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Effects of changes in the Icelandic capital controls

An event study on the stock price of Össur hf.

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Foreword

The advisor of this thesis is Martin Strieborny. I would like to thank Mr. Strieborny for being readily available and for invaluable advice throughout writing of the thesis. I would also like to thank Ásta Brá Hafsteinsdóttir for her moral support and extremely helpful comments throughout the process of writing the thesis.

Abstract

The aim of the thesis is to examine whether changes in the capital controls affect the premium of the cross-listed stock of Össur hf., it is listed on the Icelandic and Copenhagen stock exchange. The price difference is examined with two currency rates, the official rate as given by the Central bank of Iceland and the offshore rate. The Icelandic market is bounded within capital controls, while the market in Denmark is not. From the introduction of the capital controls in 2008, they have been a subject of continuous change, and this study examines the effects of these changes on the premium between the Icelandic and Danish Össur stocks. The study uses a *market model*, adjusted for time-varying volatility, which contributes more concrete results. The results from the study indicate strongly, that the price differential is affected by the changes in the capital controls. Moreover, how the change is implemented is a key factor in the overall significance of the change.

Keywords: Capital controls, Cross-listing, GARCH, market model, premium

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1   Introduction

After the financial crisis in 2008 and its aftermath, only four Icelandic companies remained on the Nasdaq OMX Iceland, down from 26 firms the year before. In the past few years the Icelandic stock market has started growing again and currently there are 13 firms registered on the Nasdaq OMX Iceland with many new listing in the last three years. One of the companies that survived the turmoil of the financial crisis was Össur hf., an Icelandic prosthetic manufacturer. Össur hf., was initially listed on Nasdaq OMX Iceland in 1999, and in 2009 it became the only cross-listed Icelandic firm when it was registered on the on the Copenhagen Stock Exchange (Össur, 1999 & 2009).

According to traditional investment theory all uncertainty is priced into stocks and arbitrage opportunities should not arise. The argument is intuitive, if such an opportunity appears, market participants will use it to their advantages, until the gap is eliminated and arbitrage is no longer available. When the same asset differs in price in two different markets there should always be a rational explanation, more specifically, difference in risk level between the two markets (e.g. Santis and Gérard, 1998; Amihud and Mendelson, 1986).

During the 2008 financial crisis capital controls were established in Iceland to restrict outflows and inflows of capital and have remained with some alteration since then. Several studies have investigated the effects of capital controls on the economy (e.g. Satyanath and Berger, 2007), and others the effects on asset pricing (e.g. Forbes, 2007). In general, the results are less than impressive with lacklustre performance for countries with capital controls, and distorted stock markets within those countries. In Iceland, scholars and politicians have been keen on pointing out the importance of abolishing the capital controls, but to this day no such plan has been put forward (e.g. Daníelsson, 2015; Benediktsson, 2013). Therefore, it is apparent that capital controls will define the Icelandic economy for at least the next few years.

Some studies have found that the price of the same asset can differ for long periods of time in segmented markets (e.g. Ma, 1996; Hietala, 1989). The basis of this, is that there are some features on the domestic or foreign market that drive a wedge between

the prices. This applies directly to the Icelandic situation, for Össur. Therefore, the Icelandic capital controls, even though they lead to great inefficiency, have created a unique opportunity for research, since the same asset, Össur hf., is listed on two markets, where one market is restricted by capital controls, and the other a free market, Denmark. In addition, the capital controls have been changed fourteen times since Össur was listed in Copenhagen, which presents an opportunity to examine whether those changes affect asset pricing.

The empirical part of the thesis focuses on whether changes in the capital controls affect the price relationship between the two markets. The study will compare the stock prices of Össur on the Icelandic and Danish market. The difference in price will be estimated, with special focus on the effects on the deviation when the capital controls are modified. The difference in the stock price will be examined with two currency rates of the Icelandic Krona (ISK), the official currency rate as reported by the Central Bank of Iceland (CBI) and the offshore currency rate as published by Citibank.

The method of choice in this research is an *Event study*. It is a traditional method in finance to estimate the effects of a single or multiple events. This method is widely recognized as an estimation method and has been used in a variety a papers regarding effect of events on economic variables (e.g. Brockett et al., 1999 and Wang et al., 2002).

The study has the potential to have explanatory power on to what extent the capital controls affect the asset prices in Iceland. The results may help investors understand the effects of abolishing the capital controls, or what effect future changes will have on the stock price of Össur. When, or if, markets become free in Iceland, the expectation is that the stocks of Össur should be equally priced due to the no arbitrage principle. The purpose of this research is to estimate the effects of changes in the capital controls on the price premium between the Icelandic and Danish stocks of Össur.

Do changes in the capital controls affect the premium between the Icelandic and Danish stock of Össur?

The results of the study seem to indicate that changes in the capital controls have an effect on the stock prices, and the premium between the Icelandic and Danish stocks of Össur. However, the significance of the changes seems to depend heavily on how they

are implemented and how comprehensive the law changes are. Unanticipated changes seem in general to have greater effect on the premium and the stock price of Össur than anticipated changes. In comparison, US healthcare firms are examined, which are not, in general, effected significantly during the event windows. This suggests that the significant effects are not caused by variables affecting the whole healthcare industry. Furthermore, Icelandic firms were also tested in comparison, and a majority of firms report significant returns during the event period. This result indicates that the capital controls are a state variable, but they affect firms differently depending on their foreign exposure. Companies with great foreign exposure, such as Össur, seem to show the most significant returns when the controls are tightened.

The Icelandic stock market, and subsequently Össur's stock price, has received little attention in the literature. The biggest contribution of the thesis is both the study itself, on the effects of changes in the capital controls, and the data collected regarding the changes in the capital controls. The data is hand collected from several sources, governmental agencies responsible for the changes, then news from media outlets, and responses from financial analysts are examined to estimate both interest and expected effect of the change. Due to the special nature of the capital controls, all information is concentrated in Iceland while global news sites do no show the situation as much interest. Therefore, almost all information is only available in Icelandic, limiting potential researchers to the ones who are fluent in Icelandic, even though the topic and the situation is very unique.

The thesis is divided into four sections. Chapter 2 reviews the existing literature on liquidity, currency risk and studies on premiums between the same assets on two markets. The situation in Iceland is also briefly introduced. In chapter 3 the methodology of the thesis is introduced and explained. In chapter 4 the empirical results are presented. Finally, chapter 5 concludes the thesis, where the results are drawn together and concluding remarks made.

2 Literature review

Several studies have looked at capital controls and its effect on the economy and asset pricing (e.g. Forbes, 2007, Li et al., 2004). One of the problems when studying capital controls is that conventional measures usually do not account perfectly for how intensive the controls are, making comparison across countries difficult (Chinn & Ito, 2008). In this chapter, the most important results from the literature are introduced. Studies on the linkage between uncertainty and price of assets are presented, with emphasis on currency risk and liquidity, which are a prominent problems in Iceland. Next, studies on the effects of capital controls on asset prices are presented. Finally, the situation in Iceland is briefly introduced.

2.1 Liquidity

In 1986, Amihud and Mendelson published a revolutionary paper, where they state that liquidity is an important factor in the CAPM. In the study, they used the bid-ask spread as a proxy for how liquid stock prices are. According to them, asset pricing is a function of liquidity, among other things, and assets with poor liquidity are in general lower priced than similar assets with better liquidity.

One of the problems using liquidity as a factor, is the difficulty of measuring it, but much like risk there is not a coherent measure of liquidity. In a later paper by Amihud (2002), a new and simple measure for liquidity is suggested that can be calculated using readily available information from stock markets around the world:

$$ILLIQ_{iy} = \frac{1}{D_{iy} \sum_{t=1}^{Diy} |R_{iyd}|} / VOLD_{ivyd}$$

The stock illiquidity is defined as the average ratio of daily absolute return to the trading volume of that day. *VOLD* is the daily volume in dollars, R_{iyd} is the return on stock *i* on day *d* of year *y* and *D* is the number of days for which data is available for the stock.

Since the paper from Amihud and Mendelson in 1986 was published, a variety of research has been conducted on the importance of liquidity with regards to stock returns. In their recognized paper from 2002, Pastor and Stambaugh found that market-wide

liquidity seems to be a state variable which is an important factor in pricing common stocks. Stocks that are more sensitive to liquidity will on average earn higher returns, indicating that investors want compensation to take on illiquid assets. Bekaert, Harvey and Lundblad (2007) looked at the effect of liquidity on returns in emerging markets in Asia and Latin America. The results were as expected, illiquid stocks have higher returns than more liquid stock. The reasoning is, as predicted by CAPM, that investors have to be compensated for higher risk, resulting from illiquidity, with higher returns.

In an interesting study conducted by Forbes (2007), she points out the curious effects of capital controls on prices. An important distinction is made between restriction on inflows and outflows. Reducing capital inflows, makes it difficult for foreign investors to invest in the economy, hence reducing valuable information and liquidity. However, restricting outflows can increase liquidity, due to the fact that domestic investors can no longer invest and raise capital on foreign markets. Under these circumstances, it is likely that assets on the market will be wrongly valuated. As Forbes points out, this is more common in lesser developed financial markets, where foreign investors could bring their expertise to value assets more correctly. Forbes' research contribution relates to the overall effect of capital controls on the market and the disturbances created.

These studies, however, do not look at cross-listing and the potential price differential that can arise due to variety of reasons. This thesis will take a much narrower look at the effects of capital controls, and the potential effects on prices of the same asset in two different markets.

The illiquidity on the Icelandic market may affect the results from this study. The Icelandic market is young, small and is dominated by large investors, both institutional and private, that have had difficulties moving large positions both prior and after the onset of the capital controls. (Finnbogadóttir, 2011). The largest investors, primarily pension funds, hold approximately 43% of stocks in all publicly issued firms. The pension funds usually apply a buy-and-hold strategy, rarely responding to external events (Jónsson and Sigurgeirsson, 2014). The lack of efficiency, may introduce bias against finding significant results, when the capital controls are modified, due to the fact that the market is already very illiquid

2.2 Currency risk

In a comprehensive study by De Santis and Gérard (1998), they describe in detail the importance of currency risk on asset pricing. Allowing for time varying currency risk, they find that currency risk is a priced factor in securities. For non-US markets in the study, the currency premium explains a large portion of the total risk premium, up and to 64% of the total risk. Due to the low dependence on foreign markets the US risk premium, however, is almost solely explained by market risk.

Griffin and Stulz (2001) examine the effects of currency shocks on stock returns, on six large market. The study reaches a conclusion, contrary to the view of Santis and Gérard earlier research on the importance of the exchange rate. The effects of the exchange rate shocks on the performance of industries are little or insignificant, even in countries and industries highly dependent on international trade. They state that the most likely explanations is that firms use financial instruments and operations as a hedge to mitigate the effect of exchange rate shocks of firms.

In a study by Antell and Vaihekoski (2007), they examine the Finnish market from 1970 to 2004, and implement a GARCH-M framework to allow a time varying variance-covariance process. The research examines the effect from a foreign investor perspective, particularly US investors. They find indications of the currency risk being significantly different from zero, and priced into the stock market. They also point at the dangers of using traditional market models when estimating small stock markets.

These studies indicate that currency risk has a large effect on how assets are priced on the stock market. As Griffin and Stulz (2001) point out, effects of exchange rate risk can be mitigated by using financial instruments and hedging. However, the derivatives market in Iceland is very primitive, and thus many firms do not use, or have access to these kind of instruments. As a result, currency risk is even more important in the Icelandic market, especially to Össur which is one of few companies with most of their income and costs in Euros. If changes in capital controls affect the risk associated with the ISK it should increase the possibility of detecting significant returns in the stock price of Össur around the changes.

2.3 Capital controls and stock prices

When studying the topic of price differential, between the same assets on two different markets, Ma (1996) found some interesting results. The subject was China, where capital controls were an important factor and somewhat resembled the situation in Iceland, were citizens in China were not allowed to hold and buy foreign currency freely. In the stock market, Chinese firms issued two types of shares, A and B. With A class only available for Chinese citizens and B class for foreigners and traded in foreign currency. The result of the study, contradicting many other studies, is that the B class stocks were sold at a discount. The study furthermore concludes, that based on this evidence, the price between the same stocks may differ between markets if the markets are segmented. The price differential may be caused by a variety of factors e.g. regulatory rules, risk aversion of investors and diversification value of stock in any given market. Another study on price differential comes from Finland (Hietala, 1989), where the situation on the stock market was also similar to the Icelandic market today. Before 1986, investors were not allowed to hold foreign securities without a special permission from the Bank of Finland. For most stocks, foreign holdings were limited to a maximum of 20% per company. These companies represented about 80% of the market, so there were essentially two types of stocks for any given company on the market, stocks restricted to Finnish investors only and stocks unrestricted for all investors to own. Hietala designed a model for the Finnish market, which entails that if foreign investors have lower rate of return than Finnish investors, the unrestricted stock will trade on a higher price than the restricted one. When the rate of return for foreign investor is higher than the Finnish investor, the price of the two stock should be identical, Finns will buy up the stocks and the foreigners will invest elsewhere. The empirical findings support this theory in Finland, where for some stock there is a significant premium on the unrestricted stock but never the other way around.

Both these papers reach a conclusion that supports the potential of different pricing of the same assets if the markets in question are segmented. Both studies look for explanations of why there exists a price differential for the same assets. The present study, however, makes no such attempt. The reason for the potential difference in price is assumed to be caused by the capital controls. As well, this study looks at individually

influencing events that might cause changes in the premium or in some instances force a premium into existence.

Lastly, in related work by Sigfússon and Björnsson (2014), the overall effect of capital controls on the stock market in Iceland is examined. It is a multiple based research, where Icelandic companies are compared to comparable foreign companies. The result indicate that six of the ten stocks on the market are influenced by the capital controls, overpriced compared to their foreign counterparts. However, there is no discussion about the cross-listed Össur, and whether changes in the capital controls have had any effect. Nevertheless, the research is still noteworthy, as it suggests that the capital controls have price distorting effects on the stock market. The study also has some drawbacks, multiple based comparison is in itself flawed and comparing Icelandic companies to their larger foreign counterparts using only multiples can lead to a misevaluation (McKinsey, 2010). The intuition behind Icelandic stocks being overpriced is clear, Icelandic investors are restricted to invest domestically. In general, this leads to higher than optimal investment on the domestic market. This increased demand from Icelandic investors is believed to be greater than the foregone interest from foreign investors due to the capital controls (Iceland Chamber of Commerce, 2014).

2.4 Capital controls in Iceland

The purpose of the capital controls, set in October 2008, was to reduce inflows and outflows of capital to and from the country, to stabilize the currency and the economy. This in effect eliminated the existing currency market and regular currency transactions in Iceland. In 2009, inflows of capital were permitted again, while the outflows were restricted even further. Despite recurring modifications, the foundation of the capital controls is still restrictions on outflows. Since the legal basis of the Icelandic capital controls is very comprehensive, the full chronology of the changes and history of the laws are left to the appendix.

ISK/EUR and Capital controls

Figure 1: Capital controls established (black line), capital controls tightened (dotted lines)

As can be seen in figure 1, it is hard to deny that the goal of stopping the free fall was successful, at least in the very short run. But one of the criticism, has however, been on how often the CBI and government have had to step in and change the laws on the capital controls in order to strengthen the ISK.

Historically, changes in the exchange rate have passed through the economy quickly, often leading to inflation spikes. Furthermore, a high correlation between the currency rate and inflation has been present in the Icelandic market. Both can be seen in figure 2. Moreover, over two thirds of corporate debt was in foreign currency at the time of the crisis, while most firms only had income in ISK (Baldursson and Portes, 2013).

Monthly changes
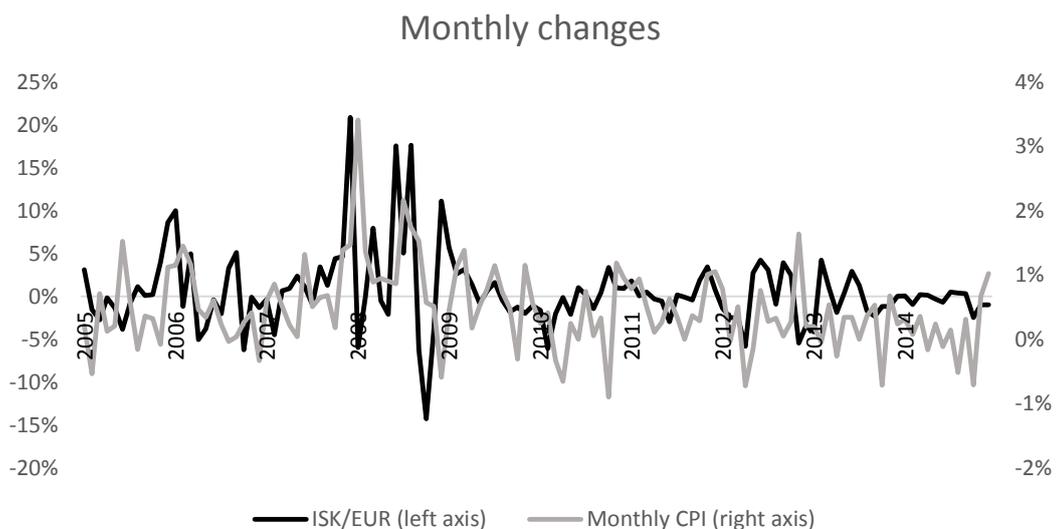
Figure 2: CPI and ISK/EUR

The exchange rate depletion, would have led to an extreme situation for households as well. Most of Icelandic households had indexed linked mortgages, which would have surged upwards, with increased inflation following the plummet in the domestic currency. A large portion of the private consumption, were foreign goods that would have increased substantially in price as well. A smaller part of households had their mortgages in foreign currency and their income in ISK, would have defaulted, had the currency been allowed to deplete (Schwartz, 2011).

2.5 Offshore rate

After the capital controls were established two markets for the ISK were created. The official CBI rate, the onshore rate, and the offshore rate of the ISK. Generally, an offshore rate refers to the exchange rate of a given currency outside of that country. In Iceland, the offshore rate applies to ISK owned by foreign individuals that got stuck in Iceland after the crisis, since they are restricted by the capital controls. These specific holders of offshore ISK, have very limited investment options with their ISK. In figure 3 the two exchange rates are plotted, where the starting point of the offshore rate is the implementation of the capital controls.
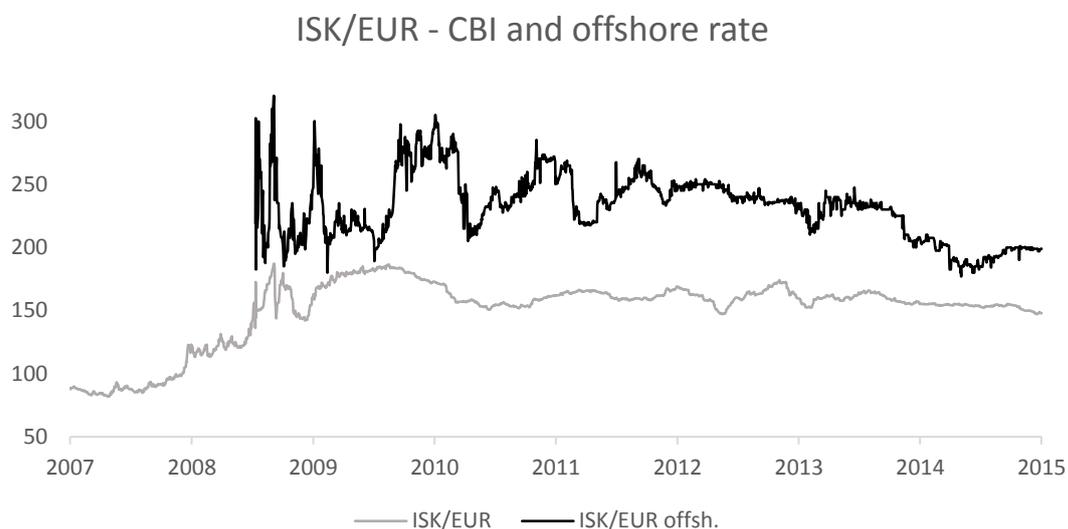
Figure 3: Historical exchange rate

The offshore rate has been considerably more volatile than the official currency rate, as the CBI cannot effect that rate as effectively as the official rate. Both these currency rates will be examined, and their implications on the effects of the study.

3 Methodology

In this chapter the methodology of the event study will be introduced along with the standard methods used in an event study. Then, the method that is used in the study is introduced, *the market model*, and the adjustments that are made to the traditional model and its specific application for this study. Next, the data that is used in the study is presented, and finally, the expected response to various events is predicted.

3.1 Event study

One way to measure the effects of certain events on other variables in economics and finance is an event study. The event study requires an estimation period where normal returns are estimated and an event window where the effects of the event are examined. The difference between the expected normal returns and actual returns in the estimation period is generally called abnormal returns. For the past decade there has been a variety of research using event studies, most studies follow a standard procedure, designed by MacKinley in 1997 and others have supported (e.g. Konchitchki and O'Leary, 2011). This procedure will be followed in this study and is listed below:

1. **Event definition**: The first task, is to define the event of interest, and how long the period, that the returns are estimated, should be, the *event window*.

2. **Selection criteria**: The next task is to decide which securities should be included in the study. Usually, event studies aggregate security returns with respect to certain features (e.g. size or industry), in order to get the overall effect of the event.

3. **Measuring normal and abnormal returns**: Normal returns are the expected returns if the event in question does not take place. Formally, it can be written as, $E[R_{it}|\Omega_{it}]$, where R is the return for firm i at time t and Ω is the conditioning information for the normal performance model. The observations are split into an estimation window of L_1 return observations and event window of L_2 return observations. Looking at it visually may facilitate understanding, and a time line of an event study can be seen in figure 4.

(Estimation window]	(Event window]	(Post − event window]	
T_0	T_1	T_2	T_3
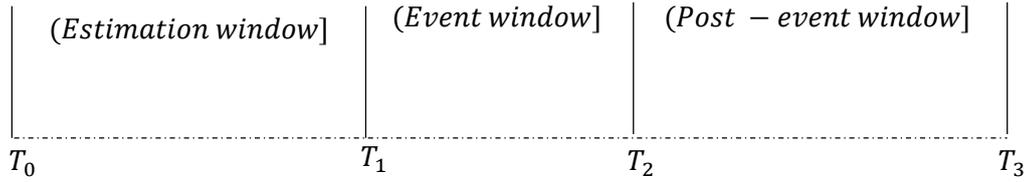
Figure 4: Event study

4. **Measuring and testing abnormal returns**: The abnormal returns can be defined by the residual. Given the normal returns the abnormal returns can be calculated with:

$$\varepsilon_{it}^* = R_{it}^* - E[R_{it}|\Omega_{it}]$$

The ε_{it}^*, R_{it}^*, and $E[R_{it}|\Omega_{it}]$ are the abnormal returns, actual and normal returns, respectively, where Ω_{it} is conditioning information for normal performance. With this model we can implement the necessary tests to estimate whether or not the abnormal returns are statistically significant from the expected normal returns in the same period.

3.2 Models of measurement in event studies

The two most common ways of measuring normal and abnormal returns are the *constant mean return model* and the *market model*. The *constant mean return model* assumes that returns are constant:

$$R_{it} = \alpha_i + \varepsilon_{it}$$

$$E[\varepsilon_{it}] = 0 \qquad Var[\varepsilon_{it}] = \sigma_{\varepsilon_i}^2$$

Expected normal return is defined as

$$E[R_{it}|\Omega_{it}^*] = \hat{\alpha}_i$$

$$\hat{\alpha}_i = \frac{1}{L_1} \sum_{t=T_0+1}^{T_1} R_{it}$$

The focus in this thesis, however, is on the *market-model*, as we assume a stable relation between the market and the security return.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

$$E[\varepsilon_{it}] = 0 \qquad Var[\varepsilon_{it}] = \sigma_{\varepsilon_i}^2$$

Expected normal return is defined as

$$E[R_{it}|\Omega_{it}^*] = \hat{\alpha}_i + \hat{\beta}_i R_{mt}^*$$

3.2.1 Adjustments to the market model

The *market model* is estimated with OLS, which relies on a constant variance. One of the problems with financial data is volatility clustering. In fact volatility of financial series display a positive autocorrelation over several days, where high volatility is clustered together in some periods and low volatility is clustered together in other periods. How persistent a series is depends on how many lags of a series are significant, the more lags the more persistent the series is. There is no correlation in returns themselves but it exists in the volatility of returns (Cont, 2001).The OLS will still be unbiased but both the variance and standard error will be computed using the wrong assumptions.

To counter the volatility clustering, security returns are sometimes estimated with an ARCH or a GARCH model, depending on the nature of the heteroscedasticity present in the data. ARCH is the predecessor, originally developed by Engle (1982) which allows the volatility today to depend on the volatility of previous periods. Bollerslev (1986), then developed an extension of this model, a GARCH model.

The most commonly used model is a GARCH(1,1), which will be implemented in this study. Various research have supported the use of GARCH(1,1) over other combinations (Engle et al., 1993; Hansen and Lund, 2005). After the adjustment there is no indication of heteroscedasticity or auto correlation. This method of integrating the GARCH(1,1) in to the event study has been used before and Wang et al. (2002) argued that this method is more efficient and reliable than traditional event studies. The reason being that GARCH is necessary to account for the time-varying volatility in the security returns.

3.3 Application of the market model to Össur hf.

In this study the focus will be on a single stock, Össur and all other calculation will be a supplement to that. The reason is that its cross-listing on the Icelandic and Danish market makes it unique, the Icelandic market, with capital controls, and the Danish market, not bounded by any restriction. However, during the sample time three companies based in the Faroe Island were also cross-listed on the Icelandic stock exchange and the Copenhagen stock exchange, but the stocks are very illiquid, and any empirical study on these stocks will have a very low validity. The turnover measured in monetary terms is extremely low, and historically these stocks have only been traded on about 4% - 15% of all trading days.

As suggested by Konchitchki and O'Leary (2011) the optimal estimation window varies somewhat, but is usually between 120-280 days depending on the study, which all events in this study fulfil. The estimation window will consist of one hundred observation (total of 200 observation), pre- and post- the event window. For increased robustness, there will be in total seven event windows estimated.

- Event day (total: 1 day)
- Event day +/- one day (total: 3 days)
- Event day +/- two days (total: 5 days)
- Event day +/- four days (total: 9 days)
- Event day +/- ten days (total: 21 days)
- Event day + four days, - one day (total: 6 days)
- Event day + one day, - four days (total: 6 days)

The length of the event window is quite arbitrary and varies between studies (Konchitchki and O'Leary, 2011). With only one stock of particular interest, it is more important to use a variety of event windows to be able to make concrete inferences from the results. With a small population and a small market as in Iceland, it is possible that the market has information about legal changes before they become public knowledge and react accordingly. By including different kind of event windows, how and when the market responds is more likely to be revealed. The expectations is that investors will adjust as soon as changes are recognized, rather than when the changes are actually implemented.

In comparison, three comparable firms listed on the NYSE, are examined as well. The firms are Hanger, Inc., Tenet Healthcare and Universal Health Care. All these firms operate in the healthcare industry. Hanger is a prosthetic producer, Tenet is an owner of a healthcare service and Universal Health Care offers a broad healthcare service in the United States. The twelve main firms listed on the Icelandic stock exchange are also examined, in comparison, using the same time period and their abnormal returns during the event periods. Two of these firms are excluded, HB and Nyherji, since they are too illiquid to perform an empirical study on. They only display changes in price about 7-8% of trading days, during a five year period. The same event dates are examined, and whether these firms' response differ from Össur's at the event dates.

3.4 Data

The most important contribution of this thesis is the gathering of information surrounding the events. The events, as previously mentioned, are changes in the capital controls. There is no official database that contains these changes, and the information is collected through various government agencies and media outlets. Most of the changes are made by the government as laws approved by the parliament. Information on these changes are gathered from Alþingi, the Icelandic parliament, specifically all changes made on the original bill from 1992 regarding rules on the currency. Total changes from the implementation of the capital controls are seventeen, eleven implemented by the parliament.

The remaining six modifications were implemented by the CBI, which has gained more power in recent years to make changes. The information on these changes are collected from the official site of the CBI.

Date of legislation	Implementation	Effect	Expectation	Interest	Legislator
31/10/2009	1/11/2009	Tightened	Unanticipated	High	Stricter restrictions - CBI
30/4/2010	30/4/2010	Tightened	Unanticipated	Small	Stricter restrictions on individuals and offshore ISK -CBI
14/6/2010	30/6/2010	Tightened	Unanticipated	High	Higher fines – Parliament
1/11/2010	1/11/2010	Loosened	Unanticipated	High	Exception for Össur - CBI
25/3/2011	25/3/2011	Loosened	Anticipated	High	Plan to reduce offshore ISK - CBI
11/6/2011	29/6/2011	Neutral	Anticipated	No	Wording - Parliament
17/9/2011	30/9/2011	Tightened	Anticipated	Small	New rules - Parliament
13/3/2012	13/3/2012	Tightened	Unanticipated	High	Stricter rules - Parliament
28/2/2012	16/3/2012	Neutral	Anticipated	No	Wording - Parliament
9/3/2013	9/3/2013	Loosened	Unanticipated	Small	Higher fines, more exceptions – Parliament
26/3/2013	5/4/2013	Loosened	Anticipated	Small	Higher fines, more individual freedom - Parliament
16/5/2014	5/6/2014	Tightened	Anticipated	Small	Higher fines – Parliament

17/6/2014	19/6/2014	Tightened	Unanticipated	High	Pension fund restrictions - CBI
6/3/2015	6/32015	Tightened	Unanticipated	High	Fewer options for offshore ISK -CBI

The normal way of aggregating all results is not an option in this study, and each event

Table 1: Events

needs to be studied individually due to the diversity of the changes. Some of the changes were anticipated while others were not, some tighten the capital controls while others loosen them, and finally some receive great interest from the media and financial analysts. To determine the level of interest, press releases from government agencies, news from the main media outlets and responses from financial analysts are examined in detail. In table 1, the events are categorized into these classes. Many of the changes are very comprehensive so the detailed description is left to the appendix.

Other data used in the study is from the data service DataStream. Given that the main focus is on the unique opportunity presented with the cross-listed stock of Össur, within and outside of capital controls, the starting date represents Össur's IPO in Copenhagen. The data spans from 04/09/2009 to 30/03/2015. Three currency rates are also obtained: ISK/Offshore EUR, ISK/DKK and DKK/EUR. The only offshore rate available for Iceland is against the Euro, it is used later when converting prices of the stocks to the same currency. The reason for using the offshore rate, is that under the capital controls the official currency rate is not at its market equilibrium, as if the currency were allowed to float freely. Therefore comparing the stock prices using the offshore rate gives another view on how the stock prices have evolved.

3.5 Expected effects of changes in capital controls on Össur

The fact that Össur was not listed on the Danish market until after the crisis will make the analysis less robust, as there is no reference point before the crisis, with both markets unrestricted.

Even though the capital controls probably rushed the process of the cross listing, the CEO of Össur, Jón Sigurðsson, stated that the goal of the listing was mainly to strengthen future growth, not to circumvent the capital controls:

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The dual listing in Copenhagen is logical next step for us, aimed at strengthening the company´s financial foundation for future growth – Jón Sigurðsson (Nasdaq OMX Copenhagen welcomes Össur hf., 2009)

As mentioned before, two currency rates will be used. The offshore rate and the CBI rate. The expectation of the effects of the changes in capital controls depend largely on the type of change. Using the CBI rate, tightening of the controls are expected to increase the premium between the two stocks. The reason is twofold, firstly it reduces the chance of domestic capital to circumvent the capital controls and investing it on foreign soil. Secondly, Össur is one of few companies on the Icelandic stock market not dependent on the domestic market, and investors might conclude that investing in Össur is one of few opportunities to diversify from domestic risk factors thereby raising its price. The expectation of loosening the capital controls is the reverse, the premium is expected to decrease if that opens possibilities for Icelandic investors to invest to a greater extend in foreign assets and decrease their domestic holdings. Both loosening and tightening and their effect also largely depend on how large and comprehensive the changes are. The expectation of neutral changes is no effect, the reason is that the neutral changes are changes that do not affect the actual purpose of the laws, only formal changes.

Using the offshore rate, the expectation is that the changes should have less effects then the CBI rate. The offshore ISK should represent to a greater extent some kind of market rate for the ISK which the CBI does not affect. Significant changes in the capital controls should also affect the value of the offshore ISK depending on the change. The argument is, that tightening of the capital controls should depreciate the value of offshore ISK and loosening should appreciate the value of the offshore ISK. This would then in affect counter the expected effect of changes in the capital controls on asset prices.

Whether changes are anticipated or not also affects the expectation of the significance of the changes. If changes are anticipated, it is more likely that the market has already responded, and possibly the response falls out of the event windows. If the changes are unanticipated, there is greater probability that the changes are unknown to investors, and therefore more likely that the premium will respond in a significant manner to the changes.

Interest from the media and financial analysts can be seen as a proxy for how much the changes affect the economy and market. Great interest indicates a larger impact and a greater chance of significant changes, little interest indicates a smaller impact and perhaps a lower chance of significant changes, and no interest indicates a very little impact of the events indicant a very low probability of any significant changes in the market.

If the legislation and implementation fall on the same day, it increases the probability of immediate response from the market, and some significant changes, while a long interval between the two may increase the chance of longer adjustment period and lower chance of significant changes. It has been common, that the CBI and parliament introduce and agree on changes after the markets close, so the market can only respond a day after the change is made.

3.6 Model validity

Augmented Dickey Fuller (ADF) test is used to test for a unit root in the series, and as is the case with many financial series there is insufficient evidence to reject the null hypothesis of a unit root. Therefore the data is converted by taking the logarithm of the prices and then obtaining the first difference.

$$R_{it} = \ln(P_t) - \ln(P_{t-1})$$

Running the ADF again on the logarithm difference, there is sufficient evidence to reject the null hypothesis of a unit root.

The premium is calculated as the difference in price between Iceland and Denmark in proportion to the price in Iceland, with the following formula:

$$Premium_t = \frac{Price\ in\ Denmark_t - Price\ in\ Iceland_t}{Price\ in\ Iceland_t}$$

The premium is a function of non-stationary processes and therefore the first difference is obtained and used in the study.

Two ways to estimate whether the *market model* is an improvement over the *constant return model* are to look at the market return coefficient and if there is a significant increase in the R-squared of the model. If the market return coefficient has significant explanatory power on the stock return and the R-squared increases, which supports the *market model*. As expected, the market return coefficients are significant at the 99%

significance level and there is a significant increase in the R-squared, both regular and adjusted, for all series. The *market model* is therefore used.

Examining the returns of Össur in Denmark and Iceland, with both exchange rates, the volatility is heteroscedastic and auto correlated. There are periods of high volatility and other times periods of low volatility. All series are tested for ARCH/GARCH effect and for every series we can reject the null hypothesis of no ARCH/GARCH effect.

4   Empirical results

This chapter presents the main findings of the event study, where the results are divided into three parts. The first part focuses solely on Össur, the second on its foreign peers and in the end, on other Icelandic firms. All numerical results are reported in the appendix.

4.1   Descriptive statistics

When examining the price premium using the CBI rate and the offshore rate, between the Icelandic and Danish stock, an interesting fact is observed. On average, the stock price is higher on the Icelandic market than on the Danish marker using the CBI rate, but the contrary holds for the offshore rate. This can be seen in figures 5 and 6 respectively.
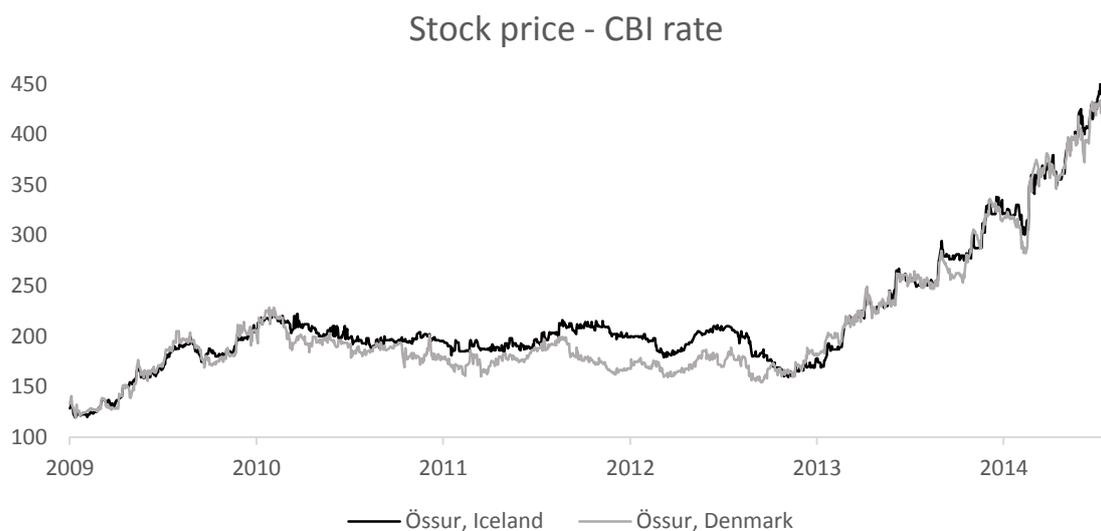
Figure 5: Historical stock price in ISK using CBI rate.

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Stock price - offshore rate
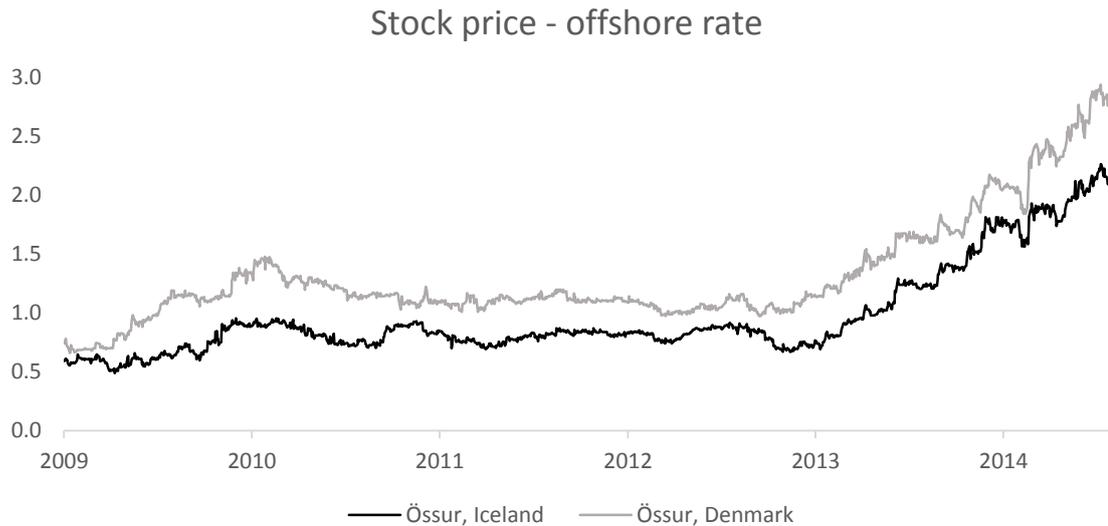
Figure 6: Historical stock price in EUR, using offshore EUR/ISK rate for Icelandic stock price.

The two premiums display very different consistency, but the offshore rate deviation is consistent through the sample, with the Icelandic stock cheaper compared to the Danish stock. The premium using the CBI rate is more volatile, and even though the price has been historically higher in Iceland for long periods, the difference has been eroded for the last two years and has been very inconsistent. Therefore, the premium increasingly resembles normal cross -listing with price discovery on two different markets (Eun and Sabherwal, 2003).

A possible explanation for the change, is that shortly before, Össur was removed from the OMXI8 index (*I. Úrvalsvísitala),* made out of the eight most actively traded shares on the Nasdaq OMX Iceland. On 11th of June 2013 NASDAQ Iceland made the announcement that Össur hf. would be removed from the OMXI8 index at the end of the month and another company would be added instead (Gengi þeirra sem hverfa, 2013).

There are no changes in any fundamentals of the company, but it seems to have had an impact on the Icelandic stock but not the Danish. After the change, using the CBI rate, the Icelandic premium vanished, and there has not been a steady premium for either of the two stocks since. The importance of being registered in the OMXI8 is somewhat substantial in Iceland because of the policy of big institutional investors, primarily pension funds, to hold stock in accordance to their weight in the OMXI8. This, at the time of capital controls, becomes even more important, as they will be forced to hold a higher

proportion of their holdings in Icelandic stocks, then they prefer (KPMG, 2014). However, to fully account for these effects, a special study would have to be conducted.

Premium (CBI rate - ISK)

Taken out of the
OMXICAP
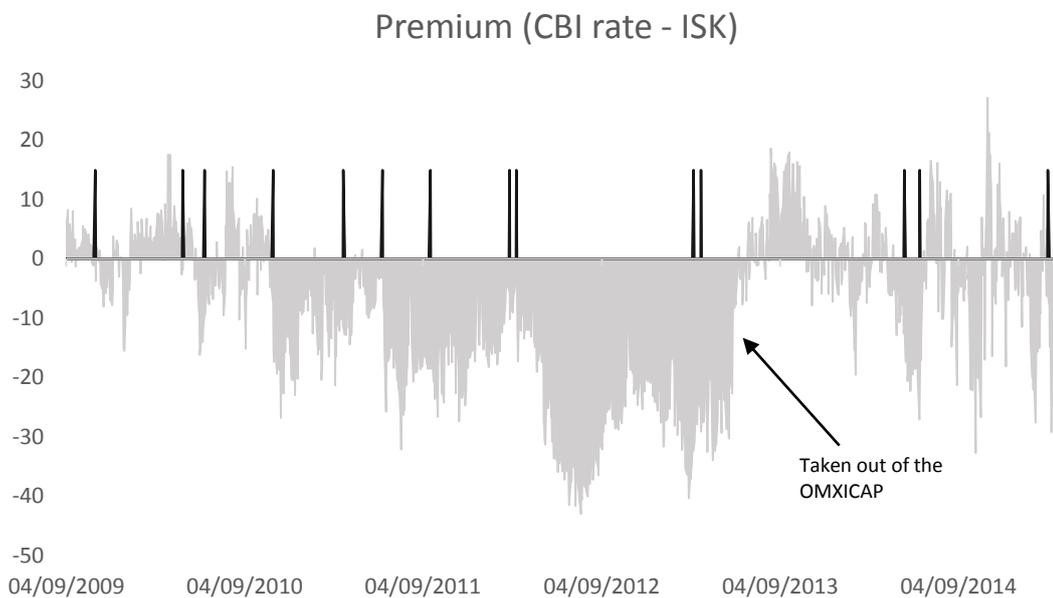
Figure 7: Össur (DK) - Össur (ICE), CBI rate, black lines represent changes in capital controls.

Premium (Offshore rate - EUR)
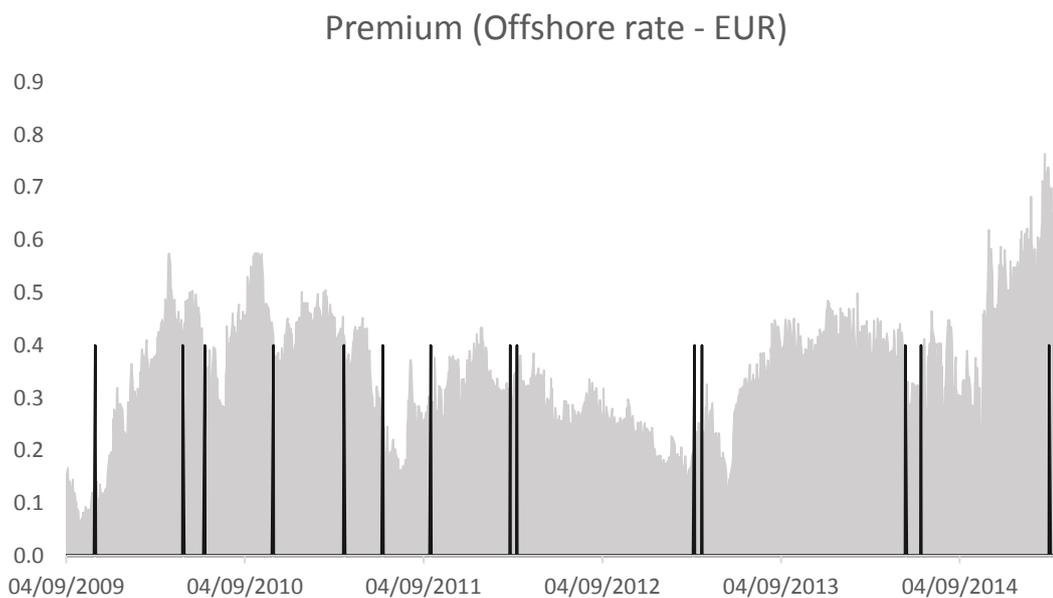
Figure 8: Össur (DK) - Össur (ICE), offshore rate, black lines represent changes in capital controls

4.2   Össur hf.

The starting point of the study, is to look at what effects the changes have had on the premium between the two stocks, calculated using the CBI rate and the offshore rate. The changes in capital controls have a significant effect on the premium using the CBI rate, five out of fourteen times, and the premium using the offshore rate is significant two times out of fourteen. There are a couple of other significant events, where only one

of the seven cumulative abnormal returns are significant in the event windows. The fact that only one of the seven events has a significant effect on the premium, indicates that there might be other factors affecting the results, and that the robustness is not high.

As expected, both neutral changes do not have a significant effect on the premium, using both exchange rates[1]. Both changes had no effect on the actual implementation of the capital controls and therefore did not have any effect on the premiums. Furthermore, both changes were anticipated and no interest was shown by the media or investors which is most likely due to the insignificance of the changes. Lastly, the laws were introduced couple of weeks before implementation, where the expectation was that all these variables would reduce the likelihood of significant results.

There are five events that have two or more significant abnormal changes during the event window using the CBI rate[2]. There are some similarities with these events. Four of them are tightening of the capital controls and one is loosening of the controls. Four of the events are unanticipated, the legislation is introduced and implemented after the markets close on the given day and there is great interest in these events, both in media and by market participants. The fifth event, however, is an event that was anticipated and minimal interest was shown by the media, and the change was accepted about two weeks before the changes actually became law. For four of the events, the most significant change appeared on the event day itself, with other event windows showing lower absolute change in the abnormal behaviour. This is a possible indication that markets may overreact when they are faced with legal uncertainty and then adjusting their views in the coming days, to the new environment.

All events that are either anticipated or shown little interest by the media and analysts do not cause significant changes in the premium, except the one on 16th of May 2014. That is somewhat in line with expectations, events that are anticipated give the markets more time to react and smooths their reaction, or possibly moving the event out of the observed event window in this study. Furthermore, little interest from the media indicates little interest from market participants and the general public.

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[1] 11/6/2011 and 28/2/2012

[2] 31/10/2009, 1/11/2010, 16/5/2014, 17/6/2014 and 6/3/2015

For four of the five events the premium is negative, indicating that the Icelandic stock is increasing more than the Danish stock, and one is positive indicating that the Danish stock is increasing more than the Icelandic stock.

For one additional change in the capital controls that is unanticipated, interest from the media is high and the legislation is accepted and implemented in a single day, after the market close[3]. Why the premium does not respond significantly to this change can perhaps be explained by the nature of the change. That is, the change was primarily directed at individuals, who had been circumventing the capital controls in order to obtain foreign currency. To prevent this, the controls were tightened, without a significant change in the premium. Potential reasons may be that the leakage was not substantial or perhaps the previously leaking capital was not used to fund investments in the stock market.

The first change was made less than two months after Össur was listed in Denmark (31/10/2009). The purpose was to tighten the current controls by preventing leakage of currency from the country which was a prominent problem. Concurrent to this change, newly invested foreign capital was now allowed to leave at their own convenience. Nevertheless, some uncertainty still remained, e.g. what exchange rate the investors would receive on exit (Icelandic Chamber of Commerce, 2011). The premium responded significantly, and as expected, the Icelandic stock rose more than the Danish one. The significance of the premium is most likely due to stricter rules on capital outflows, resulting in fewer options for domestic investors. The opening of foreign direct investment is unlikely to have had a significant effect, but foreign direct investment did not rise substantially during that period, and in fact, is still very low compared to the period before the crisis, see figure 9.

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[3] 13/3/2012

Direct foreign investment in Iceland
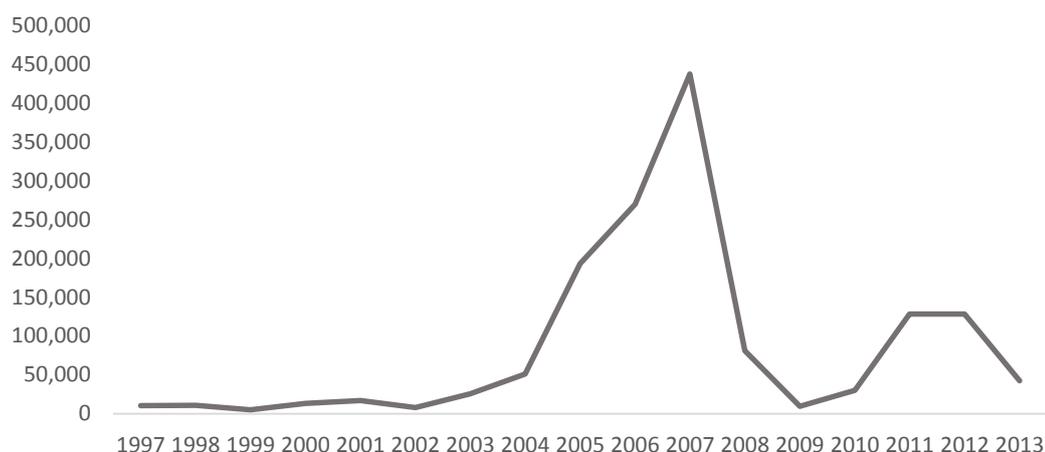
Figure 9: Direct foreign investment

The next significant change occurred when the CBI allowed owners of the Icelandic Össur stock, prior to the 1st of November 2011, date of the legislation, to transfer it over to the Copenhagen exchange. The premium with the CBI rate, has a negative sign were the Icelandic price is rising proportionally more than the Danish. The reason for this might be that the owners of Össur stocks in Iceland valued their stock higher since it gave them an option on foreign currency, being able to move it over to the Danish market at their convenience. Furthermore, this was the second time such a transfer was allowed, previously, this held for Össur stock owned prior to the 1st of November 2010, were allowed to move them over to the Danish market. If the market believed that this would be repeated for a third time, it might be valuable to hold the stock hoping for this future option. Whatever the reason, this law has not been changed again since the 1st of November 2011.

The law change on the 16th of May 2014 is not in line with expectations. That is even though the change was anticipated, the interest in the media was small, and it was not legislated until three weeks after it had been agreed upon in parliament it still had a significant effect. Furthermore, the change did not represent a major shift in the capital controls, it was a change made to facilitate fining and prosecuting individuals circumventing the capital controls. That is, after the law was instated, there was no need to proof intent of breaking the law, only proof of breaking the law, with or without intent the individual, or firm could be prosecuted. Why this event has a significant effect is hard

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to point out, possibly it caused stir and increased uncertainty on the market, and investors were expecting more changes in the future, since this was the first change in more than a year.

The next significant change came about a month later, 17th June 2014. In this instance only two event windows had significant changes in the premium[4]. The expectations was that the Icelandic stock market should increase more than the Danish, since this increases demand for Icelandic assets, as these pension funds need to invest more in Iceland. However, the opposite happened, where the change in premium was significant. The pension funds were given some grace period to implement the necessary change in their investment policy, and it is possible that the market was simply responding to the increased uncertainty and the effects of the pension funds need to invest more in the future. Moreover, it is important to note, that the pension funds that had previously been circumventing the controls represented a very small portion of the Icelandic pension funds and thus when this behaviour was prevented it may not have influenced asset demand on the market.

The last significant event also had only two significant event windows[5], the change was that foreign holders of ISK, leftover holding since before the crisis, were limited even further in their investment options in Iceland to only one government bond. The premium was negative when it was significant, the Icelandic stock rising more than the Danish stock. This change may have caused capital to move from the bond market to the stock market resulting in a significant change in the premium.

Using the offshore rate, there are fewer robust results. There are three events that report a significant change in only one event window[6]. Again, the assumption is, rather than these changes having a significant effect, some other factor may be causing the effect, and therefore it shows up only once. However, two changes, unexpectedly, have a significant effect on the offshore premium[7]. Again, the change on the 16th of May 2014

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[4] -1/+4 days and Even.

[5] -1/+4 days and -/+4 days.

[6] 30/04/2011, 11/06/2011 and 17/09/2011

[7] 9/3/2013 and 16/5/2014

is significant and greater than when using the CBI rate, which was not expected. There are couple of possible reasons for why the premium is significant both with the CBI rate and the offshore rate. The first is that the implication is more than what was indicated by interest in the media. Another, is that during that period there was an underlying factor causing the premium between the stocks to be significant. Furthermore, a movement in both exchange rates during this period might explain the significant change in the premium. However, this theory is not tested specifically.

The other event that causes significant response is the tightening of the controls on the 9th of March 2013. This event, did not receive much interest from the media, even though it was unanticipated. The change was mainly implemented by CBI as it was given greater freedom than before to grant exception from the capital controls. There was no indication, however, how and when the CBI would grant those exception. The change caused the offshore premium between the two stocks to increase, which is also contrary to expectation. That is, since the change served to loosen the controls, it should have closed the gap rather than the contrary, so perhaps there are other things that might explain this.

4.3 Foreign counterparts of Össur

The firms Hanger, Inc., Tenet Healthcare and Universal Health Care are examined in comparison to Össur. Since these are all event dates that depend on changes in capital controls in Iceland the expectation is that they do not display any abnormal returns on any of the event days. If there are significant abnormal returns for a firm or even every firm on a specific date, it might suggest that other factors are at work that affect the price of stocks in the healthcare sector in general, other than the capital controls.

The results are an in line with expectations, there are in general no significant abnormal returns for these firms which indicates that the event dates do not coincide with other events that affect all firms in the healthcare and prosthetic industry, so the effects on these dates are most likely bounded to Össur specifically.

4.4 Icelandic firms

The results for the remaining ten Icelandic firms, eligible for testing, are listed in the appendix. The overall result indicate that some changes in the capital controls do affect

companies on the Icelandic market, but varying somewhat depending on the company. Of the ten firms, seven firms display abnormal returns during changes in the capital controls for at least once. Marel, has majority of their income from abroad, displays four times significant abnormal returns during the changes. IG, also a large part of income in foreign markets, responds three times and other firms once or twice. But IG and Marel, have been listed for the longest of the firms examined. The event that causes the most firms to respond, five, is the last event, 6th of March 2015, which was both unanticipated and showed a high interest by the media.

However, most changes in the capital controls do not seem to have a significant effect on the stock price. That is perhaps caused by the fact the empirical data is biased to show insignificant results or that the tweaks in capital controls are not large enough to effect the stock prices. Furthermore, with regards to expectation, it is noteworthy that the firms with exposure on foreign markets, rather respond according to expectation, than domestic firms. This may be an indication that investors, when they are in doubt or believe that the capital controls are being tightened, look to a greater extent for firms with exposure on foreign soil. Thereby, it decreases the price of domestically dependent firms and increases the price of firms with exposure to foreign currency.

The fact that firms respond to different changes and differently to the changes, indicates that firms are affected differently. Investors might realize how each company is affected, and adjust their position accordingly, which explains why some firms show abnormal returns while other do not.

The results seem to indicate what has been previously discussed, that firms in Iceland are affected by the capital controls, and more so, that changes in the capital controls can have a significant effect on their returns in the short run.

5 Conclusion

Drawing the results together there are inconsistencies present with regards to Össur. Firstly, using the CBI rate premium between the two stocks, there was a significant premium on the Icelandic stock from October in 2010 to June 2013, but before and after that, the premium is not as consistent and might be explained by simply lagged response between the two markets. The results from the event study indicate that the premium responds significantly to five out of fourteen events, four of the five significant events are unanticipated, shown high interest in the media and legislated and implemented after the markets close. All these factors, are expected to increase the chance of detecting significant changes. However, one of the observed significant event is unexpected, shown little interest in the media and was anticipated. A possible explanation for the significance, is the nature of the change and its timing.

The premium using the offshore rate of the ISK has been consistent since Össur was listed on the Danish stock exchange. The Danish stock has been valued higher, possibly indicating a market premium of the uncertainty of Iceland and the premium individuals are willing to pay for a stock on an unrestricted market over the Icelandic restricted market. Looking at the events, the premium only responds significantly twice of total fourteen events. The expectations was that the premium would respond less using the offshore rate, as the effects of changes in capital controls on the stock price would be reduced by countering effects of the offshore rate. This holds, to some extent, with fewer events being significant using the offshore rate.

The foreign peers, in general, do not respond to changes in the capital controls, which was as expected, since the capital controls are only directed at Iceland and thus should not have any effect outside of it. Other Icelandic firms, however, respond significantly to some of the events. Seven out of the ten firms respond to at least one change in the capital controls. At most, there are five firms that respond to an event, the 6th of March 2015. The firms that respond to most events are Marel and IG, both firms with a large part of their income in foreign currency. Possibly suggesting, that firms with foreign exposure are affected the most by the capital controls, both for better and worse. These

firms, however, are one of the few ways for investors to diversify from Icelandic risk factors. The fact that many of the Icelandic firms are indeed affected strengthens the belief that the changes in capital controls have effects, and may cause the Icelandic stocks of Össur to diverge from the Danish stocks of Össur.

There are a number of things that can cause biases in the results, for Össur specifically, but also other Icelandic firms. First, the Icelandic market has always been very illiquid, both before and after the implementation of the capital controls. Changes in the capital controls therefore have to be larger than if the market had been liquid before, to affect the stock prices and premium of Össur's stocks. Furthermore, the market is very dependent on investment from pension funds, and they have not been circumventing the capital controls from the start of the legislation. In addition, there is also the problem of endogeneity on the Icelandic market, but the small market and the small index of the largest firms, that is a proxy for the market returns, can be heavily influenced by any single company, which is then used to estimate the effects on the firm. This creates a loop where the return of a single firm affects the market return which then is used to explain the returns of the firm. Finally, if the events are state variables, they will affect all of the firms forming the index during the event window, hiding the effect of the firms using the *market model*.

To answer the research question, the results seem to indicate that the changes in the capital controls have made a significant effect on the price premium of Össur stocks, and a part of the Icelandic market as well. The premium between the two stocks has been affected five times, two times using the offshore rate, indicating that investors are concerned about the changes and the uncertainty of the effects of the changes. It is hard to draw concrete conclusion about future effects of changes in the capital controls on the stock price and premium, but it seems that the implementation of the changes matter a great deal, where unanticipated changes have the greatest effect.

What will happen if the capital controls will be removed dependence largely on how that operation will be executed, and is a subject of much debate in Iceland. The effects of abolishing the controls on stock prices are also largely unknown, but the embedded need of pension funds and investors for diversification abroad will undoubtedly affect the

demand for Icelandic stocks. If foreign investment will increase more in the future it may decrease the effect of opening the capital controls.

In any case, the advantage of Össur over other Icelandic stock is very valuable. During changes in the capital controls the premium has responded significantly in some shape or form, but overall the stocks have followed each other closely. In effect, if the capital controls will be abolished, Össur, unlike other stocks on the market, should be anchored to some extent to the Danish market which should give a better view of the worth of the company than the Icelandic price. As the CBI premium has been eroded since 2013, there does not seem to be much difference in the two prices. The offshore rate, however, displays a significant and consistent premium between the two stocks, with the price of the unrestricted stock being higher than the price on the restricted stock. Using the traditional investment theory, this gap should be reduced or even eliminated if the capital controls are abolished. The other stocks do not have a similar anchor, making them more vulnerable to exchange rate depreciation even though some of them have a portion of their income in foreign currency.

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Lög um breytingu á lögum um gjaldeyrismál og tollalögum, með síðari breytingum nr. 81/2011

Lög um breytingu á lögum um gjaldeyrismál, tollalögum og lögum um Seðlabanka Íslands nr. 127/2011

Lög um breytingar á ýmsum lögum vegna nýrra laga um Stjórnarráð Íslands, nr. 115/2011 nr. 21/2012

Lög um breytingu á lögum um gjaldeyrismál, nr. 87/1992, með síðari breytingum nr. 17/2012

Lög um breytingu á lögum nr. 87/1992, um gjaldeyrismál, með síðari breytingum (sólarlagsákvæði og heimild til reglusetningar) nr. 16/2013

Lög um breytingu á lögum nr. 87/1992, um gjaldeyrismál, með síðari breytingum (rýmkun heimilda, aukið eftirlit, hækkun sekta o.fl.) nr. 35/2013

Lög um breytingu á lögum um gjaldeyrismál, nr. 87/1992, með síðari breytingum (arður, viðurlagaákvæði) nr. 67/2014

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Appendix I

Chronology

Since the implementation of the capital controls they have been changed numerous times. The changes vary somewhat, but can be divided to three categories: neutral, tightening and loosening. Where tightening makes it harder for people to transfer their capital and loosening makes it easier. The timeline of the capital controls can be seen in the graph below.

The impact of the changes are examined in the empirical part. A distinction between expected and unexpected changes is also made or not. The main media outlets and news surrounding the changes are looked at to determine the makeup of the expectation. Only changes after Össur was listed in Copenhagen, 4/9/2009, are examined below. When there is a time gap between the laws being accepted and implemented, it is explicitly stated.

31/10/2009

The next change was made on the 31st of October. The overall effect on the capital controls, were tightening. There was a significant change in capital outflows, with further restrictions on capital outflows to prevent circumvention of the controls and creating consistency. However, restriction on inflows of capital was greatly reduced, allowing foreign entities to enter the market again and leaving with the invested funds at their convenience. The change was made by the Central Bank of Iceland. This came as a surprise, with the first news of this only arriving a day earlier when the Central Bank made a statement that some change was imminent, no indication on the arrangement of the change. The event happens about two months after Össur was listed in Denmark, with the event window bounded by that event (CBI, 2009).

All the main media outlets reported the event, and there was also response from financial analysts. That indicates a high interest from market participants and the general public (e.g. Afnám gjaldeyrishafta hafið, 2009; Iceland Chamber of Commerce, 2011)

30/4/2010

The change was twofold, the first was aimed at individuals and the maximum amount of currency allowed to take out was reduced from 500.000 ISK to 350.000 ISK per trip to a foreign country. The other one was mainly directed at offshore transactions with the ISK. The main purpose of the change, was to remove all doubt of the legal status of these transaction, but an exemption was taken out to assure traders that these kind of transactions were illegal (CBI, 2010a).

There was some interest from the media, it mainly had to do with the fact that the maximum amount was reduced, but there was not a substantial response to the other change.

14/6/2010, implemented 30/6/2010

Again the 14th of June 2010 the controls were made stricter, but there wasn't much interest from the media with little to none reporting. The essence of the controls was not changing, the CBI was given a more extensive role in issuing out penalties for breaking the currency law possibly explaining the limited interest from the media (Lög um breytingu á lögum um gjaldeyrismál og tollalögum, með síðari breytingum nr 78/2010).

1/11/2010

On 1st November of 2010, the CBI issued a statement that stated that owners stocks of Össur stocks on the Icelandic stock exchange, were allowed to move it to the Danish stock market. The owners of the stock were subsequently able to sell it in Danish krona if they wanted (CBI, 2010b). No such exceptions were made for the other four companies that were cross listed. The event came as a surprise to the market which was essentially the point, but if investors would have known of this change, investors would have been tempted to buy Össur stock, only to then switch them over to the foreign index change and cash in for foreign currency (Gjaldeyrishöftum aflétt gagnvart Össur hf., 2010; Össur hf. afléttir gjaldeyrishöftunum; 2010)

25/3/2011

This event marks, as the CBI put it, the beginning of unwinding the capital controls. The announced some future actions that would be taken to try to reduce the large offshore ISK, owned by foreign investors. The plan was to hold currency auction, were the CBI would decide the currency rate at each time and then individual could make offers, to reduce the pressure and amount of offshore impatient capital, which would most likely try to get out as soon as the capital controls were abandoned. This announcement, did not really come as a surprise, but it had been anticipated for some time that the CBI would introduce some action to reduce the offshore ISK (CBI, 2011).

Both, media and financial analyst showed this event much interest as it this was one of the first direct attempts to abolish the capital controls (Landsbankinn, 2011)

11/6/2011, implemented 29/6/2011

The capital controls were temporarily extended, but it didn't come as surprise to anyone. The government had previously stated that the capital controls would not be abandoned before firstly in 2015, and this extension was primarily a legal action which would then later be made permanent (Lög um breytingu á lögum um gjaldeyrismál og tollalögum, með síðari breytingum nr. 81/2011)

30/9/2011, implemented 30/9/2011

The capital controls were again lengthened on the 30th September of 2011, but shorter than previously expected, 2013 instead 2015 (Lög um breytingu á lögum um gjaldeyrismál, tollalögum og lögum um Seðlabanka Íslands nr. 127/2011). The length of the capital controls at that time had become quite arbitrary and little respect was made to what year the government decided on, since no real believable plan was in place to abolish the controls. This had been anticipated, included in the bill were also new rules that were also to some extent anticipated. Some interest was shown from the media, but not much from financial analysts (Gjaldeyrishöft til 2013, 2011).

28/2/2012, implemented 16/3/2012

On 28th of February of 2012 some formal changes were made to the capital controls. The only difference was an insignificant change in wording of the bill. There was no interest from the media or analysts (Lög um breytingar á ýmsum lögum vegna nýrra laga um Stjórnarráð Íslands, nr. 115/2011 nr. 21/2012).

13/3/2012

The next change came on the 13th March of 2012, where again the controls were tightened. The bill was introduced when the market closed 12th of March and passed as law before the market opened again (Lög um breytingu á lögum um gjaldeyrismál, nr. 87/1992, með síðari breytingum nr. 17/2012). Before the bill was introduced, no news had been reported. The change made stricter rules on payments of foreign bonds, and limited exception for firms and individuals to move capital. There were some indication, that firms were using gaps in the laws to issue bonds on foreign soil and then repaying them back. The first news of this event came, just after the bill was introduced. Financial analysts showed interest in this events, and there were some indication that this change caused a stir on the bond market (Samþykkt með breytingu, 2012).

9/3/2013

The next change came approximately one year later. At last, the capital controls were made formally indefinite by the law so the need of extending the laws at few year interval was unnecessary. At the same time the CBI was given more power to give exceptions to individuals and firms to transfer capital (Lög um breytingu á lögum nr. 87/1992, um gjaldeyrismál, með síðari breytingum (sólarlagsákvæði og heimild til reglusetningar) nr. 16/2013). The overall effect is loosening on the capital controls, given the extended power of CBI to allow for exception. The indefinite nature of the capital controls wasn't a major issue, it was widely believed that they would be extended at their given expiry date. The bill wasn't expected, and the law passed about an hour after it was first introduced in the senate when the market had closed (Gjaldeyrishöft verða ótímabundinn, 2013).

26/03/2013, implemented 5/4/2013

On the 26th of March 2013 the government passed laws that increased the amount individuals to transfer money out of the country without a specific reason. This didn't

seem to interest the major media and little to none reports are about this event. This also came with the caveat that the CBI was empowered with more ways to pose penalties and for higher amounts (Lög um breytingu á lögum nr. 87/1992, um gjaldeyrismál, með síðari breytingum (rýmkun heimilda, aukið eftirlit, hækkun sekta o.fl.) nr. 35/2013).

16/5/2014, implemented 6/6/2014

The last change by the government than came the 16th of May 2014. The change mostly had to do with stricter rules on pay-outs of dividends and increased authority for the CBI to penalize for offenses. Overall strengthening (Lög um breytingu á lögum um gjaldeyrismál, nr. 87/1992, með síðari breytingum (arður, viðurlagaákvæði) nr. 67/2014).

17/6/2014

The next change was made on the 17th of June 2014 by the CBI, foreign pension funds operating in Iceland where given a four month grace period to adapt or the changed rules. But up until that point some pension funds had been investing for their clients in foreign countries. They did so as they believed that was within the laws, and the Central Bank seemed to agree with them, as they were not punished for their action up until that point. The pensions that were transferring savings abroad were subsidiaries for larger foreign companies for example Bayern-Versicherung. In the name of equality the CBI and stability it was not deemed right that these clients could transfer their savings abroad while others in Icelandic pensions were not able to do so (CBI, 2014).

These changes caused large interest from both media and analysts, specifically from individuals connected to these firms (e.g. Nýjar reglur um gjaldeyrishöft vekja furðu, 2014; Kemur Allianz í opna skjöldu, 2014).

6/3/2015

This change was directed specifically at offshore owners of ISK. Since the introduction of the capital controls, their capital has been stuck in Iceland with very few investment options. This change reduced their investment options even further, down to only one government bond and treasury bills (CBI, 2015). This raised the attention of most media outlets (Haftaundanþágum Seðlabankans breytt, þrengt að erlendum krónueigendum, 2015) and also some financial analysts (Vikubyrjun, 2015).

Appendix II

Descriptive statistics

		Össur hf.					
		Icelandic stock	Danish stock	Icelandic stock	Danish stock	Danish stock	Premium	Premium
	Currency	ISK	DKK	Offsh. EUR	EUR	ISK	CBI rate	Offsh. EUR
Mean		0.08%	0.09%	0.09%	0.09%	0.08%	-4.86%	27.00%
Median		0.00%	0.00%	0.00%	0.00%	0.00%	-3.20%	26.59%
Maximum		7.71%	9.02%	12.04%	9.01%	8.89%	9.88%	48.28%
Minimum		-6.39%	-9.24%	-14.34%	-9.23%	-9.30%	-25.87%	5.39%
Std. Dev.		0.02	0.02	0.02	0.02	0.02	0.07	0.08
Skewness		0.26	0.30	-0.06	0.30	0.25	-0.65	0.03
Kurtosis		6.11	5.60	7.03	5.61	5.41	2.73	2.37

Table 2: Descriptive statistics

Results

Össur

***, ** and * 99%, 95% and 90% significance respectively

Premium – CBI rate								
Date	*Effect*	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	*Tight*	*-0.70%****	*-1.68****	*-0.41%****	*-0.90%****	*-1.00%****	*-1.01%****	*-3.32%****
30/4/2010	*Tight*	-0.46%	-1.55%	0.04%	-0.10%	*-0.70**	-0.79%	-2.45%
14/6/2010	*Tight*	0.20%	0.65%	*0.55%****	0.89%	0.34%	0.45%	0.74%
1/11/2010	*Loose*	*-0.96%***	-2.22%	*-0.62%***	*-1.17***	*-1.27**	-1.47%	*-4.31%***
25/3/2011	*Loose*	-0.07%	-0.71%	-0.06%	-0.36%	-0.10%	-0.39%	-0.53%
11/6/2011	*Neutral*	-0.02%	-0.08%	0.16%	-0.20%	-0.02%	-0.16%	-0.55%
17/9/2011	*Tight*	-0.23%	-0.24%	-0.22%	-0.41%	-0.06%	-0.10%	-0.53%
28/2/2012	*Neutral*	0.60%	-0.33%	-0.87%	-0.80%	-0.74%	-0.84%	0.60%
13/3/2012	*Tight*	0.20%	0.13%	0.16%	0.14%	0.29%	0.02%	0.38%
9/3/2013	*Loose*	0.54%	0.65%	0.17%	0.75%	0.40%	0.45%	0.59%
26/3/2013	*Loose*	-0.27%	-0.97%	-0.35%	-0.12%	-0.74%	-0.92%	*-2.13%**
16/5/2014	*Tight*	*-0.56%****	*-1.75%****	*-0.30%****	*-0.78%****	*-0.77%****	*-0.94%****	*-1.87%**
17/6/2014	*Tight*	0.30%	1.13%	0.32%	*0.92%**	0.12%	0.34%	*2.54%**
6/3/2015	*Tight*	*-0.67%***	-1.21%	0.32%	*-0.97%***	-1.11%	-0.92%	-3.22%

Stock price – Iceland							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	0.83%*	1.38%*	0.21%	1.12%**	0.56%	1.16%**	0.71%
30/4/2010	Tight	-0.30%	-0.94%	-0.18%	-0.38%	-0.50%	-0.63%	-0.37%
14/6/2010	Tight	-0.63%***	-0.88%	-0.36%	-0.96%***	-0.57%	-0.87%***	-0.04%
1/11/2010	Loose	-0.30%	-0.02%	-0.20%	-0.13%	-0.33%	-0.16%	-0.53%
25/3/2011	Loose	-0.12%	-0.23%	0.22%	-0.25%	-0.03%	-0.14%	0.01%
11/6/2011	Neutral	-0.01%	-0.04%	-0.04%	-0.03%	-0.03%	0.09%	-0.21%
17/9/2011	Tight	-1.38%***	-1.27%***	-1.47%	-1.35%***	-0.77%***	-0.77%***	2.33%***
28/2/2012	Neutral	0.21%	-0.40%	-0.46%	-0.29%	-0.25%	-0.43%	0.21%
13/3/2012	Tight	0.21%	0.43%	0.05%	0.29%	0.41%	0.41%	0.32%
9/3/2013	Loose	0.02%	0.24%	0.00%	0.12%	0.00%	0.13%	0.80%
26/3/2013	Loose	0.05%	-0.14%	0.04%	0.08%	-0.09%	-0.14%	0.59%
16/5/2014	Tight	-0.17%	0.03%	-0.08%	-0.21%	0.21%	0.10%	-0.82%
17/6/2014	Tight	0.33%	-0.59%	-0.12%	0.12%	-0.05%	-0.22%	-1.11%
6/3/2015	Tight	0.47%	1.28%	0.16%	0.35%	0.53%	0.74%	2.67%

Premium - offshore							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	-4.83%	-0.84%	-0.56%	0.87%	-0.83%	-0.02%	-0.03%
30/4/2010	Tight	-0.70%	-1.04%	-0.64%	-0.49%	-1.14%	-1.05%**	-2.62%
14/6/2010	Tight	0.31%	0.24%	-1.27%	-0.03%	-0.50%	-4.96%	0.40%
1/11/2010	Loose	-0.41%	0.94%	-3.40%	0.26%	0.09%	0.45%	2.17%
25/3/2011	Loose	1.21%	0.96%	1.01%	-0.47%	0.54%	2.42%	0.89%
11/6/2011	Neutral	-0.45%	-0.47%	-0.39%	-0.39%	0.17%	-0.24%	-1.05%***
17/9/2011	Tight	0.79%	-0.78%	0.46%	-0.67%	0.17%	1.21%	-0.20%
28/2/2012	Neutral	0.88%	-0.68%	-0.15%	-0.73%	-0.19%	-0.04%	0.88%
13/3/2012	Tight	0.41%	0.41%	1.48%	0.63%	0.30%***	0.38%	5.40%
9/3/2013	Loose	1.00%***	1.40%	0.79%***	1.31%**	0.97%*	1.68%***	1.45%
26/3/2013	Loose	-1.07%	-0.30%	0.86%	-1.08%	-0.77%	-1.45%	-2.28%
16/5/2014	Tight	-0.58%***	-2.02%***	-0.32%***	-0.76%**	-1.00%***	-1.14%***	-2.97%**
17/6/2014	Tight	-0.14%	-0.65%	-0.59%	-0.37%	-0.07%	-0.53%	1.58%
6/3/2015	Tight	-0.76%	-1.70%	-0.38%	-1.17%	-0.81%	-1.06%	-3.91%

Stock price - Denmark							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	0.31%	-0.20%	-0.35%	1.33%	-0.54%	1.55%	-0.43%
30/4/2010	Tight	0.22%	-0.51%	-0.34%	0.10%	-0.11%	-0.75%	-0.38%
14/6/2010	Tight	-0.07%	-0.20%	-0.28%	-0.16%	-0.31%	-0.13%	0.02%
1/11/2010	Loose	-0.62%	*-1.49*%*	-0.35%	-0.57%	*-1.12%***	-0.95%	*-3.00%***
25/3/2011	Loose	-0.22%	-0.89%	0.10%	-0.48%	-0.24%	-0.48%	-0.48%
11/6/2011	Neutral	0.26%	0.35%	0.12%	-0.32%	0.33%	0.42%	0.27%
17/9/2011	Tight	*-0.62%**	*-1.71%****	-0.02%	*-0.89%**	-0.74%	-0.14%	-0.74%
28/2/2012	Neutral	0.77%	-0.15%	-0.39%	-0.49%	-0.89%	-0.32%	0.77%
13/3/2012	Tight	*0.73%**	0.46%	0.13%	*0.37%**	0.36%	0.26%	0.39%
9/3/2013	Loose	*0.83%****	0.97%	*0.48%***	*1.21%****	*0.89%****	0.81%	1.54%
26/3/2013	Loose	0.21%	-0.50%	0.20%	0.27%	-0.27%	-0.28%	-3.34%
16/5/2014	Tight	*-1.31%***	0.07%	*-0.79%***	-0.06%	*-1.46%****	-0.43%	-0.17%
17/6/2014	Tight	-0.18%	*-0.78%***	-0.57%	-0.04%	*-0.71%***	*-0.77%***	1.58%
6/3/2015	Tight	0.06%	0.07%	-0.19%	-0.07%	0.16%	0.17%	0.57%

Table 3: Results, Össur

Icelandic firms

IG							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	*7.6%****	4.27%	*3.36%****	*8.20%****	*12.12%****	9.65%	11.66%
30/4/2010	Tight	0.35%	0.30%	0.03%	0.28%	0.24%	0.28%	0.27%
14/6/2010	Tight	*0.88%****	0.56%	*0.77%****	*1.52%****	0.38%	*2.77%****	-0.03%
1/11/2010	Loose	*-0.79%****	*-3.72%****	*-2.41%****	*-0.86%****	*-3.52%****	*2.97%****	*-4.15%****
25/3/2011	Loose	-0.86%	-0.37%	-0.72%	-0.47%	-0.32%	-0.37%	-0.89%
11/6/2011	Neutral	-0.01%	-0.04%	-0.27%	-0.03%	-0.03%	0.09%	-0.21%
17/9/2011	Tight	-0.97%	-0.88%	-0.27%	-0.04%	-0.16%	-0.16%	-0.71%
28/2/2012	Neutral	0.42%	-0.61%	-0.14%	-0.72%	-0.41%	-0.90%	0.42%
13/3/2012	Tight	-0.10%	-0.98%	-0.18%	-0.81%	-0.53%	-0.73%	-0.08%
9/3/2013	Loose	0.74%	0.15%	*-0.49%***	0.56%	0.90%	0.89%	0.66%
26/3/2013	Loose	-0.65%	-0.61%	-0.47%	-0.02%	-0.10%	0.75%	0.91%
16/5/2014	Tight	-0.82%	-0.43%	-0.23%	-0.43%	-0.49%	-0.95%	-0.88%
17/6/2014	Tight	0.46%	0.17%	0.78%	0.41%	0.24%	0.37%	0.58%
6/3/2015	Tight	0.37%	0.50%	0.48%	0.60%	0.80%	0.82%	0.08%

Sjóvá							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
17/6/2014	Tight	0.29%	0.68%	0.99%	0.18%	0.84%	0.48%	0.14%
6/3/2015	Tight	-0.41%	-0.04%	-0.11%	-0.35%	-0.10%	-0.32%	-0.05%

Hagar							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
28/2/2012	Neutral	0.51%	-0.60%	-0.13%	-0.13%	-0.41%	-0.33%	0.51%
13/3/2012	Tight	0.69%	0.86%	0.06%	0.95%	0.04%	0.11%	0.62%
9/3/2013	Loose	-0.06%	-0.02%	-0.32%	-0.31%	-0.67%	-1.00%	-0.41%
26/3/2013	Loose	-0.85%	-0.77%	-0.40%	-0.44%	-0.20%	-0.92%	-0.85%
16/5/2014	Tight	*0.54%***	-0.40%	-0.71%	-0.95%	-0.05%	*0.68%***	0.96%
17/6/2014	Tight	0.86%	0.28%	0.34%	0.54%	0.79%	0.57%	0.67%
6/3/2015	Tight	-0.56%	*1.20%***	*1.67%***	-0.59%	0.53%	0.74%	2.67%

Eimskip							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
9/3/2013	Loose	0.90%	0.13%	0.15%	0.25%	0.63%	0.06%	0.85%
26/3/2013	Loose	-0.22%	*0.56%***	-0.03%	-0.02%	0.56%*	0.98%	0.20%
16/5/2014	Tight	*0.54%***	-0.04%	-0.14%	-0.68%	-0.42%	-0.91%	-0.58%
17/6/2014	Tight	*0.42%***	0.75%	0.99%	*0.49%***	0.58%	*0.55%***	-0.58%
6/3/2015	Tight	0.51%	*1.20%***	-0.15%*	*-0.52%***	-0.37%*	-0.69%	-0.31%

N1							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
17/6/2014	Tight	-0.32%	-0.09%	-0.16%	0.02%	0.74%	0.83%	-0.44%
6/3/2015	Tight	-0.35%	-0.30%	1.67%***	0.21%	0.34%	0.27%	0.55%

TM							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
17/6/2014	Tight	0.42%	-0.59%	-0.12%	0.49%	-0.05%	0.55%	-1.11%
6/3/2015	Tight	*-2.40%***	1.20%	*-0.67%***	*-3.02%***	-0.58%	0.74%	2.67%

Reginn hf							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
9/3/2013	Loose	0.07%	0.38%	0.66%	0.94%	0.83%	0.33%	0.01%
26/3/2013	Loose	*0.74%***	0.40%	0.61%	0.92%	0.40%	0.27%	0.05%
16/5/2014	Tight	*0.54%***	-0.52%	-0.24%	-0.02%	-0.28%	-0.71%	-0.82%
17/6/2014	Tight	-0.23%	-0.98%	-0.59%	-0.51%	-0.72%	*0.55%***	-0.32%
6/3/2015	Tight	-0.08%	-0.09%	-0.42%	-0.98%	-0.43%	0.77%	0.09%

VÍS							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
17/6/2014	Tight	*-0.40%***	*-0.87%***	*-0.21%***	*-0.45%***	*-0.55%***	*-0.64%***	-1.11%
6/3/2015	Tight	*-1.48%***	*-1.30%***	*-0.46%***	*-1.62%***	*-0.87%***	*-0.91%***	-0.70%

Fjarskipti							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
26/3/2013	Loose	**0.57%***	0.37%	0.54%	0.30%	0.39%	0.83%	0.79%
16/5/2014	Tight	**-0.77%***	**-1.01%***	**-0.12%**	**-0.60%***	**-0.86%***	**-0.95%***	-0.24%
17/6/2014	Tight	0.87%	0.35%	0.43%	0.26%	0.42%	0.73%	0.82%
6/3/2015	Tight	-0.82%	-0.58%	-0.84%	-0.25%	-0.34%	-0.53%	-0.77%

Marel							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	0.82%	1.38%	0.21%	1.12%	0.56%	1.16%	0.71%
30/4/2010	Tight	-0.002962	-0.94%	-0.18%	-0.38%	**1.44%***	-0.63%	-0.37%
14/6/2010	Tight	**1.51%***	0.99%	**0.82%***	0.26%	**0.90%***	**2.77%***	-0.04%
1/11/2010	Loose	-0.49%	**-1.27%***	**-0.42%***	-0.68%	**-0.86%****	-0.55%	-0.04%
25/3/2011	Loose	-0.12%	-0.23%	0.22%	-0.25%	-0.03%	-0.14%	0.01%
11/6/2011	Neutral	-0.01%	-0.04%	-0.27%*	-0.03%	-0.03%	0.09%	-0.21%
17/9/2011	Tight	-1.38%	-1.27%	-0.15%	-1.35%	-0.77%	-0.77%	2.33%
28/2/2012	Neutral	0.57%	-0.77%	-0.82%	-0.43%	-0.09%	-0.50%	0.57%
13/3/2012	Tight	**-0.40%***	**-0.77%****	-0.21%	**-0.41%***	**-0.52%****	-0.34%	1.44%
9/3/2013	Loose	0.02%	0.24%	0.00%	0.12%	0.00%	0.13%	0.80%
26/3/2013	Loose	0.05%	-0.14%	0.04%	0.08%	-0.09%	-0.14%	0.59%
16/5/2014	Tight	-0.17%	0.03%	-0.08%	-0.21%	0.21%	0.10%	-0.82%
17/6/2014	Tight	0.33%	-0.59%	-0.12%	0.12%	-0.05%	-0.22%	-1.11%
6/3/2015	Tight	-0.56%	1.28%	**-0.57%****	**-0.59%****	0.53%	0.74%	2.67%

Table 4: Results, Icelandic firms

Foreign peers

Hanger, Inc.							
Date	Effect	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	Tight	-0.63%	-0.12%	-0.38%	-0.97%	0.30%	**-1.50%***	-1.66%
30/4/2010	Tight	0.13%	-0.01%	-0.07%	-0.15%	0.34%	0.45%	-2.51%
14/6/2010	Tight	-1.00%	-0.52%	0.38%	-0.62%	-1.08%	-0.13%	-0.34%
1/11/2010	Loose	-0.28%	0.60%	0.60%	-0.19%	0.28%	-0.22%	-0.52%
25/3/2011	Loose	-0.07%	0.46%	-0.52%	-0.40%	0.44%	-0.16%	3.02%
11/6/2011	Neutral	**1.25%***	-0.18%	0.40%	1.02%	0.72%	0.62%	-3.02%
17/9/2011	Tight	-0.01%	0.10%	0.94%	-0.02%	0.12%	-0.26%	-2.17%
28/2/2012	Neutral	0.60%	-0.56%	-0.18%	-0.16%	-0.69%	-0.01%	0.60%
13/3/2012	Tight	0.46%	0.14%	-0.20%	0.38%	0.31%	0.49%	-0.65%
9/3/2013	Loose	0.37%	0.30%	0.07%	0.75%	-0.29%	-0.04%	0.23%
26/3/2013	Loose	0.51%	0.49%	0.21%	0.60%	0.26%	0.42%	1.12%
16/5/2014	Tight	0.45%	0.89%	-0.44%	1.24%	0.38%	0.90%	2.36%
17/6/2014	Tight	0.03%	0.12%	**-0.51%***	0.50%	-0.15%	0.36%	0.15%
6/3/2015	Tight	0.01%	-0.41%	0.47%	-0.05%	-0.02%	0.15%	-1.29%

Tenet Healthcare							
Date	*Effect*	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	*Tight*	-0.96%	-0.96%	-0.59%	-1.18%	-0.83%	-1.08%	-0.51%
30/4/2010	*Tight*	0.09%	-0.23%	0.15%	-0.12%	0.21%	0.05%	0.21%
14/6/2010	*Tight*	-1.10%	0.01%	-0.68%	-1.70%	-0.79%	0.53%	-3.65%
1/11/2010	*Loose*	0.12%	-0.08%	-0.27%	-0.21%	-0.09%	-0.17%	-1.71%
25/3/2011	*Loose*	0.19%	1.28%	-0.18%	1.56%	0.08%	0.15%	1.70%
11/6/2011	*Neutral*	0.23%	0.45%	0.06%	*1.21%***	0.06%	0.55%	1.33%
17/9/2011	*Tight*	-0.22%	-1.52%	-0.65%	-0.37%	-0.80%	-0.17%	-1.69%
28/2/2012	*Neutral*	-0.13%	-0.23%	-0.39%	-0.39%	-0.07%	-0.95%	-0.13%
13/3/2012	*Tight*	*-0.77%*	*-1.99%*	*-0.33%*	*-1.06%*	*-1.02%*	*-1.19%**	***-3.90%*****
9/3/2013	*Loose*	0.74%	1.14%	0.37%	0.57%	0.92%	*1.19%***	-0.71%
26/3/2013	*Loose*	0.86%	1.55%	0.39%	0.80%	1.31%	1.03%	1.06%
16/5/2014	*Tight*	0.96%	-0.50%	0.26%	0.81%	0.87%	0.28%	-1.14%
17/6/2014	*Tight*	-0.02%	0.25%	0.03%	0.53%	-0.61%	-0.24%	-0.65%
6/3/2015	*Tight*	0.37%	-1.43%	0.46%	-0.32%	0.73%	0.16%	2.28%

Universal Health Care							
Date	*Effect*	+/- 4	+/- 1	+/- 10	-1/+4	-4/ +1	+/- 2	Even
31/10/2009	*Tight*	-1.35%	*-2.68****	*-0.80%***	*-1.98%****	*-1.56%***	*-1.49%**	2.00%
30/4/2010	*Tight*	0.37%	0.89%	0.51%	-0.12%	0.81%	0.09%	-1.99%
14/6/2010	*Tight*	-0.47%	0.63%	-0.22%	-0.36%	0.08%	0.31%	0.47%
1/11/2010	*Loose*	0.50%	0.26%	0.16%	0.13%	0.83%*	0.98%	-0.81%
25/3/2011	*Loose*	0.32%	0.20%	-0.11%	0.84%	-0.44%	0.24%	0.39%
11/6/2011	*Neutral*	0.33%	0.26%	-0.16%	0.20%	0.43%	0.71%	-0.38%
17/9/2011	*Tight*	-0.18%	-0.47%	-0.49%	0.39%	-0.77%	-0.11%	-1.76%
28/2/2012	*Neutral*	-0.27%	-0.67%	-0.11%	-0.94%	-0.46%	-0.29%	-0.27%
13/3/2012	*Tight*	-0.13%	-0.45%	-0.09%	-0.22%	-0.20%	-0.12%	-1.93%
9/3/2013	*Loose*	0.27%	0.47%	0.17%*	0.35%	0.20%	0.23%	0.14%
26/3/2013	*Loose*	*0.42%*	0.80%	0.24%	0.50%	*0.50%*	*0.59%*	*1.65%*
16/5/2014	*Tight*	0.76%	-0.52%	0.26%	0.30%	0.43%	0.47%	-0.47%
17/6/2014	*Tight*	0.52%	-0.02%	-0.88%	0.57%	0.13%	0.46%	0.33%
6/3/2015	*Tight*	0.05%	-0.24%	0.52%	-0.02%	-0.13%	0.63%	-0.47%