

University of Groningen

Style investing

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2006

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Wouters, T. (2006). *Style investing: behavioral explanations of stock market anomalies*. [Thesis fully internal (DIV), University of Groningen]. s.n.

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Chapter 1

Introduction

The most elementary behavior of individuals when they have to make decisions is classifying or grouping objects into categories. These categories may provide some structure in the complex environment around them, which may simplify their decision-making processes (Mullainathan (2002)).

The classification of objects into categories is also very useful in financial markets. An investor is faced with an enormous flow of information and investment opportunities. Taking into consideration the number of combinations of assets that can be held, the decision process seems overwhelming. Investors may categorize assets with similar characteristics to get grip on the overwhelming number of assets and to simplify diversification decisions. By combining assets into categories that vary as aggregates in response to market conditions, investors are able to create diversified portfolios in a simplified systematic way.

There are many ways to classify assets. Asset classes can be classified in broad terms like stocks, bonds, real estate and cash, or they can be subdivided further into liquid versus illiquid, old versus new economy, domestic versus foreign, and combinations of each. Through time investors

have categorized assets in order to separate them from each other. Today, the categorization of assets is called a style. A style can be defined as a classification of assets into a category with similar performance characteristics. The process where investors base their portfolio allocation on a style level rather than on an individual stock level is known as style investing (Barberis and Shleifer, 2003). Although style investing has been introduced as a new concept in the 1980s, the categorization of assets into different groups has taken place already for a long time. For example, the value style, which refers to investing in stocks that have low prices relative to their fundamentals (i.e. dividends, earnings, etc.) can be traced back to the 1930s. In the twentieth century, new styles (e.g. technology and telecommunication) have arrived and old styles have died off (railroad bonds). Barberis and Shleifer (2003) give two reasons for the emergence of new styles: financial innovation (e.g. inflation-linked bonds) and the detection of outperformance of certain sets of stocks with similar characteristics (see section 1.2). In the next section, we give an overview of style classifications that have been followed by investors in the twentieth century.

1.1 Emergence of investment styles: historical perspective

At the end of the 19th century and early 20th century railroad bonds were a very popular asset class among institutional investors. However, bonds became an unsatisfactory investment class in the period after World War I and also after the great crash in 1929. The years 1917 to 1920 were marked by a decline in all bond prices as the result of war financing followed by post-war inflation. Especially, railroad bonds fell into difficulties, because of decline in the creditworthiness of railroad companies. Other industrial

bonds also had their disadvantages as an investment class, because many issuing companies fell into difficulties as well. Because of the negative experience with bonds as an investment class, investors moved their attention away from bonds to common stocks. Until the late 1920s, investors believed that stock prices were a reflection of present results because future results were uncertain. In the late 1920s up to the crash of 1929, the focus of investors turned away from established performance to expected future growth. Investors started to believe that the price of a stock should reflect future growth rates: stocks were invested in for their growth potentials. After the crash of October 1929, the great depression started and growth stock investing disappeared. In the 1930s and 1940s, the value stock approach started to gain attention. Graham and Dodd (1934) advocated to stay away from growth stocks. They argued that future growth was largely unpredictable, prospects in growth rates are arbitrary and inevitably subject to exaggeration. The work of Graham and Dodd remained very influential throughout most of the fifties. But during the boom after World War II, there was a revival of growth stock investing. Investors believed again that stock investments should be based on the prospects of future growth. An example of the Dutch stock market was the investment company Robeco that introduced the Rolinco Fund in the year 1965, which was a mutual fund that concentrated on growth stocks and where the focus was to obtain capital gains instead of dividends. In the first half of the 20th century, investors focused on assessing risks and rewards of individual securities in constructing their portfolios. Since the work of Markowitz (1959) in the 1950s, the introduction of an organized asset allocation framework started to gain ground among institutional investors. Because of modern portfolio theory, the emphasis moved away from asset selection to a more balanced emphasis on diversification, focusing on interrelationships of individual asset characteristics within the portfolio. As a result of diversification thinking the development of mutual funds started. In the late 1960s and in

the 1970s, there was a strong belief in market efficiency. Fama (1970) defines efficient markets as financial markets where all available information is incorporated in stock prices. This implies that portfolio managers cannot systematically outperform the market. The expected return of a stock is solely a function of risk, and should increase with the risk of an investment, as a compensation for the acceptance of additional risk. With the knowledge that investors cannot outperform the market, the best strategy is to hold diversified portfolios. As a result index investing emerged. An index portfolio mimics some broad based index of the market, such as the S&P500.

At the end of the 1970s and during the 1980s, market efficiency was questioned and research into anomaly finding emerged. Academic research started to question whether stock returns were indeed consistent with the efficient market hypothesis or whether the market was segmented in terms of investment returns. It appeared that the efficient market theory could not account for the outperformance of certain classes of stocks with similar characteristics. Academics found anomalous abnormal returns for groups of stocks, which could not be explained in terms of risks (e.g. Banz (1981), DeBondt and Thaler (1985)). To exploit these unexplained market anomalies, differentiation between stock categories were made and the rise of specific investment funds started in the early 1990s. Although, specific investment funds (e.g. foreign stock funds) had been around for a long time, the aim now is to generate excess returns because of specific stock characteristics instead of facilitating diversification along specific lines. In order to exploit market anomalies, different style classifications have been developed over the last two decades. In the next section, we highlight some of these style classifications. In chapter 2, these style classifications are further developed.

1.2 Style classifications: developments of the last two decades

Several style classifications have arrived over the last two decades to exploit market anomalies. Some classifications are more obvious than other classifications. Well-known classifications are those based on industries or countries. Although the style classification based on countries already existed, the objective was to facilitate diversification rather than generating excess returns. Other classifications that are used to classify stocks are less obvious and need analysis. Instances of relevant variables in such analyses are past performance, price-scaled ratios and market capitalization.

The first classification that is discussed here is based on market capitalization. Investors that follow such strategy divide stocks into high market capitalization stocks, large caps, and low market capitalization stocks, small caps. Banz (1981) and Fama and French (1992) show that small-caps outperformed large-caps over different periods. Those studies demonstrate that the results held even after taking into account the higher risks that accompanied those higher returns.

Momentum and contrarian strategies require classifications of stocks based on past performance. Stocks that generated high returns in the past are called winner stocks and stocks that generated low returns in the past are called loser stocks. When an investor buys winner stocks he follows a momentum strategy and an investor that buys loser stocks follows a contrarian strategy. De Bondt and Thaler (1985) form portfolios of the best and worst performing stocks over the previous three years and find that the loser portfolio outperformed the winner portfolio over the long run. Jegadeesh and Titman (1993) form winner and loser portfolios over the previous six to twelve months. They find that winner portfolios

outperformed loser portfolios in the short run. This short-term momentum effect is also shown for countries outside the US, i.e. Rouwenhorst (1998).

Other studies show momentum effects at an industry, country or style level. For example, Moskowitz and Grinblatt (1999) classify industries based on past performance. They divide stocks into twenty industry portfolios over the period 1963 to 1995. They sort the industry portfolios based on their past 6-month returns. The top-three winner portfolios are called the winner portfolios and the top-three loser portfolios are called the loser portfolios. Investing in a long-short combination portfolio (long in winners and short in losers) shows a historical average annual return of 9.5% during a period of twelve months after formation. An alternative strategy based on this concept is the style momentum strategy. Chen and DeBondt (2004) provide evidence of style momentum. Over the period 1976 to 2000, they group stocks from the S&P500 along three style-characteristics: market capitalization, book-to-market ratio and dividend yield. They rank the obtained style-portfolios by their past 3 to 12 month returns and find that stocks with characteristics that are currently in favor outperform stocks with characteristics that are currently out of favor. Alternative classifications on past performance that have been applied are for example the combination of past performance and analyst coverage. For example, Hong, Lim and Stein (2000) show that profitability of strategies based on past performance declines with analyst coverage.

Another classification is based on ratios of specific stock fundamentals to the stock's market price. Examples of such stock ratio's are: book-to-price, earnings-to-price, dividend-to-price, and cash flow-to-price. A stock with a low market price relative to the specific fundamental is called a value stock and a stock with a high market price relative to the specific fundamental is called a growth stock. Many empirical studies, i.e. Fama and French (1992), Lakonishok, Shleifer and Vishny (1994) and La Porta, Lakonishok, Shleifer

and Vishny (1997), show the outperformance of value stocks with respect to growth stocks for the US stock market. Lakonishok, Shleifer and Vishny (1994) combine the cash flow-to-price ratio and past sales growth to classify stocks. They divide stocks based on the past 5-year sales growth and cash flow-to-price ratio into nine portfolios. The value portfolio (which is the portfolio with the highest cash flow-to-price ratio and the lowest past growth rate) outperformed the growth portfolio (portfolio with the lowest cash flow-to-price ratio and the highest past growth rate) over a 5-year period after formation. The relative outperformance of value stocks over growth stocks is referred to as a value premium in stock market returns. This value premium is also reported for countries outside the US, e.g. Chan, Hamao and Lakonishok (1991), Fama and French (1998), and Dimson, Nagel and Quigley (2003).

Alternative classifications that have been made in the last decade are based on other fundamentals-related measures, such as analysts' earnings forecasts and trading volume. La Porta (1996) classifies stocks on analysts' earnings forecasts into ten deciles from high to low analysts' earnings forecasts. He finds that the portfolio with the lowest forecasted earnings growth outperformed the portfolio with the highest growth forecasts with an average annual return of twenty percent the year after formation.

In the above, we described style classifications based on specific stock characteristics in order to generate excess returns. In the last two decades also other methods have been developed to generate excess returns. An example of such a method is timing that can exploit anomalies such as calendar effects. Calendar effects show that certain days of the week, weeks of the month, or months of the year are more likely to produce rises and falls in share prices than others, i.e. January effect, weekend-effect, and holiday effect. Keim (1983) shows that daily abnormal return distributions have larger means in January relative to the remaining eleven months. Another calendar-effect is the weekend effect. Fridays show relatively high

returns and Mondays tend to be relatively low. Studies that report the weekend-effect are for example French (1980), Lakonishok and Schmidt (1988) and Doukas (1996). The final calendar effect that is discussed here is the holiday effect. Lakonishok and Schmidt (1988) and Ariel (1990) provide evidence of high abnormal returns on days prior to a US holiday for US stock markets. Cadsby and Ratner (1992), Kim and Park (1994), and Arsad and Coutts (1997) provide evidence of Holiday effects for stock markets outside the US.

1.3 Relevance of style investing

Although style investing is by no means novel as has been explained in the previous sections, the attention of style investing has grown in recent years. Style investing has become an important issue for institutional as well as for private investors. Many institutional investors claim to follow a particular investment style, such as ‘value’ or ‘small-cap’. Financial advisors may have contributed to the growing importance of style investing within the institutional investment community. Financial advisors are hired to find portfolio managers that respond to the clients’ needs. To assess the skills of a portfolio manager, advisors prefer portfolio managers to follow a style instead of investing without a style discipline (Bernstein, 1995).

In addition, the financial services industry has responded to this perception of discipline to cater the needs of private investors. Nowadays, many mutual fund managers identify themselves as following a particular style (Bogle, 2005).

Investment styles have not only become an important marketing device, but are also important for the development, analysis and performance evaluation of investment strategies and/or mutual funds. In addition, investment styles also provide insight into the forces of underlying

price movements in equity markets. In this section, we present the relevance of style investing from three different perspectives, notably from the perspective of investors, from the perspective of the functioning of financial markets and from the perspective of academic researchers.

1. Style investing is relevant to investors because it enables them to organize and simplify their portfolio allocation decisions. Transparency may increase, because the categorization leads to asset classes with the same kind of characteristics. Mutual fund managers can identify themselves with one style and fulfill the joint needs of individual investors into one fund. This leads to better diversification of investors' portfolios and to a much more disciplined way of choosing among stocks. The classification of investment strategies also plays a role in the selection and evaluation of the portfolio manager. Portfolio managers are now able to identify themselves with a particular investment style. Investors can base their selection of active managers within style guidelines and categorize active managers by style. The evaluation and selection of portfolio managers is therefore simplified, because the performance of portfolios can be compared with standardized style benchmarks (Sharpe, 1992).

However, style investing can also lead to misclassifications. As a consequence of investors applying style investing, mispricing and excessive comovement in prices (and returns) of styles is induced. Labeling stocks increases the chance for investors to make errors when they allocate funds at the level of categories. Stocks of companies with different business activities might be linked to the same asset category. An example of excessive comovement in prices is given by Cornell (2004). He shows that during the internet hype the prices of two internet companies comove more with each other than can be explained by their fundamentals. Froot and Dabora (1999) demonstrate mispricing with

two identical stocks, Shell and Royal Dutch, listed on different exchanges. The prices of these two stocks deviate more from each other than can be explained by their fundamentals. Also the demand shocks may lead to negative correlations among styles. Resources are withdrawn from one style into other competing styles. Consequently, the prices of the securities within the ‘neglected’ style depresses although the price decrease has nothing to do with the underlying fundamentals.

2. From a more general perspective of the proper functioning of financial markets, it is also important to understand style-based investment strategies. For example, positive feedback trading may result in destabilizing markets, because it may lead institutions to buy overpriced stocks and sell underpriced stocks, thereby moving market prices further away from fundamental values. This may eventually lead to an exacerbation of stock price volatility and momentum bubbles (De Long *et al.*, 1990, and Cutler *et al.*, 1990,).

It is interesting to know which market participants are positive feedback traders and, if so, to what extent they influence stock prices. In addition, it is also in the concern of policymakers to understand what the impact of positive feedback trading by market participants may have on the exacerbation of stock price volatility and the increase in the fragility of the financial system.

3. Style investing is also an important phenomenon from the perspective of academics. The classical school of financial economics seeks to understand financial markets with models where investors are fully rational. The optimal combination of assets is derived within with frameworks such as modern portfolio theory (MPT) and capital asset pricing model (CAPM). These frameworks take only two dimensions of the return distributions, notably mean and variance, into considerations when making a choice between securities. To obtain the expected

returns and expected variance investors are supposed to make unbiased fundamental-based predictions about the future. In the last two decades, the assumptions underlying MPT and CAPM have been questioned from the perspective of behavioral finance. A discussion is going on in the literature whether investors are capable of carrying out the dynamic optimization problems required by tenets of neo-classical finance theory. For example, Kahneman and Tversky (1974) have shown that people make judgments using rule of thumbs to deal with a deluge of information. Are investors always capable of making optimal decisions? And if investors are not fully rational, in what way are they biased?

In addition, empirical researchers in finance have challenged the efficient market hypothesis. Over the last three decades researchers have found patterns in stock returns, which are inconsistent with the efficient market hypothesis, such as the value premium, the momentum-effect in the short run and the mean reversion effect in the long run (see section 1.2). These patterns can not be explained with the risk measures that are used in MPT-based models, like market beta and standard deviation. Since the basic model of risk and return, the CAPM, cannot explain observed return anomalies, new theoretical frameworks have been developed. These theoretical frameworks can be separated into two schools, rational and behavioral. The rational school explains the differences in stock returns in terms of non-diversifiable risk and the behavioral school explains it in terms of bounded-rational behavior of investors and limited arbitrage in stock markets (see chapter 2, section 2.3.1).

1.4 Objective of the study

As we mention in this chapter, various anomalies have been found which cannot be explained with rational models such as CAPM. Since then, new theoretical frameworks, rational and behavioral, have been developed. Our aim is to contribute to the discussion between the rational and the behavioral ‘school’. Because of the competing explanations for some of the anomalies, we believe that the assumptions of behavioral and rational models need empirical scrutiny. To contribute to the discussion, it is important to understand how beliefs of investors are measured. In what follows we have, therefore, decided to concentrate largely on the investor-based drivers behind behavioral models. In this thesis the focus is on style investing. In order to explore the mechanisms of style investing, the main purpose of this thesis is to empirically investigate the behavioral reasoning underlying empirical observations of return patterns for the US stock market. The investment styles classification that we concentrate on in most of our research is based on the distinction between value and growth stocks (see section 1.2). This thesis consists of two parts, each with an individual goal:

- 1 The first objective will be to find explanations for the value premium by introducing an alternative method of classification. We analyze the dynamic process underlying the behavior of value stocks and the generating of the value premium.
- 2 The second objective will be to find explanations for stock returns by introducing the effect of collective preferences of investors into the dynamics of stock markets. We introduce stock and style popularity as an important factor in the investment process.

The empirical literature, e.g. Fama and French (1992), shows that in most of the times value stocks generate on average higher returns than growth stocks. The difference in returns between value and growth stocks is called the value premium. This value premium presents an interesting puzzle for researchers in finance, because the ‘traditionally’ known risk measures cannot explain this risk premium. Different explanations that try to explain the existence of a value premium can be summarized into two different schools. The rationalist school believes that the higher average returns for value stocks are a reward for additional systematic risks, which have not yet been observed. The behavioral school believes that the value premium is not the result of systematic risks, but the inability of investors to process and evaluate information correctly. The value stocks generate higher returns because of the biased behavior of the typical investor.

Many of the categorizations in section 1.2 imply that an individual stock may change classes over time. For example, a stock that is classified as value stock at time t , may lose its status as value stock at a later point in time. This may lead to dynamics within and among asset classes. To pursue the first objective of this thesis we develop an alternative method of ranking for value and growth stocks. By analyzing an alternative method with a more sophisticated ranking we want to show better insights in the dynamic process underlying value stocks and the value premium. We make a distinction between switching versus fixed-style stocks. Within each style (i.e. value versus growth stock investing) we distinguish between stocks that stay within a particular style for only one period and stocks that stay for two or more periods. We analyze how stocks behave when they switch from style and what variables or factors are important to explain the style-switching behavior. We find that only a small fraction of the ‘value portfolio’ is responsible for the value premium, notably the switching-style stocks in the portfolio. Theories regarding the value premium, like the expectational error hypothesis and the information diffusion hypothesis, are

explored with this new classification. This leads to new insights and conclusions regarding the value premium. The subdivision of value and growth stocks into switching versus fixed-style stocks implies a critical note on style investing, because the label of value or growth stocks appears to be ‘too rough’. To profit from particular investment styles, portfolio managers may have to choose stocks that migrate from one style to another.

To pursue the second objective of this thesis, we introduce stock popularity as an important driving factor of the investment process. Performance evaluation using style analysis is based on the idea that investors try to beat market indices reflecting the particular styles employed by investors. Barberis and Shleifer (2003) create a model that is based on a demand-driven process. Stock returns are determined by investors who base their asset choice on a category level instead of an individual level of stocks. The investment process is in terms of investment cycles where the demand for a particular style is based on the past performance of the style. Instead of choosing a passive benchmark and trying to beat this benchmark by over- and underweighting stocks, investors nowadays choose a particular style that did well in the past and hope that this will be a guarantee for future performance. We develop an alternative perspective on the performance of style investing.

1.5 Outline of the study

The first objective will be pursued in chapters 2, 3 and 4. Chapter 2 gives an overview of the models that try to explain return anomalies found in the last few decades. These models are categorized as ‘rational’ and ‘behavioral models’. We argue that behavioral models can be improved upon in terms of how beliefs of investors are measured.

In the chapters 3 and 4 we will present an alternative classification method to divide stocks in different categories. In chapter 3, we test the expectational error hypothesis with our newly obtained classification of stocks, and we add a new explanation to the discussion. In chapter 4, we will provide better insights into the impact of investors' uncertainty about stock returns. We test two hypotheses, the information diffusion hypothesis and the expectational error hypothesis. Firstly, we look for evidence that uncertainty is increasing when less information about a stock is revealed. Secondly, we examine whether uncertainty is increasing because investors extrapolate past information (stock returns and forecast errors) into the future. Thirdly, we investigate whether it is more likely for a stock to migrate from style when investors are more uncertain about future earnings.

The second objective (see section 1.4) of this thesis will be pursued in chapter 5. In this chapter, we describe the popularity of investment styles as being driven by collective preferences of investors and the changes of such preferences over time. In order to measure popularity, it will be necessary to construct a popularity index for different investment styles. Using different variables that reflect popularity, we create a popularity index. Having constructed a popularity index, it will be possible to check to what extent stock popularity can be attributed to style investing, as opposed to popularity of individual stocks. In addition, the time series of returns from the different investment styles will be used to test to what extent past performance in returns is related to the attractiveness of investment styles. Finally, we summarize our main findings from this thesis in chapter 6 and mention some issues that deserve further research.

Chapters 3 to 5 are three chapters based on three different working papers. Therefore, the introductions and data descriptions of these chapters may show some overlap. In addition, chapter 3 and 5 are joined work with Dr. A. Plantinga.

