Rights Issues: an Opportunity for Profit?

— Bachelor Thesis —

Justin A. van Haaren (406068)
Erasmus School of Economics
Erasmus University Rotterdam

Supervisor:
drs. Jing Zhao

Abstract

The aim of the research is to find out whether or not it is possible to implement a short-selling strategy that allows for the generation of abnormal returns based on equity rights trading periods. The sample is comprised of Western-European and North-American firms that between 2009 and 2015 have issued equity rights to their shareholders. It turns out that although the strategy does not work as a general rule, it does work for Italian and Belgian firms.

Table of Contents

Introduction

MOST firms are extremely hesitant to issue equity; when they do they oftentimes decide to provide their existing shareholders with so-called equity rights: each right entitles the shareholder to buy new shares at a discount. Secondary equity issues are usually associated with a significant price decline (Asquith & Mullins, 1986), resulting in loss for existing shareholders. As such, these shareholders need to be compensated for their losses and this is often done through the issue of these rights. They are tradable on the exchange and often trade for a period of about two to three weeks, during which shareholders can either opt to sell their rights in exchange for money and other investors can buy these to be able to purchase shares with discount, or they can keep them and purchase shares themselves.

This research aims to find out whether or not it is possible to construct a trading strategy to profit from rights-issuing stocks. That is, does short selling a rights-issuing stock during its rights-trading period yield abnormal returns? The inspiration for this kind of strategy came from an interview in a Dutch television show in which a fund manager was interviewed who described this strategy that is employed by his fund (Platte, 2017). The reasoning as to why this would work, is that when the shares go ex-right, shareholders who do not want additional stock will want to sell, which would create downward price pressure. Near the end of the period, when most rights have been traded, investors would calm down and the price would start recovering (Platte, 2017).

This paper will analyse the performance of the strategy on a sample of West-European and North-American stocks from January 1st, 2009 until December 31st, 2015 in order to find out if there is an anomaly: a strategy is considered that entails just shorting a stock before its shares go ex-right, only to buy these shares back at some point during the rights trading period.

The paper will examine different points in time during the rights trading period to determine the optimal point of buy-back. Additionally, if abnormal returns are proved (possibly just for stocks with specific characteristics), the paper will try to find certain factors that can predict whether or not abnormal returns can be generated.

The equity issuance announcement is already associated with a price decline (Asquith & Mullins, 1986), but the rights trading period is fundamentally different in that it, unlike the announcement of equity issues, is anticipated. This makes it particularly interesting for potential use in trading strategies. The goal of this research is to find out whether or not rights-issuing firms underperform and if so, if they actually generate negative returns over the rights-trading period. Negative returns, however, are not required for a valuable result. Underperformance according to the Capital Asset Pricing Model is enough to build a strategy through long exposure in the market and short exposure to rights-issuing firms. This strategy would therefore perfectly fit in a so-called *alternative beta* portfolio, where common anomalies and arbitrage opportunities are

exploited using factor models. This way, exposure to market performance is highly reduced. During recent years, alternative beta has gained much interest from investors as it provides a cheaper alternative to hedge funds. Therefore it would be interesting to identify a new potential component and that is what this paper will hence try to find out.

Short-selling equity comes at a price: the shares that are sold have to be borrowed from another investor at a stock loan fee. This fee differs per broker or custodian and is determined by internal supply and demand for said equity, as well as the generic pricing strategy of said broker or custodian.

As was noted by Saffi and Sigurdsson (2010), pricing strategies differ per broker and as such one needs data from many different brokers and custodians in order to able to have a reliable stock loan rate. Although there are databases that provide averages of many different brokers, I do not have access to these and as such this paper will rely on two work-around methods:

I. Using a theoretical *stock loan fee*, following Saffi and Sigurdsson (2010), a theoretical estimation of the value of the stock loan fee based on some basic short sale constraints and firm characteristics can be constructed.

II. By inverting the calculation of the abnormal returns, with the actual stock return and expected return, a maximum value of the stock loan fee for the strategy to be profitable can be calculated.

By applying both methods, it should be possible to draw conclusions about the performance of the trading strategy either as a general rule, or for stocks that have specific characteristics.

It was found that the strategy does not work as a general rule: rights-issuing firms do not universally underperform. However, it was found that for Italian and Belgian firms the strategy does in fact work.

Theoretical Framework

Firms are generally reluctant to issue equity and are more inclined to issue debt or if possible even finance investments using internally generated funds. This hierarchy of most preferred to least preferred means of financing is often referred to as the *pecking order theory*. In the 1960's, the pecking order theory was first suggested by Donaldson (1961). His field study described a strong reluctance of managers to resort to external funding — rather than internal — and only doing so in cases of severe fund deficiency. The study named several potential reasons why management decisions exhibit this structural tendency: amongst them the fact that management has complete and independent control over internal funds as opposed to external ones which require negotiations (Donaldson, 1961). Another one that equity issuance would lead to attention which could turn out negatively if expectations were not to be met.

Another important reason for managers not to issue equity except as a last resort is given by Myers and Majluf (1984) and Myers (1984), who describe from an asymmetric information perspective why an equity issue could signal overvaluation to the market. Their model describes a manager's choice of whether or not to issue new shares based on a trade-off between the benefit of the *Net Present Value* (NPV) of a potentially profitable investment opportunity with new capital and the costs of an equity issue under asymmetric information. They argue that managers aim to maximize existing shareholders' value and that investors know this, because of which they will adjust their willingness to pay (Myers & Majluf, 1984) (Myers, 1984). It follows that rational managers are only inclined to issue new shares if they have unfavourable information, which is in turn anticipated by investors. In short: issuing equity signals unfavourable information.

Next to this, there are other theoretical arguments why a stock price should fall when new shares are issued. One of those is the so-called price-pressure hypothesis brought forth by Scholes (1972). He argues that the demand curve for securities is downward-sloping and therefore an increase in share supply should lead to a lower price, contrasting with financial theory which assumes horizontal demand. According to Asquith (1986), proponents of the price-pressure theory argue that a "sweetener" is required to market additional securities and this is where rights come into play.

In addition to these theoretical arguments as to why the stock price should fall, Asquith and Mullins (1986) found empirical evidence of a significant price decline on the day of announcement of the equity issue. Although not all equity issues also involve the issue of rights, it is the most dominant form of equity issue in Europe (Slovin & Sushka, 2000).

The choice between the two main alternative means of equity financing, namely fully underwritten offers and rights offers, is accompanied with a paradox. Whereas in Europe equity is almost exclusively issued through rights offers, in the United States direct equity financing is the dominant mode of equity financing although being widely regarded as the more expensive option (Heinkel & Schwartz,

1986). This paradox has been attempted to be solved by various researchers (Hansen & Pinkerton, 1982), who have sought to explain it from different perspectives. Starting from the notion that rights offerings are generally cheaper as there are no underwriting costs involved, they offer the following possible solutions: Parsons and Raviv (1985) argue that underwritten equity financing allows for discriminating between lower-valuation and higher valuation investors: equity is first offered at a high valuation to attract high-valuation investors. In case there are not enough subscriptions, the remainder is offered at a lower valuation. This is not possible with rights offers, which are distributed to existing shareholders. In addition, Heinkel and Schwartz (1986) offer an asymmetric information model in which the choice of financing contains an information component about the expected future stock price. They argue that "high-quality" firms, *id est* those with a higher expected stock price will opt for rights offerings, whereas those with a lower one will go for an underwritten equity issue. The underlying rationale is that for a "low-quality" firm, a rights offering gives rise to false signalling costs that exceed the higher fee for underwritten offerings. For the "high-quality" firm, equity rights allow for credible disclosure of its high quality (Heinkel & Schwartz, 1986). Moreover, Hansen and Pinkerton (1982) show that using the flotation cost, it is by far not always beneficial to opt for a rights offering vis-à-vis an underwritten offer. They show that the flotation cost can heavily vary and differ significantly from the expected value when central stockholders exist, making the choice between a rights offer and underwritten offer far from obvious.

Contrary to some of the prior research which focuses on the announcement day, this paper will investigate the period after the actual rights issue rather than the announcement thereof. The announcement date differs from the execution date in one fundamental way: assuming absence of inside information, the announcement of a rights issue cannot be anticipated beforehand, making it impossible to construct a trading strategy on it (note that although Dann, Mayers, and Raab (1977) described that if an investor responds within 15 minutes he can achieve abnormal returns, this is probably no longer the case nowadays since we have algorithmic and high-frequency trading). It is merely the expected fall in price brought forward in time. However, the ex-rights date *is* known and therefore, if underperformance can be proved, this would make the event suitable for a trading strategy, as it can be anticipated.

No similar research has been done before, in general rights trading literature is rather scarce to begin with, let alone empirical evidence of trading strategies thereon. Nevertheless, a good theoretical argument can be made for the strategy: not all investors would be willing to buy extra shares, be it with discount. For instance, Parsons and Raviv (1985) present a model where there are two groups of investors: those with high valuations and low valuations. Unlike underwritten offers, rights do not allow for any form of price discrimination and therefore a substantial number of investors may want to sell. Therefore, they would be likely to sell their current shares after the rights are issued

(the ex-rights date), so that they can also sell the rights for cash. Then, a substantial number of shares would be put up for sale during the rights trading period, creating strong downward price pressure on the stock involved. Built upon this argument several studies have been performed over the years adding an empirical component. For instance, Kabir and Roosenboom (2003) investigated whether or not the stock market valuation of stocks is consistent with subsequent operating performance, using data on equity rights-issuing firms in the Netherlands from 1984 to 1994. They found that stocks that issue rights underperform significantly in terms of both stock price performance and operational performance (such as net income and sales ratios) during the rights trading period and the three subsequent years respectively. This paper will expand such an analysis to a global sample, but will instead use a post-Global Financial Crisis (GFC) time period of 2009 till 2015.

The evaluation of the proposed trading strategy does not straightforwardly entail calculating the cumulative abnormal return and flipping the sign to make it representative of the opposite of a normal share purchase. In fact, the nature of a short sale is inherently different from that of a basic long position: whereas purchasing shares only involves finding a seller that is willing to sell at one's desired price, short selling requires additional steps (D'Avolio, 2002). As short selling involves the sale of shares that one does not own, the first step is for one — henceforth referred to as the *short seller* — to obtain these shares. As such, a shareholder has to be found that is willing to lend the desired number of shares to the short seller, before they can be sold on the stock exchange. The lender will require a fee to be paid to be willing to lend his shares, which is an additional source of income for many institutional investors, referred to as the *stock loan fee* (D'Avolio, 2002).

One fundamental difference between a long and a short position lies in the fact that returns are not symmetrical: whereas a stock and thus a long position cannot incur a loss greater than 100% as it cannot go negative, a share can increase by more than 100% meaning that losses can theoretically reach infinity. Therefore, the short seller is usually required to put up collateral to his broker. On this collateral, the short seller should receive the market-free interest rate. This implies that there is cash flowing from the lender to the borrower, as well as vice-versa (D'Avolio, 2002). The stock loan fee can be defined as the difference between the rebate rate, which is the rate the short seller receives, and the risk-free rate, the theoretical value the short-seller should get. The relationship looks as follows (Saffi & Sigurdsson, 2010):

$$Loan\ fee_{n,i,t} = \begin{cases} Fee_{n,i,t} \\ Riskfree\ rate_t - Rebate\ rate_{n,i,t} \end{cases}$$

For the purpose of this research, it is assumed that the investor posts cash collateral as fees for non-cash collateral are entirely determined by direct negotiation between the lender and borrower (Saffi & Sigurdsson, 2010) and as such there is no data on the fees. Although usually not high, the fee can in some cases determine whether or not a strategy is profitable; the fee can explode in cases of high short sale constraints or if there is a large degree of dispersion in investor

opinions, as described by D'Avolio (2002). Divergence in investor opinion, he finds, increases short-sale constraints such as loan fees. The divergence in investor opinion described earlier (those who want to sell and those who do not) could then lead to higher stock loan fees.

In order to evaluate the trading strategy, the following hypotheses ought to be tested:

Hypothesis 1: Equity rights-issuing firms universally underperform during their rights trading period.

Hypothesis 2: For certain individual countries, equity rights-issuing firms underperform during their rights-trading period.

Hypothesis 4: In general, a strategy short selling rights-issuing firms and having long exposure to the market during the rights-trading period generates absolute positive returns.

Hypothesis 4: A strategy short selling rights-issuing firms and having long exposure to the market during the rights-trading period generates absolute positive returns for certain individual counties.

Hypothesis 5: Higher-beta stocks perform fundamentally different during their rights-trading period compared to lower-beta stocks.

Data

First, from Bloomberg a dataset on historical equity rights issuing firms containing the announcement date, effective date (ex-right date), settlement date (end of the rights trading period), and tickers is obtained. Due to limitations with regard to the magnitude of the data, the paper focuses on Western European, American, and Canadian companies only, for the period January 2009 until December 2015. Next to this, the dataset also includes data on total assets, country, and net income which will be used for the second part of the analysis.

In order to be able to calculate the cumulative abnormal return, Datastream is used to obtain stock returns including dividends for the trading periods as well as estimation periods to calculate the expected returns of the stocks during their rights trading periods. Also, the index returns of the main indices for the countries involved are obtained here. Note that the tool used only supports up to 14 indices, so that only the 13 largest countries by number of stocks in the sample are used. The others (all European) are matched with the Eurostoxx200 index which is a relatively appropriate index for European countries. For each country in the sample, the main index of that country is matched with the stocks in Datastream.

Furthermore, the risk-free rates (EONIA, Fed Funds Rate, LIBOR, and the Canadian overnight rate) are obtained from Bloomberg, which are needed for the expected returns. As risk-free rates have been at near-zero levels, the impact of the risk-free rate is almost negligible, meaning

that accuracy with regards to country match is not crucial.

These datasets are all combined into one, after which the aggregate database is cleaned. First, all observations with missing values for any of the important dates (effective or settlement) are deleted. Next, those stocks for which no returns can be found are also deleted from the sample, leaving 1525 observations. Due to missing settlement dates for some stocks, some trading periods exhibit negative trading periods of thousands of days (base date is January 1st, 1900) and these observations are deleted. Moreover, stocks with trading periods shorter than five and longer than 35 days are also deleted from the sample to create convenient time periods for the analysis.

Lastly, the raw data contains companies from island groups such as the Cocos Island and the Sandwich Islands. Due to the limited number of observations from these countries and these economies are likely to be inherently different from those of the others, these island groups are removed from the sample as well. A table containing all remaining countries can be found on the next page. Also, observations that have nonsensical values (many firms in the sample have total assets of 0) are removed.

A table containing the descriptive statistics of the final dataset (Table 3) — that is, the one where all data is merged into one dataset and the aforementioned observations eliminated — can be found on the next page.

From Table 1, two things can be noted: first, there seems to be a large discrepancy between countries with regards to the likeliness of

Table 1: Country Composition

Country	Number of Observations
Germany	383
United Kingdom	378
France	243
Switzerland	156
Italy	97
Sweden	68
United States	58
Spain	55
Austria	40
Belgium	39
Netherlands	32
Norway	29
Greece	18
Ireland	16
Finland	15
Poland	12
Denmark	10
Canada	9
Luxembourg	4
Total	**1525**

Table 2: Descriptive Statistics of the risk-free rate

Weekly Annualized Rate	Mean	St.Dev.	Min	Max
EONIA	0.6%	1.2%	-0.4%	4.4%
Fed Funds Rate	0.3%	0.6%	0.0%	4.3%
LIBOR	0.7%	0.8%	0.2%	4.8%
Canadian Overnight Rate	1.0%	0.8%	0.1%	4.2%

corporations issuing rights: for instance, the United States have an economy that is much larger than those of the others, yet they are immensely underrepresented in the sample. This is in line with Eckbo and Masulis (1992), who described that equity rights issues are a rare practice in the US, as opposed to Europe where it is the dominant form of equity issuance.

Table 3: Descriptive Statistics of the sample

Variable	Mean	St.Dev	Min	Max	Median
#Trading days	19.0	5.7	5.0	30.0	18.0
Total Assets (Millions $)	16,626.6	95,522.6	0.0	985,941.0	132.8
Net Income (Millions $)	15.1	1,054.1	-13049.6	8524.8	0.0
Offer Size (Millions $)	443.8	1,643.2	0.0	22,149.9	176.7
Ex-rights day return	-0.1%	4.5%	-39.5%	33.4%	0.0%
Run-up Return	-3.0%	2.0%	-97.6%	1,104.3%	-12.4%

Methodology

As was mentioned earlier, due to data constraints the research is divided into two parts: first, one that uses the theoretical values of the stock loan fee to calculate the return and second, an inversion of the return calculation is used in order to determine the maximum value for the strategy to be profitable. Following Saffi and Sigurdsson (2010), a theoretical value of the stock loan fee is determined. For each day this is calculated and as this interest rate is charged overnight for most or all brokers — meaning that the daily fluctuation in value has no effect on the loan fee charged — these are just inserted in the calculation of the cumulative abnormal return as separate (negative) rates. This is possible because multiplication is a commutative operation, such that the order of the elements is of no importance.

The trading strategy that is examined in this paper is best described in the following way: before the rights trading period starts, shares are sold short. Then, for different points in time the cumulative returns are calculated and these are then compared to the expected returns for that period based on the CAPM model. To clarify the methodology, a timeline is provided (Figure 1) showing all relevant points in time.

Note that the stock loan fee is not the actual amount that has to be paid in order to buy shares. Rather it is the cost of borrowing taking into account the time value of money. It works as follows: when one short-sells a stock in the market, he will receive the proceeds right away. As these proceeds are used as collateral by the prime broker or custodian, these funds cannot be invested in risk-free assets by the short-seller. He must be compensated for this by the broker or custodian that will pay the short-seller the risk-free rate — less an amount that the broker gets to keep for its services — which is known as the *short rebate*, or *rebate rate*. The difference between the risk-free rate and the short rebate is what we call the *stock loan fee*, which in this manner is implicitly charged to the short-seller.

Note that not all brokers offer all their clients this short rebate: usually only the largest clients benefit from this practice. However, smaller clients are often able to trade *Contract for Differences*[1] which offers the possibility to take

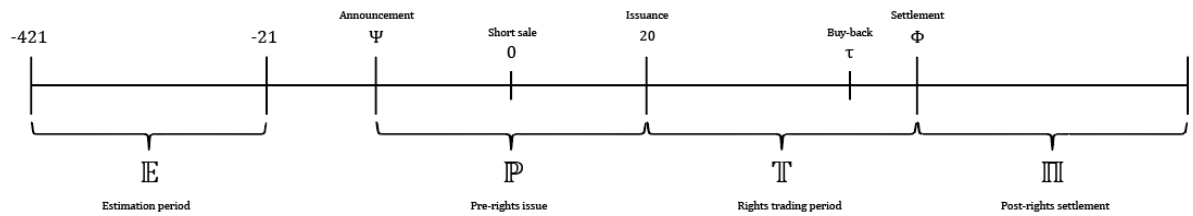

Figure 1: Timeline of the strategy

[1] A Contract for Difference (CFD) is a direct agreement between two parties, of which the buyer receives the price difference between opening and close of the underlying asset. When this difference is negative, the seller will pay the buyer. CFDs are not standardized and thus not traded on exchanges: the terms are set by each seller and can thus vary. They offer a flexible and often cheaper way to obtain short exposure to an asset. However, an investor will face a higher degree of counterparty risk, because of its non-exchange nature.

on short exposure to a certain stock without having to actually short the stock, which means no rebate rate or stock loan fee applies. Moreover, due to low interest rates in the post-GFC era, this amount would be negligible as (nearly) risk-free rates have dropped to zero- or even negative levels.

The reader might wonder why one would bother considering the stock loan fee if this fee is usually negative (also considering the aforementioned data constraints). The reason is that during periods of low supply and high demand, the stock loan fee charged may explode to extremely high levels (sometimes above 30% per annum*) as the shares become harder to borrow. As with the general rules of supply and demand, if there is a strong demand and low supply, the rates will significantly rise. As was found by Boehme, Danielsen, and Sorescu (2006), there is a strong positive relationship between the short interest — recall that this is the ratio between shares sold short and total shares outstanding — and the stock loan fee charged. The difference between the average stock loan fees for lowest and highest short interest vigintiles in their sample is about 1,000% (just below 0.2% vs. just below 2%).

Relation between the stock loan rate and the short rebate rate:

The stock loan fee can be defined as the difference between the rebate rate, which is the rate the short seller receives, and the risk-free rate, the theoretical value the short-seller should get as described in the theoretical framework. The relationship can be written as follows:

$$\delta_{i,t} = r_{f,i,t} - \rho_{i,t}$$
$$\Updownarrow$$
$$\rho_{i,t} = r_{f,i,t} - \delta_{i,t}$$

Where δ (delta) denotes the stock loan fee, ρ (rho) denotes the short rebate, and r_f denotes the risk-free rate. Note that this rate is not only time-dependent, but also (indirectly) firm-dependent because of different prevailing rates in different currency zones.

The strategy:

The strategy entails the short selling of a stock from before the beginning of the rights trading period (ex-rights date) and then buying back the shares near the end of the period. As such, the short seller will profit from any price declines during this period and lose from price increases, as well as any potential dividends. The abnormal return of this short selling strategy could be viewed as the alpha of the cumulative abnormal return (CAR) with a sign change. As such, the returns generated will be compared to the expected returns of the stock during the period to see if this strategy does actually lead to negative alpha. To calculate the abnormal returns of strategy one, the standard formula for the *cumulative abnormal return* (CAR) will be slightly adjusted to incorporate the loan fee (short rebate) that is to be paid (received) when the stock is sold short. The formulæ for the standard CAR, as well as for the modified one are depicted below:

Basic formula for the CAR:

$$\prod_{t=1}^{T}(1 + r_{i,t}) - \prod_{t=1}^{T}(1 + E[r_{i,t}])$$

Adjusted formula to incorporate short-selling and cost of borrowing:

$$\prod_{t=1}^{T}(1 + r_{i,t})(1 + \delta_{i,t}) - \prod_{t=1}^{T}(1 + E[r_{i,t}])$$

In this adjusted formula, δ (delta) depicts the stock loan fee. Note that it is positive, as the value needs to be positive when multiplied with the value of the shorted stocks. The letter *i* is used to denote the company and *t* is for time or, more specifically, the number of days since the start of the effective date of the rights (ex-rights date).

Determining the short selling points in time

As it is not explicitly clear at what point in time the shares ought to be sold short, nor — and more importantly I daresay — when they ought to be bought back, these points have to be chosen in a rather arbitrary fashion. This of course leads to a (conceivably large) variability in results, or even the difference between whether a result can be found or not, depending on which points in time are chosen. As the research methodology employed in this paper, particularly the calculation of the CARs for numerous companies during different time periods, is a highly labour-, resource-, and time-intensive process, in this paper the point of short selling will be fixed at a set point in time; the point of buy-back will be set at six different points, namely ¼, ⅓, ½, ⅔, ¾, and the end of the rights trading period $\mathbb{T} = [20, \Phi]$.

In order to determine the fixed point of short-selling, the stock prices for the period between announcement and ex-rights date ($\mathbb{P} = [\Psi, 0]$) from Datastream are used: for each company the fraction of the period of the day with the highest price is taken and this is averaged over all companies. The day of the fraction with the highest stock price is taken as the short-selling point (0) for all companies in the sample.

By evaluating the short-selling strategy at these six different buy-back points in time, it is possible for investors to determine the optimal point in time to employ this strategy; it also makes sure that an effect is not deemed insignificant while it in fact does exist at a different point in time.

Expected return

Following typical financial research practices, the expected return is estimated using the standard Capital Asset Pricing Model (CAPM):

$$E[r_{i,t}] = r_{f,i,t} + \hat{\beta}_i \cdot (R_{M,i,t} - r_{f,i,t})$$

Where $r_{f,t}$ denotes the risk-free rate at time *t*, $\hat{\beta}_i$ denotes the estimated standardized coefficient of a regression of the stock returns on the market reinvestment index, and $R_{M,t}$ is the return of said index.

For the risk-free rate, the *European OverNight Index Average* (EONIA) is used for the European countries, which is a commonly used proxy for the risk-free rate of the Eurozone and it is charged overnight, allowing for easy

incorporation in the CAR formula. The same logic applies to the Fed Funds rate for the US, LIBOR for the UK, and the Canadian Overnight rate for Canadian stocks.

As a market reinvestment index, for each corporation the primary stock exchange of home country is used. The standardized coefficient is estimated using the very same market model, but then applied to a prior period, estimation period $\mathbb{C} = [-421,-21]$. The coefficient can be estimated as follows:

$$\hat{\beta}_i = \frac{s_{r_i,R_M}}{s_M^2}$$

Here, s_{r_i,R_M} is the sample covariance between the stock return and the return on the market and s_M^2 is the sample variance of market return.

The estimation period $\mathbb{C}$ is set to be -421 to -21 days with respect to the ex-rights date as to not be too far in the past as to make sure that the standardized coefficient has not changed significantly since then and is still relevant. Also, the length should not be too great as this would both affect the coefficient if earlier times were characterized by a different beta, as well as make the research too resource-intensive.

For each stock, the primary index of listing will be used, more specifically, a reinvestment index. A reinvestment index is one where dividends are not taken out of the fund but instead reinvested into the index. The reason for choosing said index is that the price of shares that pay out dividends usually drops as capital flows out of company; however, investors still do not lose money and this should hence be controlled for.

Instead of using each stock's primary exchange of listing, a general European index could have been used instead. However, to make sure that the company involved is exposed to the same macroeconomic developments and these can hugely differ amongst countries, they are all paired with their home index. In addition, since investors generally tend to suffer from a so-called *home bias* (…), it is more appropriate to use separate country indices instead of a broad European one.

Approach I: theoretical stock loan fee

As data on the stock loan fee and/or rebate rate is unavailable, an alternative approach has to be taken. The first one is to, instead of using the real data, using a theoretical value based on a solid theoretical foundation. Although this is of course not academically rigorous and the validity and/or reliability of the results will be compromised, it will still not do away with the usefulness of this research. In fact, future researchers who do have access to said data can easily re-do this research and simply substitute these theoretical values with the real ones.

As was mentioned earlier, each broker or custodian uses its own pricing strategy and these may therefore differ substantially from broker to broker. However, in the core, the real determinants of the stock loan fee are supply and demand for stock borrowing. However, short interest data is mostly only available for US stocks.

A first starting point would be research by Engelberg, Reed, and Ringgenberg (2016). They found that in their sample, the 99th decile stocks have a mean stock loan fee of 14.79% per annum.. Note that this is the annual fee; to distinguish between annual and daily rates, throughout this paper capital letters will refer to annualized rates, whereas lowercase letters will denote daily rates. As such, the value for the annualized base borrow rate will be $\Gamma = 0.1479$, which is converted to a daily rate of $\gamma = 3.78$ bps.

Although this value is probably far from accurate for the whole period considered and for all firms in the sample, it is a conservative number.

Positive relationships between the stock loan fee and several short sale constraints have been identified by amongst others Saffi and Sigurdsson (2010). They identified one of these constraints to be the availability of shares to short, the so-called *free float*, which is the percentage of shares that are available for investors to trade (a measure of liquidity) (Saffi & Sigurdsson, 2010). Furthermore, they find turnover (the number of shares being traded as a percentage) to be a significant determinant of the stock loan fee. However, the data on these variables is not available for a large part of the sample and as such, the base rate of 3.78 bps per day is used as the fixed rate.

Note that this is an assumed stock loan fee and this thus by no means representative of the actual level of this fee. Also note that for this purpose of this theoretical stock loan fee, the base rate — and thus the firm-specific short sale constraints — are assumed to be time-independent which is also by no means representative of the actual performance. Clearly, the time periods and sample companies are different and as such this method is by no means accurate for the sample of rights-issuing firms. However, I believe that by having taken a very conservative approach, the value will more likely be too high than two low, resulting in a bias in favour of the null hypothesis of no abnormal returns. Also note that since the stocks will only be sold short for a relatively short period of time, namely two to three weeks, the stock loan fee only has a small impact on the actual performance.

Approach II: inverting the calculation

As a second approach to overcome the problem of data constraints, another method is used: this time, the stock loan fee is not assumed to take on a specific value. Rather, the cumulative abnormal return as calculated in a similar way as described above is constructed to be zero by definition. This way, it is possible to determine the level of the stock loan fee that would make this strategy generate a risk-adjusted return equal to that of the market, in order to then enable investors to determine whether or not the strategy will work based on the stock loan fee (short rebate) they pay (receive) in order to short sell the stock.

Although perhaps not very academically rigorous, this approach will still allow for useful insights and could lay a foundation for future trading strategies: this analysis will allow one to say something about the profitability of the strategy conditional on certain levels of the

stock loan fee. Taking the formula for the CAR and equating it to zero allows for the calculation of the maximum value of the stock loan fee that makes the strategy outperform the market:

$$\prod_{t=1}^{\tau}(1+r_{i,t})(1+\delta_{i,t})-\prod_{t=1}^{\tau}(1+E[r_{i,t}])=0$$

As before, $r_{i,t}$ is the daily stock return of stock i on day t, $\delta_{i,t}$ is the stock loan fee of stock i on day t, and $E[r_{i,t}]$ is the expected stock return of stock i on day t based on the CAPM model. The first element is the product of the realized cumulative stock returns and the stock loan fee (since the stock loan fee increases with the value of the short-sold stocks it is positive in this equation). The second element is the cumulative expected return based on the market model. By equating the two, the maximum stock loan fee to make the short selling strategy outperform the market is derived. Equivalently, it can be written as an equation of the returns of strategy and the expected returns:

$$\prod_{t=1}^{\tau}(1+r_{i,t})(1+\delta_{i,t})=\prod_{t=1}^{\tau}(1+E[r_{i,t}])$$

Which is equivalent to:

$$\prod_{t=1}^{\tau}(1+r_{i,t})\prod_{t=1}^{\tau}(1+\delta_{i,t})=\prod_{t=1}^{\tau}(1+E[r_{i,t}])$$

Which in terms of δ translates to:

$$\prod_{t=1}^{\tau}(1+\delta_{i,t})=\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}$$

Since the maximum stock loan fee represents the average fee for the whole duration of the period, the rate becomes time-independent and the product can be written as follows:

$$(1+\delta_{i,MAX})^{\tau}=\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}$$

Which translates to:

$$\delta_{i,MAX}=\sqrt[\tau]{\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}}-1$$

Rates are usually presented as annual rates; the daily rate can be annualized as follows:

$$\Delta_{i,MAX}=\left(\sqrt[\tau]{\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}}\right)^{365}-1$$

Would the actual stock loan fee be greater than this value, the strategy will underperform; a lower value means that there is an opportunity for the generation of abnormal returns. Note the different notation of small letter δ, which is the daily stock loan fee, vis-à-vis its capital letter Δ, which represents the annualized fee.

Care must be taken, however, as one cannot simply compute the average of the maximum stock loan fee as it is not a linear function, i.e. computing the average of the maximum stock loan fee for the sample and entering the results back into the calculation of the CAR will yield a result different from zero. Therefore, another way of estimating the fee is required: instead of computing an average of the maximum stock loan fee, a weighted average is computed using the τ-th power root of ratio between the expected return and the actual return of the stock (which is the source of the nonlinearity).

Computation of the time-root weighted mean:

$$\delta_{MAX} \sum_{i=1}^{1525} \left[\delta_{i,MAX} \cdot \sqrt[\tau]{\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}} \right] \cdot \frac{1}{\sum_{i=1}^{1525} \sqrt[\tau]{\frac{\prod_{t=1}^{\tau}(1+E[r_{i,t}])}{\prod_{t=1}^{\tau}(1+r_{i,t})}}}$$

Whether or not a significant result can be found, the analysis need not and will not end here. In addition to the preceding approaches, the rest of the methodology will focus to identify specific factors that determine the (non-) profitability of the strategy. The dataset used contains several variables through which the observations can be grouped. These include: country, beta, run-up period return,

Country

The first and perhaps most logical step is to investigate whether there are effects in different countries and how these effects differ per country. The sample is divided on a per-country basis so that it can be analysed if and if so how the results differ per country. Moreover, the country variable is included the final regression to see how the different variables affect each other.

Whether or not the aggregate sample exhibits underperformance for rights-issuing firms, individual countries may or may not exhibit these effects. That is why this part focuses on individual countries that exhibit underperformance by means of confidence intervals: it is determined what the maximum stock loan fee is that renders the strategy profitable and a 95%- and 99%-confidence interval are built around these values. The maximum fee is determined using Approach II using time-roots as weights.

Beta

In order to find out if and if the beta of a stock matters for the outcome of the strategy, the sample is grouped into a *High Beta* group and a *Low Beta* group. Stocks with a high beta are defined as those that have a beta greater than 1 In other words, stocks that carry more systematic risk than the market. This variable is used in two different ways: first, the sample is divided in the two groups and the same analyses as performed earlier will be performed on each group separately. Additionally, the High Beta variable will be included as a dummy variable in the final regression alongside other fundamental variables. One may wonder why the beta is used as arbitrarily assigned high- and low-beta groups instead of using it as a continuous variable. The reason is that the paper aims to identify stock characteristics that determine whether or not the strategy is profitable, it seeks to establish predictive relationships. Hence being able to identify stocks that are likely to underperform by certain criteria, *exempli gratia* a beta higher than 1, is more useful than establishing a relationship that captures the continuous impact.

Final Regression

Lastly, a regression is performed of the CARs for the different points in time of buy-back on Total Assets, Net Income, Run-up return, high beta, trading days, and country. This in order to

identify potential relationships between these variable and the CAR that could aid in identifying the factors that generate abnormal returns for the strategy. Also, it will cancel out any misleading relationships identified in the preceding analyses.

$$CAR = \alpha + \beta_1 TotalAssets + \beta_2 NetIncome + \beta_3 RunupReturn + \beta_4 Highbeta + \beta_5 TradingDays + \sum_{j=1}^{19} \beta_j \cdot Country_j + \epsilon$$

Total Assets

Total assets are the total assets that can be found on the firm's most recent public balance sheet. It is measured as a continuous variable in millions of dollars.

NetIncome

Net Income is the net income that can be found on the firm's most recent public income statement and is measured as a continuous variable in millions of dollars.

Run-up return

The run-up return is the cumulative stock return between the beginning of the estimation window and the day of the rights issue. It includes dividends and is expressed in percentages.

High Beta

High beta is a dummy variable that is equal to one for stocks that have a beta of 1 and equal to zero otherwise.

Trading days

Trading days is the number of days between the effective date (issue date) and the settlement date (end of the trading period) and is expressed as a positive integer.

Country

Country is the country where the company is primarily registered and is measured as a nominal variable that is incorporated as a set of dummy variables in the final regression.

Results

The methodology section described how the research is built up: first, looking at the aggregate. Second, identifying groups that exhibit larger or smaller effects (or an effect at all). Third, regressions to see what fundamentals can be identified as factors that determine the performance of each stock and how these interrelate. Consequently, the results section is separated into three different sections, indicated by Roman numerals.

I: Aggregate sample

The results of the analysis of the aggregate sample can be found in Table 4. It turns out that there is no evidence of consistent underperformance of rights-issuing stocks. Moreover, contrary to expectations the only significant result is one that is positive: for the first quarter of the rights trading period, there is a significant outperformance of the benchmark of 2.41 percentage points, significant at both the 5%- and 1%-level. Since underperformance does not occur, trading strategies trying to profit from it need not be further investigated. However, it may still be possible to group the sample based on fundamental characteristics for which these trading strategies would work. Interesting to note is that there is a clear downward trend in the returns in that at ¼th of the trading period, there is significant outperformance, which decays as the buy-back point moves farther away. Later on it is even in insignificant negative territory.

II: Groups within sample

(A) Countries

The results of the grouping per country can be found in Table 5. From the table, it is evident that for most countries, underperformance cannot be concluded. However, some countries do exhibit (strongly) significant underperformance. Italy, Belgium, the Netherlands, and Finland show significant underperformance for at least one buy-back point in time at the 5%-level. In particular, Italian and Belgian firms are reasonably consistent underperformers. Italy's underperformance is significant at the 5%, 1%, and even 1‰ levels for all but ¼th, where it is only significant at the 5% level. Belgium, though less than Italy, also shows significant underperformance at the 5%-level for most points in time. That is why these two countries qualify for the subsequent analysis where the performance of the trading strategy is examined.

Table 4: Cumulative abnormal return of total sample

Point of buy-back	Mean	SE	t-value
¼	2.41%	0.92%	2.61 ***
⅓	0.26%	1.05%	0.24
½	0.16%	0.93%	0.17
⅔	-0.06%	0.86%	-0.07
¾	-0.17%	0.81%	-0.21
Φ	-0.60%	0.83%	-0.72

Table 5: Cumulative abnormal return per country per buy-back point

Cumulative Abnormal Return per country per buy-back point

		¼				⅓			
Country	**N**	**Mean**	**SE**	**t-value**		**Mean**	**SE**	**t-value**	
Austria	39	3,92%	2,17%	1,8	*	4,40%	2,70%	1,62	
Belgium	39	1,87%	2,20%	0,86		-5,30%	1,70%	-3,13	***
Canada	9	-7,43%	5,13%	-1,45		-2,20%	8,90%	-0,24	
Denmark	10	-1,44%	4,60%	-0,31		-1,60%	4,70%	-0,35	
Finland	15	-1,90%	3,80%	-0,49		-4,90%	2,90%	-1,68	
France	231	0,82%	0,96%	0,86		0,70%	1,90%	0,4	
Germany	358	3,72%	1,20%	3,08	***	1,60%	1,30%	1,17	
Greece	18	-2,60%	3,60%	-0,72		-2,30%	5,60%	-0,42	
Ireland	16	0,50%	3,80%	0,14		9,00%	7,30%	1,24	
Italy	95	-2,90%	1,20%	-2,43	**	-5,60%	1,10%	-5,04	****
Luxembourg	2	-0,60%	2,10%	-0,3		-4,00%	0,40%	-10,97	*
Netherlands	27	2,37%	5,30%	0,45		-7,60%	4,70%	-1,62	
Norway	29	1,50%	3,60%	0,41		-5,80%	5,20%	-1,12	
Poland	11	-1,60%	5,40%	-0,3		0,40%	4,10%	0,1	
Spain	55	2,10%	1,80%	1,15		1,10%	2,30%	0,47	
Sweden	64	0,60%	3,60%	0,16		-4,50%	3,40%	-1,31	
Switzerland	95	-2,30%	2,18%	-1,07		0,70%	2,00%	0,37	
United Kingdom	362	3,10%	2,60%	1,18		3,10%	4,20%	0,74	
United States	50	1,70%	3,00%	0,56		-2,50%	2,70%	-0,91	

Table 5 - continued

Cumulative Abnormal Return per country per buy-back point

		½				⅔			
Country	**N**	**Mean**	**SE**	**t-value**		**Mean**	**SE**	**t-value**	
Austria	39	4,6%	2,9%	1,58		3,2%	2,6%	1,23	
Belgium	39	-4,3%	1,5%	-2,82	***	-3,5%	1,7%	-2,04	**
Canada	9	-2,9%	9,0%	-0,32		-3,3%	9,1%	-0,36	
Denmark	10	-4,1%	6,1%	-0,68		-4,3%	8,3%	-0,52	
Finland	15	-5,4%	2,7%	-1,98	*	-6,5%	3,4%	-1,90	*
France	231	0,7%	1,9%	0,35		0,5%	2,0%	0,26	
Germany	358	2,0%	1,4%	1,38		2,1%	1,6%	1,31	
Greece	18	-2,1%	5,9%	-0,35		-3,1%	6,7%	-0,46	
Ireland	16	1,4%	5,2%	0,28		-1,6%	5,4%	-0,30	
Italy	95	-6,3%	1,1%	-5,57	****	-7,8%	1,2%	-6,36	****
Luxembourg	2	-3,6%	3,4%	-1,05		-0,4%	0,7%	-6,34	*
Netherlands	27	-8,4%	4,7%	1,79	*	-9,2%	4,3%	-1,86	*
Norway	29	-5,2%	5,4%	-0,96		-4,3%	5,3%	-0,81	
Poland	11	1,3%	4,2%	0,32		0,5%	4,0%	0,12	
Spain	55	0,4%	2,1%	0,21		1,6%	2,4%	0,66	
Sweden	64	-4,0%	3,5%	-1,14		-5,5%	3,7%	-1,47	
Switzerland	95	1,2%	2,0%	0,58		1,0%	1,9%	0,54	
United Kingdom	362	2,4%	3,4%	0,72		1,6%	2,8%	0,59	
United States	50	-2,4%	2,7%	-0,89		-1,4%	3,1%	-0,45	

Table 5 - continued

Cumulative Abnormal Return per country per buy-back point

		¾				Φ			
Country	**N**	**Mean**	**SE**	**t-value**		**Mean**	**SE**	**t-value**	
Austria	39	2,8	2,1%	1,24		2,4%	2,1%	1,14	
Belgium	39	-4,3%	1,7%	-2,53	**	-3,4%	2,0%	-1,70	*
Canada	9	-3,5%	9,2%	-0,38		-3,9%	9,8%	-0,40	
Denmark	10	-3,3%	7,8%	-0,43		-6,7%	7,1%	-0,94	
Finland	15	-7,5%	3,7%	-2,05	*	-9,5%	3,9%	-2,46	**
France	231	-0,8	1,4	-0,59		-1,9%	1,3%	-1,43	
Germany	358	1,9	1,5%	1,25		1,3%	1,5%	0,84	
Greece	18	-2,1%	6,4%	-0,33		-3,1%	6,3%	-0,48	
Ireland	16	-3,6%	5,3%	-0,68		-2,9%	5,5%	-0,53	
Italy	95	-7,3	1,3%	-5,56	****	-7,6%	1,4%	-5,42	****
Luxembourg	2	-8,8	3	-2,92		-12,6%	6,6%	-1,92	
Netherlands	27	-10,9	5	-2,17	**	-10,4%	4,8%	-2,18	**
Norway	29	-7,1%	5,2%	-1,35		-6,5%	5,1%	-1,27	
Poland	11	-0,38	4,1	-0,09		1,7%	4,3%	0,39	
Spain	55	1,1%	2,3%	0,48		0,1%	2,4%	0,04	
Sweden	64	-5,8	3,7	-1,55		-8,5%	3,8%	-2,27	**
Switzerland	95	2,5	2,6	0,95		2,8%	2,6%	1,10	
United Kingdom	362	3,1	2,9	1,1		2,4%	2,9%	0,81	
United States	50	-2,5	3,5	-0,72		0,0%	3,6%	-0,03	

(B) Beta

The sample can be divided in a high-beta group and a low-beta group. High beta implies a higher systematic risk (Sharpe, 1964) and as such there is a chance that high-beta stocks react differently to a rights issue than lower-beta ones do. From Table 6, it can be noted that there is no statistical evidence that higher-beta stocks either over- or underperform, with the exception of high beta outperformance at ¼th of the trading period at the 5% level.

III: Analysing Individual Countries

For the analysis where the stock loan fee is regarded as given, as shown in Table , it became clear that for Italy the strategy is profitable taking into account the cost of short-selling at all relevant significance levels for most buyback points. For Belgium, at the 5% level, only at the ⅓rd, ½lf, and ¾th of the trading period the strategy yields returns. In the Netherlands, the strategy does not yield returns that are significant at the 5% level and the same applies to Finland with the exception of the end of the trading period. In short, for Italy and Belgium the trading strategy does yield significant positive returns, given a stock loan fee of 14.79% per annum.

The second part zooms in on two individual countries that turned out to have significant underperformance in the previous part: Italy and Belgium. Two approaches were used: one where the stock loan fee is regarded as given and fixed at 3.78bps per day. In addition one where the maximum stock loan fee to render the strategy profitable is used; the results can be found in Table 8. As it turns out, consistent with the previous analysis, Italy is particularly suitable to employ a rights-issuing stocks shorting strategy: for all investigated points of buy-back the maximum stock loan fees that make a trading strategy profitable are extremely high, ranging from 135% to 481% per annum. This translates to a lower confidence interval boundary that is very high at the 5% level and relatively high at the 99% level too. Intervals show that a lower stock loan fee is required to make the strategy work for Belgium, yet still far exceeding reasonable levels at the 95% confidence interval. The lower bound for the ¼th point confidence intervals even reach into negative territory, making potential profits for the strategy in Belgium uncertain.

Table 6: Cumulative Abnormal Return for High Beta stocks

Point in time	N	High Beta	SE	t-value
¼	190	4,0%	2,0%	1,98 **
⅓	190	4,4%	2,7%	1,62
½	190	4,5%	2,8%	1,61
⅔	190	3,4%	2,9%	1,16
¾	190	2,9%	2,7%	1,10
Φ	190	2,0%	2,6%	0,77

IV: Final Regression

For the final regression, none of the variables turned out to have a significant coefficient on the CAR, the only exception being Run-up return for the end-of-trading-period point of buy-back. A percentage point increase in the run-up return is associated with a 0.02 percentage point decrease in CAR. Besides this, all other variables are insignificant and as such the table can be found in the appendix.

Table 7:CAR when a stock loan fee of 14.79% per annum is applied

		N	Mean	SE	t-value	
¼	Belgium	39	2,6%	2,2%	-1,83	*
	Italy	95	-2,2%	1,2%	1,20	
	Netherlands	27	3,1%	5,3%	0,59	
	Finland	15	-0,8%	3,9%	-0,21	
⅓	Belgium	39	-4,6%	1,7%	-2,70	**
	Italy	95	-4,9%	1,1%	-4,40	****
	Netherlands	27	-6,9%	4,7%	-1,46	
	Finland	15	-3,9%	2,9%	-1,33	
½	Belgium	39	-3,6%	1,5%	-2,33	**
	Italy	95	-5,7%	1,1%	-4,94	****
	Netherlands	27	-7,7%	4,7%	-1,64	
	Finland	15	-4,4%	2,8%	-1,61	
⅔	Belgium	39	-2,8%	1,7%	-1,61	
	Italy	95	-7,1%	1,2%	-5,78	****
	Netherlands	27	-8,5%	5,0%	-1,71	*
	Finland	15	-5,6%	3,5%	-1,60	
¾	Belgium	39	-3,6%	1,7%	-2,10	**
	Italy	95	-6,7%	1,3%	-5,02	****
	Netherlands	27	-10,2%	5,1%	-2,02	*
	Finland	15	-6,5%	3,7%	-1,77	*
Φ	Belgium	39	-2,8%	2,0%	-1,34	
	Italy	95	-6,9%	1,4%	-4,91	****
	Netherlands	27	-9,8%	4,8%	-2,03	*
	Finland	15	-8,6%	3,9%	-2,20	**

Table 8: Maximum stock loan rate to make strategy profitable

	τ	Daily rate	Per annum	SE	Lower Limit (95%)	Lower Limit (99%)	95% Confidence per annum	99% Confidence per annum
Italy	¼	0,23%	135%	0,08%	0,08%	0,03%	33%	11%
	⅓	0,35%	254%	0,07%	0,21%	0,17%	117%	85%
	½	0,39%	310%	0,07%	0,24%	0,20%	144%	106%
	⅔	0,48%	471%	0,08%	0,32%	0,26%	216%	160%
	¾	0,45%	407%	0,09%	0,28%	0,22%	174%	125%
	Φ	0,48%	481%	0,09%	0,30%	0,24%	199%	141%
Belgium	¼	-0,05%	-15,8%	0,09%	-0,22%	-0,28%	-55,6%	-63,9%
	⅓	0,27%	167,7%	0,06%	0,15%	0,11%	74,0%	51,3%
	½	0,21%	113,3%	0,05%	0,10%	0,07%	45,3%	28,2%
	⅔	0,19%	98,5%	0,06%	0,08%	0,04%	33,1%	17,0%
	¾	0,23%	132,4%	0,06%	0,12%	0,09%	56,0%	37,1%
	Φ	0,20%	105,2%	0,06%	0,07%	0,03%	30,3%	12,5%

Conclusion

This paper analysed a trading strategy that aims to exploit downward price pressure on rights-issuing stocks. From several thorough analyses, it followed that such strategies do not work as a general rule. Nevertheless, the results could still prove valuable as it was found that for two countries, namely Italy and Belgium, underperformance for rights-issuing stocks does occur. In order to calculate the expected profit from said strategies, however, the actual data on the stock loan fees is required, rather than the proxies used in this paper. It therefore remains more of an indicative rather than rigorous method to examine the feasibility of the strategies. As the strategy does work for Italy, it may be beneficial to include this as a factor in a (an alternative beta) portfolio.

It turned out that none of the examined fundamental factors could predict whether or not the strategy does in fact yield significant returns, aside from the countries Italy and Belgium.

The main and most obvious limitation is the use of theoretical values for the stock loan fee or the inversion of the formulæ to calculate the maximum stock loan fee, rather than using the actual data itself. As already explained earlier, I did not have access to this data. Researchers who do have access to this data are welcomed to proceed the analysis and find out how well the strategy would actually perform for these two countries. Also, when focusing on just two countries, a larger sample can be used and perhaps a larger beta estimation period to obtain a more accurate beta for the stocks. Next to this, other grouping factors could be analysed in order to identify more factors that contribute to the profitability for the trading strategy. It might also be interesting to research how the pay-off of the strategy has evolved over time or how a long-Germany rights issuers and short-Italy rights issuers-strategy would perform.

In short: investors who wish to exploit the underperformance of rights-issuing firms should short sell Italian and Belgian rights-issuing firms and buy back the shares at ⅔ of the trading period for Italian firms and at ⅓ for Belgian firms.

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Appendix

Table A: Results of the regression of CAR on various variables

	¼			⅓			½			⅔			¾			Φ		
	β	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**
Country																		
Belgium	-0.02	0.09	-0.29	-0.10	0.10	-1.06	-0.10	0.09	-1.12	-0.07	0.08	-0.93	-0.08	0.07	-1.05	-0.07	0.08	-0.87
Canada	-0.09	0.14	-0.62	-0.08	0.16	-0.51	-0.10	0.14	-0.68	-0.08	0.13	-0.62	-0.09	0.12	-0.75	-0.09	0.13	-0.73
Denmark	-0.06	0.13	-0.43	-0.04	0.15	-0.28	-0.07	0.14	-0.51	-0.06	0.12	-0.47	-0.04	0.12	-0.34	-0.07	0.12	-0.59
Finland	-0.08	0.11	-0.71	-0.09	0.13	-0.67	-0.09	0.12	-0.81	-0.09	0.11	-0.88	-0.09	0.10	-0.91	-0.11	0.10	-1.06
France	-0.04	0.06	-0.62	-0.03	0.07	-0.47	-0.04	0.07	-0.57	-0.03	0.06	-0.42	-0.03	0.06	-0.51	-0.04	0.06	-0.61
Germany	0.05	0.06	0.77	-0.03	0.07	-0.42	-0.03	0.06	-0.48	-0.01	0.06	-0.17	-0.02	0.06	-0.35	-0.02	0.06	-0.37
Greece	-0.08	0.11	-0.70	-0.07	0.12	-0.56	-0.07	0.11	-0.66	-0.07	0.10	-0.66	-0.05	0.09	-0.52	-0.05	0.10	-0.55
Ireland	-0.04	0.11	-0.39	0.04	0.13	0.35	-0.03	0.11	-0.30	-0.05	0.10	-0.49	-0.07	0.10	-0.68	-0.06	0.10	-0.56
Italy	-0.06	0.07	-0.88	-0.10	0.08	-1.27	-0.11	0.07	-1.58	-0.11	0.07	-1.70*	-0.11	0.06	-1.76*	-0.11	0.06	-1.68*
Luxembourg	-0.05	0.20	-0.25	-0.05	0.23	-0.21	-0.05	0.20	-0.25	-0.04	0.18	-0.23	-0.05	0.17	-0.31	-0.07	0.18	-0.41
Netherlands	-0.03	0.09	-0.35	-0.14	0.10	-1.39	-0.15	0.09	-1.64*	-0.14	0.08	-1.70*	-0.15	0.08	-1.86*	-0.10	0.08	-1.30
Norway	-0.04	0.09	-0.43	-0.10	0.11	-0.98	-0.10	0.09	-1.07	-0.08	0.09	-0.89	-0.10	0.08	-1.19	-0.09	0.08	-1.06
Poland	-0.07	0.12	-0.56	-0.07	0.14	-0.48	-0.06	0.13	-0.50	-0.06	0.12	-0.53	-0.06	0.11	-0.57	-0.04	0.11	-0.35
Spain	-0.01	0.08	-0.18	-0.04	0.09	-0.45	-0.05	0.08	-0.64	-0.02	0.07	-0.32	-0.03	0.07	-0.39	-0.03	0.07	-0.46
Sweden	-0.03	0.08	-0.41	-0.07	0.09	-0.84	-0.08	0.08	-1.00	-0.08	0.07	-1.13	-0.08	0.07	-1.22	-0.10	0.07	-1.52
Switzerland	-0.04	0.07	-0.62	-0.05	0.08	-0.70	-0.06	0.07	-0.84	-0.04	0.06	-0.66	-0.04	0.06	-0.60	-0.03	0.06	-0.52
United Kingdom	-0.01	0.06	-0.14	-0.01	0.07	-0.16	-0.02	0.06	-0.30	-0.01	0.06	-0.23	0.00	0.06	0.05	0.00	0.06	-0.03
United States	-0.02	0.08	-0.27	-0.08	0.09	-0.91	-0.09	0.08	-1.13	-0.06	0.07	-0.85	-0.08	0.07	-1.11	-0.05	0.07	-0.70
Total Assets	0.00	0.00	-0.98	0.00	0.00	-0.19	0.00	0.00	-0.43	0.00	0.00	-0.55	0.00	0.00	-0.23	0.00	0.00	-0.41
Net Income	0.00	0.00	-0.01	0.00	0.00	0.26	0.00	0.00	0.03	0.00	0.00	0.18	0.00	0.00	0.15	0.00	0.00	0.15
Trading days	0.00	0.00	1.43	0.00	0.00	-0.43	0.00	0.00	-0.65	0.00	0.00	-0.53	0.00	0.00	-1.25	0.00	0.00	-1.20
Run-up period return	-0.02	0.01	-1.84*	-0.02	0.01	-1.29	-0.02	0.01	-1.42	-0.02	0.01	-1.63	-0.02	0.01	-1.94*	-0.02	0.01	**-2.05****
High Beta	0.03	0.03	1.10	0.06	0.04	1.56	0.06	0.03	1.92*	0.05	0.03	1.71*	0.04	0.03	1.56	0.03	0.03	1.20
Constant	-0.02	0.07	-0.29	0.06	0.08	0.68	0.07	0.07	0.91	0.05	0.07	0.70	0.07	0.06	1.08	0.07	0.07	1.01