Aalto University
School of Economics

Norms, catering incentives and nominal share prices: European evidence

Finance

Master's thesis

Lasse Helin

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Department of Accounting and Finance
Aalto University
School of Economics

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Abstract
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NORMS, CATERING INCENTIVES AND NOMINAL SHARE PRICES: EUROPEAN EVIDENCE

PURPOSE OF THE STUDY

The purpose of this thesis is to examine what drives active nominal share price management and how nominal share prices behave over time. First, I investigate if real share prices are decreasing over time and nominal share prices rigid. I then examine the effect of the adoption of the euro on share price levels. Finally, I especially concentrate on determining if norms and catering incentives affect a firm's share price choice and the decision to split.

DATA

I use Thomson Datastream data for company financials and market data, and the Securities Data Company's (SDC) Non-U.S. Initial Public Offerings (IPO) database for new listings. The sample consists of 92,856 firm-year observations between 1980 and 2008 in 11 European markets. There are in total 1,803 stock split events and 917 IPOs in the sample.

RESULTS

I document evidence of share price norms in Europe. Norms explain up to 33% of the variation in the (log) split adjustment and up to 45% of the variation in (log) IPO prices. Drifting away from the norms price also seems to be the key motivating driver for the decision to split. Real share prices are decreasing over time in all sampled countries. Evidence on rigid nominal share price levels is inconclusive, although it is more likely that nominal prices are rigid than not. The introduction of the euro seems to have fuelled a permanent shift in share price levels.

The data also reveals that catering incentives for low-priced stocks affect the choice of IPO price and the propensity to split. When low-priced stocks trade at a relatively high premium over high-priced stocks, firms are more likely to split their stock and choose a low IPO price. Managers do not appear to act small by choosing a low price when catering incentives are high, or choose to split when recent splits have earned high abnormal ex-date returns.

KEYWORDS

Share price, stock split, IPO price, catering theory of nominal share prices, share price norms

Aalto-yliopiston kauppakorkeakoulu
Pro Gradu -tutkielma
Lasse Helin

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NORMS, CATERING INCENTIVES AND NOMINAL SHARE PRICES: EUROPEAN EVIDENCE

TUTKIELMAN TAVOITTEET

Tutkimuksen tavoitteena on tutkia miksi yritykset aktiivisesti hallinnoivat osakkeensa nimellishintaa ja selvittää, pysyvätkö nimellishinnat keskimäärin muuttumattomina ajan kuluessa. Tutkimus pyrkii selvittämään, seuraavatko osakkeiden hinnat Euroopassa normeja. Lisäksi tutkitaan euron käyttöönoton vaikutusta osakkeiden nimellishintatasoon. Tutkimus keskittyy erityisesti tarkastelemaan vaikuttavatko normit ja sijoittajien osoittamat preferenssit osakkeen nimellishinnan valintaan ja osakkeen jakamisen (”osakesplit”) todennäköisyyteen.

LÄHDEAINEISTO

Tutkimusotos perustuu Thomson Datastream:n tilinpäätös- ja markkinatietoihin, sekä Securities Data Company:n (SDC) Yhdysvaltojen ulkopuoliseen listautumisantitietokantaan. Otos koostuu 92,856 yritysvuodesta vuosien 1980 ja 2008 välillä yhdessätoista eurooppalaisessa pörssissä. Otos sisältää 1,803 osakkeen jakamista ja 917 listautumisantia.

TULOKSET

Tutkimus todentaa normien vaikutuksen osakkeiden nimellishintoihin Euroopassa. Normit selittävät 33 % osakesplit:n hintamuutoksen logaritmista ja 45 % listautumishinnan logaritmista. Etääntyminen normihinnasta vaikuttaa myös olevan tärkein selittävä tekijä osakesplit:n todennäköisyydelle. Todisteita ajan kuluessa muuttumattomista nimellishintatasoista ei voi pitää täysin vakuuttavina, joskin on todennäköisempää että nimellishintatasot ovat muuttumattomia kuin että ne eivät ole. Euron käyttöönotto vaikuttaa aiheuttaneen pysyvän muutoksen nimellishintatasoissa.

Lisäksi näyttää siltä, että yritysjohtajat vastaavat sijoittajien osoittamiin preferensseihin alhaisen nimellishinnan osakkeille valitessaan listautumishintaa ja päättäessään osakkeen jakamisesta. Yritykset eivät yritä näyttäytyä pienikokoisina valitsemalla alhaisen nimellishinnan kun pienikokoisten yritysten arvostus on korkealla.

AVAINSANAT

Osakehinta, osakkeen jakaminen, listautumishinta, sijoittajapsykologia, osakehintanormit

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1 INTRODUCTION

1.1 Background and Motivation

A company's nominal share price level is irrelevant in efficient and frictionless markets. Consider two identical firms whose shares have different denominations. Firm A has 10 million shares outstanding while Firm B has 5 million. The value of both firms is €100 million. It follows that Firm A's shares should be trading at €10 and Firm B's shares at €20. Should parity be broken, arbitrageurs would quickly correct the situation by selling the overpriced share and buying the underpriced. Thus, nominal share price should not matter.

Yet firms often pro-actively manage their share's denomination using stock splits and stock dividends, the effects of which appear to be purely cosmetic. Take for instance Nokia, the Finnish mobile phone giant. Over the 14-year period from 1995 to 2008 the company split its stock four times, increasing the number of shares outstanding 64-fold. The company closed 2008 trading at €11.10 while the un-split share price would have been €710.40. Splits are also relatively common: in the sample of U.S. firms used by Lakonishok and Lev (1987), in almost each of the twenty years between 1963 and 1982 five to ten percent of firms split their stock.

Stock distributions are by no means a modern phenomenon. According to Dewing (1941), the practice of nominal share price management dates back to the seventeenth century. In 1682 The East India Company, which had been given the exclusive right to trade in the East Indies by Queen Elizabeth, declared a stock dividend of 100% after a run-up in price from 245 to 460. Until the early twentieth century stock dividends were mostly utilized by British companies; only 12 cases of stock dividends were declared in the U.S. from 1871 to 1910. The relative infrequency of stock distributions in the U.S. up to the First World War was largely explained by legal doctrine that restricted corporations from issuing stock without securing compensation in exchange.

Despite appearing to be purely “neutral mutations”, splits are far from costless. Investors are affected by the increased relative bid-ask spread after splits (Copeland (1979), Conroy et al. (1990), Kdapakkam et al. (2005)), inflating trading costs per share. Institutional investors are often subject to fixed brokerage commissions per share, implying higher trading costs post split as the number of shares increases[1]. Stock distributions also increase the number shareholders, increasing net annual administrative fees. Since stock distributions are costly, and to no apparent effect, it is interesting to ask why companies nevertheless frequently use stock distributions to manage their nominal share price?

A breadth of research has concentrated on investigating how market frictions might motivate firms to manage their share price level. Asquith et al. (1989) find that split announcements lead investors to increase their expectations that past earnings increases are permanent. Splits therefore act as signals of inside information. Angel (1997) proposes an intermediary-determined optimal trading range hypothesis, predicting that market making incentives motivate firms to split. According to this hypothesis, a larger tick size relative to the share price makes liquidity provision more profitable for intermediaries. The third standard explanation, cited by most practitioners, suggests an investor-determined optimal trading range where the marketability a firm’s shares is optimized (e.g. Baker and Gallagher (1980)).

As noted by Benartzi et al. (2010), all of these standard explanations have limitations. Both the investor-determined optimal trading range hypothesis (also known as the marketability hypothesis) and the intermediary-determined optimal trading range hypothesis are inconsistent with the data; prices do not reflect changes in investor income and composition, nor do they respond to changes in commission structure and minimum bid-ask spreads. The signaling hypothesis is hindered by findings that post-split performance is not superior, begging the question of what firms are actually signaling. Some splits, such as those by mutual funds and exchange-traded funds (ETF), cannot be motivated by signaling, since their

[1] Benartzi et al. (2010) use a conservative commission cost estimate of $0.02 per share to illustrate the effect of fixed brokerage commissions on the share of General Electric. According to their calculations, investors would have saved $100 million in trading costs in 2005 alone, had GE never split its stock.

managers are not likely to have superior inside information about constituent companies and therefore cannot predict future performance. Finally, the marketability hypothesis predicts that the share price of mutual funds should be irrelevant, since the shares are divisible. Still, mutual funds often do split. Even if individual investors preferred lower priced shares, because they have a budget constraint within which to implement portfolio diversification, they could just buy diversified and divisible ETFs.

Two recent papers have addressed the so called nominal share price puzzle from perspectives that do not involve signaling, marketability or institutional trading frictions. Benartzi et al. (2010) argue that share prices matter simply, because firms find it important to follow norms. This view posits that firms set their share price according to the conventions in their industry and size groups. To illustrate, the authors note that US firms in the top market capitalisation quintile trade at approximately five times higher nominal share prices compared to firms in the bottom size quintile. The relationship is monotonic over time, meaning that for each year in the sample the 1^{st} size quintile trade at a lower nominal price than the 2^{nd} size quintile and so on. Another finding supporting the norms view is that the average nominal share price in the United States has remained relatively constant at around $30 since the Great Depression. During the same period consumer prices have increased by 1526%. Thus, share prices have decreased significantly in real terms. Had share prices increased with inflation, the average price would now be around $450.

Baker et al. (2008) propose a catering theory of nominal share prices, hypothesising that when setting their share prices firms may be responding to catering incentives. The authors find that recent split announcement abnormal returns, market-to-book premiums paid for low-price shares and premiums for small stocks all have a significant effect in time series and firm level tests. The low-price premium and small-stock premium have even more significant effects on post-split prices and prices chosen at IPO.

1.2 Objective and Contribution

The purpose of this thesis is to examine what drives firms to actively choose a nominal share price level rather than to let the nominal share price compound with inflation and returns. My main hypotheses are that norms and catering incentives explain the managerial incentive to choose a specific share price level. I also aim to determine whether average nominal share price levels in Europe exhibit behaviour that implies the existence of norms, as in the US.

This thesis contributes to existing literature in a number of important ways. Although research on stock splits is abundant in the US corporate setting, I am the first, to my knowledge, to construct and study a cross-European data set of stock splits and to study the norms and catering theories of nominal share prices with European IPO and split data. Furthermore, I am the first, to my knowledge, to study the existence of share price norms on a large scale, spanning several markets simultaneously. Finally, I study the effect of the adoption of the euro on share price levels. This is an important test, as a shift in nominal share prices due to the change in the denomination of share prices would provide further support for the existence of norms.

As in Benartzi et al. (2010), my main findings support the hypothesis that norms are the key driver affecting the choice of nominal share price. Norms explain up to 33% of the variation in the (log) split factor and up to 45% of the variation in the (log) IPO price. Norms also seem to be the single most important determinant of a firm's decision to split its stock. On the other hand, the evidence on rigid average nominal share price levels in Europe is inconclusive due to the relatively short sample period. However, the data suggests that it is more likely that nominal share price levels are rigid than not. Further supporting the existence of norms, nominal share price levels seem to have permanently shifted in response to the adoption of the euro.

As for the catering hypothesis of nominal share price management, I find that companies respond to relatively high valuation levels for low-price stocks by splitting more often and by choosing a lower listing price. The explanatory power of catering incentives is much lower than that of norms: catering incentives explain up to 6% in the variation of the (log) IPO price. Managers do not try to portray their company as small-capitalisation by choosing a lower share price when small-capitalisation stocks earn higher premiums compared to high-capitalisation stocks. Nor do managers increase splitting activity and split factors when recent splits have earned high abnormal ex-date returns. The results could be different when testing for abnormal announcement returns as in Baker et al. (2008), which I am unable to do due to data limitations.

1.3 Definitions of the key concepts

As in Baker et al. (2008) I consider active nominal share price management to happen when a firm splits its stock, distributes a stock dividend or chooses the IPO price. Stock splits and stock dividends are interchangeably referred to as stock distributions. Nominal share price, the item of interest in this study, refers to the unadjusted price per one share as quoted on the stock exchange system at the close of trading. The real share price refers to the nominal share price adjusted for the consumer price index level at a given point in time. When referring to real share prices quantitatively, the year to which prices are fixed is always explicitly stated.

Data limitations have two important effects on the definition of stock splits. First, I only study forward splits, whereby a company increases the amount of shares outstanding without compensation, thus decreasing the share price. Reverse splits (increasing the share price by dividing the number of shares outstanding) are therefore not under scrutiny. Second, only splits executed at a factor of 2-for-1 or higher are considered.

1.4 Structure of the Study

The thesis is organized as follows. Section 2 reviews related earlier literature on active share price management. Section 3 specifies the hypotheses of this study. Section 4 discusses and describes the data employed, data limitations and the methodology used to test the hypotheses. Section 5 presents the results, interpretation and implications. Section 6 concludes.

2 LITERATURE REVIEW

This section presents the theoretical framework of active nominal share price management and summarises the related key empirical findings. I begin by presenting the three standard explanations put forward to explain why firms actively manage their nominal share price level. In tandem with each theory, I present both supporting and contrasting evidence from previous studies. I eventually conclude that their explanatory power does not seem sufficiently strong. I therefore introduce two alternative theories on nominal share prices. It is these two theories, catering and norms, which I aim to evaluate in the empirical section. Finally, although my thesis does not aim to contribute to the literature on split announcement effects directly, I review the evidence on investor reaction to stock splits to provide further clues as to why splits are so common.

2.1 Standard explanations for active nominal share price management

Stock distributions do not affect a corporation's future cash flows, discount rate, capital structure, investment opportunities or any other real feature of the firm. Thus, a firm cannot increase its market value through such paper transactions. As already discussed, splits are far from costless. Annual administrative costs increase with number of shareholders post-split, institutional investors subject to per-share brokerage fees find their trading costs higher, the relative bid-ask spread widens increasing trading costs for all investors and the direct cost of a split can be close to $1 million for a large firm.[2] It is puzzling, then, why firms so often manage their share price through stock distributions. The following three theories have often been offered as explanations for firms' motives to split. I will first discuss the marketability hypothesis, supported by most practitioners according to previous literature. I then move on to discuss the intermediary-determined optimal trading range, or "pay to play" hypothesis. Finally I discuss the signaling hypothesis. In tandem with each hypothesis, I present both supporting and contrasting empirical evidence from previous literature.

[2] Benartzi et al. (2008) estimate that direct costs of a split are in the range of $250,000 to $800,000 for large firms

2.1.1 The marketability hypothesis

Many of the classic papers on nominal share price management argue that firms have an investor-determined optimal trading range in which the marketability of shares is at its highest. According to this argument, stock distributions enhance the attractiveness of shares by restoring the price to a preferred trading range. The optimal trading range can arise in a variety of ways, depending on the type of investor under consideration.

Firstly, individual investors may have a budget constraint that restricts them from including a stock in their portfolio. Consider a budget constrained investor who prefers to purchase round lots (e.g. 100 shares), or who is located in a marketplace where buying odd lots is costly or difficult. Imagine that our hypothetical investor has a budget of €10,000 to construct a stock portfolio and wishes to diversify firm-specific risk by including 10 stocks in his portfolio with equal weights. The investor thus has approximately €1,000 to invest in each stock and prefers to buy 100 shares (a round lot) of each. In order to be considered a potential investment target by our hypothetical investor, a company would therefore need to manage its share price toward €10 or below. This is approximately the price to which Nokia has managed its share through splits. It should be noted that I am not suggesting that a typical investor actually has an average budget of €10,000 and prefers to hold on average 10 stocks in his portfolio. It is nevertheless obvious that Nokia's unsplit share price of over €700 at the end of 2008 would have made it less likely, ceteris paribus, that an average investor would have invested in Nokia, compared to a share price of €10.

By managing the share price downward, therefore, a company can increase the number of potential buyers for its shares, thereby enhancing liquidity. Amihud et al. (1999) find that a reduction in the minimum trading unit (MTU), which is the minimum number of a firm's shares required for a trade, of firms listed on the Tokyo Stock Exchange leads to a significant increase in the number of investors.

Secondly, behavioral and cognitive factors could result in investor preferences for shares in a particular range. Although classical financial theory assumes rational investors, deviations from normative behavior have been documented by a variety of authors.[3] For instance, investors may have an illusion that a share worth €5 has more room to grow than one that is worth €30. As described by Barberis and Xiong (2008), individual investors may interpret lower priced stocks as “lotteries” which have a better chance of a high payoff than high priced stocks. Consumers make purchases of over €50 considerably less frequently than purchases below. Perhaps buying shares whose nominal value resembles other everyday purchases is more attractive. Svedsäter et al. (2007) study the money illusion in financial judgments. Their experiments with 247 Swedish university students implied that the students were more willing to invest in a stock after a split, because it appeared to be cheaper. One out of four participants, being asked to give reasons for why they were more willing to buy post-split, mentioned that they felt the value of the stock had decreased although they understood the “neutral mutation” effect of splits. In the words of Dewing (1941): “So uncritical is the intelligence of the average investor that he seldom weighs the actual participation of each share of stock in the actual property or in the permanent earnings capacity of the company.”

Finally, institutional investors should prefer higher share prices as their trading costs are dependent on the number of shares traded, not the net value of trades.

The firm then faces a decision regarding the group of investors it wishes to satisfy with its nominal share price. Does it choose a low price preferred by individual investors, or a high price preferred by institutional investors? The answer may lie in Merton’s (1987) model of capital market equilibrium with incomplete information. Merton notes that investors are usually only aware of a subset of all available securities. From this incomplete information diffusion it follows that investors do not have the option to invest in all securities, but only those securities they know about. The potential demand for a stock depends on the fraction of investors that are aware of the company. Since individual investors prefer lower share prices, they are more willing to consider investing in a firm with a low share price. Therefore, a low

[3] See for example Kahneman and Tversky (1979), Thaler (1985), Tversky and Kahneman (1986), Bikhchandani, Hirschleifer and Welch (1992), Shefrin and Statman (1993), Brennan (1995), Elton, Gruber and Rentzler (1989) and Gruber (1996)

share price stimulates demand, widening the shareholder base and thus leading to higher investor recognition. Merton shows analytically that the level of investor recognition is positively related to a firm's market value. Similarly, Amihud et al. (1999) find that Japanese firms reducing their MTU experience cumulative abnormal returns of 5% on average in the 200 day period beginning 20 days after the announcement. Kadlec and McConnell (1994) study listings on the NYSE in the 1980s and find that firms that experience the greatest increase in the number of shareholders following listing have the greatest share price increases in response. One implication of the Merton model is that large, well-known firms with large investor bases should on average have higher share prices as they do not have the incentive to increase demand from individual investors. Large firms do indeed have higher share prices, documented for instance by Benartzi et al. (2010) and Dyl and Elliott (2006).

To fully understand the underlying reasons for corporate actions, it is useful to consult practitioners. One method employed in previous research has been probing companies directly for their motives. The majority of managers seem to subscribe to the marketability hypothesis, as documented by Baker and Gallagher (1980), who surveyed 100 CFOs in two groups of firms: one with firms that used splits and one with firms that did not. 98.4% of CFOs in the splitting group and 93.8% in the non-splitting group agreed that splitting "… [makes] it easier for small stockholders to purchase round lots (more shares, lower price)." In a follow-up study Baker and Powell (1993) report that over 90% of managers in their sample subscribe to the existence of an optimal trading range. They also document that the mean preferred trading range is between $20 and $35. Dolley (1933) reports that the primary motive in his sample of 88 splits between 1922 and 1930 is to increase liquidity of the common stock.

Should the marketability hypothesis have explanatory power, firms that split should experience more demand for their shares by individual investors and thus higher liquidity and higher valuations. The evidence on positive split announcement returns will be reviewed later. As for liquidity, evidence from mutual fund splits is mixed. Mutual funds provide a clean testing ground for the marketability hypothesis as other conventional explanations do not apply. Fernando et al. (1999) study 194 mutual funds that executed a split between 1978 and 1993. They find significant post-split increases in net asset inflows to splitting funds, accompanied by increases in the number of shareholders. On the other hand Rozeff (1998) finds no correlation between fund splits and flows.

One prediction is that firms with higher share prices should have more institutional owners. Accordingly, Dyl and Elliott (2006) find that institutional ownership, proxied by the holding size of an average investor, is positively correlated with share price. Fernando et al. (2004) study 5619 IPOs from 1981 to 1998 and report a statistically and economically significant positive relationship between IPO price and institutional ownership.

Although it has explanatory power, the marketability hypothesis fails to address some key issues. For example, why do many large firms with high investor recognition, such as Nokia, insist on maintaining a low share price? The marketability hypothesis would predict that once high investor recognition is achieved, a firm should increase its share price to reduce trading costs for institutional investors.

More importantly, the marketability hypothesis does not explain why firms on average would hold constant nominal share prices as in Benartzi et al. (2010). At the least average nominal share prices should move in lock-step with inflation and national income which increase the budget of a budget constrained investor. In addition, the significant increase in institutional ownership in the U.S. over the past 50 years or so should have been accompanied by an increase in the optimal trading range. This has not happened: average share prices have remained around $30 since 1933.

Some direct tests of increased marketability of shares have failed to verify the predictions. Lakonishok and Lev (1987) conclude that splits do not appear to have a permanent effect on the volume of trade, meaning that liquidity is not increased post-split. Rather, splits seem to be aimed at restoring stock prices to a “normal range”. The authors admit that other aspects of marketability, such as the composition of shareholders, may be affected by splits.

Finally, odd-lot trading is no longer difficult; in fact Benartzi et al. (2010) note that odd-lot trades may nowadays get better execution on the NYSE, because they are now required to take place at the same price as the most recent, or next, trade. A rational investor should not have a preference for round lots, if buying odd-lots is not more costly. Although irrational preferences may lead to investor preference for a particular trading range, it is more difficult to conceive why investors would have constructed preferences for round lots.

2.1.2 The pay to play hypothesis

Another theory suggests an optimal trading range from the point of view of market makers. According to Angel (1997) firms may split their stock to increase the tick size (minimum possible difference between bid and ask prices) relative to share price. This increases the potential profits for market makers, which motivates them to increase liquidity provision. Theoretically the optimal relative tick size is achieved when the benefits of liquidity provision are exactly counterbalanced by the costs imposed on investors by the tick size. Splits also increase the volume of trade, thus increasing commission revenue to brokers and therefore further motivating brokers to provide liquidity.

Angel (1997) provides a history of the amount of splits before and after an NYSE rule change in 1915 whereby stocks began to be quoted in dollar increments rather than percentage of par value. Before the rule change splits were rare: a split would have reduced the cost of buying a round lot (thus increasing marketability) but would not have affected the relative tick size. After the rule change stocks began splitting regularly as the relative tick size increased post split.

As explained by Benartzi et al. (2010), the problem with the broker-driven optimal trading range is that it does not fit with the data. The model predicts that if there is an optimal ratio of tick size to nominal share price, then if tick sizes fall in the aggregate, nominal shares prices should fall as well to keep relative tick sizes at the optimal level. This prediction is also explicitly stated by Angel (1997). This did not happen when the tick size on the NYSE changed from 1/8th in 1997 to 1/100th. The decrease in tick size by a factor of 12.5 should have decreased average share prices on the NYSE by the same factor. However, as discussed above average prices on the NYSE have remained stable since 1933.

Lipson and Mortal (2006) note that in addition to not fuelling a temporary upsurge in the number of splits, the reduction in NYSE tick size did not lead to a permanently lower level of post-split prices. This suggests that the relative tick size is mostly irrelevant to managers. Further, it seems that tick size effects are not necessary for splits to impact clientele: the number of brokers promoting a stock does not seem to depend on the relative tick size. Splits simply seem to raise the gross revenues to existing liquidity providers.

2.1.3 The signaling hypothesis

Some authors have suggested that splits are used to signal inside information. The notion that firms' financial decisions convey information about a firm was proposed by Ross (1977), Leland and Pyle (1977) and Bhattacharya (1979). The signaling framework assumes asymmetric information between managers and investors, that managers have an incentive to convey favorable information to investors, and that it is too costly for low-value firms to engage signaling tools available to high-value firms. Splits are eligible to be considered signals since they are costly financial decisions, as discussed above. Were they not, management of any firm, low-value or high-value, could continuously adjust the nominal share price level to the desired level with no signaling of private information involved.

Brennan and Copeland (1988) argue that managers use splits to communicate private information about firms' future prospects. They develop a model where undervalued firms use stock splits to signal the quality of their future prospects. They find that their signaling model explains up to 27% of announcement-date returns for splits. One implication of the signaling hypothesis is that the market reaction to splits should be positive. This is in fact the case, as implied by the extensive literature on positive abnormal announcement returns, discussed later.

Asquith, Healy and Palepu (1989) suggest that splits signal information about earnings. They argue that investors interpret the split announcement as a signal that earnings increases are permanent. If the earnings increase was temporary, management could wait out the next quarter or year for the price to fall naturally to its previous range. The authors find that splitting firms experience earnings increases in the four years prior to the split announcement, and earnings changes after the split are either insignificant or positive for up to five years. Hence, the earnings increases are permanent and the signal is valid. In contrast, Huang et al. (2008) find no evidence of improved operating performance for splitting firms, suggesting that the signal is not translated to increased earnings.

Michayluk and Zhao (2007) find that average corporate bond yields of splitting stocks significantly decrease after the split announcement, confirming that bond investors perceive the split announcement as a positive signal from management. The authors also find that there is an increase in earnings forecasts by analysts at the time of the split. Actual earnings subsequent to splits also increase. The authors argue that these effects are a result of a reduction in uncertainty regarding the future performance of the company, which acts to reduce the required rate of return of investors.

Lakonishok and Lev (1987) find evidence that splitting firms experience somewhat higher growth in earnings and dividends post split, but note that most of the effect happens prior to the split, not after. They conclude that signaling does not seem to be the dominating motive for splits. Rather, splits seem to be motivated by managers wishing to position the stock in the “normal range” of trading.

Like the optimal trading range hypotheses, the signaling hypothesis has strong counterevidence. The signaling model predicts lower information asymmetry after splits since management’s private information has been communicated to the market. Easley et al. (1998) find that there is no significant change in the information content of trades after stock splits. Had the splits in their sample had signaling effects, the reduction in asymmetric information between investors and management should have decreased the amount of informed trading.

Benartzi et al. (2010) note that ETFs and mutual funds split too. It is hard to imagine that they have inside information or can predict out-performance. It is widely accepted that mutual fund managers do not possess much of an informational advantage, so they have little to signal. Muscarella and Vetsuypens (1996) study American Depository Receipt (ADR) solo-splits, where an ADR splits while the home country security does not, which in principle could be used for signaling purposes if signaling in the home market is not possible, for instance due to legislation requiring a minimum nominal share value. They note that signaling cannot explain why unsponsored ADRs split solo. In these cases the depositary bank, which can be assumed not to possess firm-specific inside information, makes the split decision. The authors also conduct direct tests to examine post-split earnings of splitting ADRs and find no significant evidence in support of the signaling model.

2.2 The catering hypothesis

Since the traditional theories fail to explain completely why firms actively manage their share prices, I now turn to alternative theories that may provide fresh perspectives. I begin by presenting the catering hypothesis of nominal share prices.

The last ten years has seen an active literature on corporate decisions influenced by catering incentives. A catering corporate finance policy responds to investor preferences for some corporate characteristics or actions. Catering incentives have been found to affect dividend policy (Baker and Wurgler (2004a, b), Li and Lie (2006)), corporate names (e.g. Cooper et al. (2001)) and investment decisions (Polk and Sapienza (2006)) to name a few. Greenwood (2007b) finds that Japanese firms are more likely to split when stock splits have generated high announcement returns. The announcement returns proxy for investor preferences: managers infer that investors award stock splits with high positive abnormal returns, wherefore investors reveal a preference for splits.

Baker, Greenwood and Wurgler (2008) devise a catering theory of nominal share prices, where managers act to satisfy the revealed time-varying preferences of investors. They predict that when investors place relatively high valuations on low-price shares compared to high-price shares, splits will be more frequent and to lower post-split prices. Like Greenwood (2007b), they also use abnormal announcement returns earned by recent splits as one proxy for catering incentives. Because of the strong cross-sectional relationship between firm size and share price, documented for instance by Benartzi et al. (2010) and Dyl and Elliott (2006), the authors also contemplate the possibility that catering-minded splitters may be trying to appear small-capitalisation instead of low-price. As price quotes are more easily available in the financial press than market values, this is not an unreasonable heuristic. Therefore they also test whether splitting firms are catering to investor appetite for small firms. The three proxies for catering incentives explain up to 30% of annual variation in the frequency of stock splits.

The authors also test whether catering proxies explain some of the time variation of average IPO prices. IPOs are an interesting laboratory for testing active share price management, since firms that go public do not have a legacy of share prices. Catering incentives explain 75% of the time variation in IPO prices. Finally, the proxies also explain 52% of the variation in post-split prices.

Firm-level robustness checks also support the catering hypothesis. A firm’s propensity to split is increasing in catering proxies, while the post-split price and IPO price are decreasing.

The results again imply that nominal share prices matter to investors. The question is: why? Perhaps managers are catering to satisfy the investors’ preference for a certain trading range; Merton’s (1987) model of investor recognition predicts higher demand for stocks with lower nominal share prices leading to higher valuations. Positive abnormal announcement returns could just reflect the increase in marketability. However, the investor recognition framework does not provide an answer to why investors’ preferences would be time-varying. The trading frictions discussed in the context of the marketability and pay to play hypotheses may be part of the story, but as discussed their explanatory power is limited. Baker et al. (2008) suggest that exploring psychological factors may provide better answers.

2.3 Norms

The norms view of stock splits posits that managers are simply following convention in setting the firm's nominal share price. When the nominal share price deviates from the norm, firms use stock distributions to realign the share price. The higher the deviation from the norms price, the more likely a firm is to split. The post-split price and price chosen at IPO are chosen to conform to the norms price. The norms price has been suggested to depend on the market average share price (e.g. So and Tse (2000)) as well as industry (Lakonishok and Lev (1987)) and size peer group average share price (Benartzi et al. (2010)).

Lakonishok and Lev (1987) suggest that splits are mainly aimed at restoring share prices, which have increased during an unusual growth period, to a normal range defined in terms of market, industry-wide and firm-specific prices. They find that a gap of close to 70% opens between a group of splitting firms and control firms in the four to five years prior to the split due to superior operational performance by the splitting firms. This gap vanishes almost completely in the four months after the split. As for stock dividends, the authors note that they do not seem to be intended to restore share prices to normal levels, because most stock dividend-emitting firms already have low prices, and the increase in the number of shares is relatively small. They suggest that firms with low cash dividend yields use stock dividends to substitute for cash dividends, as some (irrational) investors may temporarily regard the two as substitutes.

So and Tse (2000) study the target price habit in the framework of corporate culture, suggesting price is a function of sociological norms set by investors, managers and financial analysts. They show that the post-split price depends on the market norm; in their methodology the deviation from market median price explains 29% of the variation in the split factor. Habit may also play a role in the decision to split, as the distance from market norms price has a higher effect on propensity to split when the firm has split before. Management may therefore have a target price to which the firm splits when its stock reaches a certain level.

Benartzi et al. (2010) argue that the tendency of firms to manage their nominal share prices to "normal ranges" suggests share prices constitute a macroeconomic norm in the spirit of Akerlof (2007).

In his 2007 presidential address at the American Economic Association, Akerlof shows how the existence of norms nullifies the five neutrality results in macroeconomics. The neutralities that brought Keynesian economics to its knees are: the independence of consumption and current income; the irrelevance of current profits to investment spending; the long-run independence of inflation and unemployment; the inability of monetary policy to stabilize output; and the irrelevance of taxes and budget deficits to consumption. Although these neutralities do not fit with the Keynesian view of macroeconomics, Akerlof showed that these neutralities are violated by the existence of decision makers' norms. As Vilfredo Pareto pointed out in the beginning of the Twentieth Century, utility functions of decision makers should include the decision makers' opinions as to how they should, or should not, behave. These opinions are called norms, and they can be individual or societal in nature. In the context of nominal share prices this means that managers are just following norms in setting the share price. The existence of norms implies that the real benefits of splits do not need to outweigh the real costs, since utility is derived also from returning the share price to the norms range.

Benartzi et al. (2010) go on to show that almost 80% of the price targeted by managers via stock splits (with split ratios above 1.25) is explained by the deviation from the size and industry peer group median prices. The abnormal announcement returns documented earlier are seen by the authors as rewards for the increased comfort experienced by investors when the share price is returned the norms price. Norms also explain why large firms tend to have higher share prices; size groups have share price norms to which firms align their share price. Benartzi et al. (2010) show that firms adopt a higher share price after large market capitalization increases, as they "graduate" from one size group to the other.

As discussed earlier, it is difficult to use the standard explanations of stock splits to explain why mutual funds split. Rozeff (1998) finds that, on average, one percent of mutual funds split in a given year. Norms seem to affect also fund managers' decision to split. Cross-sectional evidence implies that mutual fund split factors are positively correlated with the deviation of the fund's price from average prices. The evidence points to the explanation that the most likely rationale for mutual funds to split is to bring the share price back toward the market norm.

Muscarella and Vetsuypens (1996) find that the pricing of ADRs is consistent with the existence of share price norms. The share price on the home exchange is in line with that exchange's pricing, while the number of shares packaged in an ADR is designed to bring the price in line with other securities on the foreign exchange. Solo-splits are done to bring the share price back to the norms price.

It is easy to understand why norms explain why nominal share prices in the U.S. have remained practically constant since 1933; since norms are derived from decision makers' perception of how they should behave, and these opinions are shared throughout a society, a powerful shock is needed to change a norm. Such a shock may have happened around the time of the Great Depression, before which average share prices in the US oscillated around $80.

2.4 Market reaction to stock splits

If stock distributions are purely cosmetic actions, they should not induce any real effects. An extensive literature proves otherwise. In this section I review the literature on the market reaction to stock distribution announcements. I will show that stock splits announcements are generally greeted with positive abnormal returns, consistent with the predictions of the theories introduced above. Positive excess returns are also present around the ex-date. Finally, I will present evidence on the effect of stock splits on the variance of returns and volume of trade.

Like Lakonishok and Lev (1987), Fama et al. (1969) note that stocks that split experience significant run-ups in share price in the few years leading to the split, resulting from increases in expected earnings and dividends. They study 940 splits on the NYSE between 1927 and 1959 and find that splitting companies on average experience uniformly positive returns in the 29 months prior to the split and during the split month. In the months following the split, abnormal returns do not exist. The authors suggest the evidence supports the signaling motive of stock distributions, arguing that when a split is announced or anticipated, the market interprets this as improving the probability that dividends will be substantially increased. Thus, earnings increases are interpreted as being permanent, awarded with positive excess returns in the split month. The signal also needs to be validated within a reasonable time frame: those firms that declare a dividend increase in the year after the split have on average slightly positive excess returns post split, while those firms that declare no dividend perform poorly in each of the twelve months following the split.

Bar-Yosef and Brown (1977) claim that Fama et al. (1969) overstate the positive excess return in the months surrounding the split, arising from the use of constant instead of moving betas. The authors use moving betas to investigate the market reaction to splits using a sample of 219 first-time splitters between 1945 and 1965. They confirm the positive excess returns surrounding the split announcement, although the magnitude of returns is lower than in Fama et al. (1969) (18% compared to 31%). It is worth noting that the authors find the moving betas of their sample firms to be significantly unstable in the months surrounding the split, supporting the hypothesis of Fama et al. (1969) that there is increasing uncertainty regarding the permanence of earnings increases in the months leading up to the split. Charest (1978), applying a slightly modified methodology, finds similar results to Fama et al. (1969): in the 24 months leading up to a split announcement the average cumulative abnormal return is around 30% and the abnormal returns vanish after month zero.

One significant limitation to the abovementioned studies is that they do not control for the potential contamination of the data by other information releases on the split announcement dates. In the sample of Grinblatt et al. (1984), for instance, more than 80% of the stock distribution announcements had some other significant simultaneous announcement ranging from merger information, earnings reports and cash dividend declarations to stock authorization announcements. Another limitation is the use of monthly data. The valuation effects of other corporate announcements in any given month are then included in the announcement return calculation for that month. Grinblatt et al. (1984) clean their sample of other announcements in the three-day period around the split announcement and analyze split announcement returns with these “pure events”. The results show a 3.3% two-day abnormal announcement return for stock splits and 5.9% for stock dividends using the “pure sample”. The corresponding figures for the contaminated sample are slightly lower: 3.0% for splits and 4.9% for stock dividends. The announcement return sign is positive for 74% of stock distributions.

What is noteworthy is that the authors also document a significant positive average abnormal return in the three days surrounding the split ex-date of approximately 1%. Similar results are also documented earlier by Charest (1978). Chottiner and Young (1971) find that for 945 stock distributions declared by NYSE firms between 1963 and 1968, the ex-date opening price is higher than the price predicted their asset pricing model. Using data on 137 splits by stocks traded on the London Stock Exchange (LSE), Kalotychou et al. (2009) also report significant positive abnormal returns around the ex-date.

The excess returns surrounding the ex-date may arise from a change in splitting companies’ co-movement with the market. Brennan and Copeland (1988) analyze changes in splitting firms’ beta coefficients around the split announcement and ex-date. As predicted by Fama et al. (1969), splitting firms’ beta exhibits a temporary increase of about 20% at the time of the split announcement. The shift from a normal co-movement level with the market increases to 30% at the ex-date and remains around 18% in the 75 days following the split. This is consistent with the prediction that investors become nervous as they await “confirmation” regarding the permanence of earnings increases, and when this permanence is either confirmed by a dividend increase or disconfirmed by a lack of, volatility drops to a normal level. The abnormal returns around the ex-date are therefore just reward for increased riskiness of the stocks that split. However, it should be noted that the evidence regarding beta increases after splits has been shown to be dependent on the method of measurement: Wiggins (1992) and Desai and Jain (1997) find that there is no evidence of a significant beta change subsequent to stock splits.

Finally, the volume of trade of splitting firms is affected by the split announcement. Lakonishok and Lev (1987) find that up to the twelve months before the announcement the monthly volume traded relative to shares outstanding is almost identical for splitting firms and control firms. The trading volume of the splitting firms is higher than that of the control firms' beginning from twelve months before the announcement, peaking in month zero, when the average monthly turnover of the splitting sample is 5.4% versus 4.1% for the control sample. This difference vanishes by the second month after the split month, or around the average ex-date. Since long-term liquidity effects are not found, the authors consider the evidence as contrary to the marketability hypothesis. On the other hand, Dhar et al. (2004) suggest that the increased trading activity after a stock split is caused by the shift in clientele caused by increased interest from individual investors. The increased attractiveness to individual investors of just-split stocks is in support of the marketability hypothesis.

3 HYPOTHESES

This section presents the hypotheses of this thesis. First, I examine the time-variation of average share prices from the perspective of norms. Second, I include direct tests for share price norms and catering incentives, investigated through splits and IPOs.

Some of the hypotheses have not been tested for previously. To begin, Benartzi et al. (2010) argue that a major shock is needed to induce a shift in nominal share price levels. I test whether the adoption of the euro and the associated change in share denomination constitutes such a shock. Further, the effect of the share price norm deviation on the propensity to split has not been tested, although it is implied by tests on the post-split price. Finally, I expand the univariate tests by Benartzi et al. (2010) on the effect of norms on IPO prices to a multivariate setting. I do not assign separate hypotheses for control variables, but discuss them in the context of robustness checks.

3.1 Hypotheses for share price levels

According to Benartzi et al. (2010) share prices in the U.S. have remained at roughly the same level since 1933, when they claim a shock in norms shifted the average nominal share price downward to $30 from approximately $80, around where the average price had oscillated in the full century up to the Great Depression. As inflation has constantly eroded the value of the dollar since then (with a factor of 15), this means that real share prices have decreased significantly.

> **H1.** *Average real share prices in European markets have decreased over time.*

If norms explain the nominal price puzzle, then similar behavior of share prices should be evident in other markets as well, at least where companies are allowed by law to manage their share price to the level they desire without disproportionate costs involved, such as the countries sampled in this thesis. After all, decision makers in other cultures are also likely to have a sense of how they should behave, and incorporate this perception in their utility functions. Insensitivity of nominal share prices to inflation does not in itself prove the existence of norms. Only if nominal share prices seem to remain constant over time can we say prices confine to norms. I hypothesize that such market-specific share price norms prevail in Europe, but admit that the short time series of data make the share price norms quite difficult to detect.

> **H2.** *Average nominal share prices in European markets have remained approximately constant over time.*

A change in the currency in which shares are denominated could plausibly fuel a permanent shift in the norms price. I therefore test whether the adoption of the Euro in eight of the eleven countries in my sample had an effect on the norms price. I further hypothesize that the larger the change in the denomination of share prices, the larger the shift in norms. A change in the share price norm should therefore be most significant in those countries against whose currency the Euro was particularly strong at the time of adoption.

> **H3.** *The adoption of the Euro caused a shift in average nominal share price levels, most notably in those countries where the Euro was particularly strong against the home currency*

The fact that shares began to be quoted in Euros already in the beginning of 1999 may have softened the impact of the currency change, as the actual Euro notes and coins became the legal tender only in the beginning of 2002.

3.2 Norms hypotheses

The norms hypothesis predicts that as the share price drifts further away from the firm's norms price, management becomes more and more likely to split the stock to restore the price to a normal range. Lakonishok and Lev (1987) suggest firms confine to the normal trading range within their market and industry peer group. Benartzi et al. (2010) show that firms also align their nominal share price with their size group peers.

> **H4.** *A firm's propensity to split is increasing in its distance from the share price norms defined in terms of market, industry-wide and size-group average prices.*

Following naturally from the above, a splitting firm should set the post-split share price based on the median prices in its market, industry group and size group. The split factor should therefore depend on the deviation from the share price norm. Benartzi et al. (2010) show that newly listed firms on the NYSE and AMEX choose a share price that aligns them with the average price in the firms' size quintile. I further expect that the share price chosen by newly listed firms depends on the firms' market and industry group average share price.

> **H5.** *Post-split prices and prices chosen at IPO are dependent on norms prices defined in terms of market, industry-wide and size-group average prices.*

3.3 Catering hypotheses

Baker et al. (2008) argue that firms manage their share prices to cater to investor preferences. They argue that splitting propensity is positively correlated with proxies for catering incentives. These proxies are the market-to-book premium of low-denomination stocks over high-denomination stocks, the market-to-book premium of small-capitalization stocks over high-capitalization stocks and magnitude of recent abnormal split announcement returns.

> **H6**. *A firm's propensity to split is increasing in the magnitude of time-varying catering incentives.*

Catering-minded managers can be expected to choose lower share prices when the premiums for low-priced stocks and small-stocks are high.

> **H7.** *Post-split prices and prices chosen at IPO are dependent on the magnitude of time-varying catering incentives.*

4 METHODOLOGY AND DATA

To begin this section I will describe the data samples employed in this thesis. I then move on to discuss the empirical models for the price targeted by managers at IPO and at split, and the model for propensity to split. The purpose is to study which catering and norms variables are correlated with splitting propensity and the denomination chosen by the sampled firms. Finally, I discuss a variety of descriptive statistics relating to my data samples. I will not separately discuss the data used for share price level analysis, but describe it in the context of the split sample.

4.1 Split data

The data for splits and share prices comes from the Thomson ONE Banker Datastream database. I use a 29-year sample period from 1/1980 to 12/2008. For my sample I consider companies listed in 11 EU countries at some point during the sample period for at least one calendar year. To be included in the sample, I require that a company's sector classification in Datastream is not "financial services", "real estate investment trust", "unclassified" or "unquoted equities". Naturally arising from the purposes of this thesis, I further require that the company is quoted in the country's legal tender, sovereign or euro. Table 1 summarizes the countries, exchanges and currencies included in the sample. There are in total 92,856 firm-years in the final sample.

The main criteria for choosing the sampled countries and exchanges are (1) the availability of data and (2) the inclusion of both euro and non-euro countries to enable testing the hypothesis that the euro caused a shift in nominal share prices. Otherwise the choice is arbitrary. From each country, only the most important exchange is included. The three largest exchanges (Frankfurt, London and Paris) contribute almost 70% of the total sample of firm-years. The smallest exchange (Vienna) represents less than 2% of the total. The sample is split roughly equally between non-euro and euro countries. For some countries the data series does not begin from 1/1980, because Datastream does not provide the full time series of financial data.

Specifically, the Swedish time series begins in 1982, the Finnish series in 1987 and the Portuguese series in 1988.

The market and financial data also comes from Thomson. Datastream is used to extract data on consumer price indices (CPI). The benchmark indices used for calculating market returns are the Datastream calculated all-share indices where data is available throughout the sample period. For Finland and Portugal, for which Datastream calculated all-share indices are unavailable, I use the MSCI market indices. To ensure comparability over time, all share price data quoted in the sovereign currency are translated to euro at the 01/1999 fixed exchange rate for those countries that have adopted the euro. For Denmark, Sweden and UK share price data are quoted in the sovereign currency. In the regression tests all market and financial data are translated to euro.

Table 1: Sample countries, exchanges and currencies

This table reports the 11 countries included in the sample. For each country, the exchanges and currencies represented in the sample are stated. The Euro exchange rate against the home currency is the fixed rate locked at midnight on January 1, 1999. Proportion of total firm-years means the proportion that a country represents in the total sample of firm-years.

Country	Exchanges	Currencies	Euro fixed rate	% of total firm-years	Series begins
Austria	Vienna Stock Exchange	Austrian Schilling, Euro	13.7603	1.9 %	1980
Belgium	Euronext Brussels	Belgian Franc, Euro	40.3399	3.5 %	1980
Denmark	OMX Copenhagen	Danish Krone	NA	4.5 %	1980
Finland	OMX Helsinki	Finnish Markka, Euro	5.94573	2.3 %	1987
France	Euronext Paris	French Franc, Euro	6.55957	17.0 %	1980
Germany	Frankfurt Stock Exchange	German Mark, Euro	1.95583	14.8 %	1980
Italy	Milan Stock Exchange	Italian Lira, Euro	1 936.27	5.5 %	1980
Netherlands	Euronext Amsterdam	Dutch Florin, Euro	2.20371	4.1 %	1980
Portugal	Euronext Lisbon	Portuguese Escudo, Euro	200.482	2.1 %	1988
Sweden	OMX Stockholm	Swedish Krona	NA	7.3 %	1982
UK	London Stock Exchange, AIM	Sterling	NA	36.9 %	1980

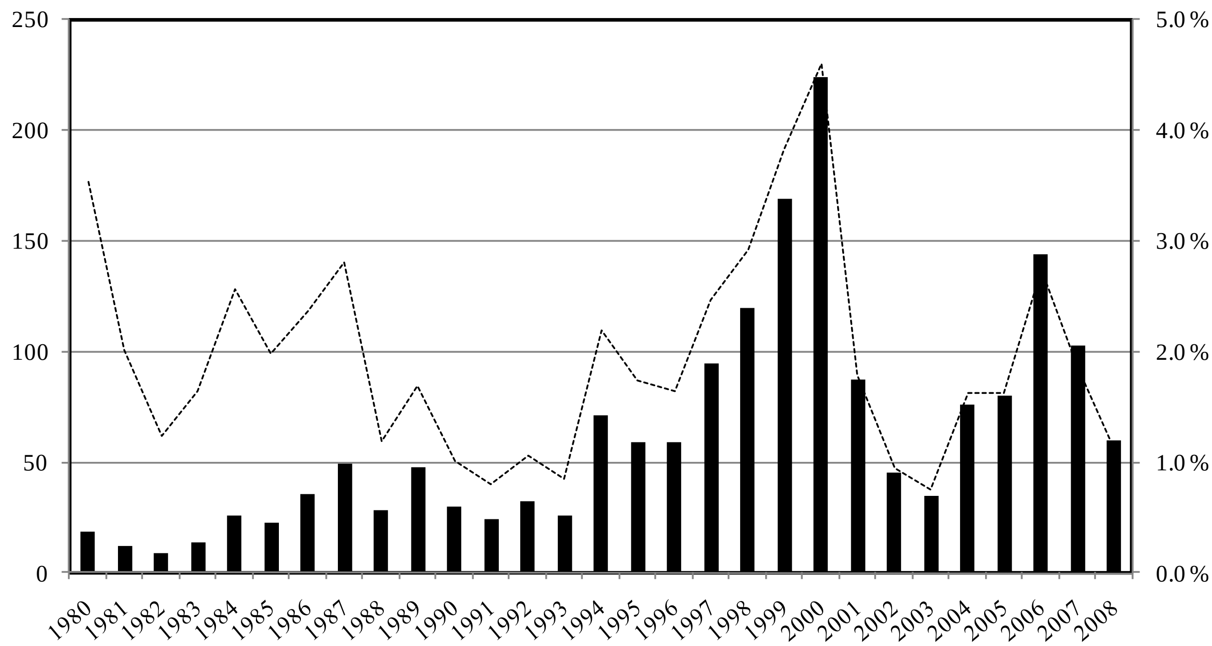
Datastream does not provide split event or announcement dates directly. The sample of stock splits is therefore inferred from daily time series data on the share capital adjustment factor (Datastream item AF) of the sampled firms. The adjustment factor is the daily ratio of shares outstanding to shares outstanding at the close of the last trading day in the sample period (December 31st 2008). I classify a change in the adjustment factor as an adjustment event. An adjustment event indicates a date when a company's shares outstanding has changed. Obviously not all changes in a company's number of shares are splits or stock dividends. To clean the sample of adjustment events that are not stock distributions, I require that the change in the adjustment factor is at least 2-for-1 (for instance equity issues rarely more than double the number of shares outstanding). The ex-date share price change is further required to indicate a "neutral mutation". More specifically, I require that the price reaction on the split ex-date is at least 70% and at most 120% relative to the split factor. The percentages are admittedly arbitrary, but seem to effectively eliminate events that are not splits (mostly large rights issues and issues relating to the financing of M&A transactions).

Since these operations are necessary to ensure the data is genuine, reverse splits (adjustment factor less than 1) and stock dividends (adjustment factor normally between 1.25 and 1) will be outside the scope of this study. To ensure the stocks included in the sample are liquid, I exclude splits for which daily price data is not available for the entire period from 120 trading days prior to the split event through to 15 days after. I also require that during the same time period the splitting firm has at least 10 days of non-zero returns. This operation also administers to the exclusion of entities listed on Datastream as equities, but which in reality are thinly traded equity-like instruments such as rights. Finally, I exclude outliers from the sample of stock splits by manually trimming spurious observations where necessary. As depicted in Figure 1, the selection criteria result in a final sample consisting of 1,803 splits with split ratios of more than 2-for-1.

What is noteworthy, it seems there is little data available during most of the 1980s. This mainly results from the fact that the data series for Finland and Portugal only begin in the latter half of the decade. Second, the data may be scarce due to incomplete documentation of companies by Datastream: the number of firm-years in the sample increases from 537 in 1980 to 2829 in 1989 (20.3% compound annual growth rate (CAGR)), after which the growth in firm-years becomes steadier (3.5% CAGR). This is more likely to be caused by the expansion of the database to include more listed equities than a flood of IPOs. There are two clear peaks in the number of stock splits. The first peak coincides with the "dot-com bubble" at the turn of the millennium and the second with the hot asset markets preceding the "credit crunch" which began in 2007. This is in line with previous evidence that splitting firms are characterized by a period of abnormally high returns that have caused a run-up in share price.

Figure 1: Distribution of stock splits over time

This figure reports the number of splits in the sample by year from 1980 to 2008 in absolute terms (columns – left axis) and as a proportion of all firms included in the sample in a given year (line – right axis).



Quite surprisingly, splits seem to be as common as in the US, although the results are not directly comparable to many of the previous studies where splits with ratios above 1.25-to-1 are included. Michayluk and Zhao (2007) report that roughly half of the splits in their split sample spanning 1986 to 2006 have a split factor higher than 2-for-1. Lakonishok and Lev (1987) report that in 14 of the 20 years in their sample more than 5% of firms split. In the sample of Baker et al. (2008), splitting frequency exceeds 5% in 24 out of 44 years. Combining this information, and assuming the distribution of splits by factor stays constant over time, we can infer that in most years more than 2.5% of stocks split at a ratio above 2-

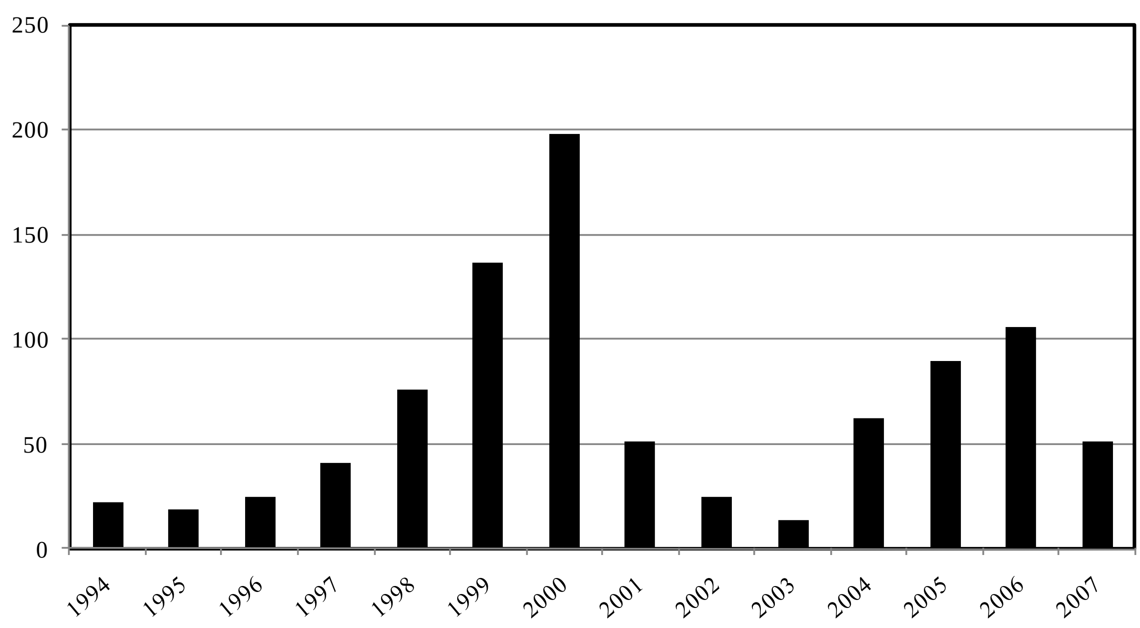
for-1. Splitting frequency in my sample is in line with this result: in 20 of the 29 years more than 2.5% of companies split their stock at a ratio above 2-for-1.

4.2 IPO data

The sample of initial public offerings (IPOs) comes from the Securities Data Company's (SDC) Non-U.S IPO Database. I use a 14-year sample from 1/1994 to 12/2007. The sample period is chosen based on the availability of data. The sector and currency requirements mentioned in the context of splits are also applied to IPOs. I further require that the amount raised in the IPO exceeds €10m and that financial data is available on Thomson One Banker for determining the company's size peer group and the closing price used in the empirical tests. The company's market capitalisation 5 trading days post IPO is required to be at least €10m. To ensure comparability over time, IPO prices in the sovereign currency are translated to euro at the 01/1999 fixed exchange rate for those countries that have adopted the euro. For Denmark, Sweden and UK IPO prices are quoted in the sovereign currency. The final sample consists of 917 IPOs, distributed over time as depicted in Figure 2.

Figure 2: Distribution of IPOs over time

This figure reports the number of IPOs in the sample by year from 1994 to 2008 in absolute terms.



Like with splits, IPO activity seems to correlate with returns. The two peaks in IPO activity coincide with hot asset markets. This supports the idea that managers are more willing to bring their company to the market when valuations are high, in order to increase the proceeds from selling the IPO shares. Ritter (2002) notes that the peak in IPO volume in 1999 and 2000 was almost completely due to technology stocks (with poor short-term earnings prospects) seizing their opportunity to raise equity capital in the hot IPO market. During this time period the number of IPOs in the US by “old-economy” stocks remained mostly constant.

4.3 Model specifications and variables for price targeted by management

In this section I discuss the ordinary least squares (OLS) regression models for the post-split price and the price targeted by management in IPOs. I will discuss the models in general and each dependent and independent variable separately and base my model and the inclusion of different variables on previous literature. I do not discuss previously tested control variables separately, or include them in the main regression specifications. Instead, I discuss them in the context of robustness checks.

Similarly to Baker et al. (2008) the models for the post-split price and price chosen at IPO test for the effect of time-varying catering incentives on the prices chosen by management. The industry and size norms variables follow the logic of Benartzi et al. (2010). All dependent and independent variables are logged, except for the recent split ex-date abnormal returns. The models for post-split prices and prices chosen at IPO are as follows:

> *Pre-split price – post-split price = f(small-stock premium, low-price premium, split ex-date abnormal returns, price relative to size group norms price, price relative to industry group norms price, price relative to market norms price).* *(1)*

IPO price = f(small-stock premium, low-price premium, split ex-date abnormal returns, size group norms price, industry group norms price, market norms price). *(2)*

To summarize equation (1) in words, I regress the absolute change in share price chosen by the management of splitting company *i* in period *t,* on the aggregate premium paid for low-price stocks and the aggregate premium paid for small-capitalisation stocks in the period prior to the split, the average abnormal ex-date return of recent splits, and the ratio of pre-split price to the size, industry and market median prices in the period prior to the split.

All variables are expected to have positive coefficients. Baker et al. (2008) argue that when market-to-book valuations imply that investors prefer low-price and small-capitalisation stocks, firms split more often and to lower post-split prices, catering to investor preferences. The authors also argue that the magnitude of recent abnormal split announcement returns has an effect on the decision to split and the post-split price. As my sample is inferred from market data, estimating the announcement return reliably is not possible. In the spirit of the announcement return proxy I calculate an ex-date abnormal return proxy and include it as an explanatory variable in the regression specification. Since the ex-date abnormal returns of splits are much smaller in magnitude than abnormal announcement returns, this proxy is expected to be significantly weaker than the announcement return proxy used by Baker et al. (2008), but may prove to proxy for catering incentives all the same.

The distances to norms prices should also be positively correlated with split factors. The further away a corporation’s share price is from the norms price, the more likely the firm is to split to bring the share price back in line with peers.

I include country and industry dummy variables to account for unobserved effects. I control for the effect of firm size in the context of robustness checks.

As shown by equation (2), I regress the price chosen by a listing company *i* in period *t* on the low-price and small-stock premia, recent abnormal split ex-date returns, and the median prices in the company's size, industry and market peer groups at the end of the period prior to the split. The catering variables are expected to have negative coefficients: lower share prices are chosen when splits receive high abnormal ex-date returns and when low-price stocks and small-capitalisation stocks attract higher valuations. The norms variables on the other hand are expected to have positive coefficients as companies are expected to choose their initial price based on the motivation to align the company with its peer groups.

I include industry dummy variables to account for unobserved effects. Possible firm size effects will be controlled for in the context of robustness checks. Inconsistent with the split price regression, I do not control for country effects. This is because the dependent variable is highly dependent on the country of listing, and country dummies would absorb most of the explanatory power of the model.

4.3.1 Dependent variables

As mentioned above, the methodology used in the OLS regressions follows that of Baker et al. (2008) with additional norms variables in the spirit of Benartzi et al. (2010) added to the regression equation. As the sample consists of companies listed in different countries with different nominal share price levels, tweaking the dependent variable in the post-split price regression is required.

> **Pre-split price less post-split price:** The absolute share price level chosen after a stock split is not meaningful in the context of this study unless it is controlled by prior prices and returns. To fully capture the effect of norms on the post-split price, the dependent variable must capture the price chosen relative to the pre-split price. The dependent variable is therefore specified as the (log) share price one day prior to the ex-date less the (log) share price at the

close of the ex-date as reported by Thomson. The dependent variable is analogous to that of Lakonishok and Lev (1987). All share prices are expressed in euro.

IPO Price: The closing price of newly listed firms 5 trading days after the IPO, as reported by Thomson Financial. If the listing occurs before 1/1999 or the offer price is otherwise reported in the sovereign currency, the price is converted to euro using the fixed exchange rates reported in Table 1 or the spot rate. I deviate here from the methodology of Baker et al. (2008) who use the first day closing price for newly listed firms as the dependent variable. The reason is simply that the availability of price data on Thomson is significantly better after a few trading days has passed since the IPO. The reason for not using the IPO offer price as provided by SDC is to take into account that IPOs are, on average, underpriced. Managers are likely to take this underpricing into account when choosing the nominal offer price. The actual nominal trading range chosen by management is therefore more properly reflected once the market has priced the stock during the first few days of trading. I do nevertheless also report the results using the offer price as dependent variable.

4.3.2 Catering variables

The catering variables are as defined by Baker et al. (2008). The authors argue that when low-price stocks and small-capitalisation stocks earn high premia and when recent splits have earned high abnormal returns, managers tend to choose lower share prices. The ex-date abnormal return proxy is included in the price level regressions, although it should intuitively only affect the propensity to split, not the price level chosen. Baker et al. (2008) however find that the announcement return proxy has a statistically significant effect both on the price level chosen at IPO and post split (equal-weighted t-values of 2.2 and 2.6 respectively).

Low-price premium: Calculated at the end of each calendar year from 1979 to 2007 for each market. It is the difference of the logs of average market-to-book ratios of low-priced and high-priced stocks, where averages are winsorised at the 10 percent level. Low-price stocks are defined as those stocks whose price per share is below the 30th percentile of all common stocks in the market. High-priced stocks are those above the 70th percentile. For a split or IPO in year *t*, the low-price premium at the end of year *t-1* is the explanatory variable of interest.

Small-stock premium: Calculated at the end of each calendar year from 1979 to 2007 for each market. It is the difference of the logs of average market-to-book ratios of small-capitalisation and high-capitalisation stocks, where averages are winsorised at the 10 percent level. Low-capitalisation stocks are defined as those stocks whose market capitalisation is below the 30th percentile of all common stocks in the market. High-capitalisation stocks are those above the 70th percentile. Similarly to the low-price premium, the explanatory variable of interest is the small-stock premium at end of year *t-1*.

Average Abnormal Ex-Date Returns: The average ex-date abnormal return of all splits in a given market during one calendar year. The abnormal ex-date return for a single split event is calculated as the cumulative abnormal return (CAR) from one trading day before the ex-date through to ten days after, scaled by the square root of the number of days in the event window times the standard deviation of daily returns in the 100 trading days ending five days prior to the ex-date. This methodology captures the potentially increasing volatility of a splitting stock between the announcement date and ex-date, implied by Brennan and Copeland (1988) to explain the abnormal ex-date returns. CAR is the return on the stock over the market return over the said interval. As for the other catering proxies, the variable is lagged by one year in the regression specification.

4.3.3 Norms variables

The norms variables follow the logic of Benartzi et al. (2010). In their model specification the dependent variable is an absolute targeted change in price, and distances from norms prices are also defined in absolute terms. I specify the independent variables as logged ratios and the dependent variable as a logged difference, using the methodology of Lakonishok and Lev (1987).

Pre-Split Price: Splits are often announced days after management make the decision to split. This is mostly due the to administrative, legal and communication procedures involved in executing the split. The price management is targeting is therefore not relative to the announcement date or ex-date price, but the price on the date when the split decision is made. Lakonishok and Lev (1987) and Brennan and Copeland (1988) use the share price five days prior to the announcement of the split as the pre-split share price to account for the announcement lag. Since my split data is inferred from market data, an approximation of the date of the split decision is not possible. I therefore use the price one day prior to the ex-date as the pre-split price. This is likely to lead to an upward bias in the pre-split price, because splitting firms tend to experience positive abnormal returns in the few months prior to the split (Fama et al. (1969) note that the time between announcement and ex-date is 1-3 months).

Market Median Price: The median price of all stocks in the IPO or splitting firm's home market. The norms price of interest is the median price in the firm's market at the end of the year prior to the split or IPO.

Size Median Price: The median price for the IPO or splitting firm size group quintile in the home market. Size group quintiles are calculated at the end of each calendar year from 1979 to 2007. The norms price used in the regression specifications is the median price in the firm's size group quintile at the end of the year prior to the split or IPO.

Industry Median Price: The median price in the IPO or splitting firm's industry group in the home market. Calculated following similar methodology to the size median price. Industry groups are classified according to Datastream industry definitions. The norms price of interest is the median price in the firm's industry group at the end of the year prior to the split or IPO.

4.4 Model specification and variables for the likelihood of stock splits

To estimate the effect of norms and catering variables on the likelihood of stock splits I follow the methodology of So and Tse (2000) and apply a logistic (probit) panel regression of the form[4]:

$$Probability\ (Y = 1) = F\ (X'\ \beta). \qquad (3)$$

The dependent variable is a binary variable indicating if company *i* splits its stock in year *t*. *F( )* is the cumulative density function of a standard normal variate; *X' = (1, price relative to size group norms price, price relative to industry group norms price, price relative to market norms price, small-stock premium, low-price premium, abnormal split ex-date returns)* is the vector of independent variables and $\beta = (\beta_1, \beta_2, \beta_3, \beta_4, \beta_5)$ is the vector of coefficients of the independent variables.

I include country and industry dummy variables to account for unobserved effects. I control for the effect of firm size in the context of robustness checks.

4.5 Descriptive statistics

Table 2 reports some summary statistics for my sample of 1,803 splits. The average split factor in the total sample is relatively high at 5.42-to-1 compared to previous authors. Median split factors are generally lower than average split factors, since the split factor does not, in theory, have a limited upside. Naturally, the comparison to US studies is not very fruitful as they usually include splits with ratios above 1.25-for-1. For the sake of curiosity, the average split factor in the sample of Baker et al. (2008) is slightly below 2-for-1. In the sample of Lakonishok and Lev (1987) the average split factor is 1.85-for-1. One relevant comparison is

[4] Hahn and Soyer (2008) note that in binary response models the logit link provides better results in the presence of extreme independent variable levels. As my response variables are log-transformed except for the average ex-date return which does not receive extreme levels, I use the probit link which provides better data fit for moderate-size data sets in the absence of extreme independent variable levels.

to the sample of Kalotychou et al. (2009) whose sample of 137 UK splits with split factors above 2-for-1, which has an average split factor of 3.2-for-1, in line with the UK average in my sample.

Table 2: Summary statistics for the sample of splits

This table reports summary statistics for the sample of 1,803 splits. Split factor is the number of shares outstanding one day prior to the ex-date divided by the number of shares outstanding on the ex-date. Pre-split price is the price one day before the ex-date in euro. Average abnormal return is the average standardized cumulative abnormal return in each country over the intervals [-60,-30], [-30,-1] and [-1,10]. Cumulative abnormal return is the splitting stock's cumulative return in the event window over the cumulative market return. To control for differences in volatility between firms and across time, CAR is scaled by the square root of the number of days in the event window times the standard deviation of daily returns in the interval [-120,-61]. Returns include the effect of dividends. Dates are expressed with respect to the ex-date. T-statistics are from Patell (1976) and test the hypothesis that the average abnormal return is equal to zero. Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

	Split Factor		Pre-split price		Average abnormal returns		
Market	Average	Median	Average	Median	[-60,-30]	[-30,-1]	[-1,10]
Austria	6.76	7.00	259.79	159.64	0.784***	0.534***	-0.078
Belgium	9.79	7.03	379.69	219.35	0.628***	0.025	0.325**
Denmark	6.01	5.00	795.40	161.39	0.335***	0.439***	0.489***
Finland	3.65	3.00	53.52	31.00	0.637***	1.484***	-0.211*
France	4.71	4.00	275.67	136.44	1.065***	0.741***	-0.026
Germany	8.84	5.00	344.19	140.00	-0.012	0.454***	-0.060
Italy	4.60	3.13	33.52	18.76	1.555***	1.813***	0.805***
Netherlands	4.81	4.00	134.26	84.24	0.716***	0.560***	0.162
Portugal	4.40	5.00	32.89	19.67	-0.081	0.595***	0.048
Sweden	3.55	3.00	36.05	29.59	0.222***	0.924***	0.004
UK	3.51	2.63	12.65	8.96	0.321***	0.092*	0.180***
Total	5.42	4.00	215.02	59.61	0.501***	0.608***	0.101***

The highest average and median split factors are in Belgium, which accounts for 2.8% of the sample of splits, or 50 splits in total. Austria and Germany also have relatively high average split factors, averaging 6.76-for-1 and 8.84-for-1 respectively. This can be related to the evidence presented in about the average annual splitting activity. Austria and Belgium have the lowest average annual splitting activities while splitting activity in Germany is also in the lower half of the sampled countries. It seems than in German-speaking countries firms allow share prices to increase further than elsewhere in Europe before engaging in a stock split to realign the share price, explaining the relatively high average split factors. This evidence supports the idea that, if norms exist, they are a socio-cultural phenomenon. Looking from the opposite perspective, those countries that have the lowest average split factors should have the highest splitting frequencies. That is, if prices are adjusted more frequently through splits, then the split factors should be lower. UK, Finland and Sweden have the lowest average split factors at around 3.5-for-1 each. Evidence of splitting activity is somewhat supportive of this conclusion: Finland has the highest average splitting activity, Sweden the fourth highest, but UK only the eighth highest. Median splitting activity is slightly more supportive. Pre-split prices imply that share price levels are very different between countries. The average splitting firm in the UK has a pre-split price of €12.65 while the average splitting firm in Finland, which has a similar average split factor, has a pre-split price of €53.52, more than four times higher. I include country dummies in the split regressions to capture the potential institutional factors affecting the size of the split factor.

Table 2 also reports the average standardised abnormal returns for splitting stocks in each country for each of the two months prior to the ex-date and the eleven days in the split event window. Average abnormal return is the average number of standard deviations above zero in the event window. The full-sample ex-date abnormal returns of 0.101 standard deviations above zero are, on average, similar to those found in the US. Grinblatt et al. (1984) report abnormal ex-date returns of the magnitude of about 1%, while Chottiner and Young (1971) and Charest (1978) also find that ex-date prices are above the prices predicted by their asset pricing models. The average ex-date returns vary considerably across countries, but this is likely to be caused mostly by the low number of split events in some of the sample countries. Italy, Denmark and Belgium have the highest average abnormal ex-date returns, calculated based on 66, 131 and 50 split events respectively.

Average abnormal returns for the two months preceding the split event also support the results found in previous studies. Fama et al. (1969) find significant positive abnormal returns in the two months preceding the ex-date and note that abnormal returns tend to disappear by month zero. Like Bar-Yosef and Brown (1977), who find similar results, my methodology takes into account the increased variation in the splitting stocks by adjusting the CAR by the standard deviation of recent daily returns. It therefore seems that increased variance does not fully explain the average abnormal returns. The average abnormal returns of 0.501 and 0.608 standard deviations above zero in the two months before the split are statistically significant. Also the average ex-date abnormal return of 0.101 standard deviations above zero in the eleven days surrounding the ex-date is statistically significant.[5]

Table 3 presents some summary statistics for my sample of 917 IPOs. Listing prices seem to be more similar across the sample of countries than pre-split prices. The dispersion of IPO offer prices and post-IPO prices is relatively large, but compared to splits there are no clear outliers, except for the UK which has an exceptionally low average listing price. This might again have to do with the different average nominal share price dynamics in the UK. As with splits UK, Sweden and Finland have the lowest listing prices in terms of the offer price and the IPO closing price. I do not include country dummies in the IPO regressions to avoid capturing the different share price level norms in the different countries.

The equal-weighted 5-trading day return supports using the post-IPO price in the regression specification, as returns immediately after the IPO tend to be positive and large on average. Nevertheless I will also test whether IPO results are robust to using the offer price as the dependent variable. Germany seems to have the largest returns with a 23% equal-weighted median 5-day return. IPO proceeds are on average largest in the Netherlands and Portugal, and the lowest in Denmark. This may imply that differences persist in the average size of listing firms in the sampled countries. I control for the effect of firm size on IPO prices in the context of robustness checks.

[5] Statistical significance of average abnormal returns is robust to nonparametric tests on the sign of the abnormal returns.

Table 3: Summary statistics for the sample of IPOs

This table reports summary statistics for the sample of IPOs from 1/1994 to 4/2007. Offer price is the offer price reported by SDC in the home currency, translated to euro. Price (+5 trading days) is the closing stock price of the company 5 trading days after the IPO as reported by Thomson, in euro. EW 5-day return is the equal-weighted 5-day return, excluding the effect of dividends, calculated as the percentage increase in 5 trading days from the IPO company’s offer price. Proceeds in euro are the proceeds to the company in the home market, as reported by SDC.

	Offer Price		Price (+5 trading days)		EW 5-day return		Proceeds in euro (m)	
Market	Average	Median	Average	Median	Average	Median	Average	Median
Austria	27.72	20.71	30.44	21.94	9.8 %	5.9 %	143.9	42.0
Belgium	18.32	17.50	19.20	17.85	4.8 %	2.0 %	117.9	40.0
Denmark	27.58	25.18	30.21	27.49	9.5 %	9.2 %	24.3	19.9
Finland	8.95	7.60	12.69	8.12	41.8 %	6.8 %	70.8	25.7
France	22.55	19.06	25.30	20.00	12.2 %	5.0 %	108.1	22.0
Germany	27.60	22.00	41.01	27.05	48.6 %	23.0 %	79.9	24.4
Italy	14.74	6.40	17.30	6.40	17.4 %	0.0 %	151.8	34.7
Netherlands	15.64	15.60	19.10	17.29	22.1 %	10.8 %	278.2	41.8
Portugal	10.79	9.25	13.03	10.81	20.8 %	16.9 %	213.7	99.0
Sweden	8.41	8.44	9.15	8.30	8.8 %	-1.7 %	168.7	72.6
UK	2.24	1.91	2.43	2.05	8.5 %	7.3 %	92.5	30.1
Total	16.64	11.50	22.02	12.50	21.6 %	6.8 %	102.8	26.7

Figure 3 shows the development of nominal IPO prices over time in the three largest markets in terms of listings. Average IPO prices seem stable over time, in line with evidence by Benartzi et al. (2010) using US IPO data. While Benartzi et al. (2010) show that average US IPO prices have stayed between $10 and $25 since 1933, the dispersion of average IPO prices is slightly higher in Europe. In Germany and France, average IPO prices have fluctuated between €14 and €40 and in the UK from £0.9 to £4.0. The time series employed in this thesis is admittedly short, so the only conclusion that can be drawn from the development of average IPO prices is that there does not seem to be a clear trend upwards. Thus average IPO prices are either rigid, or edging slightly downwards. The results shown in Figure 3 are qualitatively similar when extended to the other sample countries.

Figure 3: Average IPO prices over time

This figure shows the development of average nominal IPO offer prices over time in France (long dash), Germany (solid) and UK (short dash). Averages are non-winsorised and rebased at 100 in 1995. 1994 is not included because the low number of IPOs in that year.

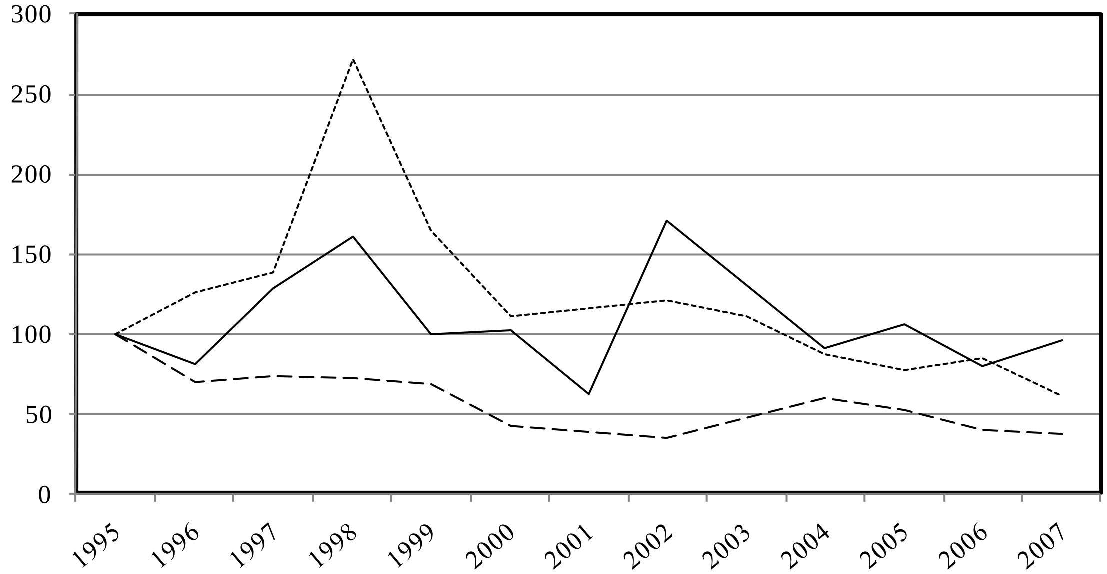


Table 4 reports the number of splits by market area. Not surprisingly most of the splitting firms come from France, Germany and UK, who together represent 60% of the total. The bottom four countries (Austria, Portugal, Belgium and Italy) together represent only 10.7% of the total. The low proportion of the sample made up by UK firms (21.2%) is slightly surprising compared to its proportion of total firm years (36.9%). Accordingly, splitting activity in the UK is in the low-end of the sampled countries at 1.5% in an average year. The UK is at odds with the rest of the sample also in terms of the peak year which happens in 1987. Although not reported in Table 4, splits are also more evenly distributed than in most countries as the peak year represents only 9.9% of the total number of splits. The sample of Kalotychou et al. (2009) of UK splits between 1990 and 2007 with split factors above 2-for-1 portrays a similar distribution; splits are evenly distributed with higher frequencies during the 1990s with activity slowing significantly in the 2000s. One contributing factor to the low splitting activity may be the relatively low average share price in the UK (compared to other countries in euro terms), which may arise from the quoting of shares in 1/100ths of the unit of legal tender. Since stock prices are on average much lower than in the rest of the sample in euro terms, managers of UK companies may therefore need to consider their shares' marketability less than managers in other countries. As for the other countries, it is unsurprising that the peak year in the absolute number of splits happens during "hot" asset markets in 1999-2000 and 2006-2007. In addition to the UK, Finland and the Netherlands are the exceptions to this rule with peak years in 2004 and 1997 respectively.

Table 4: Number of splits and IPOs by market area

This table reports the number of splits and IPOs by market area. % of total sample is the country's fraction of the sample of splits and IPOs. Average % of firms splitting per year is the average proportion of firms splitting in a particular market in an average calendar year over. Peak year is the calendar year when the number of splits or IPOs in a particular market reached its maximum.

	Total number		% of total sample		% of firms splitting per year	Peak year	
Market	Splits	IPOs	Splits	IPOs		Splits	IPOs
Austria	36	15	2.0 %	1.6 %	1.4 %	2007	2000
Belgium	50	17	2.8 %	1.9 %	1.5 %	1999	1999/2005/2006
Denmark	131	24	7.3 %	2.6 %	2.6 %	2000	2000
Finland	91	14	5.0 %	1.5 %	3.2 %	2004	1999
France	323	129	17.9 %	14.1 %	1.5 %	2000	2000
Germany	375	299	20.8 %	32.6 %	2.1 %	1999	2000
Italy	66	95	3.7 %	10.4 %	1.6 %	2000	2000
Netherlands	129	17	7.2 %	1.9 %	3.3 %	1997	1999
Portugal	40	12	2.2 %	1.3 %	2.2 %	2000	2000
Sweden	180	21	10.0 %	2.3 %	2.4 %	2006	2000
UK	382	274	21.2 %	29.9 %	1.5 %	1987	2005
Total	1803	917	100.0 %	100.0 %	2.0 %	2000	2000

Table 4 also reports the distribution of IPOs by market area. As expected the largest three countries by firm-years also lead the sample of IPOs. France, Germany and UK account for more than three quarters of all IPOs. Even more clearly than with splits, IPO activity seems to peak with hot asset markets. All countries have their sample peak year either during the 1999-2000 "dot-com bubble" or in 2005-2006 preceding the "credit crunch". The evidence is consistent with previous empirical work by e.g. Ritter and Welch (2002) and Pástor and Veronesi (2005) who find that market conditions are the most important determinant of a firm's decision to go public. Accordingly, high IPO volumes are preceded by high market returns and followed by low market returns. It should be noted that the sample size is downward biased because of the lack of financial data for some companies on the Thomson databases. For instance Aussenegg et al. (2008) report 158 and 147 IPOs on the Frankfurt Neuer Markt and Amtlicher Handel in 1999 and 2000 respectively, compared to the 82 (1999) and 84 (2000) IPOs in my sample. Most of the gaps in data are probably due to the multitude of small companies listing during the “dot-com bubble” that were acquired or de-listed for other reasons after existing as listed companies only for a short period. Such companies might be less than perfectly documented on the used databases. The sample is therefore likely to be biased upward in terms of the size of the listing companies. This seems to be the case as will be discussed later. In terms of norms, companies aligning their share price with the lowest size quintiles should thus be underrepresented.

Table 5 reports the division of the sample of splits and IPOs according to industry. I use the Kenneth French 30-industry classification in all regression specifications. The sampled firms are divided into industry categories based on their four-digit standard industrial classification (SIC) code and then matched with the Kenneth French 30-industry SIC definitions. I first experimented with the 17-industry classification, which does not make a distinction between the different service industries. This leads to a disproportionally large “Other” industry category which absorbs companies from the entertainment industries to business services and computer hardware. Since comparing firms in, for instance, the restaurants and lodging business to computer hardware companies is meaningless, it is important to separate the service industries in a more meaningful way to determine the importance of industry norms in choosing the nominal share price.

Table 5: Number of splits and IPOs by industry

This table reports the number of splits and IPOs by industry. % of total is the industry's fraction of the total number of splits, IPOs and firm years. Peak year is the calendar year when the number of splits or IPOs in a particular industry reached a maximum. Peak year of total is the number of splits of IPOs during the peak year divided by the industry total. Classification is according to the Kenneth French 30-industry classification.

	Total number		% of total			Peak year of total	
Industry	Splits	IPOs	Splits	IPOs	Firm-years	Splits	IPOs
Aircraft, ships and rail	12	4	0.7 %	0.4 %	0.7 %	25 %	50 %
Alcohol	22	4	1.2 %	0.4 %	1.2 %	18 %	25 %
Apparel	32	11	1.8 %	1.2 %	2.1 %	22 %	18 %
Automobiles	54	10	3.0 %	1.1 %	2.3 %	13 %	20 %
Business equipment	127	88	7.0 %	9.6 %	6.7 %	32 %	24 %
Business supplies	39	5	2.2 %	0.5 %	2.3 %	10 %	20 %
Chemicals	37	15	2.1 %	1.6 %	2.0 %	14 %	33 %
Coal	0	2	0.0 %	0.2 %	0.1 %	0 %	50 %
Communication	35	45	1.9 %	4.9 %	2.4 %	23 %	31 %
Construction	127	31	7.0 %	3.4 %	6.5 %	10 %	23 %
Consumer goods	37	18	2.1 %	2.0 %	2.1 %	11 %	28 %
Electrical equipment	21	10	1.2 %	1.1 %	1.5 %	14 %	30 %
Financials	238	64	13.2 %	7.0 %	15.2 %	11 %	22 %
Food products	58	8	3.2 %	0.9 %	3.2 %	10 %	13 %
Machinery	92	37	5.1 %	4.0 %	4.8 %	14 %	19 %
Metals and mining	12	13	0.7 %	1.4 %	1.5 %	17 %	38 %
Other	5	1	0.3 %	0.1 %	0.3 %	20 %	100 %
Personal and business services	243	260	13.5 %	28.4 %	14.0 %	23 %	34 %
Petroleum and natural gas	21	24	1.2 %	2.6 %	1.6 %	24 %	29 %
Pharmaceuticals	85	83	4.7 %	9.1 %	4.0 %	13 %	18 %
Printing and Publishing	46	16	2.6 %	1.7 %	2.0 %	11 %	25 %
Recreation	49	51	2.7 %	5.6 %	3.2 %	20 %	31 %
Restaurants and lodging	32	3	1.8 %	0.3 %	1.5 %	16 %	33 %
Retail	111	29	6.2 %	3.2 %	4.2 %	11 %	21 %
Steel	27	5	1.5 %	0.5 %	1.3 %	22 %	40 %
Textiles	19	4	1.1 %	0.4 %	1.3 %	16 %	25 %
Tobacco	2	0	0.1 %	0.0 %	0.0 %	50 %	0 %
Transportation	61	26	3.4 %	2.8 %	3.3 %	15 %	23 %
Utilities	28	28	1.6 %	3.1 %	2.0 %	11 %	25 %
Wholesale	131	22	7.3 %	2.4 %	6.7 %	10 %	32 %

Lakonishok and Lev (1987) examine the industry concentration in their sample of 1,015 splits in the US and detect no concentration in any particular industry. My sample also shows a strikingly even distribution of splits between the 30 industries, compared to the total number of firm years each industry represents in the sample. The largest absolute percentage differences between the proportion of total splits and firm years in the sample are two percentage points in both the “Financials” (underrepresented) and “Retail” (overrepresented) industries. The industry distribution of splits through time, not reported here, shows that splits in industries like “Financials”, “Personal and business services” and “Business equipment” tend to occur in waves. They represent a high proportion of all splits during hot asset markets. On the other hand, defensive industries such as “Pharmaceuticals”, “Transportation” and “Alcohol” represent a higher proportion of splits during periods of low asset returns. Most other industries represent a more or less constant proportion of the sample of splits through time. I control for industry effects in all regression specifications.

For IPOs the distribution compared to the number of firm years is more uneven. The advance of technology through my sample period is reflected in the relatively large proportion of IPOs represented by the “Business equipment”, “Communication” and “Personal and business services” industries. The industries include computer hardware, mobile telecommunication and computer software companies respectively. The European evidence is consistent with the US: Ritter (2002) reports that the percentage of IPOs represented by technology firms increased from about 25 percent in the 1980s to a striking 72 percent during the “dot-com bubble”. Although it is difficult to pinpoint the exact reasons why some industries have produced more new listings than others during the sample period, it may be that he “Pharmaceuticals” industry has benefited from the distribution of drugs online, while the gaming sector has boosted the “Recreation” industry. It should be noted that the proportion of the sample of firm years represented by each industry reported in is calculated for the period from 1/1980 to 12/2008. The distribution of firm years in the IPO sample sub-period 1/1994 to 12/2007 gives similar results, although technology sectors have slightly higher weightings.

Table 6 reports sample statistics related to the size of splitting and listing firms throughout the sample period for each country. Splitting firms tend to be much larger than the typical firms in their home markets in terms of the market value of equity, similarly to the sample of Lakonishok and Lev (1987). In all markets, less than one-eighth of splitting firms are in the bottom market value quintile and at least three-tenths in the top quintile. This is expected as splitting firms tend to experience unusually high earnings growth in the years leading up to the split and therefore receive higher valuations than their non-splitting peer firms. Given the well-documented positive correlation between firm size and share price, it should follow that splitting firms choose, on average, higher share prices than the firms in their industry and market peer groups.

Table 6: Splits and IPOs by size quintiles and country

This table reports the proportion of splits (Panel A) and IPOs (Panel B) by size quintile and country. For splitting firms the size quintile is determined based on the company's market capitalisation at the end of the year prior to the split. For IPOs the size quintile is determined according to the company's market value five trading days after the IPO. The market value is compared to the market values of all other companies in the company's home market at the end of the year prior to the split/IPO. Median size is reported in millions.

	Median size		Quintile				
Country	All firms	Splitting / IPO firms	1	2	3	4	5
Panel A: Splits							
Austria	71.25	286.15	2.8 %	5.6 %	16.7 %	33.3 %	41.7 %
Belgium	43.89	280.43	6.0 %	4.0 %	10.0 %	38.0 %	42.0 %
Denmark	36.76	157.78	8.4 %	12.2 %	19.8 %	20.6 %	38.9 %
Finland	96.88	212.61	6.6 %	17.6 %	24.2 %	18.7 %	33.0 %
France	56.24	306.15	5.3 %	9.9 %	14.2 %	27.6 %	43.0 %
Germany	69.40	216.16	10.4 %	17.1 %	18.1 %	21.6 %	32.8 %
Italy	158.02	273.46	10.6 %	9.1 %	19.7 %	30.3 %	30.3 %
Netherlands	88.98	326.60	9.3 %	13.2 %	20.9 %	17.8 %	38.8 %
Portugal	81.00	310.28	12.5 %	0.0 %	17.5 %	30.0 %	40.0 %
Sweden	36.07	151.43	7.8 %	14.4 %	15.0 %	25.6 %	37.2 %
UK	44.40	202.53	3.9 %	10.2 %	9.2 %	23.8 %	52.9 %
Panel B: IPOs							
Austria	80.84	347.11	0.0 %	0.0 %	20.0 %	40.0 %	40.0 %
Belgium	50.88	144.34	0.0 %	11.8 %	35.3 %	29.4 %	23.5 %
Denmark	45.32	121.00	0.0 %	8.3 %	16.7 %	41.7 %	33.3 %
Finland	102.25	302.47	0.0 %	7.1 %	35.7 %	21.4 %	35.7 %
France	50.45	144.36	0.8 %	7.0 %	26.4 %	41.1 %	24.8 %
Germany	62.59	192.52	0.3 %	12.7 %	30.4 %	39.8 %	16.7 %
Italy	214.60	357.26	7.4 %	22.1 %	31.6 %	27.4 %	11.6 %
Netherlands	158.02	479.22	5.9 %	23.5 %	5.9 %	41.2 %	23.5 %
Portugal	83.20	965.74	0.0 %	0.0 %	0.0 %	25.0 %	75.0 %
Sweden	44.78	249.33	0.0 %	4.8 %	9.5 %	47.6 %	38.1 %
UK	53.50	92.43	0.0 %	10.2 %	41.6 %	30.3 %	17.9 %

IPO firms in Europe also seem to be significantly larger than their market median firms. This evidence is somewhat different from the US. For instance Benartzi et al. (2010) find only 25% of listing firms have market values in the top two quintiles, compared to my sample where the significant majority of listing firms fall in the top two quintiles. In Europe, especially in the continent, the dynamic of the market for new listings has historically been different from that of the US. Jenkinson and Ljungqvist (2001) note that until the 1999-2000 stock market bubble, continental European IPOs usually involved mostly old, large, well established companies rather than start-ups in risky new sectors. At a median age of 50 years they were also much older than their US counterparts. Compared to the US, a much higher proportion of continental European IPOs also involve family- or state-owned enterprises that tend to be old and large. The UK new issue market is most alike with its US counterpart, and accordingly the UK has the highest proportion of IPOs in the middle quintile. As with splits, the relatively large size of listing firms predicts an above-market-average nominal share price chosen at IPO.

Small companies might also simply be underrepresented in the IPO sample due to the less complete documentation of small companies in the databases employed, as discussed earlier in the context of possible data limitations. I control for the effects of company size in the context of robustness checks.

Table 7 reports the correlations of my independent OLS regression variables. In addition to the main explanatory variables I also include the industry controls for splits and IPOs and country controls for splits. Results for splits are similar in the panel data sample used in the probit regression and therefore not reported explicitly.

Table 7: Correlation matrix of independent OLS regression variables

This table reports the correlation coefficients for the independent variables of my regression specifications for the samples of splits (Panel A) and IPOs (Panel B). The independent variables specified as described earlier in this section. Industry and country variables are dummies.

Variable	1	2	3	4	5	6	7	8
Panel A. Splits								
1 Distance to market norms price	1.00							
2 Distance to industry group norms price	0.82	1.00						
3 Distance to size group norms price	0.80	0.67	1.00					
4 Low-price premium	0.04	0.00	0.03	1.00				
5 Small-stock premium	0.07	0.01	0.04	0.65	1.00			
6 Average ex-date abnormal returns	-0.12	-0.09	-0.10	0.08	0.13	1.00		
7 Country	0.11	0.08	0.09	0.10	0.26	0.10	1.00	
8 Industry	-0.04	-0.01	-0.01	0.05	0.03	-0.01	0.06	1.00
Panel B. IPOs								
1 Market norms price	1.00							
2 Industry group norms price	0.59	1.00						
3 Size group norms price	0.96	0.57	1.00					
4 Low-price premium	-0.30	-0.08	-0.28	1.00				
5 Small-stock premium	-0.42	-0.21	-0.40	0.80	1.00			
6 Average ex-date abnormal returns	-0.12	-0.07	-0.13	0.07	0.11	1.00		
7 Industry group norms price	0.00	-0.01	0.00	0.00	0.01	-0.01	1.00	

The strong positive correlations among the norms variables and the catering variables are likely to cause interference in the pooled regressions using the full model, causing unsustainably high levels of multicollinearity. I tackle the problem of correlated independent variables in three ways. First, I run univariate tests for each independent variable in both the split and IPO regressions. Second, I test for changes in the predictive power of the regressions when a correlated variable is excluded. Third, I run the main regressions with two different specifications. The first specification omits the industry and size group norms variables and employs only the market norms variable, while the second specification omits the market norms variable from the regression, leaving in only the two least correlated norms variables.

Table 8 shows the effect of the modified regression specification on multicollinearity in the price chosen at IPO OLS regression. In the "All norms" specification the variance inflation factor (VIF) statistics for all norms variables are above 5 and the size group and market norms prices are above 10, the threshold for high multicollinearity according to Baum (2006).

Using the modified "Market norms" and "Size and industry norms" specifications reduces the maximum VIF in the regression specifications below 5. For the split regressions the individual VIFs are below 5 in the "All norms" specification", but I nevertheless study all three specifications also in the context of splits. I will report the results for each of the regression specifications in the results section, but the reader should keep in mind that the coefficients in the presence of multicollinearity may be subject to bias.

Since I am examining the effects of annually-determined time-varying catering incentives, I use robust cluster estimation of standard errors in the OLS regression specifications. Since the catering variables receive annual values they build clusters, reducing the standard deviation of the estimator. To tackle the problem, robust cluster estimation is used whenever catering variables are included in the regression specifications. The modified regression specifications and the use of robust clustering of standard errors also reduce the level of heteroskedasticity in the OLS models to sustainable levels.

Table 8: VIF statistics for different regression specifications for price chosen at IPO

This table presents the VIF statistics for the explanatory variables used in the OLS regression model for price chosen at IPO with three different regression specifications. In the 'All norms' specification all three norms variables (size, industry and market) are included. In the 'Market norms' specification the only norms variable included is the market norms price. In the 'Size and industry norms' specification only the size and industry norms variables are included.

	Variance inflation factor		
Variable	All norms	Market norms	Size and industry norms
Market norms price	15.19	1.22	
Industry group norms price	6.05		4.66
Size group norms price	11.56		4.54
Low-price premium	2.75	2.60	2.75
Small-stock premium	2.97	2.83	2.96
Average ex-date abnormal returns	1.06	1.05	1.06

5 RESULTS

This section presents the results of my thesis. First, I discuss the evidence relating to nominal and real share price levels in Europe over time. In addition to studying the development of share price levels through the whole sample period, I split the sample into pre-euro and post-euro sub-periods to study the effect of the currency change. I move on to examine the results of the main models predicting the price chosen at IPO and post split. Finally, I study the effect of norms and catering variables on the propensity to split. In conjunction with each section, I analyze the implications of the results.

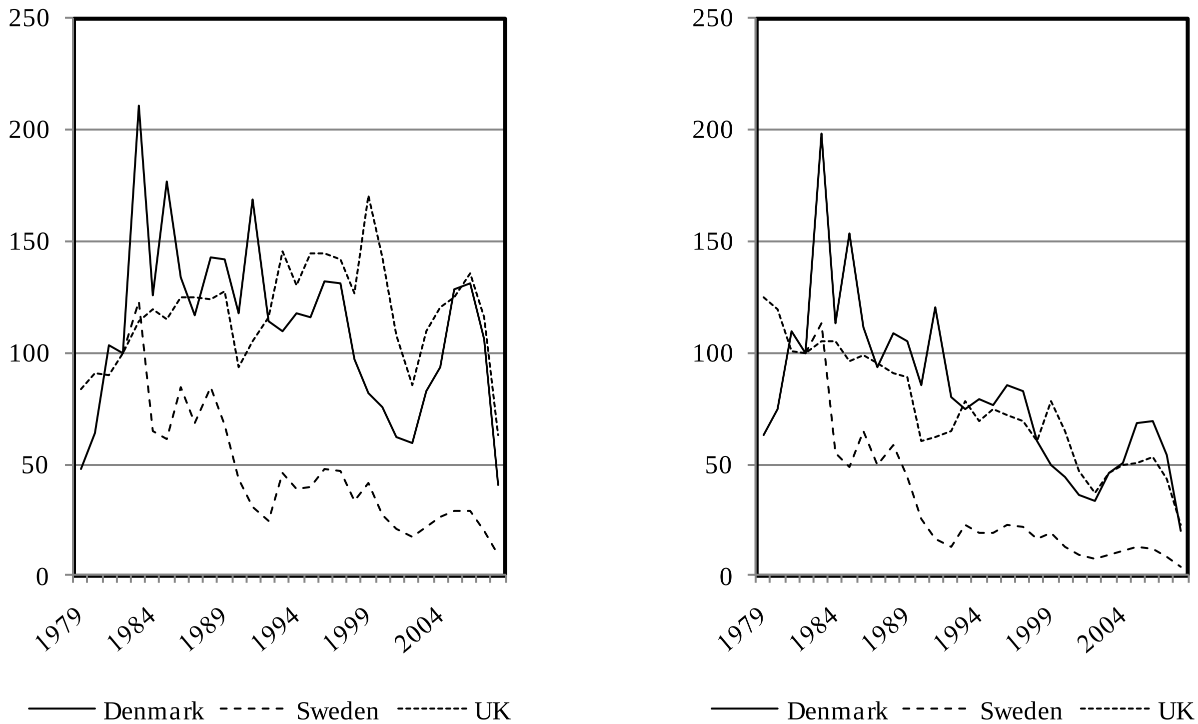
5.1 Share price level results

Figure 4 shows the development of nominal and real share prices in the three non-euro sample countries. The most obvious finding is that nominal share prices have not increased over the period in any of the three countries. Although variability around the base year (1982) value of 100 is high, there is no conceivable upward trend. Further, consistent with the hypothesis of decreasing real share prices (H1), real average share prices have a clearly decreasing trend in all three countries. The evidence on the hypothesis of rigid nominal share prices (H2) is mixed. The hypothesis predicts an approximately constant level of average nominal share prices over time. Behavior of share prices in Denmark and the UK are slightly supportive of this hypothesis, while evidence from Sweden is not. Nominal share price levels have remained approximately constant in Denmark and the UK over the whole sample period, but in Sweden there is a clear downward trend in nominal share prices.

The time series employed is admittedly short and the variation in nominal prices relatively high, making it difficult to confirm the existence of a nominal share price norm. As for the annual variance in the price level, it is similar or slightly higher to the variance of US nominal share price levels as reported by Benartzi et al. (2010). In their sample of US stocks the equal-weighted average nominal share price oscillates between $15 and $35 during 1979-2005. Rebased to 100 in 1979 this variation in the average nominal price translates to a variance between approximately 60 and 140, slightly lower than in Denmark and the UK.

Figure 4: Average share price levels in non-euro countries

This figure shows the nominal (left panel) and real (right panel) average share prices in the three non-euro sample countries throughout the sample period. Annual averages are calculated using year-end prices, winsorised at 10%. Nominal and real prices are rebased at 100 in 1982.

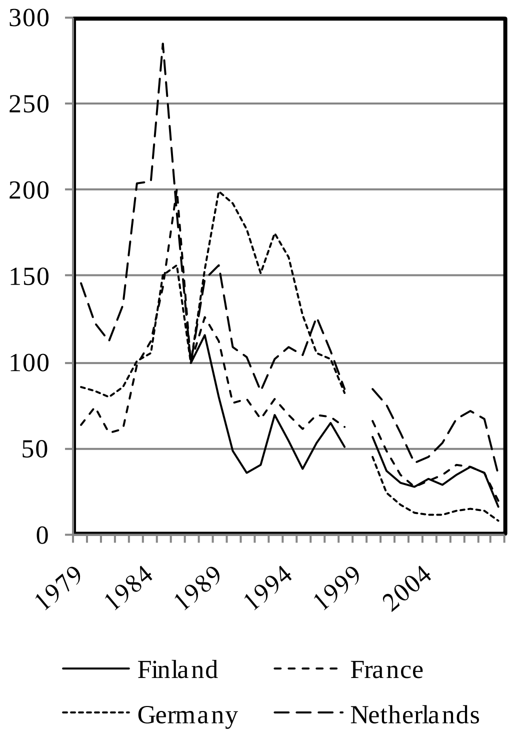


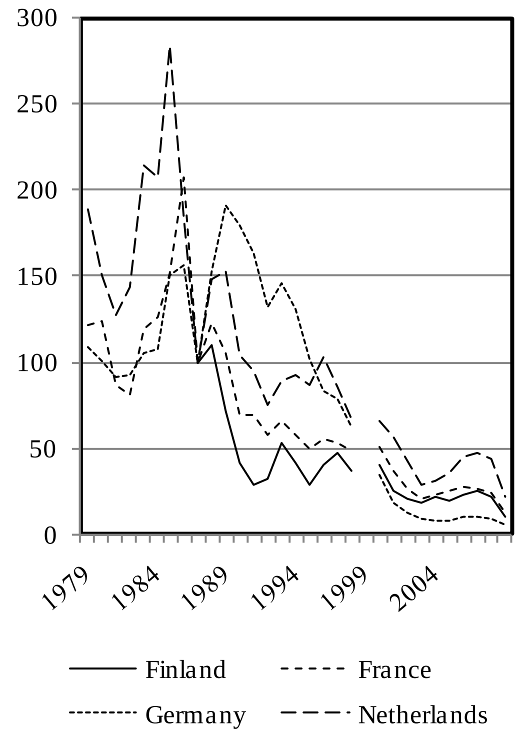
It is puzzling why nominal prices in Sweden are consistently decreasing. Given the strong documented correlation between firm size and share price, the falling prices could potentially be explained by a decreasing trend in average firm size. Although time-varying changes in the size-composition of companies in the sample explain some of the year-to-year variance in average share price level in Sweden, the downward trend remains unexplained: firm size has remained approximately constant over time both in nominal and real terms. Further compounding the puzzle of declining nominal share prices in Sweden is the similar evidence reported by Burnie et al. (2010) who study Swedish nominal share price levels from 1950 to 2009. The authors find that nominal share prices are not only decreasing in general, but the trend is independent of the nominal price quartile: average nominal prices are decreasing both in the top and bottom nominal price quartiles. The trend is also monotonous between time periods. Average nominal price in their sample decreases from the range of SEK 200 to 500 during the 1960s and 1970s to the range of SEK 90 to 340 during the 1980s and 1990s and the range of SEK 40 to 110 during the 2000s.

Figure 5 shows the development of nominal and real share prices in those euro countries with the highest exchange rates against the euro at 01/1999. The findings regarding the hypothesis of decreasing real share prices (H1) is similar to the evidence found for the non-euro countries: real share prices are clearly trending downwards throughout the sample period.

Figure 5: Average share price levels in high euro exchange rate countries

This figure shows the nominal (left panel) and real (right panel) average share prices in Finland, France, Germany and the Netherlands throughout the sample period. Annual averages are calculated using year-end prices, winsorised at 10%. Nominal and real prices are rebased at 100 in 1987.





None of the country-specific average nominal prices portray signs of an increasing trend in nominal share prices. Still, evidence regarding the hypothesis of rigid nominal share prices (H2) is difficult to interpret due to the high year-to-year variance of share prices and the short sample period. There seems to be some evidence, although weak, suggesting that nominal share price levels oscillate around a norms price. It is worth noting that in all of these four euro countries nominal price levels have oscillated close to their 1987 prices for most of the 1980s and 1990s, reaching their country-specific sample period lows in the few years after the introduction of the euro in 1999 and staying below the pre-euro levels thereafter.

The pattern in nominal share prices around 1999 is slightly supportive of the hypothesis of a change in share price norms caused by the introduction of the euro (H3). Taking into account the hot stock market of 1999 and the high country specific returns[6], it is striking that the nominal share price level was approximately the same or lower in all countries in the end of 1999 compared to end of year 1998. Neither can the fall in nominal share prices be attributed to a flood of IPOs at lower-than-average nominal share prices: in Finland and Netherlands the average IPO in 1999 fetched a price above the market median price in 5 trading days after the listing. In France and Germany the average IPO was priced slightly lower than the median stock 5 days after the listing, but the 11% and 28% discounts to market median price respectively do not explain the development of average share prices.[7] What is more, the median size of sampled companies increased in all countries from 1998 to 1999, implying that a fall in the size of the companies listed on the sampled exchanges cannot explain the change in nominal price levels. Finally, the behavior of nominal share prices in 1999 is peculiar compared to the next period of high stock market returns in 2006 to 2007, preceding the credit crunch. In this period the nominal share price level edged upwards in all four countries, responding to market-wide returns. Why this did not happen in 1999 may be explained by a switch in norms caused by the introduction of the euro.

Why nominal share price norms would have switched downwards instead of upwards is a question left unanswered. The introduction of the euro already caused a downward switch in the denomination of shares in all of the countries in my sample (sovereign exchange rates against the euro were below 1 for all countries as reported in Table 1). There is no clear trend

[6] Stock market returns, including dividends, in 1999 were 97%, 55%, 39% and 27% in Finland, France, Germany and Netherlands respectively.

[7] Still, it may be that due to data limitations I am unable to observe especially IPOs of those companies that only existed for a short period of time. The period was characterised by a magnitude of low-capitalisation internet stocks listing at an opportunistic time to reap the full benefits of the “dot-com bubble”.

in the post-euro nominal price level between countries either. The average share price levels in Finland, Germany and the Netherlands have settled between €10 and €20, while in France prices have oscillated between €20 and €50 since 1999.

Figure 6 shows the average nominal share price in Finland from 1912 to 2008. It is easy to see why the short time series makes the detection of a nominal share price norm difficult. The two years in which the average share price in Finland is at an unusually high level coincide with the first two years of my sample. With the exception of these two years (1987-1988), it seems that a share price norm in fact may have existed in Finland from the 1950s until the late 1990s. At the least it can be concluded with significantly increased certainty that the introduction of the euro caused a shift in share price norms. The average nominal share price level is below the 1950-1998 share price level in each of the ten years since 1999.

Figure 6: Average nominal share price level in Finland, 1912-2008

This figure shows the average nominal share price in Finland from 1912 to 1970 and from 1987 to 2008. Averages are calculated using year-end prices, winsorised at 10%. Prices are in euro, with pre-1999 prices translated to euro at the 01/1999 fixed exchange rate. Pre-1963 prices are divided by 100 due to a 100-to-1 adjustment in the value of the Finnish markka in 1963. Data is courtesy of Peter Nyberg.

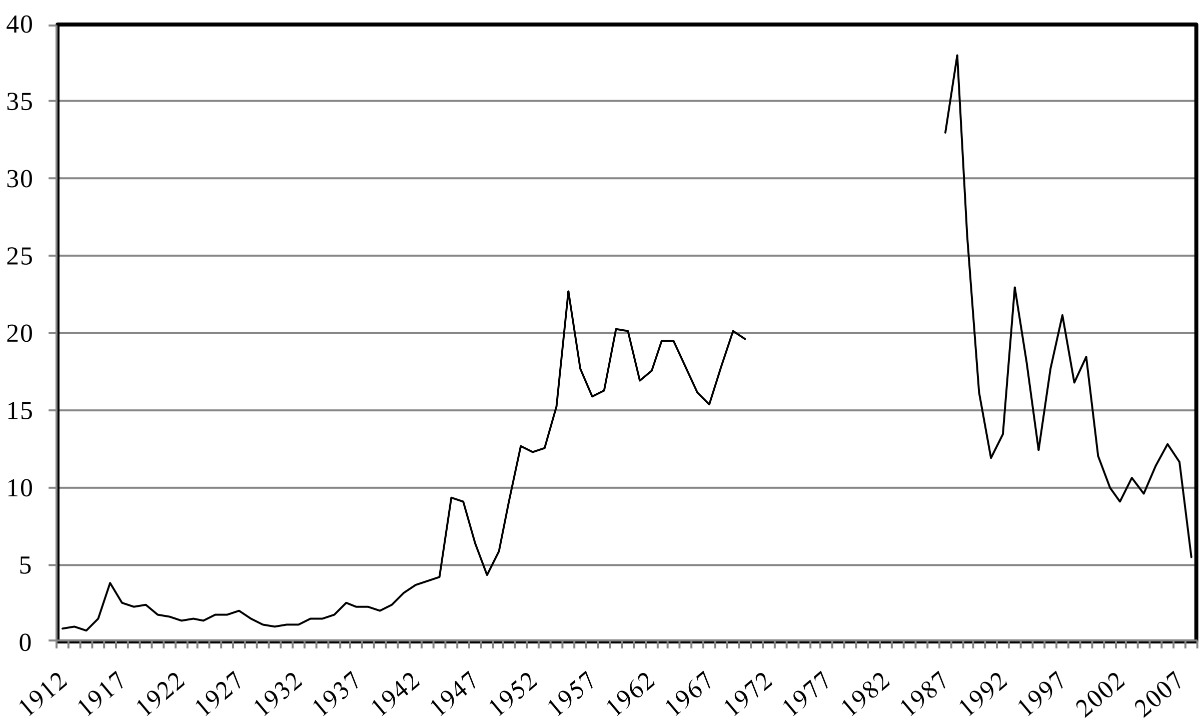
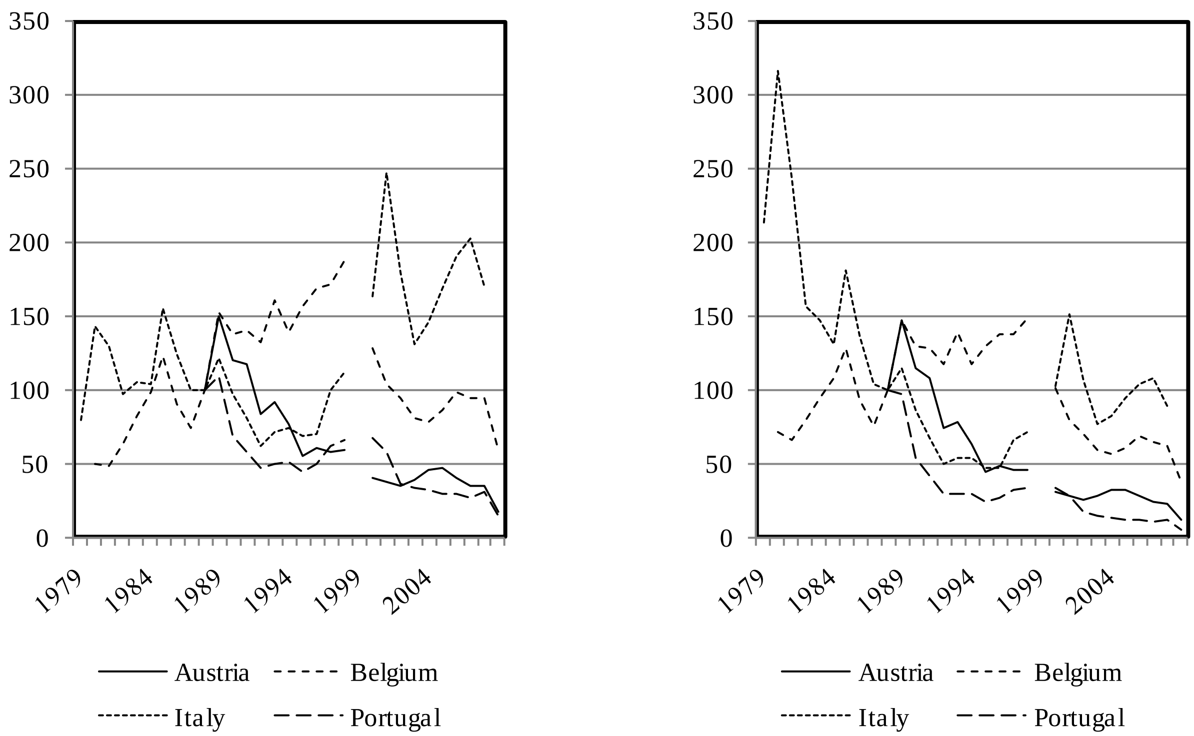


Figure 7 shows the average nominal and real share prices in the four countries with the weakest exchange rates against the euro at 01/1999. The evidence regarding the hypothesis of decreasing real share prices (H1) is further accumulated, as real share prices mostly exhibit a clearly downward edging trend throughout the sample period. The exception to this rule is Belgium, where real share prices seem to trend slightly upwards in the pre-euro period. Investigating the Belgian share price data more closely, the slightly increasing real prices and the clearly increasing nominal prices in the pre-euro period are not robust to median prices, which alleviate the effect of a wide dispersion of nominal prices and a relatively large proportion of expensive stocks.

Figure 7: Average share price levels in low euro exchange rate countries

This figure shows the nominal (left panel) and real (right panel) average share prices in Austria, Belgium, Italy and Portugal throughout the sample period. Annual averages are calculated using year-end prices, winsorised at 10%. Nominal and real prices are rebased at 100 in 1988.



For these four countries, nominal share prices show the most convincing rigidity in the period leading up to the adoption of the euro, in terms of the range around the rebased share prices in which nominal prices oscillate. Nominal prices stay for the most part approximately within 50% of the 1988 price, with the exception of Belgium toward 1999. Although any meaningful conclusions about the hypothesis of rigid nominal share prices (H2) are difficult to establish, the trend that can be interpreted from Figure 7, if any, is a stationary one.

After 1999, share prices in Austria, Belgium and Portugal fall clearly below the pre-euro levels. If a share price norm exists in these countries, there seems to be a shift downwards in the share price level caused by the adoption of the euro. As with the high euro exchange rate countries, compared to stock market returns in 1999, the fall in share price levels seems unwarranted.[8] The median size of companies increased in all countries during 1999, which should lead to higher nominal share price levels as discussed previously, all else equal. Prices of IPOs in 1999 do not explain the abrupt fall in share prices as they were mostly priced at or above the market median price.[9] Further compounding the evidence for a shift in norms is the behavior of nominal share prices during the next period of high stock returns in 2006 and 2007, when nominal share prices exhibit an increasing or stationary trend in all countries.

In Italy, where prices show the most convincing rigidity before the euro, a jump in prices is observed in 1999 after which a new average share price level seems to be established. The jump of 45% in nominal share prices in 1999 is significantly above the 25% return on the Italian stock market during the same period. New listings during 1999 were also made at a significant price premium to the market median price; IPO prices averaged 220% above the market median price at the beginning of the year.

The evidence is somewhat supportive of the hypothesis of a change in norms caused by the euro (H3). Puzzling changes in nominal share price levels are documented for each country around the 1999 adoption of the euro. Still, it remains a mystery why share prices in Italy

[8] Stock market returns, including dividends, in 1999 were 8%, -9% and 7% for Austria, Belgium and Portugal respectively.

[9] In Belgium there were three IPOs in 1999, listing at a price of 20-35% compared to the market median price. The effect on the nominal share price level was, however, negligible because of the low number of IPOs. Again, it should be noted that data limitations may bias the average listing prices upward.

would increase significantly while share prices in other countries fell. Perhaps this has to do with the fact that nominal share prices in terms of euro had been in the range of €2 to €7 between 1980 and 1998, perhaps too low a norms level for nominal share prices. At least lower than in any of the other euro countries. Again, there seems to be no trend between countries in the levels to which nominal share prices have settled post-euro. In Italy and Portugal shares now trade between €5 and €10 on average. In Austria and Belgium the share price norm is well above €50.

To conclude, it seems that the time series is indeed too short to make conclusive inferences from the share price level results. The results do, however, point to the expected direction. Future analysis of longer time series should confirm the existence of market-wide nominal share price norms in Europe. Based on the preceding analysis it can be concluded with sufficient certainty that real share prices are indeed decreasing over time. The analysis of share price levels in around the euro adoption will be made more complete by investigating the full population of IPOs during 1999. If no new information about listing prices is uncovered, it can be concluded that the euro adoption did indeed have an impact on nominal share price levels.

5.2 Price chosen by management at split

Table 9 reports the OLS regression results for the price targeted at stock split. I first perform univariate regressions separately for each explanatory variable, and report the coefficients in the first column. I then move on to run the full specification regression and the two alternative specifications described earlier in the context of norms-related multicollinearity. Finally, after documenting that average ex-date returns are insignificant in all specifications and noting that the inclusion of the average ex-date return variable reduces the sample size by more than 100 observations, I run the different specifications again without the average ex-date returns variable.

First, the splitting firm's distance from the market, size group and industry norms prices seem to positively affect the magnitude of the price adjustment. This finding is statistically significant at the 1% level and consistent with the hypothesis that share price chosen at split is dependent on norms prices (H5). It seems that the market norms variable captures the explanatory power of the size and industry group norms variables in the full specification where all three norms variables are included. In fact, market norms seem to be the key driver determining post-split prices, based on the univariate test results and the slightly higher explanatory power of the "market norms" specification over the "size and industry norms" specification. Running the models without any norms variables reveals that market norms explain up to 33% of the variation in the dependent variable, compared to 29% for size and industry group norms combined. Specifically, I find that a one percent increase in the distance to the market norms price results in approximately 0.94% higher split adjustment in the "market norms" model. In the "size and industry norms" model a one percent change in the distance from the size group norms (industry norms) price leads to a 0.46% (0.52%) increase in the split adjustment. The findings are consistent and of the same sign with Benartzi et al. (2010) and Lakonishok and Lev (1987), who study the effects of size and industry group norms, and market norms, respectively.

Somewhat unsurprisingly I document an insignificant relationship between the split adjustment and the small-stock premium. In fact, all catering variables receive insignificant coefficients in univariate and full specification tests. The result is contrary to that of Baker et al. (2008) who report a positive and statistically significant sign in post-split price regressions. The result is inconsistent with the hypothesis that catering incentives are positively correlated with the split factor chosen by management (H7).

When I exclude the average ex-date return proxy from the regressions the sample sizes increase slightly. As most of the years with no average ex-date return data fall in the early 1980s, the resulting sample is more representative of also the early sample period. The results with a higher sample size stay essentially the same. No significant changes are noticed, although the explanatory power of the models is slightly increased.

Some of the country controls receive significant signs. The country dummy for Belgium receives a positive and statistically significant sign consistent with the evidence reviewed earlier that split factors are on average highest in Belgium. Finland, Italy, Portugal, Sweden and UK receive negative and statistically significant signs, also in line with evidence on the magnitude of the average split factor: the five countries have the lowest average split factors. No industry dummy has a statistically significant sign, in line with previous evidence that splitting firms are not characterised by any significant industry-related factors.

5.3 Price chosen by management at IPO

Table 10 reports the OLS regression results for the price targeted at IPO. In addition to testing the explanatory power of norms and catering incentives on the closing price 5 trading days after the IPO, I carry out identical regressions using the offer price as the dependent variable to see if differences persist between the two specifications. As with splits, I first perform univariate tests on each of the independent variables separately. I then move on to run the three different norms specifications both with the post-IPO price and offer price as the dependent variable.

The first thing to note is that, analogous to the split tests, the IPO regressions imply that market, size group and industry norms positively affect the price chosen by listing firms. The finding is significant at the 1% level and supports the hypothesis that firms that actively choose their share price align that price with the norms price (H5). Contrary to splits, the "size and industry norms" specification has better explanatory power than the "market norms" specification, and especially the size norms variable seems to absorb the explanatory power of the market norms variable in the full specification. It also absorbs the effect of industry norms in the "size and industry norms" specification. Running the models without any norms variables and comparing the r-squared to the full closing price specifications reveals that size and industry norms explain up to 45% of the variation in log IPO prices while market norms explain 40%. The results imply that a one percent increase in the size group norms price leads to a 0.67% increase in the IPO price. In the "market norms" model a one percent increase in the market norms price leads to a 0.68% increase in the IPO price.

Finally, it should be noted that the industry group norms price is only significant at the 1% level in the univariate regressions and at the 5% level in the full specification, while the size group norms price is very strongly significant at the 1% level. This implies that size group norms price may be the strongest norms reference point to listing firms.

The small-stock premium and average ex-date return proxies are insignificant in the multivariate specifications. The small-stock premium is of the right sign and significant at the 1% level in univariate regressions. Of the right sign because from the catering hypothesis it follows that when small-capitalization stocks are favored by investors (high small-stock premium), managers may wish to appear to be small-capitalization stocks by choosing a lower share price. The strong significance of the small-stock premium in univariate tests and the high correlation with the low-price premium (0.794) suggests that the low-price premium may be capturing part of the explanatory power of the small-stock premium in the multivariate specifications. Indeed, when I exclude the low-price premium from the multivariate regressions (results not reported), the small-stock premium becomes significant at the 1% level in all specifications. Testing the models separately with the low-price premium and the small-stock premium, I find that the low-price premium model receives a consistently higher r-squared.

Further supporting the hypothesis that the IPO prices are dependent on the magnitude of time-varying catering incentives (H7) is the significant low-price premium. Consistent with the results of Baker et al. (2008), when low-priced stocks are more preferred by investors, firms choose to list at a lower price. A one percent increase in the low-price premium leads to an approximately 0.9% lower IPO price in the closing price regression. Rather expectedly, the lagged average ex-date return is insignificant also in the IPO regressions, also in univariate tests. Excluding the catering variables completely from the specifications leads to a 6 percentage point drop in explanatory power in both specifications. Hence the explanatory power of catering incentives is significantly lower compared to norms.

Table 9: Price targeted via stock splits

This table presents the results of the OLS regression of the difference between the log share price one day prior to the ex-date and the log share price at the close on the ex-date on the norms and catering variables. The market norms price is the log of the median price in the stock's home market. The size group norms price is the log of the median price in the stock's size quintile. The industry group norms price is the log of the median price in the stock's industry group. The low-price premium is calculated as the log of the average market-to-book ratio of low-priced stocks less the log of the average market-to-book ratio of high-priced stocks. The small-stock premium is calculated as the log of the average market-to-book ratio of low capitalization stocks less the log of the average market-to-book ratio of high capitalization stocks. Average ex-date return is the average ex-date abnormal return of recent splits. Industry and country controls are included in all specifications. All independent variables are lagged one year. All variables are in euro. White (1980) heteroskedasticity consistent t-statistics are in parentheses. T-statistics use standard errors that are clustered by year. Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

		Multivariate regressions - including average ex-date returns			Multivariate regressions - excluding average ex-date returns		
Variable	Univariate regressions	All norms	Market norms	Size and industry norms	All norms	Market norms	Size and industry norms
Intercept		3.503***	3.456***	4.174***	3.586***	3.520***	2.201***
		(18.640)	(18.340)	(18.620)	(20.270)	(20.010)	(11.700)
Distance to market	0.932***	0.773***	0.936***		0.765***	0.926***	
norms price	(25.250)	(9.870)	(28.400)		(9.430)	(24.760)	
Distance to size group	0.893***	0.147*		0.457***	0.139*		0.466***
norms price	(12.540)	(1.900)		(4.860)	(1.830)		(5.080)
Distance to industry group	0.796***	0.065*		0.520***	0.069*		0.507***
norms price	(20.450)	(1.710)		(8.980)	(1.750)		(8.630)
Low-price premium	0.101	0.159	0.162	0.124	0.151	0.152	0.119
	(0.760)	(0.780)	(0.780)	(0.640)	(0.940)	(0.950)	(0.780)
Small-stock premium	-0.115	-0.157	-0.162	-0.156	-0.150	-0.151	-0.137
	(-0.760)	(-0.680)	(-0.720)	(-0.640)	(-0.850)	(-0.880)	(-0.740)
Average ex-date returns	-0.027	0.190	0.192	0.141			
	(-0.230)	(1.460)	(1.510)	(1.050)			
Observations		1580	1591	1580	1688	1706	1688
R-squared		0.836	0.834	0.792	0.838	0.838	0.797

Table 10: Price chosen at IPO

This table presents the results of the OLS regression of the log price chosen by management at IPO on the norms and catering variables. The market norms price is the log of the median price in the stock's home market. The size group norms price is the log of the median price in the stock's size quintile. The industry group norms price is the log of the median price in the stock's industry group. The low-price premium is calculated as the log of the average market-to-book ratio of low-priced stocks less the log of the average market-to-book ratio of high-priced stocks. The small-stock premium is calculated as the log of the average market-to-book ratio of low capitalization stocks less the log of the average market-to-book ratio of high capitalization stocks. Average ex-date return is the average ex-date abnormal return of recent splits. Industry and country controls are included in all specifications. All independent variables are lagged one year. All variables are in euro. White (1980) heteroskedasticity consistent t-statistics are in parentheses. T-statistics use standard errors that are clustered by year. Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

	Dependent variable - closing price (+5 trading days)				Dependent variable - offer price			
		Multivariate regressions				Multivariate regressions		
Variable	Univariate regressions	All norms	Market norms	Size and industry norms	Univariate regressions	All norms	Market norms	Size and industry norms
Intercept		-0.062	0.509	0.000		0.084	0.621	0.154
		(-0.290)	(1.120)	(0.000)		(0.470)	(1.510)	(0.710)
Market norms price	0.718***	-0.127	0.683***		0.674***	-0.142	0.637***	
	(24.120)	(-1.490)	(15.920)		(20.440)	(-1.550)	(15.870)	
Size group norms price	0.736***	0.750***		0.671***	0.690***	0.695***		0.609***
	(27.880)	(12.440)		(13.680)	(20.810)	(9.370)		(9.030)
Industry group norms price	0.621***	0.079**		0.037	0.588***	0.102**		0.055
	(23.000)	(2.280)		(0.980)	(24.310)	(2.490)		(1.300)
Low-price premium	-1.336***	-0.865**	-0.832***	-0.868**	-1.243***	-0.731**	-0.703***	-0.734**
	(-5.450)	(-2.430)	(-2.990)	(-2.480)	(-5.700)	(-2.400)	(-2.990)	(-2.460)
Small-stock premium	-1.734***	0.171	0.159	0.184	-1.652***	0.062	0.038	0.069
	(-8.130)	(0.690)	(0.980)	(0.770)	(-8.290)	(1.170)	(0.300)	(0.340)
Average ex-date returns	-1.548	0.055	0.025	0.052	-0.138	0.062	0.321	0.059
	(-1.510)	(1.160)	(0.400)	(1.100)	(-1.330)	(1.170)	(0.490)	(1.090)
Observations		885	890	885		885	890	885
R-squared		0.742	0.686	0.741		0.744	0.689	0.742

5.4 Propensity to split

Table 11 presents the results of the population averaged (PA) and random effects (RE) probit panel regressions on the decision to split. I exclude the average ex-date return proxy from the binary tests since it has been shown to be insignificant in the OLS tests, and by excluding it from the panel regression the sample size increases by approximately 20%. I again begin by carrying out indicative univariate tests and then move on to run the norms specifications.

The results further support the hypothesis that managers actively manage share prices toward norms prices. All norms coefficients are significant and of the positive sign, indicating that an increase in the distance from the share price norm increases the likelihood of splitting. The pseudo r-squared calculated for the random effects model suggests that the "size and industry norms" specification has superior predictive power on the likelihood of splitting, contrary to the price chosen at split. Similarly in the PA univariate regressions the size and industry group norms variables have slightly higher t-values. However, this result is reversed in the RE specification where the market norms has the most significant t-value.

Contrary to post-split price regression, the low-price premium is positive and significant at the 1% level in the univariate regressions and in all norms specifications. Thus, propensity to split is increasing in investors' preferences for low-priced shares. The small-stock premium is significant at the 10% level in univariate regressions, but its explanatory power is diluted in multivariate specifications, even if the low-price premium is excluded from the regressions.

The results for catering variables as well as norms variables are robust to the probit model used. Again, none of the industry dummies have significant coefficients in the regressions. Finland, Netherlands and Sweden have positive and statistically significant coefficients, meaning that companies in these countries have a higher-than-average propensity to split. This is consistent with the evidence on annual splitting activity in the sample, which is highest in Finland and Netherlands, followed by Denmark and Sweden. Country dummies for the UK, and in some specifications Belgium, have negative and significant coefficients. This is not surprising given that the countries have the lowest splitting activity after Austria.

Table 11: Likelihood of stock splits

This table presents the results of the logistic (probit) regressions on the likelihood of a firm splitting its stock. The market norms price is the log of the median price in the stock's home market. The size group norms price is the log of the median price in the stock's size quintile. The industry group norms price is the log of the median price in the stock's industry group. The low-price premium is calculated as the log of the average market-to-book ratio of low-priced stocks less the log of the average market-to-book ratio of high-priced stocks. The small-stock premium is calculated as the log of the average market-to-book ratio of low capitalization stocks less the log of the average market-to-book ratio of high capitalization stocks. Industry and country controls are included in all specifications. All independent variables are lagged one year. Z-statistics are in parentheses. In population averaged tests z-statistics use standard errors that are robust to heteroskedasticity and autocorrelation up to three lags. Pseudo r-squared is from McFadden (1974). Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

	Population averaged model				Random effects model			
		Multivariate regressions				Multivariate regressions		
Variable	Univariate regressions	All norms	Market norms	Size and industry norms	Univariate regressions	All norms	Market norms	Size and industry norms
Intercept	-2.007***	-2.059***	-2.172***	-2.028***	-2.126***	-2.348***	-2.426***	-2.317***
	(-183.550)	(-25.210)	(-25.850)	(-23.650)	(-125.800)	(-22.160)	(-24.960)	(-22.310)
Distance to market	0.345***	0.273***	0.346***		0.415***	0.310***	0.418***	
norms price	(25.430)	(12.470)	(25.280)		(30.790)	(12.270)	(30.360)	
Distance to size group	0.322***	0.060***		0.189***	0.392***	0.133***		0.269***
norms price	(26.160)	(3.200)		(11.970)	(28.530)	(6.060)		(14.230)
Distance to industry group	0.326***	0.041**		0.201***	0.374***	0.052**		0.239***
norms price	(26.190)	(2.050)		(14.760)	(26.840)	(2.380)		(14.860)
Low-price premium	0.136***	0.236***	0.114***	0.224***	0.123***	0.227***	0.112***	0.215***
	(4.160)	(5.970)	(2.790)	(5.660)	(4.320)	(5.710)	(3.110)	(5.450)
Small-stock premium	0.050*	-0.050	0.023	-0.043	0.053*	-0.044	0.030	-0.038
	(1.760)	(-1.360)	(0.650)	(-1.170)	(1.810)	(-1.070)	(0.790)	(-0.940)
Observations		50 255	76 261	50 255		54 471	82 843	54 471
Pseudo r-squared						0.288	0.141	0.279

5.5 Robustness checks

To check for the robustness of the regression results on other potential explanatory characteristics of splitting and IPO firms I first investigate the effect of including the main control variables discussed in previous literature. I then split the sample in time according to broad market movements to see if norms and catering incentives have time-varying effects on the choice of nominal share price. The earlier period ranges from 1/1980 (1/1994 for IPOs) to 12/2000, which includes the "dot-com bubble" era from 1998 to the early 2000s. The later period starts and ends at 1/2001 and 4/2008, respectively.

Lakonishok and Lev (1987) suggest that a firm's price appreciation in the period leading up to the split may explain the size of the split price adjustment. To account for the effect of recent returns, I include a control variable for the year-to-date return excluding dividends in the split price regressions. Recent returns do indeed have a positive effect on the split factor, significant at the 5% level as shown in Table 12, which summarizes the results of the main regressions including control variables.

So and Tse (2000) note that given the strong positive correlation between size and share price, large capitalization firms should choose higher share prices at IPO and split, and be less likely to split, ceteris paribus. To control for the effect of firm size, I include a control variable for firm size at the end of the year prior to the split for splitting firms and at IPO for listing firms. Market capitalisation has a positive and significant effect on the IPO price as documented previously by for instance Benartzi et al. (2010). In the split regressions, somewhat unexpectedly, the size variable also has a positive and significant sign, implying that larger firms have higher split factors and are more likely to split. The most likely explanation is that exactly because large companies have, on average, higher share prices, a large company is more likely to split than a small company, because it is likely to have a larger share price distance to the norms price. This increases the propensity to split and the chosen split factor.

So and Tse (2000) also note that firms that split regularly are more likely to split than firms that do not have a history of splits. Naturally, firms that split frequently are also expected to choose lower post-split prices. To control for the effect of splitting frequency, I include a control variable for the number of splits the firm has executed during the sample period. The results are mixed. As expected, splitting frequency has a negative and significant effect on the post-split price. On the other hand, the effect on the propensity to split is insignificant.

The authors further note that firm-specific norms may affect the split decision. Managers may have a target share price, achieved through splits whenever the share price deviation from that target price becomes sufficiently large. If a firm-specific norm exists, then the split factor and propensity to split should be positively correlated with the distance from the price chosen at previous split. I do not report the results of the tests on the previous split price in the robustness checks, as it only affects those firms that have split previously thus reducing the OLS sample size to less than 500. I find that the distance from previous split price indeed has a positive and significant coefficient in the split regressions, implying the existence of a firm-specific norm.

Table 13 shows the results of the main regressions when I split the samples into two time periods based on broad market movements. The post-split price regression uses the “market norms” specification and the IPO and propensity to split regressions use the “size and industry norms” specifications. The earlier period ranges from 1/1980 (1/1994 for IPOs) to 12/2000, which includes the “dot-com bubble” era from 1998 to the early 2000s. The later period starts and ends at 1/2001 and 4/2008, respectively.

The results for the latter period are essentially similar to the results for the full sample period models. Post-split price results for the latter period stay the same, although the year-to-date return and size controls become insignificant, most likely due to the reduced sample size. In the IPO regression the industry norms and size variables loses their explanatory power, industry norms receiving an insignificant sign, again probably due to the reduced sample size. Analogous effects of reduced explanatory power are noticed in the propensity to split model.

Interestingly, the average ex-date return proxy becomes significant with a positive sign at the 10% level.

The evidence that the effect of catering incentives may be time varying is further accumulated by the results from the former period. First, the average ex-date return becomes significant with a positive coefficient at the 1% level in the post-split price regression. Quite surprisingly, the small-stock premium receives a significant, but “wrong” sign in both the IPO and split propensity regressions. The wrong sign implies that when investors value small-capitalisation stocks relatively highly, companies are less likely to split and listing companies choose higher IPO prices.

Running the split propensity regression and excluding the “dot-com bubble” years of 1999 and 2000 reveals that the stock market bubble drives the results: the small-stock premium becomes insignificant. The “wrong sign” is explained by the fact that, like in Baker et al. (2008), the lagged small-stock premium reaches its country-specific minimum in almost all sample countries during 1999-2000. Yet, many small companies opportunistically list during hot asset markets, and because of their size, choose low share prices. Similarly, when asset markets are hot share prices increase, thus increasing the propensity to split of the average company. The hot asset markets also increase the lagged average ex-date returns: country-specific maxima for the ex-date return proxy are reached in 1999-2000 for most countries. The high levels of average ex-date returns coincide with a period when companies’ share prices experience unusual increases, thus increasing split factor chosen. Accordingly, the average ex-date return becomes insignificant when the regression is run for the years from 1980 to 1998.

Table 12: Robustness checks - control variables

This table presents the main regression results, including control variables. Norms are logged absolute values in IPO regressions and logged distances from norms in split regressions. Year-to-date return is the return in the split calendar year up to the split. Market capitalisation is the logged value at previous year end for splits and five trading days after IPO for listing firms. Number of splits is the total number in the sample period. Industry and country controls are included in all specifications. See notes to Tables 9, 10 and 11 for definitions of other independent variables. T- and z-statistics are in parentheses. Probit regressions use random effects. Pseudo r-squared is from McFadden (1974). Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

	Split price adjustment		IPO closing price		Propensity to split	
Variable	Market norms	Size and industry norms	Market norms	Size and industry norms	Market norms	Size and industry norms
Intercept	1.864***	3.163***	-0.622	-0.553**	-2.582***	-3.088***
	(7.940)	(10.890)	(-1.440)	(-2.020)	(-21.890)	(-22.350)
Market norms	0.897***		0.656***		0.393***	
	(22.760)		(16.150)		(25.870)	
Size group norms		0.606***		0.577***		0.374***
		(7.700)		(10.030)		(16.560)
Industry norms		0.314***		0.101***		0.101***
		(7.620)		(2.720)		(5.130)
Low-price premium	0.127	0.054	-0.756***	-0.795**	0.304***	0.316***
	(0.610)	(0.270)	(-2.940)	(-2.440)	(7.420)	(7.160)
Small-stock premium	-0.139	-0.074	0.247	0.188	-0.041	-0.069
	(-0.620)	(-0.320)	(1.460)	(0.800)	(-0.930)	(-1.440)
Average ex-date returns	0.194	0.149	-0.035	0.020	0.033	0.033
	(1.580)	(1.220)	(-0.480)	(0.380)	(1.620)	(1.510)
Year-to-date return	0.086**	0.074**				
	(2.380)	(2.360)				
Market capitalisation	0.043**	0.181***	0.243***	0.131***	0.028**	0.192***
	(2.520)	(9.970)	(12.140)	(5.810)	(2.510)	(13.400)
Number of splits	-0.063**	-0.074***			0.002	0.008
	(-2.300)	(-2.880)			(0.030)	(0.130)
Observations	1 581	1 570	890	885	75 120	49 787
(Pseudo) r-squared	0.836	0.825	0.734	0.752	0.223	0.345

Table 13: Robustness checks - time periods

This table presents the results of the main regressions including control variables, split by time periods. Market norms, size group norms and industry norms are logged absolute values in the IPO closing price regressions and logged distances from norms in the split regressions. Year-to-date return is the return during the split calendar year up to the day prior to the split ex-date. Market capitalization is the logged market capitalization at the end of the previous year for splits and five trading days after the IPO for listing firms. Number of splits is the total number of splits during the sample period. Industry and country controls are included in all specifications. See notes to Tables 9, 10 and 11 for definitions of other independent variables. T- and z-statistics are in parentheses. The probit regressions use random effects. Pseudo r-squared is from McFadden (1974). Respectively, ***, ** and * denote statistical significance at 1%, 5% and 10% levels.

	Split price adjustment		IPO closing price		Propensity to split	
Variable	1980-2000	2001-2008	1994-2000	2001-2008	1980-2000	2001-2008
Intercept	3.926***	3.029***	-1.024**	-0.347*	-3.937***	-2.930***
	(14.490)	(18.490)	(-2.300)	(-1.750)	(-13.870)	(-16.740)
Market norms	1.084***	1.043***				
	(64.720)	(59.480)				
Size group norms			0.506***	0.645***	0.469***	0.317***
			(6.530)	(9.550)	(9.550)	(10.830)
Industry norms			0.169***	0.071	0.232***	0.098***
			(4.010)	(1.590)	(5.440)	(3.640)
Low-price premium	0.358*	0.200	-0.933*	-0.638***	0.293***	0.251**
	(1.710)	(1.500)	(-1.850)	(-2.790)	(4.550)	(2.290)
Small-stock premium	0.163	-0.369	0.369***	-0.037	-0.359***	0.199
	(1.390)	(-1.330)	(3.090)	(-0.110)	(-5.480)	(1.540)
Average ex-date returns	0.467***	0.047	0.051	0.023	-0.033	0.051*
	(3.800)	(0.810)	(0.490)	(0.390)	(-0.860)	(1.680)
Year-to-date return	-0.034	-0.029				
	(-0.213)	(-0.470)				
Market capitalisation	-0.013*	0.007	0.156***	0.090***	0.204***	0.187***
	(-1.720)	(0.580)	(6.760)	(3.530)	(8.790)	(8.650)
Number of splits	-0.050***	-0.104***			0.099	-0.105
	(-5.220)	(-4.860)			(1.120)	(-0.990)
Observations	954	617	492	395	21 362	28 425
(Pseudo) r-squared	0.957	0.964	0.682	0.745	0.648	0.718

6 CONCLUSION

This thesis examines what drives active nominal share price management and how nominal share price levels behave over time. Active nominal share price management is defined to happen when a firm splits its stock and chooses a post-split price, and when a listing firm chooses the IPO price level. Drivers affecting active price management include market-, size group- and industry group-specific share price norms, as well as time-varying catering incentives proxied by the market-to-book premium of low-priced and small-capitalisation stocks compared to high-priced and high-capitalisation stocks respectively, and the abnormal ex-date returns of recent splits. Share price levels are examined by investigating the development of average nominal and real share price levels over time. The aim is to discover whether share price norms levels can be identified in the sampled countries, similar to the US where Benartzi et al. (2010) report that average share prices have remained constant at around $30 since 1933. The data set consists of 92,856 firm-years, 1,803 split events and 917 IPOs from 1/1980 through to 4/2008 in eleven European markets. The IPO time series is from 1/1994 to 4/2008.

My findings are consistent with the hypothesis that real share prices are decreasing over time (H1) and inconclusive but consistent with the hypotheses that nominal share price levels are rigid over time (H2) and that the euro adoption caused a permanent shift in nominal price levels (H3). Additionally, I find convincing evidence supporting the hypotheses that norms drive the nominal share price chosen at split and IPO, and the propensity to split (H4 and H5). Further, I find some evidence that managers are catering to investors' preferences for nominal share prices (supporting H6 and H7). Finally, I do not uncover evidence that companies try to appear small when small stocks earn high premia or that managers' choice of share price is dependent on recent abnormal ex-date returns of splits (contrasting H6 and H7).

Real share prices are decreasing over time in all sample countries, despite constantly compounding capital gains that act to pull share prices upwards. Nominal prices show signs of rigidity in the face of inflation and returns, implying that perhaps share price norms are not purely a US phenomenon as implied by Benartzi et al. (2010). The euro adoption seems to have shifted the nominal price level in those countries that changed to the European tender. The reaction of nominal prices to a denomination-shock is further evidence for the existence of rigid nominal share prices. However, a longer time series is needed to confirm the existence of share price norms.

As in Benartzi et al. (2010), size group and industry share price norms positively affect the IPO price and are the key drivers determining the post-split price and propensity to split. Specifically, size group and industry norms alone explain up to 29% of the post-split price and up to 45% of the IPO price. Distance from the size and industry group norms prices is a significant driver of propensity to split. The results are robust over time and to adding controls for firm size, recent returns, splitting frequency, country and industry. Size and industry group norms seem to outweigh market norms for IPO firms, but the order is reversed for the split price.

Market-specific norms, suggested by Lakonishok and Lev (1987), also affect the nominal share price choice. Share price distance from market norms increases the propensity to split and explains up to 33% of the size of the split factor. Market norms alone also explain up to 40% of the IPO price. Specifically, the explanatory power refers to the observed r-squared change in the regression models. The high correlation between industry, size group and market norms makes it difficult to interpret the interplay between the different norms. Managers' decision making is obviously not as simple as the modeling in this thesis, meaning that more sophisticated examination of the different norms is needed to determine exactly how different norms affect the chosen nominal price. Investigating firm-specific characteristics of splitting firms may shed further light on the issue. Also, if a market norm exists to some extent, the within-country size group and industry norms depend on that market norm. Confining to industry and size group norms therefore means aligning with market norms as well.

Managers seem to respond to investors' implied preference for low-priced stocks by choosing a lower IPO price and splitting more often, as in Baker et al. (2008). The time-varying market-to-book premium of low-priced stocks over high-priced stocks is the only significant and meaningful catering variable in the empirical tests. The insignificant small-stock premium implies that companies do not act to be small when small-capitalisation stocks trade at a relatively high premium to high-capitalisation stocks. IPO prices and splits are also insensitive to average abnormal e-date returns.

Company size positively affects the IPO price, as the well-documented positive relationship between size and share price implies (e.g. Benartzi et al. (2010)). High market capitalisation companies are more likely to split and have higher split factors, probably because they are large due to unusually high recent returns. Recent returns are shown to increase the split factor. Frequently splitting companies have lower split factors, because they allow the share price to appreciate less before adjusting it via a split.

How and why norms evolve is a question left unanswered. Marketability and the related investor psychology is the most likely candidate for what drives the formation of norms. Although the marketability hypothesis has strong counterevidence, practitioner support for an investor-driven optimal trading range should not be overlooked. The pool of empirical evidence implies that multiple factors drive the active choice of nominal share price. Some managers may split to signal improved earnings prospects, other managers choose a low share price to cater for investor preferences, while some (or probably most) managers simply keep the nominal share price in a marketable range. The level to which share prices are managed due to these motives is the norms price. Three important areas for future research arise from the results of this thesis. First, confirming the existence of norms in other markets than the US needs examining longer data sets. It is not sufficient to plainly state, as Benartzi et al. (2010) do, that share price norms are purely a US phenomenon. This seems not to be the case, as share price norms seem to exist in Europe as well. Second, examining firm-specific characteristics of splitting firms may provide a better understanding of what motives drive firms to split. Finally, to understand norms better, an understanding of how they are born is required. Investigating the effect of macroeconomic factors on norms, such as real GDP per capita, may provide answers.

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