	16.6	20.3	17.6
CATEGORIZED BY MARKET VALUE	207	44	91	72

four firms come from the Far East and Africa. This is no surprise, as it shows that especially Japanese firms hardly took part in the global merger and acquisition wave of 1998.

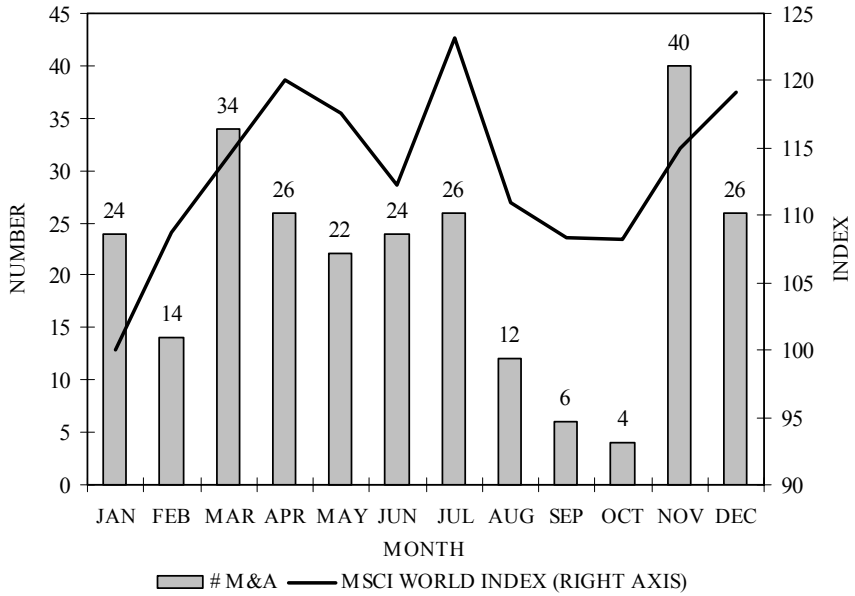
To categorize a deal as a merger or acquisition we used our, subjective, opinion to judge which firm actually ends up in charge of the new combination. However, to check the sensitivity of the results to this categorization we also performed our analysis with a categorization based on the market values of the firms involved. If any of the firms was 50% larger than the other in terms of market capitalization, we classified the deal as an acquisition with the larger firm being the acquirer and the smaller firm the target. The rest of the deals was classified as a merger. This alternative categorization method reclassifies 20.3% of the firms. But, as the last row in Table 4.1 shows, the method of categorization does not significantly affect the number of firms per category. Moreover, the empirical results do not differ substantially, so from here on we will only discuss the results based on the criterion which firm is in charge of the new combination. It should be clear that both criteria are arbitrary. We prefer using our opinion rather than a rule-based classification, because we expect to get a better classification by judging every deal on its own merits.

Table 4.1 also shows several other characteristics of our sample with Datastream data. First, relatively many targets are unlisted since the number of acquiring firms exceeds the number of target firms by 19 (i.e. 92-73). Second, acquiring firms have the largest market capitalization, as opposed to target firms, which on average have the smallest. Merging firms take a position in the middle. The valuations of targets are, with a price/earnings ratio of 20.6 times 1998 earnings on the day of announcement, higher than those of the acquiring or merging firms. However, 20 trading days before the announcement, acquiring firms have the highest valuation with a price/earnings ratio of 20.3. At that moment target firms have a price/earnings ratio of only 17.6. This suggests that, on average, there is a takeover premium of approximately 17%, i.e. the increase in the price/earnings ratio. The data show that a typical acquiring firm has a relatively high market capitalization and a relatively high valuation.

Although not the principal objective of our study, we also report two interesting patterns that show up in the database. First, the number of announced mergers and acquisitions is unevenly distributed over time as shown in Figure 4.1. There is a dependency on the stock market climate. In October 1998, when the MSCI world index bottomed, only 4 deals were announced. The rebound of the number of mergers and acquisitions in

November illustrates that during volatile periods with poor market sentiment most deals are delayed. This is due to the fact that it is hard to finance deals in a turbulent market. Moreover, in such a market it is more difficult to bid a right price for a target, or to determine the share swap ratio.

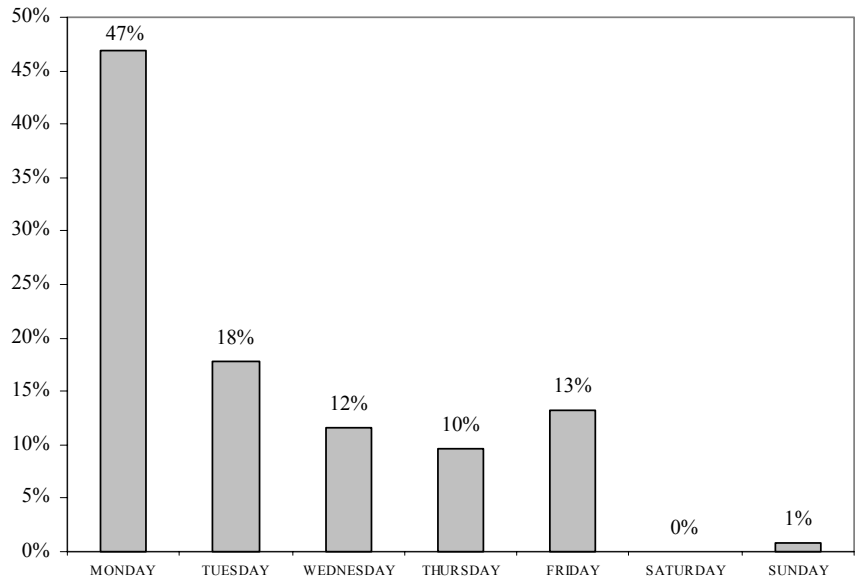
FIGURE 4.1
DEPENDENCY OF MERGERS AND ACQUISITIONS ON STOCK MARKET CLIMATE: THE MONTHLY NUMBER OF MERGERS AND ACQUISITIONS AND THE MSCI WORLD INDEX IN 1998



Second, there appears to be a strong day-of-the-week effect. Figure 4.2 reveals that management and investment bankers put in some extra hours during the weekend. Then, they have extra time to finalize a deal without the risk of rumours influencing their bond or equity prices. Almost half of the weekly number of deals is announced on a Monday.

In the next section we will focus on the price pattern around the announcement date and the changes in analysts' earnings estimates. For this purpose we constructed equally weighted cumulative price and earnings indices, starting 20 days before the announcement date and lasting until 20 and 60 days after the announcement date respectively. The price indices are calculated relative to the MSCI world index in US dollars, and are therefore

FIGURE 4.2
THE NUMBER OF MERGER AND ACQUISITION ANNOUNCEMENTS BY DAY OF THE WEEK



showing the relative performance. In formula, we calculate the relative performance as follows:

$$R_{i,t} = \frac{P_{i,t} / P_{i,t-1}}{P_{m,t} / P_{m,t-1}} - 1$$

where

$R_{i,t}$ is the return of stock i relative to the MSCI world index at day t,

$P_{i,t}$ is the price of stock i in US dollars at day t,

$P_{i,t-1}$ is the price of stock i in US dollars at day t-1,

$P_{m,t}$ is the price of the MSCI world index in US dollars at day t and

$P_{m,t-1}$ is the price of the MSCI world index in US dollars at day t-1.

The earnings indices are calculated with the consensus earnings estimates from I/B/E/S, which are also available from Datastream. These indices are absolute because there is no world index for earnings estimates available on

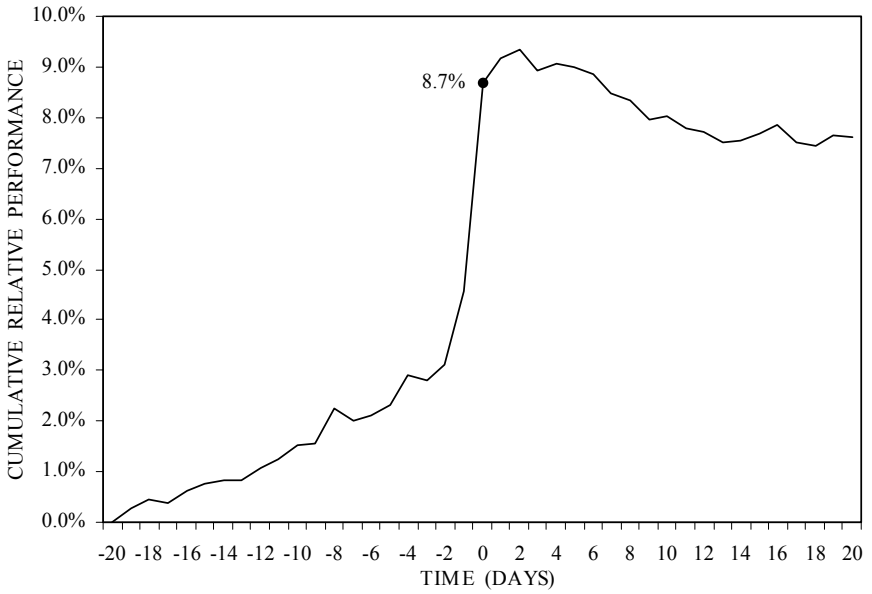
a daily basis, while for individual firms consensus estimates can change from day to day.

4.3 Empirical results

4.3.1 Reaction of stock price

Firms involved in a merger or acquisition show an outperformance relative to the MSCI world index, as illustrated in Figure 4.3. The outperformance cumulates to 8.7% in the period from 20 days before the announcement date up to and including the day of the announcement. Table 4.2 illustrates that this result is statistically significant. The average daily outperformance in that period is 0.4%, with a t-value of 2.17.

FIGURE 4.3
CUMULATIVE RELATIVE PERFORMANCE OF FIRMS INVOLVED IN A MERGER OR ACQUISITION AT AND AROUND THE ANNOUNCEMENT DATE

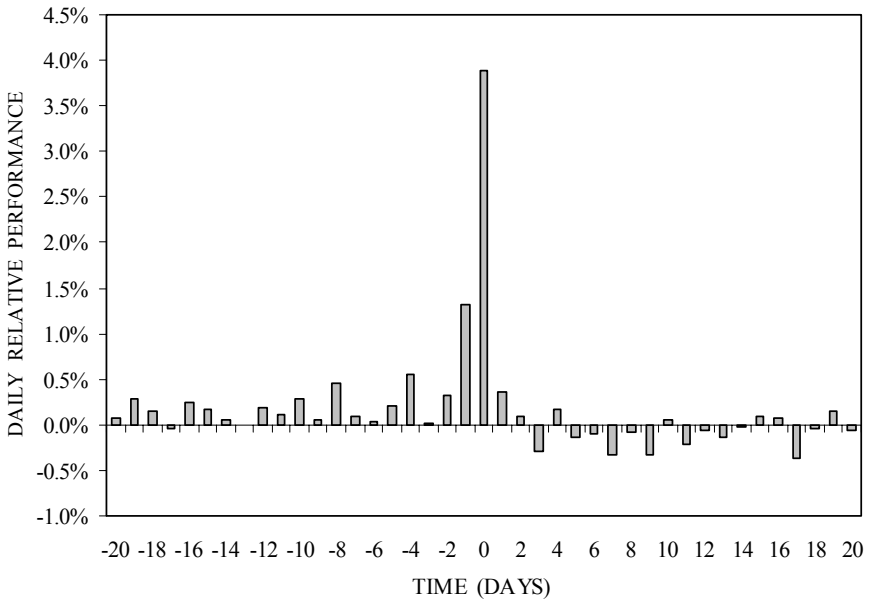


From Figure 4.4 it is clear that outperformance on a daily basis is only economically interesting the day before and the day of the announcement, with outperformances of 1.3% and 3.9%. These are also the days with statistically significant outperformances with t-values of 3.7 and 5.6 respectively.

TABLE 4.2
SPLIT BETWEEN THE PRE-ANNOUNCEMENT RUN-UP PREMIUM, THE PREMIUM AT THE ANNOUNCEMENT DATE AND THE POST-ANNOUNCEMENT PERFORMANCE

	ALL	MERGERS	ACQUIRERS	TARGETS
PRE-ANNOUNCEMENT RUN-UP	4.6%	3.3%	2.6%	7.8%
ANNOUNCEMENT PREMIUM	4.1%	4.3%	-0.2%	9.5%
TOTAL PREMIUM	8.7%	7.6%	2.3%	17.4%
AVG. DAILY OUTPERFORMANCE	0.4%	0.4%	0.1%	0.8%
T-VALUE	2.17	1.58	1.81	1.85
POST-ANNOUNCEMENT PERIOD	-1.1%	-4.0%	-0.5%	-0.2%
AVG. DAILY OUTPERFORMANCE	-0.1%	-0.2%	0.0%	0.0%
T-VALUE	-1.37	-2.41	-0.36	-0.37

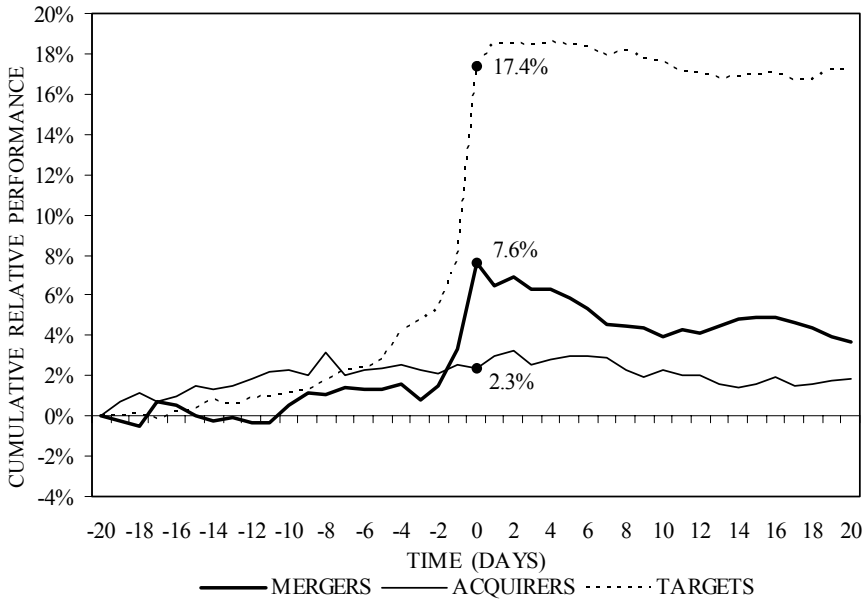
FIGURE 4.4
DAILY RELATIVE PERFORMANCE OF FIRMS INVOLVED IN A MERGER OR ACQUISITION AT AND AROUND THE ANNOUNCEMENT DATE



Separate examination of the price pattern for merging firms, acquiring firms and targets leads to the conclusion, not surprisingly, that investors who want to benefit from mergers and acquisitions have to focus on potential target firms. Figure 4.5 shows that acquiring firms achieve only a disappointing cumulative 2.3% outperformance. Merging firms yield a cumulative outperformance of 7.6%, but the targets are really interesting, with an outperformance of 17.4%. The outperformance for the targets corresponds to the increase in the targets' average price/earnings ratio of 17%, which we discussed in the data section. For the cumulative outperformance from day -

20 through day 0, as shown in Table 4.2, the results are less significant for the separate categories. Apparently, volatile returns in the pre-announcement period pollute the cumulative results after the separation into mergers, acquirers and targets. However, on a daily basis, the mergers and targets have statistically significant results from day –3 through day 0 and at day –1 and day 0 respectively. For the acquirers there is no significant outperformance.

FIGURE 4.5
CUMULATIVE RELATIVE PERFORMANCE OF MERGING FIRMS, ACQUIRERS AND TARGETS AROUND THE ANNOUNCEMENT DATE OF A MERGER OR ACQUISITION



This lack of a price reaction for acquirers might be explained by investors' doubts about the acquisition premium of 17.4% and the size of the future synergies from the acquisition. The returns for the acquirers and their targets correspond surprisingly well with the results presented by Parrino and Harris (1999). For their US sample they found an outperformance of 21.1% for the target and zero for the bidder in the period from 20 days before the announcement until five days after the final bid.

The pre-announcement run-up counts for approximately half of the total outperformance. For all firms, the run-up in the month before the announcement is 4.6% and the announcement premium is 4.1%, as stated in

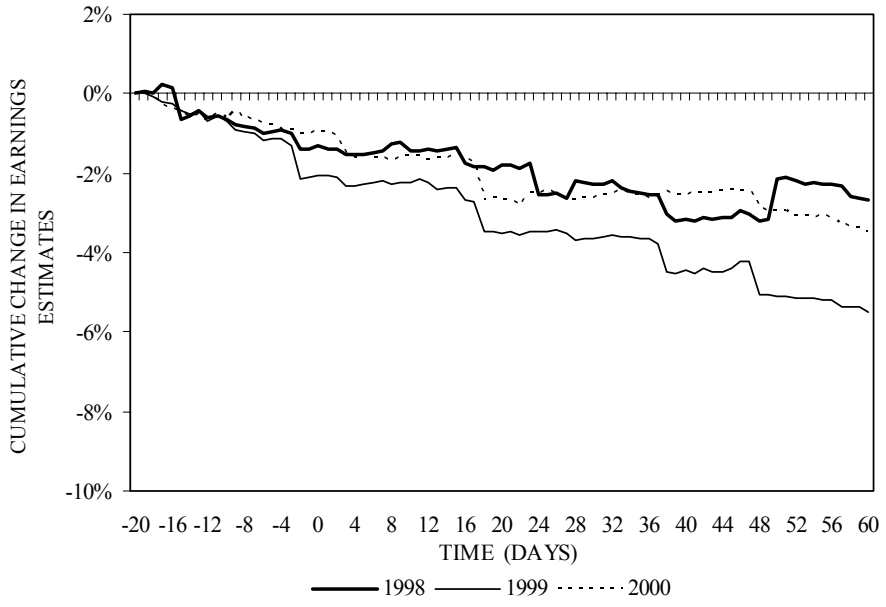
Table 4.2. The run-up is important, because it would cause bidders to pay more and thereby destroying value for the bidder's shareholders, see for example Schwert (1996). There are several explanations for this run-up. First, market rumors of a potential deal can drive up prices. We estimate that this is the case in most run-ups, especially because there is a clustering of deals per sector, as Mitchell and Mulherin (1996) report. They find that in general 50% of the mergers and acquisitions in a given industry cluster within a two-year period. Therefore, investors may anticipate potential deals once a consolidation trend has started. Second, firms sometimes announce they are talking to another unspecified party about a merger or acquisition. In other cases information even leaks out during the negotiations before the announcement. Normally, this provokes a reaction by investors. Third, public information could indicate a potential acquisition. In the US, for example, 13D filings show whether any firm has acquired more than 5% of a target. Fourth, when the bid is announced a rival bid may emerge that has been driven up by the first bid. Finally, insiders could have used their information in order to profit from the upcoming announcement. This view is supported by the findings of Barclay and Warner (1993). When looking at trading patterns during the 30 days before the announcement, they find that most of the pre-bid run-up in price occurred in medium-sized trades (500-9900 shares). Insiders dislike large trades because they catch the attention of the New York Stock Exchange monitors and other traders. Therefore, they spread their trades across different accounts and different brokers. To conclude, the run-up of prices before an announcement does not point to an inefficient market, but can be explained by the mentioned factors.

After the boom, there comes the bust, at least for the merging firms. In the post-announcement period, a gradual but significant underperformance of 0.2% a day starts from the first day after the announcement onwards. This is a pattern that will continue for a long period according to academic research. For example, Loughran and Vijh (1997) show that the average return difference between merging companies and their matching firms is -15.9% during a five-year post-acquisition period. It is striking that the underperformance of merging firms starts immediately and is also significant. This is contrary to the efficient market hypothesis, which states that all information is reflected in prices. It seems to be a winning strategy to sell firms the day after the announcement of their merger. However, the acquirers perform in line with the market in the 20 days after the announcement, as well as the targets which stay around their offered price. Therefore, the price pattern of acquisitions suggests an efficient market.

4.3.2 Changes in analysts' earnings estimates

If there are synergies to be gained by a merger or acquisition, it seems reasonable to expect upward earnings revisions by analysts for the years after the deal. Figure 4.6 shows the cumulative change in earnings estimates for all the firms in the sample for the years 1998, 1999 and 2000 from day –20 through 60. This yields a surprising pattern. There is not even a sign of upward revisions, although an unsuspecting observer would expect that at least some of the cost savings and other so often mentioned synergies would filter through to earnings[23]. However, our results suggest that, although synergies are frequently cited by managers, they are hard to find. There may be several reasons why upward revisions do not show up. First, it could take more than two years for synergies to filter through to earnings. But, if there are synergies, we expect them to filter through within two years for at least a reasonable part of the sample. Second, analysts could be conservative in

FIGURE 4.6
CUMULATIVE CHANGE IN ANALYSTS' EARNINGS ESTIMATES FOR THE YEARS 1998, 1999 AND 2000 AT AND AROUND THE ANNOUNCEMENT DATE OF A MERGER OR ACQUISITION



[23] In 1998 the monthly changes in earnings estimates for the market for the years 1998, 1999 and 2000 are in the range of an annualized -5% to -15%. We find downward revisions in the range of 2.7% to 5.5% in 81 trading days. So, the pattern in earnings revisions that we find is normal.

raising their estimates, or in case of add-on acquisitions, they could already have expected one or more deals to come through. Again, we have doubts about this argument. Management often talks about synergies. Since management is an important source of information and steers analysts' estimates, it still seems reasonable to expect at least some upward revisions. Finally, in the case of acquisitions, it could be that the anticipated synergies are equal to the premium paid for the target. Thereby, the target's shareholders would be the only beneficiaries of the deal.

In Figure 4.7 and Figure 4.8 we take a closer look at the changes in earnings estimates by separating mergers, acquirers and targets for the years 1999 and 2000. For 1999, all three groups experience ongoing downward revisions, while for 2000 acquirers can be distinguished by stable earnings estimates, instead of downward revisions. Since we cannot calculate the statistical significance of these revisions, it is not possible to derive hard results. The graphs suggest, though, that acquirers reap the fruits of their takeover, if any, after two years at the earliest. Although the stable earnings pattern may be good relative to the market, the lack of upward revisions is still somewhat surprising. The results suggest that most, if not all, synergies go to the target shareholders.

FIGURE 4.7
CUMULATIVE CHANGE IN ANALYSTS' EARNINGS ESTIMATES FOR 1999 AROUND THE ANNOUNCEMENT DATE FOR MERGING FIRMS, ACQUIRERS AND TARGETS

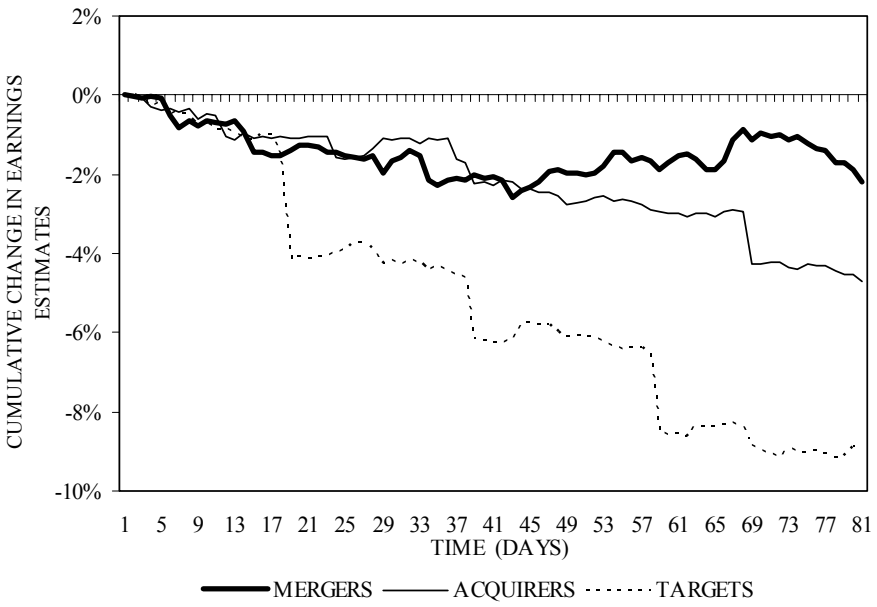
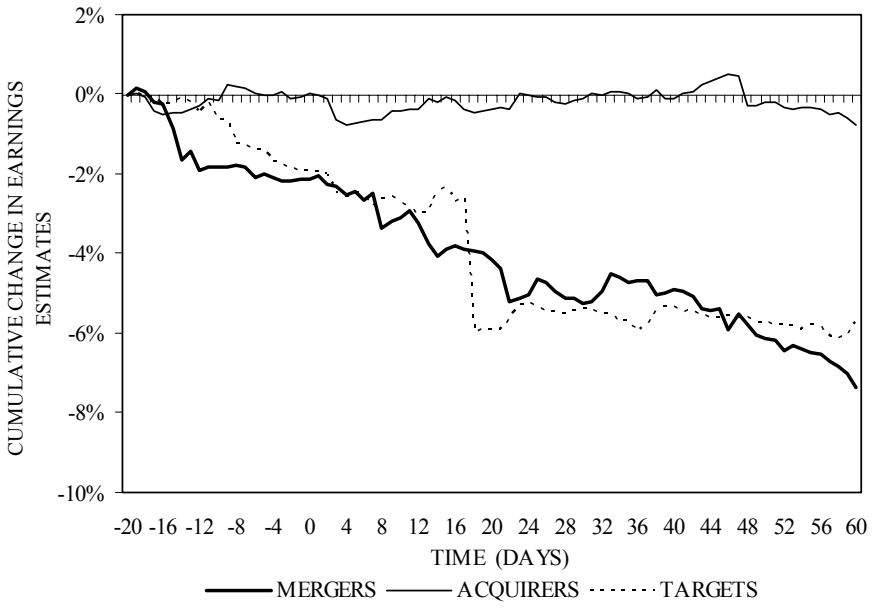


FIGURE 4.8
CUMULATIVE CHANGE IN ANALYSTS' EARNINGS ESTIMATES FOR 2000 AROUND THE ANNOUNCEMENT DATE FOR MERGING FIRMS, ACQUIRERS AND TARGETS



For mergers, the combination of ongoing downward earnings revisions for the years after the merger and the underperformance starting immediately after the announcement suggests a lack of expected synergies. It seems improbable that for the whole sample, synergies are not expected to filter through within the two-year period after the announcement. Therefore, the outperformance on the announcement would be unjustified, and conflict with the efficient market hypothesis.

The lack of upward earnings revisions supports previous academic research, in which there is no evidence of synergies. For example, Sirower and O'Byrne (1998) conclude that in 32 of the 41 cases of acquisitions in their sample the economic value added is negative. Combined with our results, this means that mergers and acquisitions should be critically assessed by investors.

4.4 Summary and conclusions

Our results, based on a global sample of the large mergers and acquisitions in 1998, raise doubts about the efficiency of stock markets. For mergers the

average outperformance cumulates to 7.6% in the 21 days up to and including the announcement day. But this can be explained by several factors, and does not point to an inefficient market. However, from the first day after the announcement onwards, a gradual and significant average underperformance of 0.2% a day shows up. Moreover, the ongoing downward earnings revisions by analysts suggest a lack of synergies, and thereby indicate that the outperformance was unjustified. These findings conflict with the efficient market hypothesis.

For acquisitions, there is no significant price reaction for the acquirers, while targets show an outperformance of 17.4%. However, after the announcement there are no abnormal returns anymore. Concerning analysts' earnings revisions, acquirers seem to reap the fruits of their takeover after two years at the earliest, if there are benefits at all. There is a lack of upward revisions, but relative to the market earnings estimates do well.

Investors who want to play the merger and acquisition game in their portfolio, should focus on potential targets because they show an attractive outperformance on an announcement. They should emphasize sectors that are in a consolidation phase, because there is a clustering of merger and acquisition activity as reported by Mitchell and Mulherin (1996). During periods with a poor investment climate, there will not be too much merger and acquisition activity. Concerning mergers, investors should not anticipate any future synergies and our results suggest selling immediately after the day of the announcement. A gradual underperformance of on average 0.2% a day starts the day after the announcement, and this will continue for a long time according to other studies.

Chapter 5

The Profitability of Insider Trades in the Dutch Stock Market[24]

5.1 Introduction

The use of insider knowledge in financial markets is illegal. Market participants should only deal on publicly available information, so that a level playing field is created for all. Otherwise, public confidence in financial markets would be undermined. To improve market transparency, the disclosure of insider trading has been required in the United States since 1934 and in the United Kingdom since 1976. However, in the Netherlands, similar legislation was introduced much more recently. Although the use of insider knowledge has been illegal since 1989, disclosure of insider trading has been required only since April 1999. In September 2002, the disclosure requirement was extended to insiders' total holdings in their company, and to trades initiated by their asset managers on their behalf.

Abnormal returns for insiders based on the abuse of insider knowledge or a better understanding of public information are also related to the efficiency of the market. If insider trades provide valuable information for investors, prices should react immediately to their disclosure. If there is no immediate adjustment to new information, a trading strategy based on insider trading could represent an interesting opportunity for investors.

The public availability of insider trade data for the Dutch market enables us to examine the profitability of insider trading with fresh data for a new market. In this study we examine the price pattern around insider trades for the period April 1999 to May 2002. We correct for possible size and value/growth effects in our sample. We focus on transactions by management, executive and non-executive directors and members of a company's supervisory board. In the remainder of this chapter, we review the literature on insider trading, discuss our data and methodology, and present our empirical results. The article ends with a summary and our conclusions.

[24] This chapter is based on Biesta, Doeswijk and Donker (2003).

5.2 Review of literature

Most research demonstrates the informative value of insider trades in the US market. Seyhun (1998) examined the American market thoroughly. With insider trade data ranging from 1975 to 1995 for the New York Stock Exchange (NYSE), the Nasdaq and the American Stock Exchange (AMEX), a data set with more than 300,000 insider transaction months is compiled, in which a purchase (sale) month for a stock is defined as a month with net insider buying (selling). In the 12 months after a purchase month he reports an average outperformance of 4.5%, while sale months generate an average underperformance of 2.7%. Two-thirds of the outperformance is realized in the first 6 months. In the 12 months before the insider activity there appears to be an underperformance for purchasing months of 2.5% and an outperformance for sale months of 16.0% with most of the outperformance in the three months before the insider activity. So, just around the transaction month there is a spike in the average performance pattern.

A cross-section regression analysis subsequently reveals a link between several transaction characteristics and the size of the relative performance. The transaction volume and the insider's position within the firm are positively correlated to the relative performance. There is a negative correlation between market capitalization and relative performance. According to Seyhun (1998) this could be due to more efficient pricing for large firms, since they are more extensively covered by analysts. Finally, Seyhun (1988) shows that net aggregate insider trading activity in a given month is significantly positively correlated with the market's return during the subsequent 2 months. However, the predictability of market returns cannot be used for a switching strategy between bonds and stocks, since on average the market return in a month with net selling still exceeds the risk-free rate.

Jeng, Metrick and Zeckhauser (20003) examine a sample for the United States ranging from 1975 to 1996. They construct purchase and sale portfolios with holding periods of 6 months. Insider transactions appear to differ from the market as a whole. Insiders disproportionately buy shares in small firms, value stocks and recent underperformers, while they sell mainly growth stocks that have generated high recent returns. However, after correcting for these characteristics there remains a significant abnormal performance for purchase portfolios of 50 basis points a month. The sale portfolio does not earn abnormal returns. A CAPM-based approach results in a significant abnormal return of 67 basis points a month. The authors do find

a relationship between trade volume and abnormal return, but they report no correlation with abnormal returns for firm size and the insider's position.

Finally, for the US market, Elliot, Morse and Richardson (1984) conclude that there is some evidence that insiders use private information relating to public releases about e.g. earnings, mergers or bankruptcies, but most insider trading appears to be unrelated to such events.

In Europe however, the results are less pronounced. On the London Stock Exchange, Pope, Morris and Peel (1990) report a 6-month cumulative abnormal return for insider purchases of 2.9% and an cumulative abnormal return of -6.7% for insider sales. Surprisingly, the abnormal return for sales is larger than for purchases, which actually appeared to be statistically insignificant. Before the event, there are no abnormal returns. Using a portfolio-based approach, Eckbo and Smith (1999) find zero or negative abnormal performance for insider trades on the Oslo Stock Exchange. Finally, Del Brio, Miguel and Perote (2001) conclude for a combined sample of the Madrid Stock Exchange and the Spanish continuous market that, although insiders earn excess returns, outsiders mirroring their trades do not.

5.3 Data and methodology

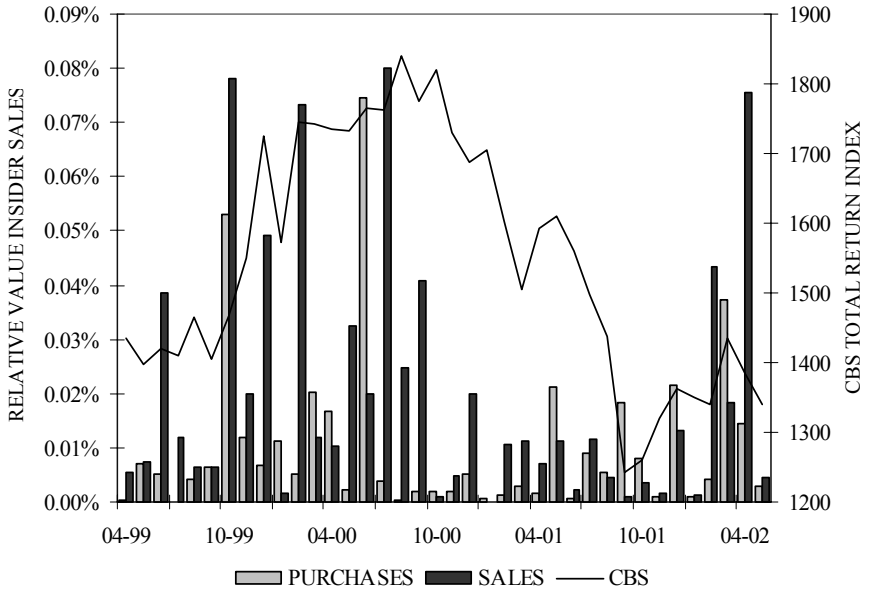
5.3.1 Data

For this study, we used the public register of Autoriteit Financiële Markten (or AFM, the financial markets regulator in the Netherlands). The register can be accessed for free by internet at www.afm.nl. Insiders, their family up to the second degree, large shareholders and the company itself have to disclose their transactions in shares of their own company. The register contains disclosed trades in stocks, options and warrants. From 1 April 1999 through 31 May 2002, the number of disclosures for companies listed on Euronext Amsterdam totals 6701. After excluding transactions directly related to (granted) options, warrants and incomplete or inconsistent disclosures, 2517 disclosed transactions in stocks remain. Subsequently, we selected the 1079 transactions from insiders, which we categorized into directors, supervisory directors and other management using Bloomberg, the Reach-database and companies' annual reports. Prices, total return and market capitalization data are from Thomson Financial Datastream, as well as book-to-market ratios.

Figure 5.1 shows the monthly values traded by insiders compared to the total value traded of all companies on Euronext Amsterdam, as well as the CBS

total return index (a broad-based index compiled by the national statistics agency) as a proxy for the market. Insider purchases represent on average 0.011% of the total value traded, while this is 0.021% for sales.

FIGURE 5.1
VALUE OF INSIDER TRANSACTIONS AND THE CBS TOTAL RETURN STOCK MARKET INDEX



It is remarkable that, before the market started its downward trend in October 2000, the traded value of insider sales in July, August and September 2000 all rank in the top 10 of the 38 months in our sample. These months are also characterized by low insider purchases. This could be an indication of the predictive value of aggregate insider trade data. However, due to the limited size of our sample we were not able to examine this item thoroughly.

The total volume traded, as a bold proxy[25] for the chance for outsiders trading against an insider, is on average 0.04% a month of total volume traded for insider purchases and 0.03% for sales, with outliers up to 0.45%. This means that the possible costs for trading against insiders are low. Jeng, Metrick and Zeckhauser (2003) report averages for value-weighted volume

[25] These probabilities are somewhat underestimated since not all 'informed' traders are required to report.

traded of 0.03% for purchases and 0.22% for sales for the US market, again expressed as a percentage of the total volume traded. The high number for insider sales in comparison with the Dutch market suggests that American firms remunerate managers more often with options.

In this study, we examine the market's reaction to insider trades by means of an event study. Thereafter, we look at the possibility of implementing an investment strategy based on insider trades with a buy-and-hold strategy for six months. We discuss both methods below.

5.3.2 Methodology

For the event study, we calculated abnormal returns as the difference between the actual return and the normal return for a stock. We estimated normal returns with the market model, which supposes that a stock's return relates to the market and to a company-specific part. For an overview of event-study methodologies, we refer to Brown and Warner (1985). We estimated parameters using an ordinary least squares regression in a control period of 250 trading days before the event period. We used the CBS total return index as the market index. In formula:

$$R^*_i = \alpha_i + \beta_i R_m + \varepsilon_i$$

where
R^*_i is the normal return for stock i,
α_i is the stock specific part of the normal return,
β_i is the sensitivity of a stock's return to the return of the market,
R_m is the return of the market index and
ε_i is the error term.

The test period runs from day -20 up to day 20 and has a length of 41 trading days. Day 0, the event day, is the first day after the insider trading action, as indicated in the Authority-FM register. This is also the first day that disclosures could be made public, but insiders have to disclose their trading activities within five days after the transaction. We assumed that insiders disclose at the last moment, i.e. day 4, which is made public at latest at day 5.

We determined the abnormal return during the event period for every day and every event as the difference between the realized return and the normal return. In formula:

$AR_i = R_i - R^*_i$

where
AR_i is the abnormal return of stock i,
R_i is the actual return on stock i and
R^*_i is the normal return on stock i based on the parameters estimated in the control period.

We then calculated the average abnormal return (AAR) per day. Next, we used a standardized t-test and a rank test to determine whether these abnormal returns statistically differ from zero. For insider sales, we interpreted negative abnormal returns as positive. Therefore, in our sample with both purchase and sale transactions, we multiplied the abnormal returns for sales by -1. We calculated Cumulative Abnormal Returns (CAR) by summing abnormal returns for different periods in the event period.

With an event study, it is important that no events overlap, as this could mean that abnormal returns result not only from the specific event, but from other events as well. We therefore removed all overlapping events from the sample. 137 non-overlapping events remain in the event study, composed of 72 insider purchases and 65 insider sales for a total of 79 companies.

To examine a buy-and-hold strategy, we used another methodology. Each month we determined for each company whether insiders generate a buy or a sell signal, based on the unanimity shown by insiders. If insiders purchase and sell a stock in the same month, or if there is no insider action at all, the stock will be excluded from the sample for that month. We constructed insider purchase and insider sale portfolios for each month with a holding period of 6 months. Portfolios are constructed as of the first trading day in a month. Here, our sample consists of 359 transaction months, with 165 purchase months and 194 sale months for a total of 95 companies.

We calculated buy-and-hold abnormal returns (BHAR), defined as the difference between the actual return for a stock and the benchmark's return. The portfolios were equally weighted on the date they were constructed.

We started with the CBS total return index as a benchmark. However, Jeng, Metrick and Zeckhauser (2003) show that the insider sample can differ from the market sample on size and value/growth characteristics. Since Fama and French (1992) conclude that returns depend on size and book-to-market ratios, we could have derived a biased BHAR.

To check the robustness of our results, we therefore also calculated BHAR for all stocks with a smallcap or a largecap index as a benchmark, and with a value or a growth index as a benchmark. For this purpose we classified all companies in the Dutch stock market into smallcap or largecap, based on their average market capitalization during the sample period. Then, we composed market-capitalization-weighted smallcap and largecap total return indices. Subsequently, we calculated BHAR as the difference between the actual return for a stock and the size index that belongs to that specific stock. Similarly, we corrected for a possible value or growth bias. We classified all companies into value or growth based on their average book-to-market ratio, using the methodology of the Morgan Stanley Capital Indices. Finally, we also composed combined indices for the size and value/growth effects, by constructing a smallcap value index, a smallcap growth index, a largecap value index and a largecap growth index, to check for a combined effect.

As a final check of the robustness of our results, we used the Capital Asset Pricing Model (CAPM), which supposes that the required rate of return for a portfolio or asset consists of the risk-free rate plus a risk premium. The risk premium depends on the quantity of risk taken, beta, and the market price for risk, $R_m - R_f$. By means of a regression analysis of the portfolio's return and the market return, both minus the risk-free rate, we estimated beta. The intercept in the regression analysis, alpha, can be interpreted as the abnormal return of the portfolio and is known as Jensen's (1969) alpha. We used daily data. In formula:

$$(R_i - R_f) = \alpha_i + \beta_i(R_m - R_f) + \varepsilon_i$$

where
R_i is the rate of return for portfolio i,
R_f is the risk-free rate,
R_m is the market return,
α_i is the alpha of portfolio i,
β_i is the beta of portfolio i and
ε_i is the error term.

5.4 Empirical results

5.4.1 Event study

As appears from Figure 5.2, there is a reversal around day 0 in the Cumulative Abnormal Returns (CAR). Before the transaction, insider purchases on average show negative abnormal returns, followed by positive

abnormal returns afterwards. The reverse applies to insider sales. Table 5.1 shows CAR for different subperiods in the event period. The results prior to the transaction are especially noteworthy for the insider sales. On average an insider sells after a period of outperformance that cumulates to 3.11% in 5 days and 5.82% in 20 days before the tranction. The t-test indicates these results to be highly significant. Stocks with upcoming insider buying show an insignificant underperformance before the event.

For the whole sample the abnormal return cumulates to 2.08% in the 21-day post-transaction period, for purchases this is 2.23% and for sales 1.91%. In general these results are statistically significant to highly significant, as is also shown in Table 5.1.

FIGURE 5.2
CUMULATIVE ABNORMAL RETURNS (CAR) RELATIVE TO THE CBS TOTAL RETURN INDEX AROUND INSIDER TRANSACTIONS

Suppose that insiders disclose their transactions on day 5, the latest permissible date, there is still an abnormal return for outsiders of 1.28% from day 6 to 20 for the whole sample. This amounts to 2.16% for the purchase sample, and -0.31% for the sale sample. These results are all significant at the t-test or the rank test. There would appear to be no incentive for outsiders to sell stocks with insider sales, since they realize an economically non interesting negative abnormal return in period 6 to 20. For

TABLE 5.1
CUMULATIVE ABNORMAL RETURNS (CAR) AROUND INSIDER TRANSACTIONS

EVENT WINDOW	ALL TRANSACTIONS			PURCHASES			SALES		
	CAR	T	R	CAR	T	R	CAR	T	R
(-20,-1)	-3.91%	***		-2.19%			5.82%	***	
(-20,-10)	-1.43%			-0.81%			2.13%	*	
(-10,-1)	-2.47%	***		-1.31%			3.74%	***	
(-5,-1)	-2.00%	***	*	-1.00%			3.11%	***	**
(0,+5)	0.80%		**	0.07%			-1.60%	*	***
(+6,+10)	0.69%			0.26%			-1.16%		*
(+10,+20)	0.63%		**	1.87%	**		0.75%		
(+6,+20)	1.28%	*	**	2.16%	**		-0.31%		**
(0,+20)	2.08%	**	***	2.23%	**		-1.91%		***
(-1,+3)	0.61%		*	0.55%	**		-0.68%		**
(-1,+5)	0.85%		**	0.46%			-1.28%		***
(0,+10)	1.49%	**	***	0.33%			-2.76%	**	***

, **AND * INDICATE TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.10, 0.05 AND THE 0.01 LEVELS. T AND R INDICATE SIGNIFICANCE FOR THE STUDENT-T AND RANK TEST RESPECTIVELY. IN THE SAMPLE WITH ALL TRANSACTIONS, ABNORMAL RETURNS OF SALES ARE MULTIPLIED BY –1*

the period 6 to 10 the results are insignificant. In the period 0 to 5 insiders realize an average abnormal return of 0.80% for the whole sample, an insignificant 0.07% for purchases but a significant -1.60% for sales. These results suggest insider sellers to have good timing capabilities in the very short run.

The results of our event study are in line with Seyhun (1998) for the United States. For the period 0 to 20 and 6 to 20 insider purchases realize higher absolute abnormal returns than insider sales. Insider sales can be triggered by various reasons such as liquidity or diversification, however purchases are often made on valuation grounds. From a diversification point of view insider purchases very quickly become irrational, since insiders are already financially tied to their company by their salary and bonuses.

For several event windows we regressed transaction value, the insider's position within the firm and the market capitalization on the CAR to estimate their importance. However, contrary to research for other markets, this analysis did not reveal significant results.

5.4.2 Buy-and-hold strategy

Figure 5.3 shows the buy-and-hold abnormal returns (BHAR) for insider trading based on portfolios with a holding period of 6 months, with the CBS total return index as benchmark. The insider purchase portfolio gradually outperforms the benchmark, while the insider sale portfolio underperforms. As appears from Table 5.2 panel A, for the whole sample (long in insider purchase portfolios and short in insider sale portfolios), the outperformance

amounts to 1.8% after 40 trading days, to 4.5% after 80 trading days and to 6.5% after 120 trading days. The abnormal return after 120 trading days is 11.3% for the purchase sub-sample and -2.4% for the sale sub-sample. For the purchases sub-sample these results are significant, but for the sales sub-sample they are insignificant.

FIGURE 5.3
BUY-AND-HOLD ABNORMAL RETURNS (BHAR) RELATIVE TO THE CBS TOTAL RETURN INDEX FOR INSIDER TRADING BASED PORTFOLIOS. PORTFOLIOS ARE CONSTRUCTED AT THE START OF THE MONTH BASED ON THE INSIDER TRANSACTIONS IN THE PRECEDING MONTH

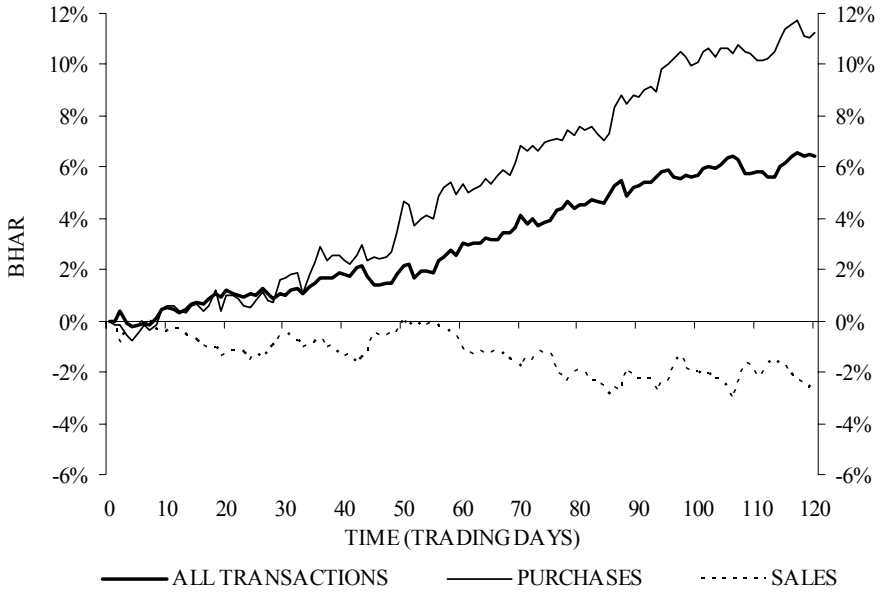


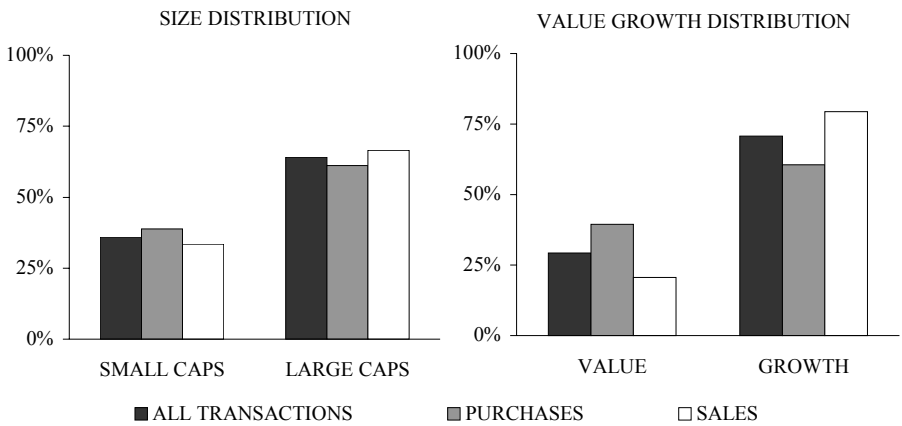
Figure 5.4 shows the size and value/growth characteristics of our sample. By definition we split the market into 50% smallcap and 50% largecap stocks, and into 50% value and 50% growth stocks. It appears that growth stocks and largecaps are overrepresented in our buy-and-hold sample, for insider purchases as well as sales. However, this bias towards largecap and growth stocks is strongest in the insider sales sub-sample. Therefore, our results could be influenced by a size and/or value/growth effect.

TABLE 5.2
BUY-AND-HOLD ABNORMAL RETURNS (BHAR) FOR INSIDER TRADING BASED PORTFOLIOS. PORTFOLIOS ARE CONSTRUCTED AT THE START OF THE MONTH BASED ON THE INSIDER TRANSACTIONS IN THE PRECEEDING MONTH

DAY	ALL TRANSACTIONS		PURCHASES		SALES	
	BHAR	T-VALUE	BHAR	T-VALUE	BHAR	T-VALUE
PANEL A						
BENCHMARK: CBS TOTAL RETURN INDEX						
40	1.8%	1.72 *	2.4%	1.35	-1.4%	-1.07
80	4.5%	2.56 **	7.6%	2.54 **	-1.9%	-0.94
120	6.5%	3.09 ***	11.3%	3.44 ***	-2.4%	-0.89
PANEL B						
BENCHMARK: LARGE CAP OR SMALL CAP INDEX						
40	2.3%	2.12 **	2.3%	1.33	-2.3%	-1.67 *
80	5.2%	2.82 ***	6.1%	1.99 **	-4.3%	-2.01 **
120	7.3%	3.35 ***	8.9%	2.60 **	-5.9%	-2.12 **
PANEL C						
BENCHMARK: VALUE OR GROWTH INDEX						
40	2.7%	2.51 **	2.6%	1.52	-2.7%	-2.06 **
80	5.6%	3.16 ***	6.7%	2.24 **	-4.7%	-2.25 **
120	7.6%	3.61 ***	9.3%	2.81 ***	-6.2%	-2.28 **
PANEL D						
BENCHMARK: VALUE/GROWTH AND SIZE ADJUSTED INDEX						
40	2.8%	2.59 ***	2.7%	1.54	-2.9%	-2.16 **
80	5.9%	3.24 ***	6.2%	2.02 **	-5.7%	-2.49 **
120	8.0%	3.68 ***	8.9%	2.58 **	-7.3%	-2.44 **

, **AND * INDICATE TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.10, 0.05 AND THE 0.01 LEVELS. IN THE SAMPLE WITH ALL TRANSACTIONS, ABNORMAL RETURNS OF SALES ARE MULTIPLIED BY –1*

FIGURE 5.4
SIZE AND VALUE/GROWTH DISTRIBUTION OF THE BUY-AND-HOLD INSIDER TRADING SAMPLE. BY DEFINITION, THE MARKET HAS BEEN SPLIT INTO 50% SMALLCAP AND 50% LARGECAP STOCKS, AND INTO 50% VALUE AND 50% GROWTH STOCKS



Using other benchmarks, differentiating by size and/or value/growth characteristics, leads to a slight change in results. The results for insider sales portfolios become significant, see panels B to D in Table 5.2. This could be due to the difference in size and value/growth characteristics with the market, as discussed above. When we use a size- and value/growth-adjusted benchmark, the outperformance after 120 days for the whole sample is 8.0%, for insider purchase portfolios this is 8.9% and for insider sale portfolios -7.3%, all results being economically and statistically significant. In general, insider purchase portfolios generate stronger outperformances than insider sale portfolios.

Table 5.3 shows the results of our CAPM-based robustness check. It appears that the alphas correspond well to the outperformance reported in Table 5.2. With the CBS total return index as a proxy for the market, alpha is 8.4% for the whole sample, 10.5% for the insider purchase portfolio and -5.1% for the insider sale portfolio. The results remain intact with the other benchmarks. The outperformance for purchases varies from 9.3% to 10.5% while the underperformance for sales lies between 5.1% and 7.7%.

TABLE 5.3
ABNORMAL PERFORMANCE OVER SIX MONTHS FOR INSIDER TRADING BASED PORTFOLIOS MEASURED BY THE ESTIMATED ALPHA FROM THE CAPM WITH DIFFERENT BENCHMARKS AS A MARKET PROXY

BENCHMARK	ALL TRANSACTIONS		PURCHASES		SALES	
	ALPHA	T-VALUE	ALPHA	T-VALUE	ALPHA	T-VALUE
CBS TOTAL RETURN INDEX	8.4%	3.73 ***	10.5%	2.74 ***	-5.1%	-1.86 *
LARGE CAP OR SMALL CAP INDEX	8.4%	3.72 ***	9.3%	2.42 **	-5.7%	-2.13 **
VALUE OR GROWTH INDEX	8.3%	3.75 ***	9.9%	2.69 ***	-6.1%	-2.31 **
VALUE/GROWTH & SIZE ADJUSTED	8.4%	3.77 ***	9.8%	2.60 **	-7.7%	-2.89 ***

, **AND * INDICATE TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.10, 0.05 AND THE 0.01 LEVELS. DAILY ALPHAS DERIVED FROM THE REGRESSION ANALYSES HAVE BEEN RECALCULATED TO SIX MONTHS ON A COMPOUNDED BASE. IN THE SAMPLE WITH ALL TRANSACTIONS, ABNORMAL RETURNS OF SALES ARE MULTIPLIED BY –1*

The results of the 6-month buy-and-hold strategy are in line with the shorter-term event study. We find the strongest signal from insider purchases. The results appear to be robust after controlling for possible size and value/growth effects, and checking with the CAPM. Taking transaction costs into account, mirroring insiders with a buy-and-hold strategy delivers economically interesting returns since we estimate round-turn transaction costs at 1% to 2% for retail investors and around 0.4% for institutional investors. Insiders appeared to be good predictors for a 6-month horizon, which is consistent with the reported results for the American market.

5.5 Summary and conclusions

To improve market transparency, the disclosure of insider trading has been required in the Netherlands since April 1999. This enables us to examine the profitability of insider trading in the Dutch stock market. In this study we examine the price pattern around insider trades for the period April 1999 to May 2002, focusing on transactions of management and supervisory directors.

The results prior to the transaction are especially noteworthy for the insider sales. On average an insider sells after a period of significant outperformance that cumulates to 5.8% in 20 days before the tranction. Stocks with upcoming insider buying show an insignificant underperformance before the event. Our event study shows a clear reversal around the insider transaction day. On average, insiders realize positive abnormal returns in the 5 days after their transaction. Again, only the results for insider sales are significant. This supports the view that, on average, insider sellers have good timing capabilities in the very short run. In the period 6 to 20 days after the transaction insider buys generate a significant 2.2% outperformance while insider sales yield an economically non interesting underperformance of 0.3%. So, outsiders can also achieve short term benefit from insiders' dealings, especially by focusing on the insider buys.

For several event windows we regressed transaction value, the insider's position within the firm and the market capitalization on the CAR to estimate their importance. However, contrary to research for other markets, this analysis did not reveal significant results.

We use a buy-and-hold strategy to test for an investment strategy based on the last month insiders' transactions. We report outperformances for insider purchase portfolios of 8.9% up to 9.3% in 6 months, after controlling for possible size and/or value/growth effects in our sample. Insider sale portfolios underperform between 5.9% and 7.3%. The results are all significant. The abnormal returns are realized gradually during the 6-month buy-and-hold period. A CAPM check showed our results to be robust. Insider purchases appear to result in higher absolute abnormal returns than insider sales. Insider sales can be triggered by various reasons such as liquidity or diversification, however, purchases are often triggered on valuation grounds.

Our results suggest that insider trades in the Dutch stock market do provide valuable information for investors. However, market prices do not fully reflect this information since there is no timely price adjustment to it. There is still room for investors to exploit this opportunity. Future research should reveal whether aggregate insider trading in the Dutch stock market also provides valuable information for the direction of the market as a whole. Our sample is too short to test the aggregate predictive power of insider trading.

Chapter 6

The Index Revision Party[26]

6.1 Introduction

As the use of benchmarks has increased, so has interest in the effects of stock index revisions. The S&P 500 was the first to attract most attention, e.g. Shleifer (1986), Harris and Gurel (1986), Jain (1987) and Pruitt and Wei (1989). More recently, other indices such as the Dow Jones (Polonchek and Krehbiel (1994), Beneish and Gardner (1995)), the Canadian TSE300 (Chung and Kryzanowski (1998)), the Italian MIB30 (Barontini and Rigamonti (2000)), the German DAX100 (Deininger, Kaserer and Roos (2001)) and the Japanese Nikkei 500 (Liu (2001)) have been examined. To date, six hypotheses have been offered to explain the effect of index revisions on stock prices. These vary from temporary price pressure due to index-related trading to permanent price effects due to a variety of reasons. Despite the growing amount of literature documenting several aspects of index revisions, results and conclusions differ widely.

In this study, we examine the annual revision to the AEX index. The AEX index is the leading index of the Dutch stock market. It is a capped market capitalization weighted index of the 25 most actively traded stocks at Euronext Amsterdam, and includes many blue chip issues such as Royal Dutch, Philips, Unilever and ING. This particular index is interesting because it is revised annually at the same time every year according to publicly available criteria. This enables investors to anticipate not only which stocks will be added or removed, but also adjustments to the index weights of those that remain. Contrary to previous research examining periodic index revisions, we take changes to the index weight of stocks that remain in the index into account. We also test an annual investment strategy, by composing portfolios from the anticipated winners and losers from the index revision. The examination of revisions to the AEX index adds fresh information to research on index revisions, since data and methodology are both new.

Our results show that prices do not efficiently adjust to publicly available information. The price pattern surrounding the AEX index revision therefore rejects the efficient market hypothesis in its semi-strong form as defined by

[26] This chapter is based on Doeswijk (2005).

Fama (1970, 1991). So, there is still an opportunity here which can be exploited by investors. The remainder of this article first reviews the literature and discusses the hypotheses that have been put forward. We then give an account of our data and methodology. Besides composing portfolios as mentioned earlier, we use regression analysis to determine the relationship between relative performance and an expected change in index weight. This is followed by a presentation and analysis of our empirical findings. Here, risk is also a subject of discussion. The chapter ends with a summary, and our conclusions.

6.2 Review of literature

Previous studies focus on stocks that enter or leave an index. They have one conclusion in common: stocks entering an index show an outperformance relative to the market. However, they disagree about the cause of this phenomenon, and whether it persists over time. There have been six hypotheses put forward to explain the price and volume patterns observed in the periods around index revisions. In order to give an overview of the growing amount of international literature on the effects of index revisions, we discuss these hypotheses below.

6.2.1 Price pressure hypothesis

According to the price pressure hypothesis, an index revision causes temporary price pressure. Due to index-related trading, entrants show an outperformance, and high trading volume, before (if entrance is known in advance) and at the time of the index revision. The reverse price pattern applies to stocks that leave the index. Subsequently, prices and volumes return to their normal level. Traders who provide the liquidity to the market earn a liquidity premium as a reward.

Harris and Gurel (1986) document a full price reversal for additions to the S&P 500 in the period 1976-1983. After the announcement, stocks outperform by 3%. However, prices return to their pre-announcement levels three weeks later. Next, the results of Madhavan (2001) for the Russell indices indicate that most of the price effect is temporary. The permanent part is described to changes in liquidity.

6.2.2 Imperfect substitutes hypothesis, i.e. downward sloping demand curves

The imperfect substitutes hypothesis implies a permanent price effect from index revisions. In this case, index investors shelve stocks that enter the

index and sell those that are removed. Because other stocks are imperfect substitutes, arbitrageurs cannot provide the market with liquidity, as in the price pressure hypothesis. This hypothesis is also known as the downward sloping demand curve for stocks, since reduced supply of a stock results in a higher equilibrium price, and vice versa.

One of the first studies documenting a persistent price effect is Shleifer (1986). The 3% cumulative outperformance for stocks added to the S&P 500 in the period 1981-1983 does not disappear within ten days after the revision took place. Afterwards, the price effect loses its statistical significance, because the standard error of the cumulative return rises. Shleifer also reports a positive relationship between the abnormal trading volume at the announcement date and the price effect, which is consistent with the imperfect substitutes hypothesis.

Several other studies support the imperfect substitutes hypothesis. Kaul et al. (2000) find strong evidence from the one-time free float adjustment of the Canadian TSE 300 in 1996, resulting in a permanent outperformance of 2.3% for stocks whose index weight is increased. Deininger et al. (2000) conclude that their findings for the German market, although mixed, come closest to the imperfect substitutes hypothesis. For the Nikkei 500, see Liu (2001), results clearly point towards a downward sloping demand curve for stocks. First, there is a small, but significant and persistent, price effect of 1.5% for additions and -2.5% for deletions at the announcement date. Second, it appears that trading volumes decrease (increase) for stocks added (deleted). This is consistent with the idea that, after a peak in trading volumes at the revision date, index-linked investments are shelved.

One other study worth mentioning is Beneish and Whaley (1996). They find a total price run up of 7% for S&P 500 additions in the period 1989-1994. Since S&P began announcing index changes five days before the effective date in 1989, this is composed of an overnight announcement premium of 3%, and another 4% outperformance in the five days up to the effective date. However, they expect this 4% arbitrage premium to disappear in the future, as soon as investors become aware of the 'S&P game'. Then, the entire price effect should appear overnight. Because the bid-ask spread after the effective date is unchanged, and only a part of the price run up is temporary, they support the imperfect substitutes hypothesis and reject the liquidity hypothesis, which we discuss next.

6.2.3 Liquidity hypothesis

According to the liquidity hypothesis, index revisions affect the liquidity of a stock. Index admission results in increased liquidity with lower trading costs and higher trading volumes, with a one-time jump in a share's price as the result. The reverse applies to stocks that are removed. In both cases, the price effect is permanent.

Dhillon and Johnson (1991) conclude that part of the permanent price increase in their S&P 500 1984-1988 addition sample may be explained by increased liquidity. Their results indicate a permanent increase in trading volume. Hegde and McDermott (2001) report an increase in liquidity for additions to the S&P 500 in their 1993-1998 sample. However, they conclude that changes in liquidity provide only a partial explanation for abnormal returns surrounding S&P 500 additions. The liquidity of deleted stocks decreases.

6.2.4 Information hypothesis

The information hypothesis supports the idea that an index revision comprises information about a company's future performance. Inclusion should result in a permanent increase in price, while a removal is bad fundamental news resulting in a one-time price drop.

Jain (1987) finds that additions to both the S&P 500 and the supplementary S&P indices earn excess returns, although it is unlikely that the latter will be followed by investors. Therefore, he argues that S&P index revisions perhaps (are perceived to) contain information. Dhillon and Johnson (1991) report that, as well as share prices, option and bond prices react to S&P listing announcements, which supports the information hypothesis. Besides, they conclude that part of their results may be explained by increased liquidity.

6.2.5 Attention hypothesis

The attention hypothesis is based on the assumption that an index revision gets media coverage. As Merton (1987) shows, news that attracts investors' attention can result in a permanent increase in the value of a company, due to the enlargement of its potential investor base. Index additions should deliver a positive permanent price effect because these stocks are new to a certain group of investors. Deletions, which are stocks that are already well known, are unaffected, since the news neither changes the investor base nor contains

fundamental information. Merton's model makes no predictions about trading volumes.

An examination of changes to the Dow Jones Industrial Average (DJIA) and the less well-known Dow Jones Transportation Average (DJTA), leads Polonchek and Krehbiel (1994) to support the attention hypothesis. Neither is a likely candidate for index trading. First, Dow Jones and Company has not authorized the use of its products for index trading. Second, the S&P and MSCI indices have a better market coverage. Nonetheless, all 11 additions to the DJIA in the period 1962-1991 experienced a permanent price increase of a cumulative average of 2.1% in the 10-day event period. Additions to the DJTA do not affect prices, nor do deletions from either index. Apart from the announcement date, there is no change in volume. These results support the attention hypothesis.

6.2.6 Selection hypothesis

The selection hypothesis posits that excess returns from index revisions are not robust. Index adjustments use historical price information to select stocks, so the returns of additions and deletions are not representative of returns in general.

Edmister et al. (1994) find that excess return parameter estimates are biased by the use of pre-announcement returns. Using a future estimation period to avoid this bias, they report no reversal of excess returns for S&P additions. They believe that something fundamental underlies changes in replacement stock price behavior, and conclude that the market displays a remarkable degree of liquidity and substitutability for replacement stocks. Findings by Chung and Kryzanowski (1998) for Canadian TSE300 index revisions, after adjusting for the sample selection criteria and liquidity cost effects, support the price pressure hypothesis.

Our review of the literature leads us to the conclusion that the empirical results vary widely for each index, examination period and research method used. It seems that several effects play a role, most notably price pressure, downward sloping demand curves and liquidity, while one effect might dominate depending on the characteristics of the specific index involved. Table 6.1 provides a summarized overview of the six hypotheses and their implied effects on price and volume. In the next section we discuss our contribution to this issue by using a new index, as well as a new research method.

TABLE 6.1
THE SIX HYPOTHESES THAT HAVE BEEN PUT FORWARD TO EXPLAIN THE PRICE AND VOLUME PATTERNS AROUND INDEX REVISIONS

		PRICE EFFECT				VOLUME EFFECT			
		NONE	TEMPORARY	PERMANENT	INCONCLUSIVE	NONE	TEMPORARY	PERMANENT	INCONCLUSIVE
PRICE PRESSURE HYPOTHESIS	WINNERS		+				+		
	LOSERS		-				+		
IMPERFECT SUBSTITUTES HYPOTHESIS	WINNERS			+			+	-	
	LOSERS			-			+	+	
LIQUIDITY HYPOTHESIS	WINNERS			+				+	
	LOSERS			-				-	
INFORMATION HYPOTHESIS	WINNERS			+			+		
	LOSERS			-			+		
ATTENTION HYPOTHESIS	WINNERS			+					X
	LOSERS	X				X			
SELECTION HYPOTHESIS	WINNERS	X							X
	LOSERS	X							X

+: POSITIVE EFFECT, -: NEGATIVE EFFECT, X: NO EFFECT OR INCONCLUSIVE

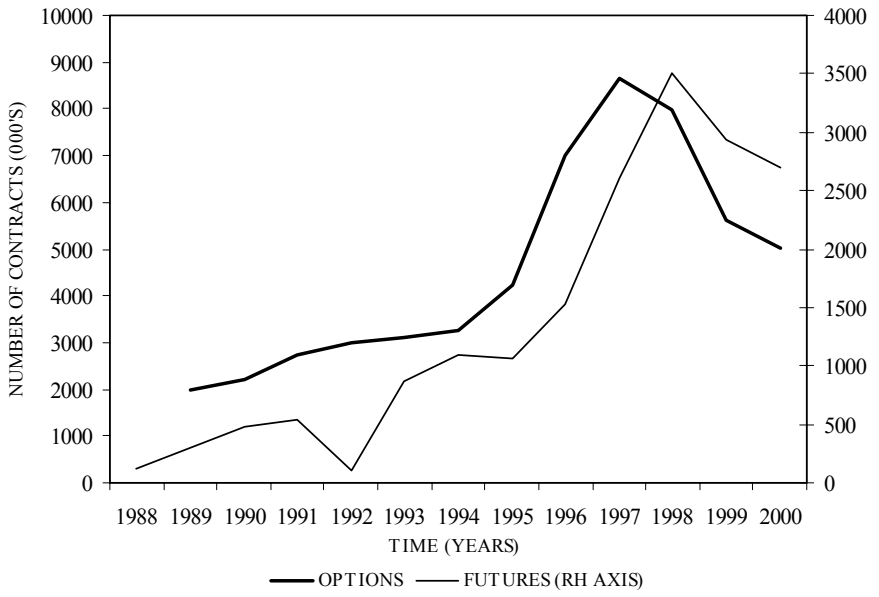
6.3 Data and methodology

6.3.1 Data

The AEX index is a capped market capitalization weighted index comprising the 25 most actively traded shares on Euronext Amsterdam, and includes blue chips such as Royal Dutch, Philips and ING. Options and futures on this index were introduced during 1987 and 1988 respectively. Figure 6.1 shows the tremendous growth in the turnover of these derivatives contracts.

According to De Nederlandsche Bank (DNB), the Dutch central bank, actively managed AEX-benchmarked mutual funds accounted for EUR 7.3 billion, while passively managed funds amounted to EUR 3.0 billion in the first quarter of 2001, giving a total of EUR 10.3 billion. However, this is likely to be an underestimate of the amount of money pegged to the AEX index, as privately managed institutional funds and retail portfolios could also be tied to this benchmark. The AEX is a relatively good benchmark compared to the MSCI Netherlands Index and the CBS Total Return Index (compiled by the national statistics office) which are the two best-known alternative benchmarks for the Dutch market. These are both uncapped market-capitalization weighted indices, in which Royal Dutch represents

FIGURE 6.1
VOLUME OF TRADED AEX INDEX OPTIONS AND FUTURES



SOURCE: EURONEXT AMSTERDAM

around a third of the total weight while all financial stocks together also capture roughly a third of the total market capitalization. So, these indices are heavily geared to only two sectors, which is undesirable from a diversification point of view. Moreover, derivatives are only available for the AEX.

Supposed that the true amount of invested money linked to the AEX would be up to twice as much as the amount managed in mutual funds: this would be between EUR 10.3 and 20.6 billion. Since the market capitalization of all index members at the end of 2001Q1 was EUR 534 billion, this equals 1.9% to 3.9% of the total market capitalization. For the S&P 500, Beneish and Whaley (1996) derive an estimate for the value of all index-linked investments of 5% to 10% of the S&P 500's total market capitalization at the end of 1994. This is obviously more than we do for the AEX, especially when we take the growth of index-linked investing between 1994 and 2001 into account. This illustrates that the popularity of index-linked investing in the US is ahead of the Dutch market. To conclude, the AEX index has some level of importance for investors in the Dutch market. This means that abnormal price or volume patterns surrounding the index revision could be caused by index-related trading.

From 1994 onwards, the composition of the Amsterdam Exchanges index (AEX) has been reviewed annually in accordance with a set of publicly available rules[27]. The adjustment takes place after the market close on the third Friday in February[28]. At the day of adjustment, a stock's index weight is capped at 10%, after which this maximum no longer applies. Stocks are selected based on the value traded in the previous calendar year. Existing index members ranked 26 or 27 by value traded have priority over new entrants ranked 24 or 25, for the purpose of stabilization. Euronext Amsterdam announces the final selection at least a month before the adjustment date (in practice this appears to be a month in advance), however investors can already determine what the selection will be at the beginning of the year. Moreover, a calculation of the provisional adjusted index can be made based on actual market capitalization to get an indication, ceteris paribus, of changes to index weights. Changes in index weights result from differences in market capitalization between index additions and deletions, from changes in the number of outstanding shares that took place during the year for stocks that stay in the index, and from changes in weightings for stocks that go back to the 10% weight cap. In the last year of our sample, index weight changes can also result from free float corrections. Given the specific nature of the AEX index revision process with publicly available index revision rules, we rule out the information hypothesis in this study.

This study focuses on the short-term price and volume impact of the AEX index revisions in the period 1994-2001. We therefore collected data from a symmetrical interval around the revision date, the test period. We start at 34 trading days before the revision, because this is the first point at which investors have all the data necessary to calculate the new index selection for each year in our sample. This means that for 1996 we start at 2 January, and for the other years a few days later. We use price, volume and market

TABLE 6.2
TOTAL ANTICIPATED SHIFT OF THE INDEX (SINGLE COUNTED) AND NUMBER OF STOCKS INVOLVED IN THE INDEX REVISION

	1994	1995	1996	1997	1998	1999	2000	2001	AVG. TOTAL
INDEX SHIFT	24.6%	6.4%	9.3%	3.5%	5.9%	8.1%	8.9%	11.8%	9.8% 78.5%
NUMBER OF STOCKS	26	26	27	26	28	26	28	27	26.8 214

[27] The rules for the composition of the AEX index are available from Euronext Amsterdam, see www.aex.nl.
[28] From 2001 onwards, the revision date has been moved to the first trading day in March to reduce pressure on the market (and its systems) from index revision-related trading during the February option expiration. Furthermore, market capitalization is corrected for free float from 2001.

capitalization data from Thomson Financial Datastream. Prices are corrected for dividends and stock splits.

As shown in Table 6.2, the number of stocks involved in the annual index revision is on average 26.8, which is just over 25 due to new entrants. The number of new entrants is limited by the stabilization rule mentioned above. The anticipated change to the index is on average 9.8%, single counted. So, on average 34 days before the index revision, it is expected that 9.8% of the index weight will be replaced at the revision date. The total sample involves 214 stocks (double counted) and an index shift of 78.5%.

6.3.2 Methodology

Contrary to previous research examining periodic index revisions, we also take changes to the weights of stocks remaining in the index into account. This is especially relevant for the price pressure and imperfect substitutes hypotheses in which, as well as additions and deletions, changes in index weight also have an effect on price and volume. But, stocks with a changed index weight could also see their liquidity affected. Finally, concerning the attention hypothesis, one could argue that stocks with an increase in index weight (as long as this is due to a higher number of outstanding shares as a result of a take over or the funding of strong organic growth) underline their growing presence in the AEX in the 'league tables' published around the index revision, thereby enlarging their potential investor base. Obviously, this effect would be smaller than for new index constituents which will draw more attention.

To examine the price and volume effect, we created portfolios from the anticipated winners and losers from the index revision, i.e. stocks whose index weight is expected to increase or decrease as a result of the revision. We do not rebalance the portfolios after the start date, so as to mimic a real annual investment strategy that has no minor day-to-day portfolio changes and no transaction costs after inception. Next, we calculated cumulative returns relative to the AEX index. We used unadjusted abnormal returns, because these generally present few difficulties in the context of event studies, see Brown and Warner (1985). Hereby we also circumvent the complications of parameter estimation. However, we do not disregard the risk of the winner and loser portfolios, as we will discuss success ratios and performance in up- and downward markets. We used daily logarithmic returns to determine statistical significance. For the volume indices, we calculated the course of a stock's volume relative to the volume of the AEX index. Besides building portfolios, we performed regression analyses to

explain a stock's return by the market return, and the anticipated change in its index weight.

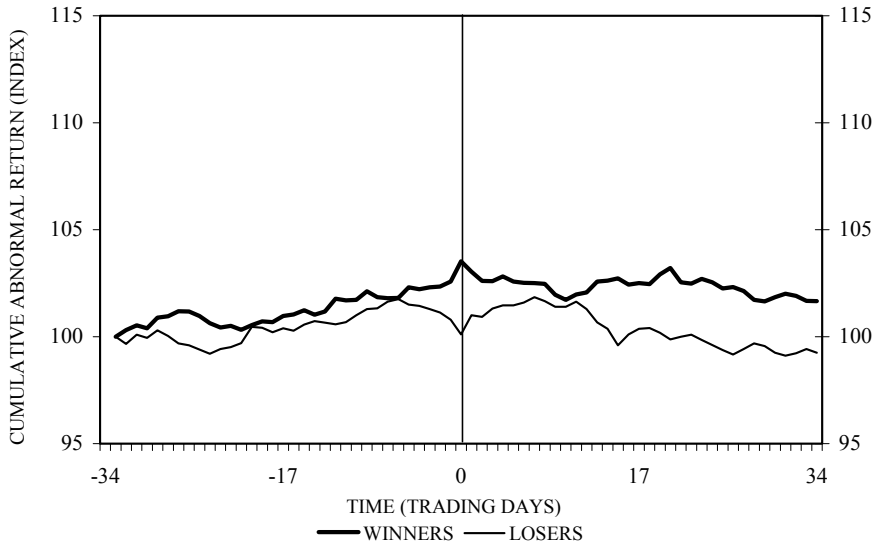
Since index additions and deletions are announced at least a month prior to the revision date, we will also give attention to the results for a symmetrical interval from trading day -19 to 20 around the revision. The announcement term of a month is long compared to other indices, moreover the announcement should not be a surprise for informed investors. In case attention plays a role, ex-ante it seems reasonable to see a gradual change in prices as the potential investor base grows each time that the media or analysts discuss the revision. But, as soon as arbitrageurs fully anticipate the revision event, they should be able to supply the market with enough shares and the abnormal price pattern should vanish. Actually, whatever the true reason is for abnormal price patterns that have been found in other studies, in an efficient market we do not expect to find any price pattern at all in this study. During the previous calendar year it became increasingly clear how the new index would look. This theoretically should have resulted in such a gradual price effect that it probably could not be found with a limited sample. However, at the revision day we do expect a spike in volumes due to the trading activity of index investors. Next, there might be some price pressure as a premium for the traders who provide liquidity to the market. Due to stock-specific risk, index investors will wait until the revision before they implement changes in their portfolios.

6.4 Empirical results

6.4.1 Price effect

Table 6.3 represents the results for equally weighted portfolios starting at day -33 up to and including day 34. The annual index revision takes effect after the close at day 0. Expected winners actually outperform in 55.1% of the cases prior to the revision, see panel A. In the eight years of our sample the winner portfolio on average delivers an economically interesting 3.5% outperformance relative to the market in the 34 days prior to the revision. Figure 6.2 shows that this outperformance appears gradually during the weeks leading up to the revision. The outperformance is significant at the 5% level. Notice that 1994 is the only year that yields a negative abnormal return. Post-revision, winners show an insignificant underperformance of -1.8%, with a statistically insignificant 1.7% outperformance remaining over the whole test period. These results correspond to most of the previous research, as discussed in section 6.2.

FIGURE 6.2
CUMULATIVE ABNORMAL RETURN FOR EQUALLY WEIGHTED BUY-AND-HOLD PORTFOLIOS WITH ANTICIPATED WINNERS AND LOSERS IN THE INDEX REVISION. TWO EQUALLY WEIGHTED PORTFOLIOS HAVE BEEN FORMED FOR EACH YEAR FROM 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE WINNER (LOSER) PORTFOLIO CONSISTS OF THE STOCKS THAT, CETERIS PARIBUS, WILL SEE THEIR WEIGHT INCREASE (DECREASE) AT THE INDEX REVISION. THIS FIGURE SHOWS THE AVERAGE CUMULATIVE ABNORMAL PERFORMANCE OF THE WINNERS AND LOSERS PORTFOLIOS



Surprisingly, anticipated losers seem to be unaffected by index revisions, as shown in Table 6.3, panel B. For example, expected losers actually lose before the revision in 49.6% of the cases. Because of the market neutral performance of losers, the results of a long-short strategy in panel C mirror the results of the winners.

The results described above are based on a simple portfolio policy with equal weights for each stock. However, more sophisticated investors will focus on the more prominent changes in the index, those which are also likely to attract the most attention from traders, (index) fund managers, analysts and/or the media. We therefore constructed portfolios with portfolio weights in proportion to the anticipated change in index weights. So, if on day -33 indications are that 10% of the index will be reshuffled at the index revision, a stock whose weight in the index is expected to change by a 0.5%-point is assigned a weight of 5% in the winner or loser portfolio, depending on whether the change concerns an increase or a decrease.

TABLE 6.3
PERFORMANCE STATISTICS OF ANTICIPATED WINNERS AND LOSERS FROM THE AEX INDEX REVISIONS BASED ON EQUALLY WEIGHTED BUY-AND-HOLD PORTFOLIOS. TWO EQUALLY WEIGHTED PORTFOLIOS HAVE BEEN FORMED FOR EACH YEAR FROM 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE WINNER (LOSER) PORTFOLIO CONSISTS OF THE STOCKS THAT, CETERIS PARIBUS, WILL SEE THEIR WEIGHT INCREASE (DECREASE) AT THE INDEX REVISION

	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
PANEL A; ANTICIPATED WINNERS									
NUMBER	11	7	5	13	7	19	8	19	89
PERIOD -33,0									
OUTPERFORMING WINNERS	5	3	3	6	4	13	3	12	49
SUCCESS RATIO (% OUTPERFORMING WINNERS)	45.5%	42.9%	60.0%	46.2%	57.1%	68.4%	37.5%	63.2%	55.1%
CUMULATIVE ABNORMAL RETURN	-0.2%	1.7%	6.1%	0.4%	5.2%	7.2%	5.3%	2.4%	3.5% *
PERIOD 1,34									
OUTPERFORMING WINNERS	4	3	2	7	3	7	3	8	37
SUCCESS RATIO (% OUTPERFORMING WINNERS)	36.4%	42.9%	40.0%	53.8%	42.9%	36.8%	37.5%	42.1%	41.6%
CUMULATIVE ABNORMAL RETURN	2.9%	-0.7%	0.5%	1.7%	1.4%	-1.5%	-12.8%	-5.6%	-1.8%
PERIOD -33,34									
OUTPERFORMING WINNERS	4	3	3	8	4	9	1	8	40
SUCCESS RATIO (% OUTPERFORMING WINNERS)	36.4%	42.9%	60.0%	61.5%	57.1%	47.4%	12.5%	42.1%	44.9%
CUMULATIVE ABNORMAL RETURN	2.7%	1.0%	6.7%	2.1%	6.6%	5.6%	-8.1%	-3.3%	1.7%
PANEL B; ANTICIPATED LOSERS									
NUMBER	15	19	22	13	21	7	20	8	125
PERIOD -33,0									
UNDERPERFORMING LOSERS	7	8	11	8	10	2	13	3	62
SUCCESS RATIO (% UNDERPERFORMING LOSERS)	46.7%	42.1%	50.0%	61.5%	47.6%	28.6%	65.0%	37.5%	49.6%
CUMULATIVE ABNORMAL RETURN	3.0%	-0.5%	1.0%	-2.3%	-1.0%	5.4%	-3.3%	-1.5%	0.1%
PERIOD 1,34									
UNDERPERFORMING LOSERS	9	9	7	7	14	3	6	5	60
SUCCESS RATIO (% UNDERPERFORMING LOSERS)	60.0%	47.4%	31.8%	53.8%	66.7%	42.9%	30.0%	62.5%	48.0%
CUMULATIVE ABNORMAL RETURN	-1.3%	-3.1%	0.5%	0.7%	-4.5%	2.4%	1.6%	-3.2%	-0.8%
PERIOD -33,34									
UNDERPERFORMING LOSERS	7	12	8	8	15	3	11	3	67
SUCCESS RATIO (% UNDERPERFORMING LOSERS)	46.7%	63.2%	36.4%	61.5%	71.4%	42.9%	55.0%	37.5%	53.6%
CUMULATIVE ABNORMAL RETURN	1.7%	-3.6%	1.5%	-1.6%	-5.5%	8.0%	-1.8%	-4.7%	-0.7%
PANEL C; CUMULATIVE PERFORMANCE OF WINNERS VS LOSERS									
PERIOD -33,0	-3.1%	2.2%	5.1%	2.8%	6.2%	1.7%	8.9%	4.0%	3.5%
PERIOD 1,34	4.3%	2.5%	0.0%	0.9%	6.2%	-3.8%	-14.2%	-2.5%	-0.9%
PERIOD -33,34	1.1%	4.8%	5.1%	3.8%	12.8%	-2.2%	-6.5%	1.4%	2.5%

** INDICATES TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.05 LEVEL*

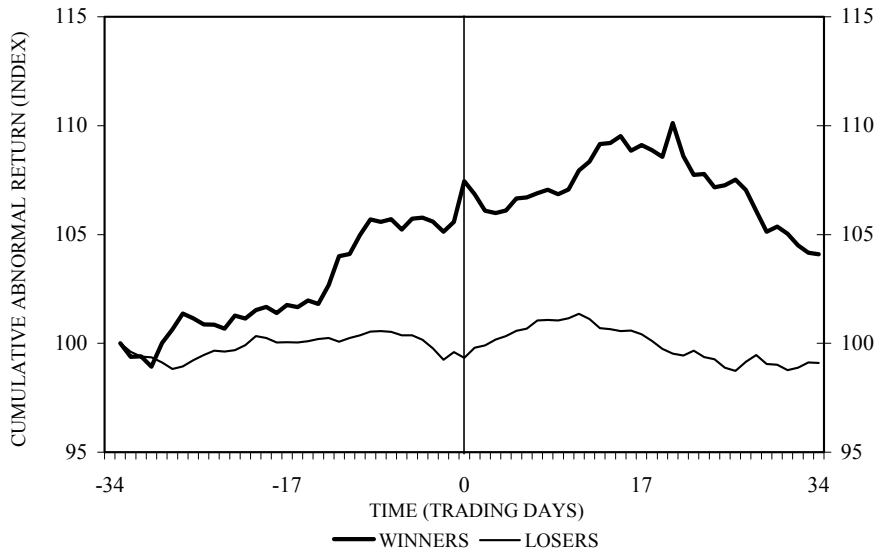
TABLE 6.4
PERFORMANCE STATISTICS OF ANTICIPATED WINNERS AND LOSERS FROM THE AEX INDEX REVISION BASED ON CHANGE-WEIGHTED BUY-AND-HOLD PORTFOLIOS. TWO CHANGE-WEIGHTED PORTFOLIOS HAVE BEEN FORMED FOR EACH YEAR FROM 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE WINNER (LOSER) PORTFOLIO CONSISTS OF THE STOCKS THAT, CETERIS PARIBUS, WILL SEE THEIR WEIGHT INCREASE (DECREASE) AT THE INDEX REVISION. THE PORTFOLIO WEIGHT IS PROPORTIONALLY DERIVED FROM THE ANTICIPATED CHANGE IN A STOCK'S INDEX WEIGHT

	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
PANEL A; ANTICIPATED WINNERS									
CUMULATIVE ABNORMAL RETURN IN PERIOD -33,0	-0.2%	1.5%	9.5%	4.7%	9.8%	5.5%	21.8%	7.0%	7.4% *
CUMULATIVE ABNORMAL RETURN IN PERIOD 1,34	0.7%	-1.8%	-2.6%	2.1%	-4.2%	8.1%	-20.7%	-3.6%	-3.1%
CUMULATIVE ABNORMAL RETURN IN PERIOD -33,34	0.5%	-0.3%	6.6%	6.8%	5.2%	14.0%	-3.4%	3.1%	4.1%
PANEL B; ANTICIPATED LOSERS									
CUMULATIVE ABNORMAL RETURN IN PERIOD -33,0	1.7%	1.0%	-0.9%	0.4%	-1.7%	-9.0%	3.9%	-0.9%	-0.7%
CUMULATIVE ABNORMAL RETURN IN PERIOD 1,34	-0.1%	-2.6%	2.5%	0.3%	-3.2%	-3.0%	2.5%	1.3%	-0.2%
CUMULATIVE ABNORMAL RETURN IN PERIOD -33,34	1.6%	-1.6%	1.6%	0.7%	-4.9%	-11.7%	6.6%	0.4%	-0.9%
PANEL C; CUMULATIVE PERFORMANCE OF WINNERS VS LOSERS									
PERIOD -33, 0	-1.9%	0.5%	10.4%	4.2%	11.7%	15.9%	17.2%	7.9%	8.3% *
PERIOD 1,34	0.8%	0.8%	-5.0%	1.8%	-1.0%	11.4%	-22.7%	-4.9%	-2.5%
PERIOD -33,34	-1.1%	1.3%	5.0%	6.1%	10.6%	29.1%	-9.4%	2.7%	5.5%

** INDICATES TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.05 LEVEL*

The results for the change-weighted portfolios are given in Table 6.4. The index revision effect is indeed reinforced if the amount of the change in index weight is taken into account. The outperformance of the winners portfolio in the pre-index revision period increases to a significant 7.4%. As for the equally weighted portfolios, Figure 6.3 illustrates that the outperformance is realized gradually in the weeks prior to the revision. Again, 1994 is the only year resulting in an underperformance for the winners portfolio. This outperformance is rather high in an international context. Beneish and Whaley (1996) also report a 7% outperformance for stocks added to the S&P 500, but this includes a 3% overnight announcement premium. In the 34 days after the revision, the winners lag the market by 3.1%. An outperformance of 4.1% remains for the test period as a whole, but this result is once again statistically insignificant.

FIGURE 6.3
CUMULATIVE ABNORMAL RETURN FOR CHANGE-WEIGHTED BUY-AND-HOLD PORTFOLIOS WITH ANTICIPATED WINNERS AND LOSERS IN THE INDEX REVISION. TWO CHANGE-WEIGHTED PORTFOLIOS HAVE BEEN FORMED FOR EACH YEAR FROM 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE WINNER (LOSER) PORTFOLIO CONSISTS OF THE STOCKS THAT, CETERIS PARIBUS, WILL SEE THEIR WEIGHT INCREASE (DECREASE) AT THE INDEX REVISION. THE PORTFOLIO WEIGHT IS PROPORTIONALLY DERIVED FROM THE ANTICIPATED CHANGE IN A STOCK'S INDEX WEIGHT. THIS FIGURE SHOWS THE AVERAGE CUMULATIVE ABNORMAL PERFORMANCE OF THE WINNERS AND LOSERS PORTFOLIOS



The change-weighted losers portfolios show an uninteresting and insignificant underperformance of -0.7% in the period before the revision.

There is an underperformance in four of the eight years, but in the other four years shorting the losers takes some percentage points from the portfolio.

Parallel to Beneish and Gardner (1995), we now take a more detailed look to the cumulative abnormal returns (CAR) for intervals ranging from one day up to the whole examination period. We sum the daily logarithmic returns of the average change-weighted winners and losers portfolios to calculate the CAR, see Table 6.5. The t-statistics used to determine the statistical significance of the CAR are based on the time-series variance of the portfolios' average cumulative abnormal returns over the whole sample period for which we have 67 daily observations. Success ratios are based on the individual eight years in our sample.

The price patterns at days 0 and 1 show results which support the price pressure hypothesis. Just before the revision the portfolio with the anticipated winners outperforms, while the losers portfolio underperforms. Immediately afterwards, winners underperform and losers outperform. As follows from Table 6.1, this supports the price pressure hypothesis. These results are significant for winners at day 0 with a 1.7% outperformance with a t-statistic of 3.02 and a success ratio of 100%, and for losers at day 1 with a 0.5% outperformance with a t-statistic of 1.90 and a success ratio of 75%. The results for losers in the 5-day periods -4 to 0 and 1 to 5 point to temporary price pressure as well. On average the losers underperform the market by 1.0% in the 5 days before the revision with a t-statistic of -1.89 while they outperform the market by 1.3% in the same post-revision period with a t-statistic of 2.32. Periods extending 5 days show insignificant results, losers are actually unaffected. For the 10-day period -4, to +5, an insignificant price effect of 0.2% results. This supports the temporary price pressure hypothesis.

Before the index revision, the results are much stronger for winner portfolios. For the 5, 10, 20, or 33 day periods before the revision date the CAR are 1.5%, 2.2%, 5.5% and respectively 7.0%, with corresponding succes ratios of 75% up to 100% and significant t-statistics for the 20 and 33 day periods. Losers are unaffected when we extend the interval to more than 5 days prior to the revision. For the symmetrical 40-day interval -19 to +20 we document a 7.9% outperformance with a t-statistic of 2.29 and a success ratio of 100%, one month being the minimum period before which Euronext Amsterdam has to announce the final selection.

TABLE 6.5
PERFORMANCE STATISTICS OF ANTICIPATED WINNERS AND LOSERS FROM THE AEX INDEX REVISION BASED ON AVERAGE DAILY LOGARITHMIC RETURNS FOR CHANGE-WEIGHTED BUY-AND-HOLD PORTFOLIOS. THE CUMULATIVE ABNORMAL RETURN (CAR) IS THE SUM OF THE UNWEIGHTED AVERAGE DAILY LOGARITHMIC RETURNS OF THE EIGHT PORTFOLIOS IN OUR SAMPLE. THE SUCCESS RATIO SHOWS THE PERCENTAGE OF YEARS IN WHICH WINNERS (LOSERS) HAVE A POSITIVE (NEGATIVE) CAR. THE CAR CAN DIFFER SLIGHTLY FROM THE PREVIOUS TABLES BECAUSE IT REPRESENTS UNWEIGHTED AVERAGE RETURNS FOR EACH DAY WHILE PREVIOUS RESULTS WERE BASED ON BUY-AND-HOLD RETURNS WITH DIFFERENT WEIGHTS DUE TO DIFFERENCES IN RELATIVE PERFORMANCES, ALSO HERE IT CONCERNS LOGARITHMIC RETURNS

PERIOD	DAYS IN CUMULATION	WINNERS PORTFOLIOS (N=8)			LOSERS PORTFOLIOS (N=8)		
		CAR LN	T-VALUE	SUCCESS RATIO	CAR LN	T-VALUE	SUCCESS RATIO
-33,0	33	7.0%	2.22 **	88%	-0.7%	-0.53	50%
-19,0	20	5.5%	2.25 **	88%	-1.0%	-0.96	50%
-9,0	10	2.2%	1.27	100%	-1.1%	-1.39	38%
-4,0	5	1.5%	1.26	75%	-1.0%	-1.89 *	25%
1,5	5	-0.7%	-0.55	38%	1.3%	2.32 **	75%
1,10	10	-0.3%	-0.18	38%	1.8%	2.38 **	88%
1,20	20	2.4%	0.96	88%	0.2%	0.16	38%
1,34	34	-3.1%	-0.97	38%	-0.3%	-0.21	50%
-9	1	0.6%	1.17	63%	0.2%	0.72	75%
-8	1	-0.1%	-0.18	38%	0.0%	0.08	63%
-7	1	0.1%	0.18	50%	0.0%	-0.20	38%
-6	1	-0.5%	-0.83	50%	-0.2%	-0.75	25%
-5	1	0.5%	0.87	100%	0.0%	-0.01	50%
-4	1	0.1%	0.10	50%	-0.2%	-0.88	25%
-3	1	-0.2%	-0.31	38%	-0.4%	-1.70 *	25%
-2	1	-0.4%	-0.76	25%	-0.5%	-2.21 **	25%
-1	1	0.4%	0.75	63%	0.4%	1.73 *	38%
0	1	1.7%	3.02 ***	100%	-0.3%	-1.17	38%
1	1	-0.5%	-0.94	38%	0.5%	1.90 *	75%
2	1	-0.7%	-1.22	13%	0.1%	0.51	38%
3	1	-0.1%	-0.17	38%	0.3%	1.17	38%
4	1	0.1%	0.20	50%	0.2%	0.68	63%
5	1	0.5%	0.89	75%	0.2%	0.93	75%
6	1	0.0%	0.06	75%	0.1%	0.45	50%
7	1	0.2%	0.28	38%	0.4%	1.57	75%
8	1	0.1%	0.26	63%	0.0%	0.12	63%
9	1	-0.2%	-0.28	38%	0.0%	-0.17	63%
10	1	0.2%	0.33	75%	0.1%	0.36	38%
-33,34	67	3.9%	0.87	75%	-1.0%	-0.53	63%
-19,20	40	7.9%	2.27 **	100%	-0.9%	-0.57	50%
-9,10	20	1.9%	0.77	88%	0.8%	0.70	50%
-4,5	10	0.9%	0.50	50%	0.2%	0.31	63%
0,1	2	1.1%	1.47	75%	0.2%	0.51	63%

, ** AND * INDICATE TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.10, 0.05 AND 0.01 LEVELS*

The asymmetrical impact of the index revision, whereby winners anticipate but losers show almost no reaction, is remarkable and contrary to most other research documenting the performance of losers surrounding index revisions. However, although much stronger, our results are in line with the reported asymmetry of Polonchek and Krehbiel (1994) for the DJIA as we discussed

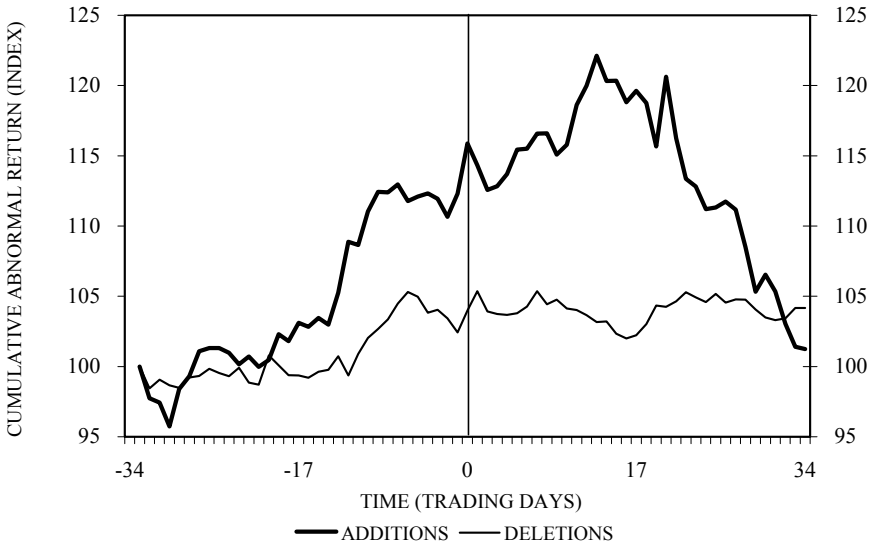
in the literature section, and support the attention hypothesis as also can be seen in Table 6.1. Another explanation could be that, according to 'street wisdom', traders would rather meet customer sales by purchasing shares and holding them in inventory than meet their purchases by taking short positions, as suggested by Chan and Lakonishok (1993). But, we reject this explanation for this study because the time horizon is too long and the difference between winners and losers is too large. The price pressure, the imperfect substitutes, the liquidity and the information hypotheses all call for symmetrical results, and therefore are not supported by our findings for intervals extending 1 to 5 days around the index revision.

A point still open for discussion is whether the price effect for the winners persists. It does persist for at least one month after the revision date as indicated by the significant outperformance in period -19 to +20. But the longer the time frame, the harder it becomes to find statistically significant results due to the increasing variance. This is one reason for caution regarding persistence for horizons of more than one month. Another reason is that further examination of a subsample consisting only of stocks that enter or leave the index almost shows a full reversal after 34 days, as shown in Figure 6.4. For this purpose we created two cross-section change-weighted portfolios, one for the stocks that are added to the index and one for stocks that are deleted from the index. Note that these results do not represent an annual investment strategy, since the two portfolios consist of all additions and deletions in all eight years.

To further check the sensitivity of stock prices to the anticipated changes in AEX index weights, and to examine portfolio performances in a rising as well as a falling market, we performed cross-section regression analyses of normal returns. Regressors originate from the market return and the anticipated change in index weight. Here, we concentrate on the period prior to the index revision, since this appeared to be the interval in which winners showed a significant outperformance.

When we regress the cumulative normal return in the 34 days before the revision to the AEX index and the anticipated change in index weight, it appears that a 1%-point change in index weight results on average in a significant 1.29% extra return over this period, see Table 6.6 panel A. The market coefficient is represented by the sensitivity to movements in the AEX, which is 0.8. This is not really close to 1 since the AEX has strong sector biases due to heavy weights in energy (Royal Dutch) and financials (ABN Amro, Aegon, ING).

FIGURE 6.4
CUMULATIVE ABNORMAL RETURN FOR CHANGE-WEIGHTED BUY-AND-HOLD PORTFOLIOS WITH INDEX ADDITIONS AND DELETIONS. TWO CHANGE-WEIGHTED PORTFOLIOS HAVE BEEN FORMED WITH ALL INDEX ADDITIONS AND INDEX DELETIONS FROM THE PERIOD 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE PORTFOLIO WEIGHT IS PROPORTIONALLY DERIVED FROM THE ANTICIPATED CHANGE IN A STOCK'S INDEX WEIGHT. THIS FIGURE SHOWS THE AVERAGE CUMULATIVE ABNORMAL PERFORMANCE OF THE ADDITIONS AND DELETIONS PORTFOLIO



Since our previous results turned out to be asymmetrical for winners and losers, we examined the sensitivity of winners and losers to the market and to index weight changes separately. Panel B in Table 6.6 indeed confirms the asymmetrical results. On average, an anticipated increase in index weight of 1%-point results in an outperformance of 2.01% before the revision, while there is no significant effect for stocks that see their index weight decline. From this regression it also appears that winners have a higher market beta than losers, suggesting a higher risk. But, when we make a distinction between upward and downward markets, see panel C, winners have a higher market beta than losers in a rising market but the reverse applies to falling markets. This combination is attractive rather than risky. Regression analyses do not yield significant results for either the post-index revision period or the test period as a whole.

For the price effect, we conclude that there is a significant outperformance for stocks whose AEX index weight is expected to increase. This outperformance is related to the change in index weight and is gradually

TABLE 6.6
CROSS-SECTIONAL REGRESSIONS OF RETURNS PRIOR TO THE INDEX REVISION. WE RAN THREE CROSS-SECTION REGRESSIONS WITH A STOCK'S CUMULATIVE RETURN IN THE 34 DAYS BEFORE THE INDEX REVISION AS THE DEPENDENT VARIABLE. NEXT TO A CONSTANT, REGRESSORS ORIGINATE FROM THE AEX INDEX AS A PROXY FOR THE MARKET, OR FROM THE ANTICIPATED CHANGE IN INDEX WEIGHT. AEX IS THE CUMULATIVE RETURN OF THE AEX INDEX, AEX_W IS AEX MULTIPLIED BY DUMMY VARIABLE 1 (D1) WHICH EQUALS 1 FOR WINNERS AND 0 FOR LOSERS, AEX_L IS AEX MULTIPLIED BY DUMMY VARIABLE 2 (D2) WHICH EQUALS 0 FOR WINNERS AND 1 FOR LOSERS, $AEX_{U,W}$ IS AEX_W MULTIPLIED BY DUMMY VARIABLE 3 (D3) WHICH EQUALS 1 IN CASE AEX IS POSITIVE (UP MARKET) AND 0 IN CASE AEX IS NEGATIVE (DOWN MARKET), $AEX_{D,W}$ IS AEX_W MULTIPLIED BY DUMMY VARIABLE 4 (D4) WHICH EQUALS 0 IN CASE AEX IS POSITIVE AND 1 IN CASE AEX IS NEGATIVE, $AEX_{U,L}$ IS AEX_L MULTIPLIED BY D3 AND FINALLY $AEX_{D,L}$ IS AEX_L MULTIPLIED BY D4. CW IS THE ANTICIPATED CHANGE IN INDEX WEIGHT 34 DAYS BEFORE THE AEX INDEX REVISION, CW_W IS CW MULTIPLIED BY D1 AND CW_L IS CW MULTIPLIED BY D2

CONST	AEX	AEX_W	AEX_L	$AEX_{U,W}$	$AEX_{D,W}$	$AEX_{U,L}$	$AEX_{D,L}$	CW	CW_W	CW_L	R^2(%)
PANEL A											
0.01	0.80 ***							1.29 *			16.0
(1.57)	(6.06)							(1.90)			
PANEL B											
0.01		0.86 ***	0.78 ***						2.01 *	0.45	16.5
(0.79)		(4.63)	(3.90)						(1.95)	(0.40)	
PANEL C											
0.00				1.12 ***	0.55	0.88 ***	0.76		1.97 *	0.05	17.0
-(0.12)				(3.65)	(1.60)	(3.05)	(1.54)		(1.86)	(0.04)	

, **AND * INDICATE TWO-SIDED SIGNIFICANCE OF THE T-STATISTIC AT THE 0.10, 0.05 AND 0.01 LEVELS, RESPECTIVELY; T-VALUES ARE GIVEN BETWEEN BRACKETS*

realized in the weeks before the index revision. On average the outperformance amounts to 7.4% for the change-weighted portfolio. Regression analyses confirmed our findings, and showed that a 1%-point increase in anticipated index weight results on average in 2% outperformance. There is no reason to suppose that the outperformance of winners is due to a higher risk profile, since market betas for winners are higher than for losers in rising markets, and vice versa in falling markets. Moreover, the winner portfolio outperformed in seven of the eight years in our sample. If the level of risk were higher, we would expect to see a more frequent underperformance.

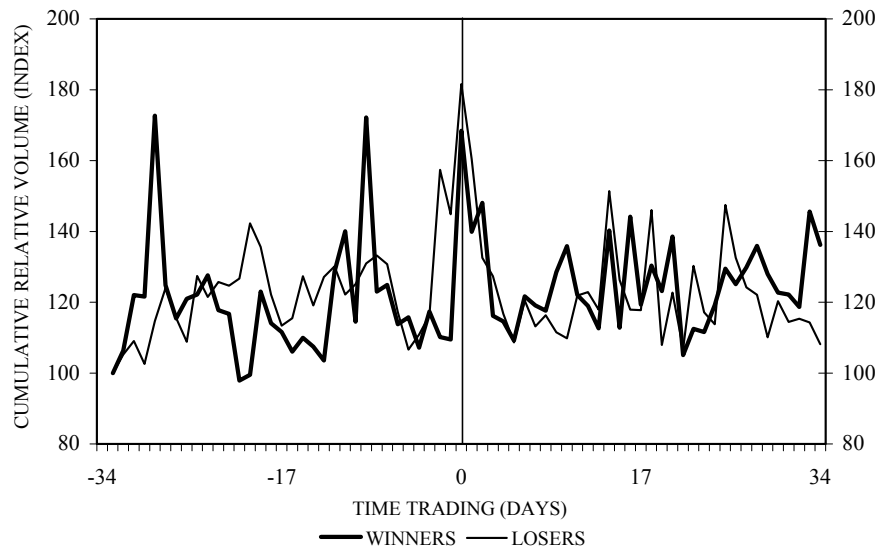
Because the AEX index is used as a basket for derivatives and for the construction of portfolios, there is ex-ante potential for prices to be influenced by index-related trading. The price patterns at days 0 and 1 indeed point to temporary price pressure. For the losers portfolio only, this extends to the 10-day period around the revision. However, in general the winners portfolios' abnormal price pattern is stronger. This applies to the two days around the revision but especially to longer intervals for which losers show no economically interesting abnormal returns. This asymmetry of our

results points towards the attention hypothesis as an important cause for the observed price effect. The index revision might attract attention from the media and analysts, and thereby enlarges the potential investor base which is aware of the company. Additions are 'new stocks' for some investors, while deletions leave the potential investor base unchanged. Second, for the stocks that remain in the index, weight increases might attract more attention than weight decreases. Our results indicate that the larger the change, the more attention it will attract. This seems plausible to us. For the price effect, apart from the price pressure and attention hypotheses, other hypotheses as discussed in the literature review do not apply to our results. We will now examine whether the AEX index revision also has an effect on volume.

6.4.2 Volume effect

As for price indices, we constructed change-weighted relative volume indices for each year. As can be seen in Figure 6.5, there is a peak of 70% to

FIGURE 6.5
CUMULATIVE RELATIVE VOLUME FOR CHANGE-WEIGHTED BUY-AND-HOLD PORTFOLIOS WITH ANTICIPATED WINNERS AND LOSERS IN THE INDEX REVISION. TWO CHANGE-WEIGHTED PORTFOLIOS HAVE BEEN FORMED FOR EACH YEAR FROM 1994 TO 2001, 34 DAYS BEFORE THE ANNUAL AEX INDEX REVISION. THE WINNER (LOSER) PORTFOLIO CONSISTS OF THE STOCKS THAT, CETERIS PARIBUS, WILL SEE THEIR WEIGHT INCREASE (DECREASE) AT THE INDEX REVISION. THE PORTFOLIO WEIGHT IS PROPORTIONALLY DERIVED FROM THE ANTICIPATED CHANGE IN A STOCK'S INDEX WEIGHT. THIS FIGURE SHOWS THE AVERAGE CUMULATIVE RELATIVE VOLUME INDEX OF THE WINNERS AND LOSERS PORTFOLIOS



80% extra trading volume for both winner and loser portfolios on the day of the index revision. However, neither line shows a trend, and the change in relative trading volume in the period before and after the revision is not statistically significantly different from zero for either winners or losers. These results therefore do not support the liquidity hypothesis. At most, the peak at the day of index revision, although not unique for winners, indicates that the index revision has some level of importance for investors in the Dutch market. These results, combined with the short term price effect, support the price pressure hypothesis.

6.5 Summary and conclusions

Interest in the effects of stock index revisions has increased recently. Originally the S&P 500 drew researchers' attention. Other indices like the Dow Jones, the Canadian TSE300, the Italian MIB30, the German DAX100 and the Japanese Nikkei 500 have now also been studied. However, empirical results differ greatly for each index, examination period and research method used. They only have one conclusion in common: stocks that enter an index show an outperformance relative to the market. Six different explanations have been offered. Temporary price pressure due to index-related trading and a permanent price effect due to downward sloping demand curves or changes in liquidity are frequently cited, while permanent effects caused by new information or media attention are less acknowledged. Finally, part of the revision effect might be caused by a selection bias.

In this study we focus on the annual revision of the AEX index. The AEX index is the main index of the Dutch stock market. It is a capped market capitalization-weighted index of the 25 most actively traded stocks on Euronext Amsterdam. Since derivatives and mutual funds based on the AEX are available, there is the ex-ante possibility that index-related trading is the main cause of a potential AEX index revision effect. This particular index is interesting because it is revised annually at the same time every year according to a set of publicly available criteria. Contrary to previous research examining periodic index revisions, we take changes in the index weight of stocks that remain in the index into account. This enables an annual investment strategy in which portfolios are composed from the anticipated winners and losers in the index revision. This adds a new piece to the index revision puzzle.

The price patterns at days 0 and 1 point to temporary price pressure. For the losers portfolio only, this extends to the 10-day period around the revision. Furthermore, apart from on the revision day itself, volume seems to be

unaffected, which is also in line with the price pressure hypothesis. In general the winners portfolios' abnormal price pattern is stronger. This applies to the two days around the revision, but especially to longer intervals for which losers show no economically significant abnormal returns. A change-weighted winners portfolio, with portfolio weights proportionally derived from the expected changes in index weight, on average yields a significant outperformance of 7.4% in the 34 days prior to the revision. For seven out of the eight years in our sample buying the winners portfolio was successful. The outperformance is rather high in an international context. Regression analyses confirm our findings. There is no reason to suppose that the outperformance of winners is due to a higher risk profile, since market betas for winners are higher than for losers in rising markets, and vice versa in falling markets.

The price effect for winners persists for at least one month (20 trading days) after the revision date. But, the longer the time frame, the harder it becomes to find statistically significant results due to the increasing variance. This is one reason to be cautious regarding persistence for horizons longer than one month. Another reason is that a subsample only consisting of index additions and deletions shows almost a full reversal 34 days after the index revision. There seems to be no volume impact from the index revision, apart from a spike on the day the revision occurs.

The asymmetrical impact of the index revision, whereby winners anticipate but losers do not, is remarkable and contrary to most other research documenting the performance of losers in index revisions. This asymmetry points to the attention hypothesis as an important cause of the observed price effect. The index revision attracts attention from both the media and analysts, and thereby enlarges the investor base aware of the company. Additions are ‘new stocks’ for some investors, while deletions leave the investor base unchanged. Moreover, weight increases for the remaining stocks could attract more attention than decreases. Our results indicate that the larger the change, the more attention it will attract. This seems plausible.

Our results oppose the semi-strong form of the efficient market hypothesis. While immediately around the revision there is some temporary price pressure which can be seen as a reasonable reward for investors providing liquidity to the market, the economically and statistically significant outperformance of winners in the weeks before the revision cannot be seen either as a timely adjustment to publicly available information, nor as a reward for a risky investment. Our results suggest that next to temporary price pressure, downward sloping demand curves and liquidity, attention

also can play a role in the abnormal price pattern observed around index revisions.

We conclude that the annual AEX index revision has been a party for those investors aware of the opportunity it presents. It seems logical that this opportunity would disappear as soon as it becomes more widely known, in line with the expectation of Beneish and Whaley (1996) that as soon as investors become aware of the 'S&P game' the arbitrage premium will disappear. But, the question remains, why has this opportunity still been available in recent years despite the growing attention to index revisions from academic researchers around the world? Perhaps we should have subtitled this chapter 'It ain't over till it's over'.

Chapter 7

Summary and Personal View

7.1 Summary

Fama and French (1992) add two factors, value and size, to the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) which links individual expected stock returns to their sensitivity for the market. The three factor asset pricing model captures a large part of the predictability of stock returns. According to the efficient market adepts, the value and size factors represent non-market linked risks. They argue that there are more risk factors than just bèta.

For the size premium the reasoning seems rather simple, small firms typically have lower analyst coverage and are illiquid. Analyst coverage and the chance of wrong asset pricing are positively correlated. This risk can be diversified and should not be priced. However, indirect trading costs for small caps compared to large caps are larger for institutional investors. Their order can move the market price substantially. Unquestionable, the higher returns for small caps are, at least partly, a compensation for their illiquidity and riskier profile. Given the low hit ratios of a size based investment strategy and the prolonged periods of low returns for small caps compared to large caps, we can at least state that the size effect is not an easy money opportunity for investors.

The arguments to label the value factor as a risk factor are far less convincing then for the size factor. Fama and French (1992, 1993) argue that size and value capture leverage. In other words, they can be seen as financial distress indicators, or risk factors. This seems to be rather straightforward, but why is it that value stocks practically always beat growth stocks, wonders behavioural finance. The value premium materializes during almost all stock market conditions. Moreover, there is no direct evidence that the value premium can be attributed to financial distress.

According to behavioural finance, the value effect is the result from extrapolation behaviour of investors. Behavioural finance supposes psychology to play an important role in investment decisions. People, in forming their expectations, do not follow the normative principles of statistics. They rely on a limited number of heuristics and are prone to their emotions which sometimes lead to severe and systematic errors. Behavioural

finance rests on the assumption that, in general, investors are irrational and that there is limited arbitrage. This leads to wrong asset pricing.

From a social economic point of view it is desirable that prices reflect true values, as pricing guides the economic activities in our society. Mispricing can lead to inefficient allocation, thereby depressing our prosperity. Moreover, a lack of public confidence in the efficiency of the capital markets may undermine their functioning. Therefore, research into investment opportunities, whether it is performed from an academic point of view or simply a search for risk free profits, serves society.

Here, we concentrate on the question whether the stock market is efficient or leaves room for exploitable investment strategies. We limit our focus to five possible anomalies, as we discuss the seasonal 'Sell in May'-effect in the stock market and four cross-sectional patterns which involve IPO's, mergers and acquisitions, insider trading and index revisions. The choice to examine these anomalies follows personal interest as well as practical relevance to investors. These patterns do not require high frequency trading and therefore might offer an opportunity to investors after including transaction costs. We summarize these possible anomalies below, starting with the one that seems to have the highest economic significance.

The market maxim "Sell in May and go away" is a simple but profitable one. On average, stocks deliver close to zero returns in the six month period from May through October, only giving a risk premium from November through April. This effect, however, has not been widely covered in academic literature. We examine the hypothesis that the seasonal pattern is caused by an optimism cycle. Towards year end, investors start to look towards next year, often with overly optimistic expectations. This results in attractive returns for stocks. Several months into the year, this initial optimism becomes hard to maintain and the stock market experiences a summer lull. A zero-investment global sector-rotation strategy based on this theory appears to be highly profitable. Global earnings growth revisions also follow a seasonal pattern parallel to that of the stock market. Finally, in a separate analysis for the US stock market, investors' optimism as measured by the initial returns on IPOs almost completely capture the results of the sector-rotation strategy. All these findings support the optimism-cycle hypothesis.

The research into IPOs centers around three issues. The initial underpricing, the long-term relative performance and the difference between hot and cold issue markets. Especially the initial underpricing offers an attractive opportunity for investors. We examine the Dutch IPO market between 1977

and 2001. It concerns a relatively large and survivorship bias free dataset. Using a sector-specific reference portfolio to calculate the relative performance of the IPOs, we find an average initial underpricing level of 17.6%. The median initial return is 5.0%, while there are negative initial returns in only 17% of the IPOs. After the first trading day, during their first three years of listing, IPOs on average underperform their benchmark by a cumulative 10.0%, but this result is statistically insignificant. The period 1997 – beginning of 2000 was a true hot-issue period for growth stocks: their level of initial underpricing was 35.8%, compared to 9.2% during cold-issue periods. These growth IPOs also significantly underperform their benchmark by 38.4% after three years.

Agrawal and Jaffe (2000) conclude, based on an extensive literature study, that many papers using different methodologies and different samples for both the United States and the United Kingdom document negative long term abnormal performance for mergers. We examine the short-term reaction of stock prices and analysts' earnings estimates to the announcement of a merger or acquisition for a global sample of mergers and acquisitions. Targets and merging firms outperform the market in the period before and on the day of the announcement. However, merging firms show a significant underperformance immediately thereafter. Moreover, we find a lack of upward revisions in consensus earnings estimates for the post-announcement years. This suggests that synergies are hard to find. Combined with the frequently documented long run underperformance, this suggests avoiding merging stocks in a portfolio.

Several studies document that insider trades have superior returns, see for example Lakonishok and Lee (2001) and Seyhun (1998). In general, insider purchases precede outperformance while insider selling predicts (marginal) underperformance. Exception to this rule, according to Scott and Xu (2004), are small sales that account for small percentages of shares owned. We examine the profitability of insider trading on Euronext Amsterdam. To improve market transparency, disclosure of insider trading has been required in the Netherlands since April 1999. Both a short-term event study and a 6-month buy-and-hold strategy reveal that insiders as well as outsiders mirroring insiders are able to realize abnormal returns. We report outperformances for insider purchase portfolios of between 8.9% and 9.3% over 6 months, after correcting for possible size and value/growth effects in our sample.

To date, six hypotheses have been offered to explain the effect of index revisions on stock prices. These vary from temporary price pressure due to

index-related trading to permanent price effects due to a variety of reasons. Despite the growing amount of literature documenting several aspects of index revisions, results and conclusions differ widely. We examine the annual revision of the AEX index in the Netherlands. This particular index is interesting, since the revision rules enable investors to anticipate changes in both constituents and index weights long in advance. Our results suggest that attention and temporary price pressure play a role in the observed revision effect. A portfolio containing those stocks expected to benefit from the index revision is showing an outperformance of up to 7% in the weeks before the revision, while losers are unaffected. Around the revision day we find indications of temporary price pressure for winners as well as losers.

The studies that we have discussed in this book suggest that the stock market is not completely efficient.

7.2 Personal view

In the end, it is a matter of believe whether the stock market is efficient or not as neither the efficient market school nor the behavioural finance school has decisive evidence to prove their view. Apart from this, like for example Cochrane (1999) argues, it is hard to measure average returns from risky strategies due to the high volatility. Even 25 years of data result in a standard error of 3% when the annual standard deviation equals 15%, so that a confidence interval of two standard errors is 12% wide, even with 25 yearly observations.

Obviously, the market is not miles away from efficiency. I am not writing from my yacht in the Mediterranean Sea surrounded by an abundance of bubbles, caviar and everything else that seems nice at first sight, but from my desk in Rotterdam. If the market would be far from efficient, of course I would be among the ones to hugely benefit from it. I invest at least as well as I drive, while (not surprisingly) I belong to the 80% of drivers that drive above average compared to other people on the road. For those who think that I might suffer from over-optimism and that my stupidity is the reason for being behind a desk instead of a yacht, I just refer to the intense discussions among academics, which in itself is a proof that the market is not miles away from inefficiency.

Personally, I believe the market is close to efficient, but not so close that it shuts down all investment opportunities for active management. The behavioural explanation is more appealing to me than the efficient market hypothesis, although I think that indirect trading costs might frequently be

well underestimated in studies that claim to document an attractive investment strategy. Most of the investment opportunities are among small and mid caps where hidden transaction costs are large due to illiquidity for institutional investors with their large amounts of money. In short, my self-image is closer to an artist than to an ape.

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Nederlandse Samenvatting

Summary in Dutch

Inleiding

De inzichten over de prijsvorming op aandelenmarkten zijn drastisch gewijzigd in de afgelopen decennia. Tot grofweg de jaren tachtig was de academische wereld het er in het algemeen over eens dat koersen zich willekeurig ontwikkelen, kortom de koersen zijn onvoorspelbaar. Met andere woorden, of je voor je beleggingsportefeuille nou een aap inhuurt die dartpijlen op de financiële pagina's uit de krant gooit, of dat je een professionele belegger inhuurt maakt niet uit, beide zijn niet in staat om de markt (na correctie voor risico) te voorspellen. Tot die tijd is het Capital Asset Pricing Model (CAPM) uit 1964 in gebruik, een prijsmodel voor aandelen dat het verwachte rendement alleen afhankelijk stelt van de marktgevoeligheid van een aandeel. Hoe beweeglijker een aandeel, hoe risicovoller het wordt beschouwd, des te hoger het verwachte rendement op een aandeel.

In de jaren tachtig neemt het aantal onderzoeken dat voorspelbaarheid van aandelenkoersen suggereert in rap tempo toe. Daarbij blijken waarderingsvariabelen als bijvoorbeeld de koerswinst-, de koerskasstroom- en de koersboekwaardeverhouding en de grootte van een bedrijf afgemeten aan de beurswaarde voorspelkracht te hebben. Hoe goedkoper een aandeel, dus hoe lager de hiervoor genoemde waarderingsvariabelen, hoe hoger de rendementen zijn die dergelijke aandelen doorgaans halen. Daarnaast behalen aandelen van een bedrijf met een lage marktkapitalisatie, gemiddeld genomen hogere rendementen dan aandelen van bedrijven met een hoge beurswaarde. Deze bevindingen leiden tot een nieuw prijsmodel, het zogenaamde driefactormodel uit 1992, dat het verwachte rendement voor aandelen afhankelijk maakt van de marktgevoeligheid van het aandeel, de waardering van het aandeel en de marktkapitalisatie van het bedrijf.

Naast waardering en grootte blijken toekomstige rendementen samen te hangen met behaalde rendementen. De rendementen over de afgelopen drie tot vijf jaar hebben een negatieve invloed op de rendementen in de komende jaren. Doorgaans genomen geldt dat hoe beter (slechter) een aandeel heeft gepresteerd, des te slechter (beter) de rendementen doorgaans zullen worden. Deze terugkeer naar het gemiddelde blijkt sterk samen te hangen met het selecteren van aandelen op basis van waardering. De rendementen over de

afgelopen drie tot twaalf maanden hebben een positieve invloed op de rendementen in de komende maanden. Dit trending effect heet momentum en staat los van de waardering en grootte, al geldt wel dat het momentumeffect sterker is voor bedrijven met een lage beurswaarde dan voor bedrijven met een hoge beurswaarde.

Er zijn nog diverse andere patronen in aandelenrendementen. Daaronder bevinden zich er vijf waar we ons op richten in dit boek. Dat zijn de 'Sell in May'-vuistregel gebaseerd op de traditionele zomerslapte op de beurzen in de periode mei tot en met oktober, de hoge rendementen van nieuwkomers op de eerste beursdag en hun veronderstelde slechte koersontwikkeling op de lange termijn, de zwakke koersontwikkeling na fusies, de voorspelkracht van de aandelenhandel door insiders en het opmerkelijke koerspatroon rondom aanpassingen van aandelenindices.

In de jaren negentig is de voorspelbaarheid van aandelenkoersen algemeen geaccepteerd. Maar deskundigen zijn het er niet over eens of deze voorspelbaarheid nu betekent dat het geld op straat ligt of niet. De relatief hoge rendementen op bepaalde groepen aandelen (als goedkope aandelen en aandelen van bedrijven met een lage beurswaarde) staan niet ter discussie, maar er bestaat wel onenigheid over het risico dat deze categorieën aandelen met zich meebrengen.

Aanhangers van de efficiënte markthypothese stellen dat die hoge rendementen het gevolg zijn van het bijbehorende extra risico dat deze beleggingen met zich meebrengen. Ter vergelijking: aandelen leveren de komende tien jaar waarschijnlijk meer op dan obligaties afgaande op de historische data, maar zijn ook risicovoller. De wetenschap dat aandelen waarschijnlijk obligaties gaan verslaan, betekent niet dat het geld op straat ligt. Zij stellen dat goedkope aandelen en aandelen van bedrijven met een lage beurswaarde bovengemiddeld veel risico lopen op een faillissement.

Aanhangers van de psychologische stroming zijn echter van mening dat door systematische beslisfouten van beleggers het geld wel degelijk op straat ligt. De voorspelbaarheid van aandelenrendementen is niet terug te voeren op extra risico voor bepaalde groepen aandelen, en de vergelijking tussen aandelen en obligaties van zojuist is volgens hen hier niet van toepassing.

Vanuit een maatschappelijk oogpunt is het wenselijk dat de aandelenkoersen een juiste weergave zijn van de onderliggende waarde van de bijbehorende aandelen, dit noemen we efficiënte markten. De reden daarvoor is dat prijzen richting geven aan onze economische activiteiten. Onjuiste prijzen geven de

verkeerde richting aan en hebben een negatief effect op onze welvaart. Bovendien kan een gebrek aan vertrouwen in de efficiëntie van de kapitaalmarkten hun functioneren aantasten. De maatschappij is er daarom bij gebaat dat er onderzoek plaatsvindt naar beleggingsstrategieën, of dat nu uit een academisch oogpunt is of dat het gedreven is uit puur winstbejag is niet van belang. Dit bevordert de efficiëntie van de kapitaalmarkten.

In dit boek staat de vraag centraal of de aandelenmarkt efficiënt is of dat die ruimte biedt voor aantrekkelijke beleggingsstrategieën. Daarbij beperken we ons tot vijf patronen in aandelenrendementen. Voordat we die bespreken, zetten we in de volgende sectie eerst wat psychologische wetenswaardigheden over het menselijk brein op een rijtje. Dat is van belang omdat de psychologische stroming veronderstelt dat beleggers over het algemeen niet rationeel zijn. Op zich leidt irrationaliteit niet tot voorspelbaarheid van aandelenrendementen als het willekeurig voorkomt. Maar als beleggers allemaal dezelfde irrationele trekjes vertonen kan dat wel tot voorspelbaarheid leiden. Dit is dan ook een tweede veronderstelling van de psychologische stroming.

Psychologie

Mensen handelen niet rationeel. Ter illustratie het volgende voorbeeld. Als je een rat in een kooi zet met twee flessen, fles A die willekeurig in 80% van de gevallen dat eraan wordt gelikt een stroomschok geeft en in 20% van de gevallen een waterdruppel, en fles B die willekeurig in 20% van de gevallen dat eraan wordt gelikt een stroomschok geeft en in 80% van de gevallen een waterdruppel, dan likt de rat na enige tijd uitsluitend nog maar aan fles B. Dit keuzegedrag is optimaal. Mensen maken in een vergelijkbare proefopzet echter suboptimale keuzes. Als er in een kamer een rode lamp en een groene lamp staan die in willekeurige volgorde oplichten met de frequentie van 80% voor de rode lamp en 20% voor de groene lamp en een proefpersoon wordt gevraagd om elke keer een voorspelling te doen welke zal oplichten blijkt dat de proefpersoon in 80% van de gevallen gokt op rood en 20% gokt op groen. Daardoor gokt hij in 68%, namelijk 100(0.8x0.8 + 0.2x0.2), van de gevallen goed. Dat is beduidend minder dan de 80%-score die de proefpersoon kan behalen door altijd te gokken op de rode lamp. Mensen zijn dus in een bepaald opzicht dom.

Mensen zijn van nature te optimistisch over hun eigen vaardigheden en inzichten. Een bekend voorbeeld daarvan is dat 80% van de mensen van mening is dat ze bovengemiddeld goed rijden in vergelijking met de medeweggebruikers. Ook hebben mensen teveel vertrouwen in hun

schattingen. Daarnaast zijn schattingen gevoelig voor recente waarnemingen en houden mensen te weinig rekening met de statistieken voor de wat langere termijn. Ten slotte hebben mensen last van 'ankers', zo gebruiken beleggers hun aankoopkoers vaak als referentiepunt terwijl specifiek hun aankoopkoers totaal irrelevant is voor de toekomstige koersvorming.

Behalve dat mensen inschattingsfouten maken, hebben ze ook opmerkelijke voorkeuren. Zo zijn mensen nogal afkerig van risico. Uit onderzoek blijkt dat de pijn van verlies ongeveer twee keer zo groot is als de vreugde van winst. Daarnaast blijken voorkeuren af te hangen van de context. Hier is het denken in verschillende rekeningen een bekend voorbeeld. Mensen hebben bijvoorbeeld een spaarpotje voor hun vakantie, één voor het pensioen, één voor de opleiding van de kinderen enzovoorts. Beslissingen worden per rekening genomen, wat suboptimaal kan zijn. Denk bijvoorbeeld aan een duur persoonlijk krediet voor een nieuwe auto terwijl er tegelijkertijd op een laagrenderende spaarrekening geld staat voor de opleiding van de kinderen.

De psychologische stroming stelt dat door systematische beslisfouten van mensen de financiële markten ruimte bieden voor abnormale rendementen, dat wil zeggen te hoge of te lage rendementen na aftrek van risico. Volgens hen functioneert de markt niet altijd goed omdat beleggers nieuws niet direct in de koers verwerken of omdat zij de vooruitzichten verkeerd inschatten. Zij zijn het niet eens met aanhangers van de efficiënte markthypothese die stellen dat ogenschijnlijk aantrekkelijke rendementen in werkelijkheid zijn te verklaren door het bijbehorende risico. We bespreken nu vijf patronen in aandelenrendementen die suggereren dat ze na risicocorrectie overrendementen bieden.

Vijf patronen in aandelenrendementen

Het 'Sell in May'-effect

De beurswijsheid 'Sell in May and go away' is eenvoudig en winstgevend. Gemiddeld genomen leveren aandelen in de zesmaandsperiode van mei tot en met oktober weinig tot niets op en bieden ze alleen een beloning voor het risico dat aandelen met zich meebrengen in de zesmaandsperiode van november tot en met april. Dit effect heeft geen brede aandacht gehad in de academische literatuur en er bestaat geen consensus onder wetenschappers over de verklaring voor dit opmerkelijke patroon. Wij onderzoeken de hypothese dat het seizoenspatroon het gevolg is van een optimismecyclus. Tegen het jaareinde aan gaan beleggers vooruitkijken naar het volgende jaar, vaak met overdreven optimistische verwachtingen. Dit resulteert in

aantrekkelijke rendementen op aandelen. Enige maanden op weg in het nieuwe jaar wordt het doorgaans moeilijk om aan dit initiële optimisme vast te houden. De aandelenmarkten belanden dan in hun traditionele periode van zomerflauwte. Een sectorrotatiebeleggingsstrategie die gebaseerd is op deze theorie blijkt enorm winstgevend te zijn. Bovendien blijkt dat de aanpassingen van de ingeschatte wereldwijde winstgroei ook een seizoenspatroon kennen dat lijkt op dat van de aandelenmarkt. Ten slotte vinden we in een aparte analyse voor de Verenigde Staten dat we met een beleggersoptimisme-indicator, afgemeten aan de eerstedagsrendementen van beursgangen, de rendementen van de secorrotatiebeleggingsstrategie volledig kunnen verklaren. Al deze onderzoeksresultaten ondersteunen de hypothese van de optimismecyclus.

Beursintroducties in Nederland over 25 jaar

Onderzoek naar beursintroducties richt zich voornamelijk op drie aspecten. De eerstedagsrendementen, de langetermijnrendementen en het verschil tussen zogenaamde 'hot' en 'cold' emissieperiodes. Met name de eerstedagsrendementen zijn een aantrekkelijke kans voor beleggers. Wij onderzoeken de beursintroducties in Nederland voor de periode van 1976 tot en met 2001. Het betreft een relatief grote en volledige dataset. In het onderzoek maken we gebruik van eigen sectorspecifieke referentieportefeuilles om de relatieve rendementen uit te rekenen van de beursgangers. We vinden een gemiddelde outperformance op de dag van notering van 17.6%. De mediaan is voor die dag 5.0%. Slechts in 17% van de beursintroducties is er op de eerste dag sprake van een underperformance. Gedurende de eerste drie jaar van notering blijven beursgangers gemiddeld genomen na hun eerste beursdag een cumulatieve 10% achter bij hun benchmark (referentieportefeuille), maar dit resultaat is statistisch niet significant. De emissieperiode 1997 tot en met de eerste helft van 2000 was 'hot' voor zogenaamde groeiaandelen. Die lieten op de eerste handelsdag gemiddeld genomen een outperformance zien van 35.8%, ruimschoots meer dan de 9.2% gedurende een 'cold' emissieperiode. Deze groeiaandelen laten ook een significante underperformance van hun benchmark zien van 38.4% na drie jaar.

Fusies en overnames in een wereldwijde context

In de academische literatuur zijn er veel aanwijzingen dat fusies van bedrijven op de beurs gemiddeld genomen uitlopen op een langetermijnunderperformance. Wij onderzoeken de kortetermijnreactie van aandelenkoersen en van de winsttaxaties van aandelenanalisten op de

aankondiging van een fusie of overname op basis van een wereldwijde dataset. Doelwitten en fuserende ondernemingen verslaan de markt in de periode voor en op de dag van aankondiging. Kopers kennen een kleine outperformance voor de aankondiging van een overname, en presteren op de dag van aankondiging in lijn met de markt. Onmiddellijk na de dag van aankondiging is er voor fuserende ondernemingen sprake van een underperformance. Bovendien vinden we een gebrek aan opwaartse herzieningen van de consensus winstraming voor de jaren na de fusie. Dit suggereert dat synergetische effecten moeilijk te vinden zijn. In combinatie met de frequent gedocumenteerde langetermijn underperformance voor fuserende bedrijven suggereren de onderzoeksresultaten dergelijke bedrijven te mijden in een portefeuille.

Insider trading

Diverse studies documenteren dat insiders superieure rendementen behalen. Over het algemeen geldt dat aankopen door insiders worden gevolgd door een outperformance terwijl insider verkopen een voorspeller zijn van (marginale) underperformance. Uitzondering op deze regel zijn kleine verkopen die een klein percentage van het aandelenbezit vertegenwoordigen. Wij onderzoeken de voorspelkracht van handel door insiders op Euronext Amsterdam. Om de markttransparantie te bevorderen moet de handel door insiders gemeld worden sinds april 1999. Zowel een kortetermijnstudie als een zesmaandsbeleggingsstrategie gebaseerd op de handel van insiders laat zien dat insiders én outsiders die insiders imiteren abnormale rendementen behalen. Wij vinden outperformances voor de insider koopportefeuilles tussen de 8.9% en de 9.3% over een periode van zes maanden.

Aandelenindexherzieningen

Er zijn in de academische literatuur zes verklaringen aangedragen om het effect van aandelenindex-herzieningen op aandelenkoersen te verklaren. Deze variëren van tijdelijke prijsdruk die te wijten is aan indexgerelateerde aandelenhandel tot permanente koerseffecten door diverse factoren. Hoewel er een duidelijk groeiende hoeveelheid literatuur is die diverse aspecten van indexherzieningen onder de loep neemt, blijken resultaten en conclusies uiteen te lopen. Wij onderzoeken de jaarlijkse aanpassing van de AEX-index in Nederland. Specifiek deze index is interessant omdat de regels van de indexherziening het voor beleggers mogelijk maken om ruimschoots van tevoren te anticiperen op zowel de nieuwe indexsamenstelling als de gewichten van de fondsen in de index. Onze resultaten suggereren dat zowel de aandacht voor de indexherziening als indexhandel een rol spelen bij de

koerseffecten rondom de indexherziening. Een portefeuille die bestaat uit fondsen die profiteren van de indexherziening laat een outperformance zien van 7% in de weken in aanloop naar de indexherziening, terwijl de 'verliezende fondsen' geen bijzondere koersontwikkeling laten zien. In de dagen rond de indexherziening vinden we aanwijzingen voor tijdelijke koerseffecten voor zowel de 'winnaars' als de 'verliezers'.

Persoonlijke visie

Uiteindelijk is het een kwestie van geloof of de aandelenmarkt efficiënt is aangezien zowel de aanhangers van de efficiënte markthypothese als de psychologische stroming geen waterdichte bewijsvoering hebben om hun visie hard te maken. Het is overduidelijk dat de markt niet ver van efficiëntie verwijderd is. Ik schrijf dit boek niet op mijn jacht in de Middellandse Zee omringd door een overvloed aan bubbles en kaviaar en al die andere dingen die op het eerste gezicht geweldig lijken, maar vanachter mijn bureau in Rotterdam. Als de markt verre van efficiënt zou zijn, zou ik bij de eersten behoren om daar van te profiteren. Ik beleg minimaal zo goed als ik autorijd, en ik rijd (niet verrassenderwijs) beter dan gemiddeld. Voor degenen die denken dat ik aan over-optimisme lijd en dat mijn domheid de reden is dat ik achter mijn bureau zit in plaats van op mijn jacht, wijs ik op de intense discussie onder academici over dit onderwerp. Die discussie zelf is al een bewijs dat de markt niet ver van efficiëntie vandaan zit.

Persoonlijk denk ik dat de markt dicht op efficiëntie zit, maar niet zo dicht dat het de mogelijkheden voor actief vermogensbeheer afsluit. De psychologische stroming spreekt mij meer aan dan de efficiënte markthypothese, hoewel ik erken dat indirecte transactiekosten wel eens regelmatig onderschat zouden kunnen worden in studies die claimen een aantrekkelijke beleggingsstrategie te documenteren. De grootste beleggingskansen bevinden zich immers onder de small en mid caps waar de verborgen transactiekosten voor institutionele beleggers groot zijn door de illiquiditeit. Mijn zelfbeeld ligt dichter bij een artiest dan bij een aap.