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The spillover effect of macroeconomic news on bond yields - Evidence from Scandinavian government bond markets and European corporate bond index

Finance

Master's thesis

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PURPOSE OF THE STUDY

The main purpose of the study is to investigate the market responses of daily yields of Scandinavian (Finland, Sweden, Norway and Denmark) government bonds and a major European corporate bond index to broad set of major macroeconomic news of U.S. and selected European countries. The study also investigates if U.S. macroeconomic news has more significant impact on the yields than equivalent European countries' news and which news have the most effect on the bond yields. Additional purpose of the study is to study the effect of the level and slope (term structure of interest rates) of German benchmark government bond yields on the government bond and corporate bond index yields during the macroeconomic news announcement days.

DATA AND METHODOLOGY

The macroeconomic news data in this study consists of 23 different major macroeconomic news from U.S, German, French and UK economy. The study investigates both the effect of macroeconomic news announcements and the surprise of the announcements on bond yields. Therefore, I employ the actual news release data and the corresponding market expectations data in the study. The bond yield data in this study is comprised of daily yields spanning from 1997 to 2011. The market responses of daily yields are investigated by daily yield and spread changes over benchmark German government bond yields. In order to investigate the effects of macroeconomic news and benchmark term structure of interest rates on bond yields, several regressions are run for the different macroeconomic news and term structure of interest rates variables during the news announcement dates.

RESULTS

The results indicate that 21 out of the 23 macroeconomic news used in this study have statistically significant effect on at least one of the daily yields investigated in this study. The effects vary significantly across different news and markets. The results reveal that U.S. macroeconomic news have in general more significant impact on the yields in this study than equivalent European countries' news when investigating news' surprise spillover effect on yield changes . The results also reveal that Finland and Sweden government bond markets are the most responsive to the foreign macroeconomic news spillover effect. In addition, strong evidence is found that there is a negative (positive) relation between the German government term structure of interest rates and the investigated bond spreads (yields) during the macroeconomic news announcement days.

Keywords Macroeconomic news, term structure of interest rates, unexpected change, spillover effect, surprise effect

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TUTKIMUKSEN TAVOITTEET

Päätavoitteena tässä tutkimuksessa on tutkia USA:n ja valittujen Euroopan maiden merkittävien makrotalouden uutisten vaikutusta Skandinavian (Suomi, Ruotsi, Norja ja Tanska) valtioiden joukkovelkakirjojen ja merkittävän eurooppalaisen yritysvelkakirjaindeksin tuottojen markkinareaktioihin. Tutkimuksen tarkoituksena on myös selvittää vaikuttavatko USA:n makrotalouden uutiset enemmän velkakirjojen tuottoihin kuin Euroopan vastaavat sekä mitkä uutiset vaikuttavat eniten tuottoihin. Tutkimus tutkii myös verrokkina käytettävän Saksan valtion joukkovelkakirjalainan korkorakenteen vaikutusta tutkittaviin valtioden ja yritysvelkakirjaindeksin tuottojen markkinareaktiohin makrotalousuutisten julkistuspäivinä.

AINEISTO JA MENETELMÄT

Tutkimuskessa käytettävä makrotalousaineisto koostuu 23 merkittävästä makrotalousuutisesta koskien USA:n, Saksan, Ranskan ja UK:n kansantalouksia. Tutkimus tarkastelee niin makrotalousuutisten vaikutusta kuin uutisten yllätysvaikutusta velkakirjojen tuottoihin. Tämän vuoksi käytän tutkimuksessa makrotalousuutislukuja sekä aineistoa uutislukujen markkinaennusteista. Tutkimuksen velkakirjadata koostuu päivätason tuotoista (koroista) vuosilta 1997-2011. Velkakirjojen päivätason tuottojen markkinareaktioita tutkitaan tarkastelemalla korkomuutoksia ja korkojen muutoksia verrattuna Saksan valtion joukkovelkakirjalainan korkoihin. Tutkiakseni makrotalouden uutisten ja korkorakenteen vaikutusta velkakirjojen tuottoihin, teen useita regressioita eri makrouutisille ja korkorakenteen muuttujille uutisten julkaisupäivinä.

TULOKSET

Tutkimuksen tulokset osoittavat, että 21 makrotalouden uutista 23:sta vaikuttaa tilastollisesti merkitsevästi vähintään yhteen tutkimuksen velkakirjojen päivätason tuottoihin. Kyseiset tulokset vaihtelevat huomattavasti läpi tutkimuksessa käytettävien eri uutisten ja markkinoiden. Tuloksista käy ilmi, että USA:n makrotalouden uutisilla on merkittävämpi vaikutus velkakirjojen tuottoihin kuin Euroopan vastaavilla uutisilla, kun tutkitaan uutisten yllätysvaikutusta tuottojen (korkojen) muutoksiin. Tulokset paljastavat myös, että Suomen ja Ruotsin valtion joukkovelkakirjalainojen tuotot reagoivat eniten makrotalouden uutisten heijastusvaikutukselle. Lisäksi tulokset paljastavat vahvan vaikutussuhteen Saksan valtion joukkovelkakirjalainojen korkorakenteen ja tutkittavien velkakirjojen tuottojen ja tuottojen eron verrokkin tuottoihin välillä.

Avainsanat Makrotalouden uutinen, korkorakenne, odottamaton muutos, heijastusvaikutus, yllätysvaikutus

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1. Introduction

Asset price movements following regularly scheduled macroeconomic announcements provide a unique source of information about the evolution of public and private sector expectations and about how those expectations reflect back on the economy. Policy makers and market analysts closely follow these market reactions.

In bond markets, macroeconomic news alters interest rates along the yield curve as market participants not only adjust their views about the state and prospects of the economy, but also because they reassess their expectations about the reaction of monetary policy to such news (Fleming and Remolona 1999).

The governments' borrowing and costs of debt (in other words bond yields) has been on one of the most commonly discussed topics globally and has now put the subject under the magnifying glass even more than before, partly because of the recent euro debt crisis. Also analysts and economic news reporters seems to have been paying increased amount of attention and interest in changes of major macroeconomic news releases and policy rates. As this study explains in some part the behavior of the government and corporate bond yields, it gives pivotal importance to the study.

The main purpose of this study is to investigate the market responses of daily yields of Scandinavian (Finland, Sweden, Norway and Denmark) government bonds and a major European investment-grade corporate bond index to broad set of major macroeconomic news[1] of U.S. and selected European countries. The other purpose of this study is to study the effect of the level and slope (term structure of interest rates) of the German benchmark government bond yields[2] on the government bonds and corporate bond index yields during the macroeconomic news announcement days. In addition, this study investigates if U.S. macroeconomic news has more significant impact on the yields than equivalent European countries' news and which news have most effect on the bond yields

I employ a long and extensive dataset of international macroeconomic news (longest macroeconomic news data spanning from 1997 to 2011) and bond yields, which allows me to

[1] This study investigates the effect of actual news announcement and the news surprise which is the difference between the actual macroeconomic news announcement value and the corresponding market expectation or forecast value.

[2] The German government bond market is widely considered as the benchmark for other European bond markets among market participants.

find any possible significant relationships between the news announcements and bond yields. The data also allows me to differentiate between contemporaneous announcements and to determine which announcements significantly affect bond yields and the size and sign of the yield response. By including a corporate bond index in this study, I can examine if the macroeconomic news effect on bond yields behave differently between the credit risk instruments and default-free government bonds. Besides this, I also catch in part the relation between the default-free benchmark yields and Scandinavian government bond yields and the market's perception to default risk in European corporate bond index yields by controlling the German term structure of interest rates during the news announcement days.

In recent years, analysts and economic news reporters seems to have been paying increased attention and interest in changes of major macroeconomic news releases and policy rates and especially to the unexpected changes i.e. surprises. This attention is being paid in the belief that these economic factors can affect asset market returns, such as interest rates and stock returns. Despite the large interest on these issues, academics and policymakers do not have comprehensive and full understanding of how these factors affect the economy and asset returns, especially in less studied Scandinavian markets.

As the results of this study explain in part the behavior of bond yields, it is of fundamental importance, also from an investment perspective, simply because of the importance and magnitude of debt as an asset class.

These results also have important implications for the risk management perspective of institutions and companies with Scandinavian government bond and corporate bond investment portfolios. This information is valuable to company/institution level and all the way to investment portfolio managers, who can allocate funds to adjust and better optimize their portfolios' risk-return. In addition, the results will be helpful to parameterize pricing models for credit sensitive instruments, such as corporate bonds and credit default swaps.

1.1. Research questions

Given the increasingly important and interesting role of global macroeconomic news in determining bond returns, this study seeks to characterize the spillover effect of macroeconomic news announcements and surprise part of the announcements on Scandinavian government bond and European corporate bond index yields. I also investigate the effect of the level and slope (term structure) of benchmark German government bond

yields to the government bonds and corporate bond index yields. The main research questions of this study are presented below:

Q_1: Are there significant spillover effects from foreign macroeconomic news announcements to daily Scandinavian government bond yields and European-wide corporate bond index yields?

Q_2: Which macroeconomic news have most effect on Scandinavian government bond and corporate bond index yields?

Q_3: Are there any significant differences in the effects of macroeconomic news announcements on bond yields between the practically default-free government bonds and (default) risk bearing corporate bond index yields?

Q_4: Does some U.S. macroeconomic news has more significant impact on Scandinavian government bond and European corporate bond index yields than equivalent European countries' macroeconomic news?

Q_5: Is there a positive and/or negative relation between the changes in level and slope of the benchmark German government term structure and the changes in bond yields and spreads used in this study?

Previous literature (see e.g. Faust et al. 2007 and Balli 2009) studying the spillover effect of international macroeconomic news on bonds has shown that different markets do not respond similarly to news even among European countries. This is why results of e.g. the relation between German government bond market and macroeconomic news cannot be expected to hold in Scandinavian government bond and European corporate bond markets.

It is frequently argued that U.S. economy news and monetary policy drive world bond returns. This study seeks to shed light on this view by studying the effect of several major U.S. and comparable European countries' macroeconomic news. Related evidence suggests that e.g. German bond returns respond more to U.S. macroeconomic news than domestic or other European countries' news, see for example Goldberg and Leonard (2003) and Andersson et al. (2009). The reasons cited for such findings include the importance of the U.S. to global growth and the earlier release of U.S. macro announcements compared to the European area (which may lead markets to draw conclusions about the European economies from the U.S. announcements). Also, greater financial market integration between U.S. and Europe is

considered to be an enabling factor for the U.S. macroeconomic news importance to European markets. It is interesting to see in my study whether Nordic government bond markets and a major European corporate bond index react more to U.S. macroeconomic news than to other European countries' news as seems to happen with German bond returns in the results of the above mentioned studies.

I present three specific hypothesis (see Chapter 5) in this study that are related to some of the research questions presented in this chapter.

1.2. Contribution to the previous literature

This study contributes to the existing literature in a number of ways. Firstly, I employ a much longer sample of data than is commonly used in the literature with a historical time span from 1997 to 2011 (varying between different macroeconomic news, depending on the availability of data). To the extent that the news reactions are constant through time, this should contribute to more precise estimates. In addition, previous literature has concentrated to study the effect of macroeconomic news announcement or the news surprise factor on bond yields or spreads. This study investigates both the effects of news announcements and the surprise factors to bond yields and spreads which gives a more comprehensive comparison of different relationships and bond behavior.

Another academic contribution to existing research is that this study investigates whether the U.S. macroeconomic news has more significant impact on Scandinavian government bond and European corporate bond index yields than equivalent European countries' news. Previous studies that investigate the Scandinavian government bond market have not researched this area.

Moreover, I employ a more comprehensive set of international macroeconomic news announcements in my study than the existing studies that investigate the Scandinavian government bond market.

Finally, the research methodologies used in earlier studies differ somewhat from this study, as I employ a methodology which is a combination of some of the previous ones. The methodologies of Duffee (1998), Balduzzi et al. (2001), Andersson et al. (2009) and Balli (2009) all jointly in part constitute the methodological foundation of this thesis.

1.3. Results

The results obtained in this study indicate that some foreign macroeconomic news announcements have statistically significant spillover effects on the daily Scandinavian government bond and European corporate bond index yields. The effects vary across economic news and different yields and spreads i.e. different markets. More specifically, 21 out of the 23 macroeconomic news announcements used in this study, have statistically significant effect (at least at 10 percent level) on at least some of the investigated daily yield or spread changes.

The results indicate that the yields will rise on signs of stronger than expected economic conditions. The results also reveal that Finnish and Swedish government bond markets are the most responsive to the foreign macroeconomic news spillover effect.

Whilst investigating the news surprise spillover effect on yield changes the study finds that the U.S. macroeconomic news have in general more significant impact on the yields in this study than equivalent news coming from European countries.

Strong evidence is found that there is in general a negative (positive) relation between the changes in level and slope of the benchmark German government term structure of interest rates and the changes in bond spreads (yields) during the macroeconomic news announcement days.

The most important macroeconomic news based on the results of this study is the U.S. nonfarm payroll announcements. When investigating the macroeconomic news' surprise effect on simple yield changes (i.e. not on spread changes) majority of the most important news are from the U.S. economy (four out of five statistically most important news are U.S. macroeconomic news).

1.4. Structure of the study

The study is structured in the following manner. In Chapter 2, I present a review of the previous literature related to macroeconomic news' and term structure of interest rates' effect on bonds and various other asset classes. In Chapter 3, I discuss the background of macroeconomic news announcements and Scandinavian government bond markets which are the main variables I focus in this study. Thereafter, Chapter 4 presents the data and variables used to conduct this study, which is followed by the hypothesis and motivation for them in Chapter 5. After that, the methodology used in this thesis is described in Chapter 6. In Chapter 7, I present the results of the study and compare them to the previous literature. In Chapter 8 the results are drawn together and I conclude the study. The references are listed in Chapter 9 and Chapter 10 includes the appendices.

2. Previous literature

In this chapter I discuss the previous literature related to this study. Firstly, I present the relevant literature related to the macroeconomic news' and other macroeconomic factors' effect on bond yields/prices. Thereafter, I discuss the importance of U.S. macroeconomic news on bond prices and the time-variation in the effects of macroeconomic news. In addition, I shortly present macroeconomic news' effect on stock markets. Lastly, I present the relevant previous studies investigating the relation between benchmark term structure of interest rates and bond yields and other asset prices. A brief review of factors, other than macroeconomic news and term structure of interest rates, which explains the bond yield and spreads changes, is also covered in the last section.

2.1. Macroeconomic news' and other macroeconomic factors' effect on asset prices

Overall, the literature about the macroeconomic news announcements' impact on asset prices is large and spans across asset classes. At least since the early 1980s, the asset price movements that follow scheduled macroeconomic news announcements have been identified as a relevant source of information about the development of the economy and public and private sector expectations and how those expectations feed back on economy. Policy makers and market analysts closely follow these market reactions, and an active literature has developed documenting reactions of various markets to macroeconomic news[3].

There is wide evidence that asset prices are moved by macroeconomic news and monetary policy. According to Fleming and Remolona (1999) market participants adjust their views about the prospects of the economy according to macroeconomic news which alter interest rates along the yield curve in money and bond markets. Market participants not only adjust their views about economy, but also reassess their expectations about the reaction of monetary policy to macroeconomic news. Thornton (1998) states similarly that the reaction of interest rates to monetary policy related news reflects the changes in policy rates, as well as the market participants' views about the reliability and efficiency of such a decision. Similar to interest rates, exchange rates have also been shown to respond strongly to news about the

[3] See e.g. Schwert (1981), Pearce and Roley (1985), Ito and Roley (1987), Hardouvelis (1988), Cook and Hahn (1989), Ederington and Lee (1993), Fleming and Remolona (1999), Bollerslev et al. (2000), Kuttner (2001), Anderson et al. (2003) and Bernanke and Kuttner (2005).

state and development of economy and monetary policy (Andersen et al., 2003 and Faust et al., 2007).

Balduzzi et al. (2001) uses intraday data of U.S. Treasury government bond market to study the effects of macroeconomic announcements on yields and trading volumes. They find that some news releases (measured by surprises) have a significant effect on the price of at least one of the instruments (a three-month bill, a two- and 10-year note and a 30-year bond) used in the study. They also report that the effects vary greatly according to maturity of the instruments and that most of the adjustment to news generally occurs within one minute after the announcement.

There are several other previous studies of international (macroeconomic) factors affecting on government and corporate bond yields. Codogno et al. (2003) and Geyer et al. (2004) find in their studies that certain global factors has important explanatory power of the changes in bond yield spreads and local factors have less if none explanatory power. Andersson et al. (2009) studied the response of German intraday bond yields (spanning from 1999 to 2005) to major macroeconomic news and ECB monetary policy announcements. The authors find that German bond market seems to react more strongly to U.S. macroeconomic news than to aggregated and national euro area and UK news. They also report that this phenomenon increases over the time period considered.

Bredin et al. (2010) explores monetary policy surprises' spillover effect, instead of macroeconomic news announcements' effect, on international bond yields. The authors find that bond returns react more to domestic than to foreign monetary policy surprises. They also report a strong difference between the effects of domestic monetary policy surprises on bond returns in Germany in relation to the UK. An unexpected monetary tightening in Germany leads to a rise in the bond return as opposed to UK it leads to a fall in the returns. They trace this effect to news about lower (or higher) inflation expectations and could be potentially explained by differences in the credibility of the monetary policy decision-makers in different countries.

Many other studies also examine the effects of different domestic and foreign financial and macroeconomic news on bond yields and spreads and other assets, e.g. Andersen et al. (2003), Von-Thadden (2004), Ehrmann and Fratcher (2005), and Faust et al. (2007).

Most of the studies where macroeconomic or monetary policy indicators' effect on interest rates has been studied concentrate on U.S. and Germany government bond yields. One reason for this concentration of studies is that there are available intraday-data of bond yields and prices from the U.S. and German government bond futures markets. For Scandinavian government bond markets, there are no equivalent futures market instruments that track the intraday bond data, which makes it hard to find public historical intraday government bond yield data. This study uses daily (end-of-day) bond yields, which affects slightly on the significance of the spillover results as there will be other noise (other events and news during the day) affecting the daily yields. However, this is likely not to have considerable impact, as bond markets are generally less volatile than most of the other financial markets e.g. equity and commodity markets. The advantage of using daily bond yields in the studies of macroeconomic news' effect on daily asset prices is that it allows me to avoid certain possible measurement problems. These possible measurement problems are explained in more detail in Chapter 4.

Balli (2009) finds significant results that the global shocks, including some of the macroeconomic news, affect euro bond markets in various levels, creating differences in bond yields even when controlling different market specific factors. He uses daily yield changes and includes some Scandinavian countries in his study as I do. However, he measures only the actual news impact and not the surprise factor of the news bond yields, which I investigate the both in my study. In addition, unlike Balli, I also control the effect of benchmark (German government) term structure of interest rates on bond yields and spreads during the macroeconomic news announcement dates. Balli (2009) also uses partially different and a less comprehensive set of macroeconomic news than I use in my study.

Smales (2012) examines the Australian interest rate futures market and finds nine major macroeconomic news that affect interest rates order imbalance and returns. He also found that right after a scheduled macroeconomic announcement the sensitivity to order flow was increased in the Australian interest rate futures market, because the level of information asymmetry increased.

Some other studies have concentrated in financial asset pricing and volatility when studying the market reactions to macroeconomic news during announcement days. This kind of research has concentrated mostly on the conditional volatility implied by ARCH/GARCH models. For example, one of the earlier studies of such models is from Engle and Li (1998)

who investigate the degree of persistence heterogeneity related to scheduled macroeconomic announcement dates and dates with no announcements in the treasury futures market.

2.1.1. The importance of U.S. macroeconomic news on bond prices

As of the literature on importance of the U.S. macroeconomic news and interdependence in markets, related evidence suggests that e.g. German bond yields/returns respond more to some U.S. macro news than equivalent domestic or other European countries' news (see for example Goldberg and Leonard 2003 and Andersson et al. 2009). There are several reasons cited for such findings. First, the U.S. can be considered as the engine of global growth, which therefore explains its importance for the global financial markets, including Scandinavia and other European countries. Second, European area macroeconomic news announcements are typically released later than the equivalent U.S. macroeconomic news data (which may lead markets to draw conclusions about the European economies from the U.S. announcements). In this respect, only European countries' releases that cause investors to revise these conclusions should lead to market reactions. Third, the fact that economic business cycles have become more integrated and globalization therefore has led to a higher degree of interdependence between economies, especially U.S. and Europe. This could be considered more of an enabling factor for the hypothesis than a prerequisite for it.

The results of Gravelle and Moessner (2001) indicate that Canadian macroeconomic news influence Canadian interest rates much less than comparable U.S. news. They rationalize these results by the close integration between Canada and the US markets but also reason that there is some market uncertainty about the reaction function of Canadian monetary policy. Similarly, Kim and Sheen (2000) report that the U.S. news affect Australian interest rates, especially at the short end of the yield curve, more than Australian news.

Christiansen (2007) has used the GARCH model which Bekaert et al. (2005) used to assess return spillovers in European bond markets. Her results implicate that in EMU markets (but not in non-EMU countries) after the introduction of euro, the regional effects have become dominant over both own country and global effects.

2.1.2. Time-variation in the effects of macroeconomic news

This study assumes constant impact of macroeconomic announcements i.e. I don't study the possible time varying effect of the different news announcements. There are previous studies

that give many reasons why the effect of macroeconomic news announcements (and surprises) might change with the business cycle or other economic conditions (see for example, David 1997, Veronesi 1999 and Ehrmann and Fratzscher 2003 and 2005).

Previous academic papers of Ehrmann and Fratzscher (2003, 2005) use regression analysis in a rolling window and Andersen et al. (2007) study the effect of macroeconomic variables in different business cycles. These authors argue that time-variation of the effects of news announcements may occur for many reasons of which they mention three of most interest. First, policy-makers may prefer certain macroeconomic news announcements (indicators) when making policy decisions for a given time period. This may reflect to increased effects in financial returns to these certain announcements. Second, macroeconomic news may behave in an unusual manner during different times during the business cycle and this may lead to these variables as being particularly important, at least temporarily. For example, the U.S. employment data in late 2003 and early 2004 probably fell into both these above mentioned categories, when there were growing concerns about recovery of the employment situation. This led to increased attention in markets to the monthly U.S. nonfarm payroll unemployment news announcements. Third, the researchers in the studies assume that different market reactions depend on the state of the business cycle. For example, if a change in economic cycle/activity is expected in the markets, but the extent and importance of the following up- or downturn is unknown, some forward-looking macroeconomic news announcements may have increased importance by market participants.

Andersson et al. (2009) consider various monetary policy regimes when investigating the German long-term bond markets. Their study concentrates on the time period when euro was introduced in January 1999. The authors generate three different monetary policy regimes (tightening, accommodative and neutral), by splitting their sample period into three subsamples. Their results indicate that the impact of public information about US activity and employment on German bond markets has increased over time.

Barr and Priestley (2004) and Aggarwal and Lucey (2010) use an asset pricing model and employes daily asset prices in their studies of time-varying expected bond returns. These studies implicate a time varying financial integration in bond markets.

On the contrary of the above mentioned studies e.g. Faust et al. (2007) studied the effect of wide range of U.S. macroeconomic announcements on exchange rates and interest rates and

his found little evidence of time-variation in the effects. His results indicated that there is a significant consistency in the effects across the major announcements used in his study.

2.1.3. Macroeconomic news' effect on stock markets

In a study of stock market returns, McQueen and Roley (1993) report that macroeconomic news and monetary policy announcements effect stock prices because they reveal information about the determinants of the fundamental asset values of stocks. Flannery and Protopapadakis (2002) investigate the effect of macroeconomic news announcements on different stock market indices by using a GARCH model. The authors consider as a potential risk factor any macroeconomic news announcement that either have effect on asset returns or on increased conditional volatility. The results of the study indicate that measures of inflation (consumer price index and producer price index) affect only the level of stock returns. Furthermore, they find that three macroeconomic announcements (balance of trade, unemployment and housing starts) affect only the conditional volatility stock returns.

Bomfim (2003) investigates the effect of monetary policy announcements on the volatility of stock returns. The authors results indicate that unexpected (surprise) monetary policy decisions seem to increase substantially the stock market volatility in the short-term. The author reports expected results as positive sign surprises tend to have a larger effect on volatility of the returns than negative sign surprises.

There are also several other studies investigating the reaction of stock prices to macroeconomic announcements see e.g. Pearce and Roley (1985), Guo (2004), Bernanke and Kuttner (2005), Boyd et al. (2005) and Andersen et al. (2007). Most of these research papers investigate the reaction of an aggregate market index instead of certain stocks or portfolios with different features excluding Guo (2004) and Bernanke and Kuttner (2005) who study the reaction to unanticipated (surprise) changes in the target rate.

2.2. The relationship between benchmark term structure of interest rates and asset prices

In order to investigate the effect of the term structure of interest rates on bond yields, many earlier studies employ the level and slope of benchmark government bond yields. These both variables are of key importance, as the level of the yield curve is consistent with the markets'

long-term inflation expectations and the slope seems to be a good predictor of the business cycle (see e.g. Estrella and Hardouvelis, 1991 and León and Sebestyén, 2012).

A number of earlier studies concentrate on the relation between U.S. Treasury and other benchmark government bond yields and the yield spreads on bonds. Folkerts-Landau et al. (1997) and Erb et al. (2004) reported a possible effect of the yield on U.S. government bonds or the slope of U.S. yield curve on the emerging market government bond returns. For studies that cover the euro zone government bond markets, Blanco (2001) explained the bond yield differentials in euro government bonds by employing U.S. corporate bond yields[4] as a proxy for the international risk factor. In the empirical study of Dungey et al. (2000), they found strong evidence that the common international factors affect yield differentials in euro bond markets.

Many studies have reported significant relation between benchmark term structure and especially corporate bond yields. Iwanowski and Chandra (1995) examine the relation between Treasury yields and yield spreads of noncallable bonds during the late 1980s and early 1990s. They find that there is a small negative relation between change in the level of the Treasury yield and change in corporate bond yield spreads. However, they find no significance between the relation of the change in Treasury slope and yield spreads. Longstaff and Schwartz (1995) and Duffee (1998) report similar results, except they find notable negative relation also between the slope and bond spreads. Chen et al. (2007) finds similar negative relationships with bond spreads and Treasury term structure using somewhat different bond data (active and inactive bond data, bonds can include options) and measures as authors above.

Skinner and Papageorgiou (2001) use zero-coupon spot rates (instead of yield to maturity) in their study and similarly find a negative correlation between Treasury term structure and the spread on corporate bonds. In addition they find that this relation change slowly through time. In contrast with Longstaff and Schwartz and Duffee, the authors do not find that the relation would increase between the bond yield spreads and changes in the level and slope of the Treasury yields as they move down to lower credit rating bonds. Also Chen et al. (2007) finds similar negative relationships with bond spreads and Treasury term structure using somewhat

[4] Corporate bond spreads are calculated by subtracting the corporate bond index from the benchmark government bond yield.

different bond data (active and inactive bond data, bonds can include options) and measures as authors above.

Overall, the literature of macroeconomic news' and benchmark term structure of interest rates' effect on bond yields explains only partly the bond yield movements. There are also a vast literature that explains the bond yield and spreads changes with other factors and relations. To mention a few of these, some explains the yield changes by default risk (Collin-Dufresne et al. (2001) and Liu et al. (2009)) and different prevailing tax practices on bonds and other securities (Elton et al. (2001)). Bhojraj and Sengupta (2003) introduces corporate governance as an explaining factor for the bond spreads and Kwan (1996) shows that changes in a firm's stock price are negatively correlated with contemporaneous and future changes in the yields of its bonds.

There are several studies that also acknowledges liquidity's influence in bond yields (Elton et al. (2001)), consentrates on aggregate proxies of liquidity (Duffie and Singleton (1997)) or assumes that liquidity explains the unexplained portion of the yield spread (Collin-Dufresne et al. (2001)). Also some relatively recent studies empirically test and find evidence that liquidity is indeed priced in corporate bond yield spreads e.g. Longstaff et al. (2005), Chen et al. (2007). Covitz and Downing (2007) state that more illiquid bonds earn higher yield spreads, and that yield spreads reduces significantly when liquidity improves. This view adds to the above default risk and "tax effect" literature that neither the level nor the dynamic of yield spreads can be fully explained simply by the determinants of default or credit risk and taxes.

3. Background of the main variables used in the study

In this chapter I discuss the background of macroeconomic news announcements and government bond market which relationship I focus in this study. In the first part, I cover the dynamics and features of the macroeconomic news announcements. In the second part, I discuss about government bonds in general and Scandinavian (more specific Norway, Sweden, Finland and Denmark) government bonds.

3.1. Macroeconomic news

Macroeconomic news (i.e. economic indicators) are statistics about an economic activity. These statistics can be used and analyzed to assess the historic, current and future economic performance and development. Economic indicators can also be applied to e.g. study of business cycles.

Macroeconomic news/indicators can have a large impact on the markets. Therefore, it is important for all investors to know how to interpret and analyze these news. Before the internet, some market participants were able to receive the macroeconomic news releases in timely fashion (e.g. economists and experienced professionals), and therefore had an advantage over other investors. Currently, many different groups collect and publish economic indicators to all public with a specific schedule for release, which allows investors to prepare for certain information at certain times (see Table 2).

3.1.1. Attributes of the macroeconomic indicators

Macroeconomic/economic indicators may differ in various ways, which is important to know in order to understand the dynamics and importance of different news. Next, I present the three major attributes each economic news/indicator has

3.1.1.1. Relation to the Business Cycle / Economy

Economic news indicators can have one of the three different features in relation to the economy:

Procyclic: Procyclical economic news indicator moves in parallel with the economy. This means that when economy is doing well, the economic indicator is usually increasing. On the other hand, when the economy is not doing well e.g. in recession, this indicator is usually

decreasing. A widely followed procyclical economic news indicators are for example the industrial production (index) indicator and gross domestic product (GDP).

Countercyclic: A countercyclic/countercyclical economic news indicator does not move in paraller with the economy. The employment situation (unemployment rate) becomes worse when the economy gets worse, which means that unemployment rate increases (countercyclic economic news).

Acyclic: Unlike procyclic and countercyclic indicators an acyclic economic news has no relation how the economy is doing. Hence, acyclic indicators have generally little or no use in studying the relation between economy and these indicators. An example of acyclic economic indicator could be the number of goals Manchester United scores in a year, which has no relationship to the economic situation.

3.1.1.2. Frequency of the Data

Economic indicators are released in different frequencies. Most countries release the GDP figures quarterly, the consumer confidence monthly and the initial jobless claims weekly. Even more frequent economic indicators, such as the S&P 500 Index, are available almost real time as the index value is updated every 15 seconds during trading sessions.

Almost all economic news/indicators have predefined release schedule. This is why people who follow the news can prepare for and plan on seeing specific information at certain times of the day, week, month and/or year.

3.1.1.3. Timing

Macroeconomic news/indicators can be divided into three different categories (leading, coincident and lagging indicators) based on how those follow the overall economic cycle:

Leading indicators

Economic indicators, which measure economic performance that change before the economy starts to follow a particular pattern or trend are called the leading indicators/news. These indicators tend to precede (by one to 12 months) other changes in economic activity, which make those useful to predict (but are not always right) the future movement/pattern of the economy. Some of the most common leading economic indicators include for example manufactures' and durable goods orders, new housing starts and money supply (M2).

Coincident indicators

Coincident/concurrent indicators are economic and financial market indicators, which change at approximately the same time as the economy. Accordingly, these indicators provide information about the current state of the economy. Some of the most followed coincident news/indicators are gross domestic product (GDP), industrial production, retail sales and nonfarm payroll.

Coincident indices (several coincident indicators compiled in an index) may be used to measure the state of economy more reliable, as some of the short-term noise associated with individual indicators can be eliminated.

Lagging indicators

Lagging indicators are economic and financial market indicators that generally change after an economy has changed or started to follow a certain trend or pattern. These indicators usually follow the economic cycle by about six months unlike coincident indicators (moves with the economic cycle) or leading indicators (moving ahead of economy). Some of the most common lagging indicators include the unemployment rate and consumer price index (CPI).

3.2. Government bonds

A government bond is a security issued by a county's government and it is usually denominated in the country's own currency. When a government issues a bond in foreign currency, it is usually called a sovereign bond. Bonds are most commonly issued through underwriting process. In this process, financial service providers, forms a syndicate and buys the bond issue from an issuer and then sells them further to investors. However, unlike underwriting process, the government bonds are generally issued through auction process. In this process only market makers can bid for bonds and in other cases the members of the public and banks can participate in the bidding. The first ever government bond was issued by the English government in 1693 to raise money to fund a war against France.

Government bonds can fundamentally carry several risks e.g. country, political, credit, currency and inflation risk. Government bonds can be protected of inflation risk by issuing inflation-indexed bonds. In the past, government bonds have been widely regarded as practically risk-free bonds, because governments could easily devaluate their currencies (e.g. by printing more money) or raise taxes to redeem the bond at maturity. However, the downgrade of the United States debt rating and the sovereign debt crisis in the European

Union has created some genuine doubts into those risk-free assumptions. There are also examples of governments defaulting on theirs debt for example in Russia during the "ruble crisis" in 1998.

Table 1. Historical credit ratings for Scandinavian countries used in the study.

This table presents the historical credit ratings for Norway, Sweden, Finland and Denmark during the time span of this study from 1997 to 2011. The credit ratings are Standard & Poor's issuer credit ratings (foreign currency long term ratings).

Year	Norway	Sweden	Finland	Denmark
1997	AAA	AA+	AA+	AA+
1998	AAA	AA+	AA+	AA+
1999	AAA	AA+	AA+	AA+
2000	AAA	AA+	AA+	AA+
2001	AAA	AA+	AA+	AAA
2002	AAA	AA+	AAA	AAA
2003	AAA	AA+	AAA	AAA
2004	AAA	AAA	AAA	AAA
2005	AAA	AAA	AAA	AAA
2006	AAA	AAA	AAA	AAA
2007	AAA	AAA	AAA	AAA
2008	AAA	AAA	AAA	AAA
2009	AAA	AAA	AAA	AAA
2010	AAA	AAA	AAA	AAA
2011	AAA	AAA	AAA	AAA

The market's perception of government's creditworthiness determines the terms on which a government can sell bonds. Norway, Sweden, Finland and Denmark have a different (more stable and sound) fiscal position than most other industrialized European countries and may be viewed a "safe place to be" by the market participants. The strong historical credit ratings of these countries represent their strong creditworthiness and fiscal positions (see Table 1) during the time span of this study (from 1997 to 2011). In recent years, the global growth has been showing signs of slowing down, at the same time as debt problems still are present This can probably be considered important reasons for even further attractiveness of the Norwegian, Swedish, Finnish and Danish government bonds with a strong credit rating.

4. Data

The data used in this study consist of large set of different variables, which can be categorized in various bond yield data and macroeconomic news announcement data published in the U.S. and in a few economically significant and large European countries (Germany, UK and France). Next, I will first introduce the data and variables starting from bond and interest rate data, following the macroeconomic news data and in the end of this chapter I will introduce relevant summary statistics of all the variables used in this study.

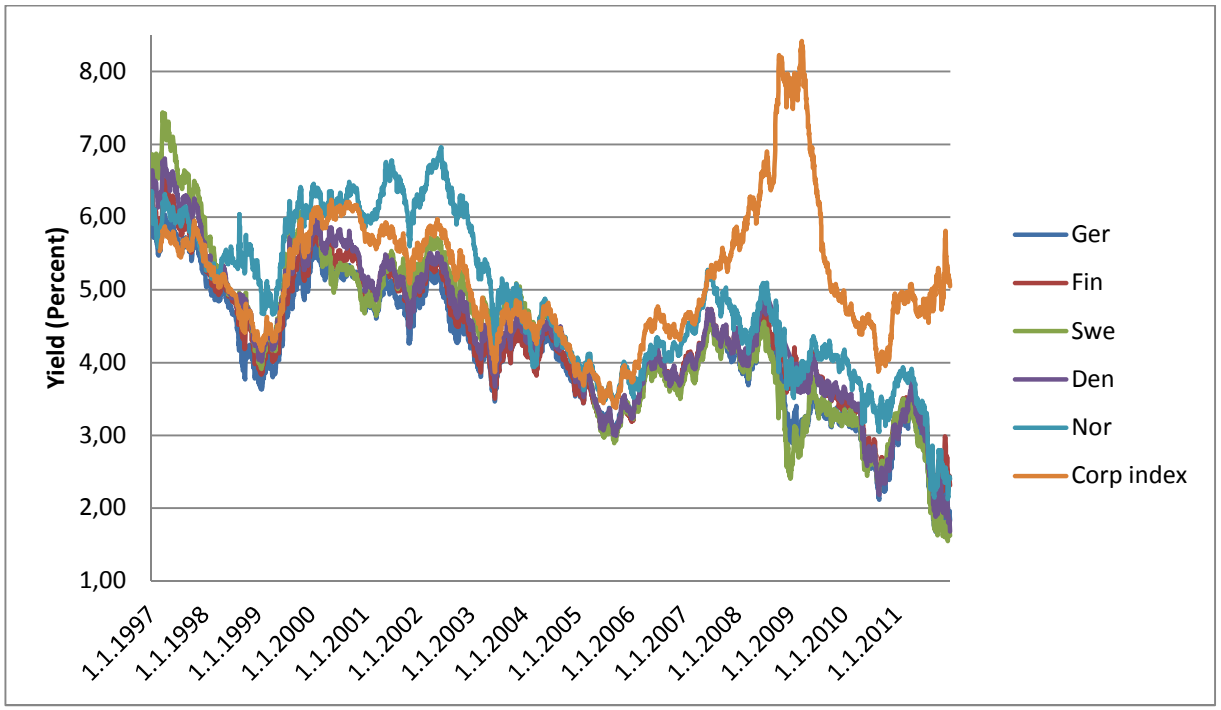
4.1. Bond yield data

As dependent variables for this study I use the daily yield changes of 7-10-year corporate bond index (see Chapter 4.2. for detailed description) and 10-year euro denominated Scandinavian government bond yields for each country (Finland, Sweden, Norway and Denmark) and spread changes of these yields over German 10-year government bond yield. The bond yields are acquired with daily frequency from Bloomberg database. The yields used in this study are bond bid yields. I employ long historical dataset on trading days from January 1, 1997 to December 31, 2011. The yield spreads over benchmark and the daily yield spread changes are calculated by using the daily end-of-day bond yield data (closing bid yields). I use long-maturity corporate bond index and government bonds to eliminate short-run fluctuations in yield differentials.

The figure 1 presents the historical development of yields on government bonds and corporate bond index used in this study. The most apparent information emerging from the Figure 1 is the large increase of the corporate bond index yields starting from mid 2007 till the second quarter of 2009. This skyrocketing of the index yields is heavily influenced by the financial crisis and its symptoms like credit crunch. After the first quarter of 2009, the index yields experienced a steep decline as the effects of the financial crisis started to decrease. For the government bond yields, it can be seen from that there is a general downward trend during the time span of this study (from 1997 to the end of 2011) reaching the lowest yield levels during 2011.

Figure 1. Historical development of yields on government bonds and corporate bond index.

The figure displays daily historical yields on the government bond and corporate bond index yields used in this study. The yields in the figure represent German, Finland, Sweden, Norway and Denmark 10-year euro denominated government bond yields and a European corporate bond index (the BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield denoted as "Corp index". The German 10-year government bond yields are used to calculate yield spreads for the study's regressions. The x-axis represents observation dates and the y-axis yield levels (%).The data range is January 1997 to December 2011.



4.2. Corporate bond index

The corporate bond index used in this study is the Bank of America Merrill Lynch 7-10 Year Euro Corporate Index. All the corporate bonds in the index have remaining maturity of 7-10 years and consists a subset of The BofA Merrill Lynch Euro Corporate Index. This index tracks the performance of EUR denominated investment grade corporate debt publicly issued in the Eurobond or Euro member domestic markets. Qualifying securities must have an investment grade rating, which is an average of Moody's, S&P and Fitch ratings. All the securities in the index must have also a fixed coupon schedule and a minimum amount outstanding of EUR 250 million. Euro legacy currency, warrant-bearing and defaulted securities are excluded from the Index.

The index yields are acquired with daily frequency from Bloomberg database. I employ long historical dataset on trading days from February 28, 1997 to December 31, 2011.

4.3. Benchmark term structure of interest rates

In this study, I also need variables to summarize the information in the benchmark German government term structure of interest rates in order to investigate the term structure's effect on changes in yields and spreads. The most of the changes in the government term structure can be expressed by the changes in the level and the slope, which is reported e.g. by Chen and Scott (1993) and Duffee (1998). These both variables are of key importance, as the level of the yield curve is consistent with the markets' long-term inflation expectations and the slope seems to be a good predictor of the business cycle (see Estrella and Hardouvelis, 1991 and León and Sebestyén, 2012).

I measure the level of the German government term structure of interest rates with the German 3-Month Bubill yield, and the slope with the spread between the 30-year German government bond yield and the 3-month Bubill yield. The rates are comprised of Generic German government bills and bonds. These yields are retrieved from the Bloomberg database. I use time-series data of daily Bubill and bond yields mentioned above and I employ long historical dataset from trading days from January 1, 1997 to December 31, 2011. German government bond yields are in general considered riskless and appropriate yields for the benchmark comparison with other European government bonds used in this study. Duffee (1998) uses these corresponding U.S. measures (3-month Treasury bill yield and the spread between 30-year U.S. Treasury bond yield and the 3-month Treasury bill yield) in his study to measure the U.S. Treasury term structure of interest rates.

4.4. Bond yield data frequency

In this study I investigate the daily changes in bond yields and spreads during the announcement days of macroeconomic news, which means that I use daily yield data rather than intra-day or tick-by-tick data. There are no publicly available (and relatively inexpensive) intra-day yield data for Scandinavian government bond markets unlike for e.g. major economies' bond markets like Germany and U.S., where there are high trading volumes and liquid bond futures markets with available intra-day data. This is one reason why Scandinavian bond markets have been studied less in this field of literature.

As discussed later in the results of this study in Chapter 7, a slight drawback of the daily frequency of yield data is that during the day other news and events may cause some noise on the yield changes. However, the Scandinavian government bond markets (and the Merrill Lynch 7-10 Year Euro Corporate Index) are generally less volatile than many other financial asset markets (such as stocks and commodities), which makes the drawback of the daily frequency less important.

On the other hand, an important fact for using daily yield data is that the macroeconomic news are not always released at the official announcement release times (see Ehrmann and Marcel Fratzscher 2005). For example, for Germany there is evidence of leakage of some macroeconomic news announcements before the official announcement time. According to Andersen et al. (2003) this is one documented reason by some studies why e.g. German announcements have much less evidence when studying the effects on intra-daily price changes around the official release times. The advantage in my study is that I exclude this measurement problem by using daily yield data. In addition, it would be also relatively difficult to compare the reaction of yields on different bonds due to nonsimultaneous trading during a shorter intra-day period of time after the news announcement.

4.5. Macroeconomic news data

In order to measure the macroeconomic news and the surprise factor of the news in this study, I need the actual news release values and the corresponding market expectations or forecasts. The macroeconomic data releases are collected from Bloomberg as are the market expectations. The Bloomberg's synchronized survey data on market expectations of macroeconomic news consists of median expectations of the survey panelists. Andersson et al., (2009) uses the same Bloomberg source for macroeconomic news releases and for the expectation data. They tested for unbiasedness in the expectations data using standard techniques used in the literature (see Balduzzi et al., 2001) and found that the survey expectations are of good quality (null hypothesis of unbiased data could not be rejected at 10 % level).

In this study I use an extensive sample of macroeconomic news announcements (see Table 1), which are most used and influential in the academic studies and press (see e.g. Faust et al., 2007 and Balli 2009). The U.S. macroeconomic news announcements are generally regarded as important macroeconomic news (see discussion in e.g. Chapter 2.1.1) and there are a good

coverage of survey expectations data of these news. Therefore, I use a broad set of U.S. releases and a smaller and comparable set of some the macro news from other European countries. These other countries include Germany, UK and France as these countries are large and influential economies in Europe and their macroeconomic news are used (at least in parts) in many other academic studies (see e.g. Andersson et al., 2009 and Balli 2009). It is not possible to get as extensive set of similar macroeconomic announcements for these European countries as for U.S., because the survey expectations are either missing or too irregular for the European news.

I do not use the euro area aggregated macroeconomic news data in this study, as it tends to have less significant effects on European government bond yields than e.g. U.S. or German equivalents have according to the study of Andersson et al (2009). Most euro area aggregate macro news announcements are released later than the corresponding U.S. macro news. The delayed releases of the aggregate euro area statistics is linked to the time needed to compile the statistics from all EMU member states. The delayed release of euro area macroeconomic news also have greater potential to contain less new information as the national releases (e.g. German or France CPI) are already known to the investors at the time of the announcements.

The units of measurement obviously differ across the macroeconomic indicators e.g. U.S. CPI indicator is measured by monthly percentage change (MoM%) and the U.S. employees on nonfarm payroll indicator is measured by total monthly net change (MoM net change). Hence, to allow for meaningful comparisons of the estimated news response coefficients across indicators, asset classes and markets, this study follows Balduzzi et al. (2001), Andersen et al. (2003b) and (2003) and Andersen et al. (2007) in the use of "standardized surprise and standardized news" factors. Specifically, I divide the surprise by its sample standard deviation, defining the standardized news associated with indicator *i* at time *t* as:

Equation 1:

Standardized surprise

$$K_{i,t}^{S} = \frac{(A_{i,t} - E_{i,t})}{\sigma_i^S}$$

In the equation $A_{i,t}$ denotes the announced value of macroeconomic news indicator *i*, $E_{i,t}$refers to the market's expectation of the news indicator *i* as described in the Bloomberg

survey median forecast, and σ_i^S is equal to the sample standard deviation of the surprise component $A_{i,t} - E_{i,t}$. The numerator translates announcements into surprises and the denominator standardizes the surprises. Because σ_i is a constant for any indicator *i*, this standardization affects neither the statistical significance of the estimated response coefficients nor the fit of the regressions compared to the results based on the "raw" surprises. Using this equation, regressing bond yields and spreads on surprises, the regression coefficient is the change in the yields and spreads for a one standard deviation change in the surprise.

As for the standardization of a macroeconomic news indicator $K_{i,t}^A$, I use the following equation:

Equation 2:

Standardized news

$$K_{i,t}^A = \frac{A_{i,t}}{\sigma_i^A}$$

Where $A_{i,t}$ is the announced value of macroeconomic news announcement/indicator *i*. I divide announced value of macroeconomic news indicator *i* by the σ_i^A, which is the standard deviation of the news indicator distribution. Thus, when regressing bond yields and spreads on news indicators, the regression coefficient is the change in the yields and spreads for a one standard deviation change in the news indicator.

When regressing the $K_{i,t}^A$ and $K_{i,t}^S$ on the daily yield and spread changes, the macroeconomic news response coefficients for the $K_{i,t}^A$ and $K_{i,t}^S$ represent the average daily yield or spread changes (in basis points) following a macroeconomic news release for a standardized news announcement and surprise of one.

Table 2 presents the macroeconomic news announcement data used in the study. The data in the table from left to right presents the macroeconomic news categorized by different countries of which economy the news represents, source of the news announcements, frequency of the news announcements, the first and the last date for the news announcements used in this study, units of the news data and release times for the announcements.

Table 2. Macroeconomic news announcements used in the study

Data release	Source	Frequency	First release date	Last release date	Units	Release time
U.S.						
CPI	BLS	Monthly	19.2.1997	16.12.2011	MoM% change	8:30 ET
Nonfarm payroll	BLS	Monthly	7.2.1997	2.12.2011	MoM Net Change	8:30 ET
Housing starts	Census	Monthly	17.3.1998	20.12.2011	Thousands	8:30 ET
PPI	BLS	Monthly	12.12.1997	15.12.2011	MoM% change	8:30 ET
Retail sales	Census	Monthly	13.6.2001	13.12.2011	MoM% change	8:30 ET
Trade balance	BEA	Monthly	20.3.1997	9.12.2011	$ billion	8:30 ET
Unemployment	BLS	Monthly	7.2.1997	2.12.2011	% rate	8:30 ET
Industrial production	FED	Monthly	14.2.1997	15.12.2011	MoM% change	9:15 ET
Durable goods orders	Census	Monthly	26.11.1997	23.12.2011	MoM% change	8:30 ET
Consumer confidence	CB	Monthly	25.2.1997	27.12.2011	Quoted rate	10:00 ET
Manufactures' new orders	Census	Monthly	6.3.1997	5.12.2011	MoM% change	8:30 ET
Initial jobless claims	DOL	Weekly	3.7.1997	29.12.2011	Thousands	8:30 ET
Germany						
CPI	Destatis	Monthly	26.2.2003	9.12.2011	MoM% change	8:00 CET
Business confidence (exp. of econ. growth)	ZEW	Monthly	25.3.1997	13.12.2011	Quoted value	10:00 CET
Industrial production	DB	Monthly	3.4.1997	7.12.2011	MoM% change	8:00 CET
Unemployment rate	DB	Monthly	5.2.1998	30.11.2011	% rate	9:55 CET
France						
CPI	Insee	Monthly	25.3.1997	13.12.2011	MoM% change	8:45 CET
Business confidence (general production)	Insee	Monthly	28.10.1998	23.11.2011	Quoted value	8:45 CET
Industrial production	Insee	Monthly	28.3.1997	9.12.2011	MoM% change	8:45 CET
Unemployment rate	Insee	Monthly	28.2.1997	30.7.2007	% rate	8:30 CET
UK						
CPI	ONS	Monthly	20.1.2004	13.12.2011	MoM% change	9:30 CET
Industrial production	ONS	Monthly	12.3.1997	7.12.2011	MoM% change	10:30 CET
Unemployment rate	ONS	Monthly	15.5.2002	14.12.2011	% rate	10:30 CET

Acronyms for the sources are as follows: BEA (Bureau of Economic Analysis), CB (The Conference Board), DOL (Department of Labor), BLS (Bureau of Labor Statistics), Fed (Federal Reserve Board of Governors), Census (Bureau of the Census), Destatis (German Federal Statistical office), ZEW (Centre for European Economic Research), DB (Deutsche Bundesbank), Insee (National Institute of Statistics and Economic studies) and ONS (UK Office for National Statistics). Release time is the time of the day when the corresponding macroeconomic variable is announced.
Acronyms for the release times are as follows: ET (Eastern Standard Time) and CET (Central European Time, UTC+1).

4.6. Summary of the variables

In this section, I present the summary statistics of the variables used in this study. In the table 3, I present the summary statistics concerning the macroeconomic news variables. The complete statistics of all the variables used in the regressions of the study are presented in the Appendix 1. In addition, correlation matrices between two example set of regression variables are presented in Table 4.

Table 3. Macroeconomic news variables' summary statistics

The table presents the summary statistics of all the macroeconomic news variables that are used in the regressions of this study. In the first colum the "A_" represents certain standardized macroeconomic news announcement and the "S_" represents the corresponding standardized surprise factor of the news. The statistics presented for the news variables are the number of observations in the sample, mean, standard deviation, standard error, minimum and maximum.

Macroeconomic news	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_US_Nonfarm payroll	179	0,289	1,000	0,075	-3,234	2,103
S_US_Nonfarm payroll	179	-0,199	1,000	0,075	-3,501	2,708
A_US_Initial jobless claims	757	4,652	1,000	0,036	3,201	8,332
S_US_Initial jobless claims	757	-0,033	1,000	0,036	-4,270	4,430
A_US_Unemployment	179	3,164	1,000	0,075	2,117	5,537
S_US_Unemployment	179	-0,149	1,000	0,075	-3,323	2,658
A_GER_Unemployment	162	6,824	1,000	0,079	4,930	8,575
S_GER_Unemployment	162	-0,257	1,000	0,079	-3,697	2,773
A_UK_Unemployment	115	4,763	1,000	0,093	3,699	6,675
S_UK_Unemployment	115	0,030	1,000	0,093	-2,265	2,265
A_FR_Unemployment	125	8,023	1,000	0,089	6,393	10,229
S_FR_Unemployment	125	-0,507	1,000	0,089	-3,474	1,737
A_US_Retail sales	127	0,210	1,000	0,089	-3,155	6,053
S_US_Retail sales	127	0,038	1,000	0,089	-2,314	6,654
A_US_Durable goods ord.	170	0,026	1,000	0,077	-3,534	3,648
S_US_Durable goods ord.	170	-0,022	1,000	0,077	-3,075	4,050
A_US_Manufacturers' ord.	178	0,108	1,000	0,075	-3,523	3,335
S_US_Manufacturers' ord.	178	0,075	1,000	0,075	-3,603	2,976
A_US_Housing starts	166	2,704	1,000	0,078	0,873	4,337
S_US_Housing starts	166	0,114	1,000	0,078	-3,031	3,067
A_US_Trade balance	177	-2,371	1,000	0,075	-4,180	-0,481
S_US_Trade balance	177	-0,008	1,000	0,075	-2,957	3,562
A_US_Ind. production	179	0,209	1,000	0,075	-4,529	2,750
S_US_Ind. Production	179	-0,093	1,000	0,075	-5,701	3,135
A_GER_Ind. production	177	0,034	1,000	0,072	-4,039	-0,851
S_GER_Ind. production	177	-0,095	1,000	0,072	-3,073	-1,851

Table 3 continued

Macroeconomic news	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_UK_Ind. production	178	-0,114	1,000	0,075	-5,412	4,279
S_UK_Ind. production	178	-0,382	1,000	0,075	-5,581	2,635
A_FR_Ind. production	173	0,071	1,000	0,076	-2,666	2,838
S_FR_Ind. production	173	-0,121	1,000	0,076	-2,911	3,019
A_US_CPI	179	0,621	1,000	0,075	-5,324	3,758
S_US_CPI	179	-0,051	1,000	0,075	-3,042	3,042
A_GER_CPI	107	0,427	1,000	0,097	-1,758	2,930
S_GER_CPI	107	0,027	1,000	0,097	-6,691	1,912
A_UK_CPI	96	0,657	1,000	0,102	-2,223	2,779
S_UK_CPI	96	0,208	1,000	0,102	-2,220	3,330
A_FR_CPI	178	0,530	1,000	0,075	-1,895	3,031
S_FR_CPI	178	-0,019	1,000	0,075	-3,804	2,853
A_US_PPI	169	0,282	1,000	0,077	-3,427	3,916
S_US_PPI	169	0,068	1,000	0,077	-2,517	3,566
A_US_Consumer conf.	179	3,060	1,000	0,075	0,805	4,661
S_US_Consumer conf.	179	0,017	1,000	0,075	-2,792	2,463
A_GER_Business conf.	118	0,446	1,000	0,092	-1,698	1,951
S_GER_Business conf.	118	-0,074	1,000	0,092	-2,626	2,505
A_FR_Business conf.	131	-0,317	1,000	0,087	-2,963	1,559
S_FR_Business conf.	131	-0,031	1,000	0,087	-3,628	5,229

As discussed in the previous Chapter 4.5., I employ standardized macroeconomic news announcement and announcement's surprise factors in the study. Therefore, the standard deviations (S.D.) for the variables equals one and the standard errors (S.E.) are equal for each news' announcement and announcement's surprise factors.

Table 3 shows that the number of the news announcements and the surprise factors of the news announcements are smaller than the first and the last announcement dates and the frequencies of the announcements in the Table 2 would suggest. The number of news surprise factor observations are limited to the first available market expectations data of the corresponding news announcements from the Bloomberg database. I employ equal amount of observations of the news announcements and surprise factors of the news in order to get comparable results for the regression coefficients.

Table 4. Correlations between variables

This table presents correlation matrices between two example set of regression variables, which gives a good overall view of the correlations between variables of all the regressions done in this study. The two set of variables for which the correlations are presented are for the regressions of U.S. nonfarm payroll and U.S. consumer confidence macroeconomic news, which are one of the most important news on the bond yields in this study (see discussion in Chapter 7.5.). The "Announcement" is the standardized macroeconomic news announcement variable and the "Surprise" is the standardized variable of the actual news indicator minus the market expectations of that indicator. The "level" and "slope" represents the benchmark term structure variables, which are the daily change in German 3-Month Bubill yield and the daily change in spread between the 30-year German government bond yield and the 3-month Bubill yield respectively on the days when news announcement are released. The "yield" and "spread" are the daily yield and spread change variables for the Scandinavian government bonds and corporate bond index. All the variables are from the specific macroeconomic news announcement days.

Correlation matrix between the variables used in the regression of U.S. consumer confidence news on yields and spreads

Announcement	Surprise	Level	Slope	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread	
1,00	-0,22	-0,09	0,07	-0,04	-0,03	-0,06	-0,03	-0,04	-0,04	-0,01	-0,03	-0,03	-0,02	Announcement
	1,00	-0,06	0,11	0,16	0,14	0,10	0,16	0,12	0,00	-0,02	-0,06	-0,02	-0,10	Surprise
		1,00	-0,84	0,09	0,09	0,10	0,08	0,05	-0,01	-0,01	0,01	-0,03	-0,09	Level
			1,00	0,40	0,31	0,21	0,40	0,37	-0,10	-0,15	-0,23	-0,12	-0,18	Slope
				1,00	0,76	0,64	0,92	0,85	0,03	-0,27	-0,35	-0,18	-0,40	Fin yield
					1,00	0,68	0,82	0,68	-0,12	0,33	-0,11	0,02	-0,36	Swe yield
						1,00	0,67	0,56	0,00	0,10	0,42	0,06	-0,27	Nor yield
							1,00	0,85	-0,17	-0,20	-0,34	0,06	-0,46	Den yield
								1,00	-0,15	-0,28	-0,36	-0,19	0,00	Corp yield
									1,00	0,28	0,35	0,43	0,36	Fin spread
										1,00	0,51	0,51	0,23	Swe spread
											1,00	0,43	0,28	Nor spread
												1,00	0,34	Den spread
													1,00	Corp spread

Table 4 continued

Correlation matrix between the variables used in the regression of U.S. Initial jobless claims news on yields and spreads

Announcement	Surprise	Level	Slope	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread	
1,00	0,21	-0,01	0,07	0,06	0,10	-0,08	0,11	0,15	0,04	0,07	-0,13	0,11	0,14	Announcement
	1,00	-0,06	0,14	0,16	0,10	0,14	0,20	0,15	0,01	-0,07	-0,03	-0,02	-0,02	Surprise
		1,00	-0,80	-0,04	0,15	-0,08	0,10	-0,07	0,14	0,32	0,05	0,34	0,05	Level
			1,00	0,49	0,24	0,34	0,36	0,40	-0,16	-0,42	-0,30	-0,48	-0,25	Slope
				1,00	0,61	0,51	0,76	0,63	0,44	-0,25	-0,40	-0,30	-0,27	Fin yield
					1,00	0,41	0,85	0,54	0,07	0,49	-0,24	0,22	-0,10	Swe yield
						1,00	0,45	0,44	0,05	-0,10	0,47	-0,21	-0,10	Nor yield
							1,00	0,62	0,07	0,15	-0,37	0,18	-0,23	Den yield
								1,00	0,00	-0,14	-0,28	-0,23	0,44	Corp yield
									1,00	0,13	0,10	0,19	0,05	Fin spread
										1,00	0,26	0,77	0,26	Swe spread
											1,00	0,24	0,25	Nor spread
												1,00	0,25	Den spread
													1,00	Corp spread

5. Hypotheses

In this section I present the testable hypotheses of this study. First I present the actual hypothesis and after each hypotheses I present the theory and reasoning behind it.

> **H_1:** Some foreign macroeconomic news announcements have statistically significant effect on daily Scandinavian government bond and European corporate bond index yields.

In many studies where macroeconomic indicators' effect on interest rates has been studied it is shown that some macroeconomic news factors have statistically significant regression results on different countries' and indices' interest rates (see e.g. Andersen et al., 2007 and Faust et al., 2007, which uses intra-day interest rate data in their studies). Balli (2009) studied the effect of macroeconomic announcements (not the surprise factor) on daily government bond yield differentials in European bond markets and found that some macroeconomic indicators had statistically significant effect on yield differentials and that the significance (or insignificance) changes between countries. I assume that some of my study's macroeconomic factors have significant effects on the daily bond yields covered in the study. **H_1** will be tested by OLS regression discussed in the Chapter 6 to find the statistically significant macroeconomic news.

> **H_2:** Some U.S. macroeconomic news has more significant impact on Scandinavian government bond and European corporate bond index yields than equivalent European countries' news.

Related evidence suggests that e.g. German bond yields/returns respond more to some U.S. macro news than equivalent domestic or other European countries' news, see for example Goldberg and Leonard (2003) and Andersson et al. (2009). There are several reasons cited for such findings. First, the U.S. can be perceived as the engine of global growth, which therefore explains its importance for the global financial markets, including Scandinavia and other European countries. Second, the U.S. macroeconomic news data are typically released earlier than equivalent European area macro announcements (which may lead markets to draw conclusions about the European economies from the U.S. announcements). Third, it may also be argued that business cycles have become more integrated and globalization therefore has led to a higher degree of interdependence between economies. This could be considered more of an enabling factor for the hypothesis than a prerequisite for it. In this respect, only

European countries' releases that cause investors to revise these inferences should lead to market reactions. This same effect should apply for Scandinavian government bond and European corporate bond index yields/returns as these are in a similar position as German bond yields to U.S. macro news. **H_2** will be tested by comparing the significance and the number of significant comparable U.S., German, UK and France macroeconomic news to different government bond and corporate bond index yield and spread changes.

> **H_3:** There is a negative (positive) relation between the changes in level and slope of the benchmark German government term structure and the changes in bond spreads (yields).

I expect this hypothesis to hold during the macroeconomic news announcement days in my study. As mentioned by Estrella and Hardouvelis (1991) that increases in the slope of the benchmark term structure foreshadows improvements in real economic activity. For other part decreases in the slope of the term structure can indicate an increased likelihood of future recessions. These theories suggest that as short-term rates increases (and consequently the slope reduces), the possibility of future recession increase. I expect that the corporate bond yield and spread changes would respond to the increased likelihood of future recession. This hypothesized relation has been reported in the results of previous studies by e.g. Longstaff and Schwartz (1995), Duffee (1998) and Chen et al. (2007). **H_3** is tested by using OLS regression discussed in the Chapter 6.

6. Methodology

This chapter discusses the methodological issues related to this study. Some of the most important papers that form the basis for the methodology used here are Duffee (1998), Balduzzi et al. (2001), Andersson et al. (2009) and Balli (2009). All the aforementioned jointly constitute the methodological foundation of this thesis.

To investigate the effect of macroeconomic news announcements and benchmark government term structure of interest rates on daily yield and spread changes in the Scandinavian government bond market and corporate bond index, I utilize a general econometric model.

In this model, the dependent variables are the daily (basis point) changes in yields and spreads on government or corporate bond index *j*. The spreads are calculated over the Germany 10-year benchmark bond yield during the macroeconomic news announcement days *t*. This spread change is denoted as $\Delta SPREAD_{j,i,t}$ and the yield change as $\Delta YIELD_{j,i,t}$. The change in spread and yield is calculated from the previous day's *t-1* closing bid yields and announcement day's *t* closing bid yields.

The measure for the level of benchmark (German) term structure of interest rates is denoted as Y_t, which is the news announcement day *t* 3-month German Bubill yield. I define the slope of benchmark term structure with the spread (basis point) between the 30-year constant-maturity German bond yield and the 3-month Bubill yield. This spread is denoted as $TERM_t$, which is the news announcement day *t* spread.

Ordinary least squares (OLS) regressions of Equations 3 and 4 are run separately for each macroeconomic news announcement and the news surprise factors and on the benchmark government bond term structure factors during these macroeconomic news release dates[5].

[5] An alternative way of running the regression is to include in one regression announcements and surprises in all macroeconomic news variables, where the sample for the regression includes all announcement days, not just the days for a particular announcement. This alternative specification has been implemented by e.g. Balduzzi et al. (2001) and they obtained essentially the same as those from running the regressions separately. However, running separate regressions has the advantage that we can allow for different intercept terms, and that we can investigate the different explanatory power of the model for the different announcements.

Equation 3:

Regression of daily bond spread changes on macro news and benchmark term structure.

$$\Delta\text{SPREAD}_{j,i,t} = \alpha_0 + \alpha_1 \Delta Y_t + \alpha_2 \Delta\text{TERM}_t + \beta_S K_{i,t}^S + \beta_A K_{i,t}^A + \varepsilon_t.$$

The $\Delta\text{SPREAD}_{j,i,t}$ is the daily (basis point) change in yield spread on government (Finland, Sweden, Norway and Denmark) or corporate bond index (The BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield over the German 10-year government bond yield during a macroeconomic news announcement i release days t. Letter α_0 is an intercept constant and α_1 and α_2 are the coefficients on ΔYt and $\Delta TERMt$, the daily (basis point) changes in level and slope of the German government bond term structure respectively. The K_i represents the 23 different U.S., German, UK and French macroeconomic news announcements listed in Table 2. Error term is defined as εt.

Equation 4:

Regression of daily bond yield changes on macro news and benchmark term structure.

$$\Delta\text{YIELD}_{j,i,t} = \alpha_0 + \alpha_1 \Delta Y_t + \alpha_2 \Delta\text{TERM}_t + \beta_S K_{i,t}^S + \beta_A K_{i,t}^A + \varepsilon_t.$$

The $\Delta\text{YIELD}_{j,i,t}$ is the daily (basis point) change in yields on government bonds (Finland, Sweden, Norway and Denmark) or corporate bond index (The BofA Merrill Lynch 7-10 Year Euro Corporate Index) during the macroeconomic news announcement i release dates t. The other factors in the equation 4 are the same as described above in the equation 3.

The regression is run separately for each government bond and bond index j yield and spread changes and for total of 23 separate macroeconomic news indicators, which include 23 news announcements' standardized surprise factors $K_{i,t}^S$ and 23 standardized news announcements $K_{i,t}^A$. This means that I run two separate regressions[6] (for each government and corporate index bond yield and spread changes) for each macroeconomic news, which includes the standardized news announcement data and the standardized surprise (actual - expectations) data of that specific news i. In addition, the ΔY_t and ΔTERM_t (the benchmark term structure)

[6] For the regressions where the coefficients for the standardized surprise have been statistically significant, I have done the same regression without the standardized news announcement variable and the surprise coefficients have remained significant consistently. This applies aslo in other way round, in case of statistically significant coefficients for standardized news announcements. I performed these tests in order to test the fit for the use of standardized surprise factor and standardized news announcement factor in the same regression.

factors from the news announcement days *t* are included in each regression[7]. I run in total of 230 (23 macroeconomic news * 10 yield and spread changes) separate regressions. The complete regression results can be seen from Appendix 2.

The OLS regression with government bond spread changes as the dependent variables and the macroeconomic news announcements as independent variables are used by Balli (2009) in part of his study to examine the effects of macroeconomic news (no surprise components of the announcements and yield changes are investigated in his study) on government bond yields. OLS regression with government bond yield changes as the dependent variables and the macroeconomic news announcements as one of the independent variables are used by e.g. Balduzzi et al. (2001) and Andersson et al. (2009). However, they use intraday bond yield/price data in their studies. I use daily yield data in my study, as Balli (2009) does in his study. Balduzzi et al. (2001), Andersson et al. (2009) and Balli (2009) don't use the government bond term structure of interest rates as an explaining factors in their studies. However, for example Duffee (1998) used the government bond level and slope (term structure) factors in his OLS regression when studying their effect on changes of bond yield spreads over benchmark Treasury yields. He reported mostly statistically significant results.

The OLS regression analysis in this study is conducted using GRETL statistical software tool (see review studies of gretl e.g. Baiocchi and Distaso 2003 and Yalta and Yalta 2007). My OLS regressions for each indices use robust standard errors (Heteroskedasticity and Autocorrelation Consistent) by applying Newey–West HAC estimator (see Newey and West 1987) in GRETL.

[7] I included international corporate market risk factor variable to explain the changes in yield and spread changes during the macroeconomic news announcement days. This variable is the daily change in spread between U.S. 10-year corporate bonds with AAA ratings and U.S. 10-year Treasury bond yield. This international risk factor contains corporate market risk (excluding the specific factors) in U.S. markets as the Treasury bond yield is the riskless return and AAA rating corporate bond index contain the market risk. However, the variable had weak or no statistically significant results on bond yields during different news announcement days and it didn't increase the explanatory power (R^2) of the regressions. Thus, I have left the international corporate market risk variable out of the Equations 3 and 4.

7. Results

In this chapter I present the results obtained in this study thoroughly and analyze the implications of the main results. The results investigate the effects of macroeconomic news announcements on daily yields and spreads in the Scandinavian government bond markets and European corporate bond index by utilizing a general econometric model. These results not only consider the news effects of U.S., German, UK and French macroeconomic news, but also the interactions between the benchmark German government term structure of interest rates and the Scandinavian governments' bond and European corporate bond index yields and spreads. Moreover, I compare my results to the findings in previous studies.

In chapter 7.1., I discuss the interpretation of the regression results and the fit of the regression model. In Chapter 7.2., I present the results of the effect of the macroeconomic news announcements' on bond yields and analyze the results in a more general level. Thereafter, in Chapter 7.3., I present and analyze the results of the effect of the benchmark term structure on yields. In Chapters 7.4. and 7.5. I present the results to answer the spesific questions if U.S. macroeconomic news have more significant impact on bond yields than equivalent European countries' news and which macroeconomic news affect the most on bond yields.

7.1. Interpretation of the regression results

Table 5 and Appendix 2 report the OLS regression estimation results of daily bond yield and spread (over benchmark German 10-year government bond yield) changes of four Scandinavian countries' bonds[8] and a European corporate bond index[9] on macroeconomic news (actual announcement and surprise factors) and benchmark term structure during the news announcement days. The macroeconomic news in Table 5 have been categorized between activity and employment, price and forward-looking news based on the nature of the economic indicator. The Table 5 presents the results for three selected macroeconomic news announcement regressions and the results for regressions for all the 23 news used in this study, can be seen in Appendix 2.

The regressions are based on the equations 3 and 4 discussed in Chapter 6. Summary statistics of all the variables used in the regressions can be seen in Appendix 1.

[8] Finland, Sweden, Norway and Denmark 10-year euro denominated bonds
[9] he BofA Merrill Lynch 7-10 Year Euro Corporate Index

The macroeconomic news response coefficients, denoted as "News" and "Surprise", in Table 5, represent the average daily yield or spread changes (in basis points) following a standardized macroeconomic news announcement and surprise value of one.

Table 5 shows that the first activity and employment based macroeconomic news' (US nonfarm payroll) impact, which "News" variable value of one has on daily yield change of the Norwegian government bond ("Nor yield") is -0,96 basis points (-0.0096%) and on daily spread change of the Finnish government bond spread ("Fin spread") is 0,3 basis points (0.003%). The US nonfarm payroll news impact, which standardized surprise ("Surprise") of one has on daily yield change on the Norway government bond is 1,72 basis points (0.0172%) and on daily spread change on the Denmark government bond spread ("Den spread") is 0,36 basis points (0.0036%). All four of these example coefficients are statistically significant on at least at 5 percent level.

The benchmark German term structure of interest rate response coefficients ("Level and "Slope") represent the average daily yield and spread change (in basis points) following changes (in basis point) in the 3-month German Bubill yield ("Level") and the spread between the 30-year constant-maturity German bond yield and the 3-month Bubill yield. These coefficients are regressed with each macroeconomic news during the announcement dates.

For example, the results in Table 5 report that in case of the US initial jobless claims announcement days, an increase of 10 basis point (0,1%) in the "level", the yield for corporate bond index ("Corp yield") increases by 6,77 basis points (0,0677%) and the spread for the same index ("Corp spread") decreases by 2,73 basis point (-0,0273%). Both of the coefficients are statistically significant at a 1 percent level.

In addition, Table 5 indicates that in US initial jobless claims announcement days, an increase of 10 basis points in the "Slope" results in an increase of 6,86 basis points (0,0686%) in "Corp yield" and a decrease of 2,55 basis points (-0,0255%). Again, both of the coefficients are statistically significant at 1 percent level.

The fit of the regression model[10] can be considered to be clearly better when investigating the yield changes as dependent variables than the spread changes. This can be seen from the

[10] In the Table 5 the adjusted R^2 values represent the goodness of fit of the regression model. An adjusted R^2 value as e.g. 0.7 may be interpreted as 70% of the variation in the response/dependent variable can be explained by the explanatory variables. In general in a linear model, the R^2 statistic indicates how much the model is able to explain the variations in the dependent variable.

Appendix 2, as the adjusted R^2 values[11] are significantly lower for the spread change regressions than for the yield change regressions.

The results in Appendix 2 indicate that the most consistent and largest differences in the R^2 values between different regressions are in the ones with the Norwegian government bond yield change as the dependent variable. In these regressions, the R^2 values are the lowest compared to the other yield change regressions. This suggests that the explanatory power of the regression is the lowest when investigating Norwegian government bond yield changes on macroeconomic news. One of the main reasons for this could be that the German government term structure of interest rates has weaker relationship on Norwegian government bond yields than on the other yields, which could indicate that the countries' economic relationship is also relatively weaker.

In the following section I will analyze the results in the Appendix 2 on a general level in order to present the main findings and features of the effects of macroeconomic news on bond yields.

[11] The adjusted R2 is almost the same as R-squared, but it takes into account the number of explanatory variables and penalizes the statistic as extra variables are included in the model.

Table 5. Regression results of daily bond yield and spread changes on macroeconomic news and benchmark term structure.

The left column represents regression independent variables, adjusted R^2 and standard error categorized by different macroeconomic news. Three different news are represented in this table (see Appendix 2 for for the results for all of the news used in this study). The columns 2 to 12 represents the dependent daily yield and spread change variables of four Scandinavian countries (Finland, Sweden, Norway and Denmark) 10-year euro denominated bond yields and a European corporate bond index (the BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield denoted as "Corp". The daily spread change variables are calculated over benchmark German 10-year government bond yield. The "News" variable is the standardized value of news announcement (e.g. unemployment rate) and the "surprise" variable is the standardized value of the actual news indicator minus the market expectations of that indicator. The "level" and "slope" variables represents the benchmark term structure of interest rates, which are the daily change in German 3-Month Bubill yield and the daily change in spread between the 30-year German government bond yield and the 3-month Bubill yield respectively on the days when news announcements are released. The summary statistics of all the variables can be seen from Appendix 1. The dependent daily yield and spread change variables are regressed on specific news announcement's "news" and "surprise" variables and on contemporaneous daily changes in the "level" and "slope". Estimation uses OLS regression and is based on Equations 3-4. In parentheses are the values of t-statistics, adjusted for Heteroskedasticity-robust standard errors (variant HC1). *** indicates statistical significance at the 1 percent level, ** indicates significance between 1 and 5 percent and * represent significance between 5 and 10 percent.

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
Activity and employment										
US nonfarm payroll										
News	-0,0021 (-0,640)	-0,0058 (-1,438)	-0,0096 (-2,286)**	-0,009 (-2,788)***	-0,0019 (-0,6045)	0,003 (2,975)***	-0,0003 (-0,0984)	-0,0037 (-1,103)	-0,0002 (-0,1949)	0,004 (1,945)*
Surprise	0,0116 (3,227)***	0,0155 (3,554)***	0,0172 (3,827)***	0,0178 (5,018)***	0,0117 (3,374)***	-0,0016 (-1,343)	0,0019 (0,5741)	0,0039 (1,086)	0,0036 (2,403)**	-0,0015 (-0,6914)
Level	0,2912 (6,182)***	0,2620 (4,581)***	0,2404 (4,077)***	0,289 (6,201)***	0,2234 (4,892)***	-0,0181 (-1,003)	-0,0486 (-1,076)	-0,0690 (-1,437)	-0,009 (-0,4607)	-0,0887 (-3,078)***
Slope	0,4176 (8,632)***	0,3166 (5,391)***	0,2644 (4,367)***	0,388 (8,157)***	0,3071 (6,547)***	-0,0187 (-1,024)	-0,1207 (-2,601)**	-0,1719 (-3,485)***	-0,0404 (-2,012)**	0,1320 (-4,463)***
Adj. R^2	0,400	0,250	0,215	0,440	0,308	0,074	0,051	0,090	0,059	0,142
Std.Err.	0,040	0,048	0,050	0,039	0,038	0,013	0,038	0,041	0,016	0,024

Table 5 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
Activity and employment										
US initial jobless claims										
News	0,0004 (0,432)	0,0008 (0,515)	-0,0009 (-0,635)	<-0,0001 (-0,086)	<-0,001 (-0,021)	-0,0007 (-1,010)	-0,0003 (-0,263)	-0,0021 (-1,362)	0,0004 (-0,503)	-0,0012 (-1,542)
Surprise	0,0027 (3,374)***	0,0031 (2,807)***	0,0019 (1,418)	0,0025 (2,849)***	0,0013 (1,003)	0,0001 (0,311)	0,0005 (0,464)	-0,0006 (-0,536)	0,0002 (0,379)	-0,0013 (-1,670)*
Level	0,8718 (26,74)***	0,7415 (17,13)***	0,5845 (11,41)***	0,8779 (30,22)***	0,6768 (17,38)***	-0,0779 (-4,460)***	-0,208 (-4,719)***	-0,3652 (-6,795)***	-0,110 (-4,255)***	-0,2730 (-9,897)***
Slope	0,8641 (28,50)***	0,725 (18,02)***	0,5542 (10,85)***	0,8755 (33,27)***	0,6864 (18,10)***	-0,0772 (-4,446)***	-0,2156 (-5,287)***	-0,3871 (-7,090)***	-0,1086 (-4,599)***	-0,2553 (-9,701)***
Adj. R^2 Std.Err.	0,754 0,022	0,493 0,0344	0,294 0,040	0,740 0,023	0,569 0,027	0,045 0,015	0,081 0,032	0,171 0,038	0,068 0,017	0,238 0,021
US unemployment										
News	-0,0002 (-0,144)	-0,0001 (-0,037)	-0,0006 (-0,179)	0,0029 (1,343)	0,0022 (0,6815)	-0,0008 (-0,732)	-0,0006 (-0,201)	-0,0012 (-0,362)	0,0020 (1,873)*	0,0015 (0,561)
Surprise	-0,0011 (-0,433)	-0,0058 (-1,777)*	-0,0044 (-1,241)	-0,0019 (-0,746)	0,0004 (0,153)	-0,0003 (-0,407)	-0,0052 (-1,835)*	-0,0037 (-1,253)	-0,0019 (-1,431)	0,0011 (0,490)
Level	0,9152 (16,49)***	0,7553 (9,425)***	0,702 (8,124)***	0,9056 (15,22)***	0,7186 (11,04)***	-0,0779 (-2,944)***	-0,2441 (-2,916)***	-0,2905 (-3,437)***	-0,1238 (-3,766)***	-0,2748 (-7,502)***
Slope	0,9325 (18,53)***	0,7362 (10,48)***	0,6685 (8,820)***	0,9016 (15,92)***	0,7217 (12,94)***	-0,0703 (-2,890)***	-0,2729 (-3,952)***	-0,3344 (-4,556)***	-0,1223 (-3,944)***	-0,2817 (-8,621)***
Adj. R^2 Std.Err.	0,760 0,025	0,399 0,043	0,313 0,046	0,702 0,028	0,550 0,031	0,046 0,013	0,105 0,037	0,136 0,039	0,117 0,015	0,249 0,022

7.2. The effect of the macroeconomic announcements on bond yields

The results in Appendix 2 confirm the hypothesis **H_1:** Some foreign macroeconomic news announcements have statistically significant effect on daily Scandinavian government bond and European corporate bond index yields. The results indicate that 21 out of 23 macroeconomic news used in this study have statistically significant effect on at least 10 percent level on the daily yields (yield or spread changes) in question. In addition, most of the news announcements are statistically significant on only some of the daily bond yield and spread changes used in this study.

The Appendix 2 results illustrate that the news response coefficients have statistically significant impact on some of the daily yield and spread changes and that the significances vary between different government bonds and the corporate bond index. In case of 7 out of 23 macroeconomic news announcements, both the "News" and "Surprise" do not have statistically significant effect on any of the government bond or corporate bond index daily yield changes and only 5 out of 23 have no significant effect on any of the daily spread changes. However, the results imply also that in case of each of the government bond and corporate bond index there are some macroeconomic news that have no statistically significant effect on either yield or spread changes. These results are in line with the results of e.g. Andersson et al. (2009) who investigate the effect of macroeconomic news surprises' on intra-day bond returns and Balli (2009) who investigates the macroeconomic news announcement ("News") effects on daily changes in government bond yield differentials over the German benchmark bond.

The results in Appendix 2 show that there are two macroeconomic news (FR unemployment and UK industrial production), which have no statistically significant effect (at 10 percent level) on any of the daily yield or spread changes.

The varying significance of the effects of macroeconomic news on different bond yields in the regression results are in general in line with earlier studies of e.g. Andersen et al. (2007) and Faust et al. (2007), which uses intra-day interest rate data in their studies. However, by using intra-day yield data, the news announcement coefficients and significance levels (derived from t-statistics) are increased and the explanatory powers of the regressions are higher.

Some previous studies[12] find that most of the market reactions of returns and volatility to new information were completed at the time of each news announcements and less reaction thereafter. This suggests that a good part of the macro news announcements' impact on bond yields is confined to high-frequency intra-day adjustments which cannot be uncovered at the daily frequency in this study.

I use daily yield data rather than intra-day or tick-by-tick data in my study. One reason for this is that there are no publicly available intra-day yield data for Scandinavian government bond markets unlike for e.g. major economies' bond markets like Germany and U.S., where there are high trading volumes and liquid bond futures markets with available intra-day data. This is also one reason why Scandinavian bond markets have been studied less in the field of this literature.

In general, the macroeconomic news surprise response coefficients ("Surprise") should have a positive sign for yield changes when the news announcements are higher than expected. This relation should be opposite (negative sign) for the U.S. initial jobless claims and the unemployment news releases where a higher than expected number indicates that more people than anticipated are unemployed. As can be seen in the Table 5 and Appendix 2, all the significant "Surprise" coefficients are consistent with the expectation that yields will rise on signs of stronger than expected economic conditions or faster than anticipated inflation. For the U.S. initial jobless claims, the "Surprise" coefficients are positive, because I have transformed the sign of the surprises [(Actual – Expected) *-1] to allow for a meaningful comparison across other "non-employment related" macroeconomic news.

Analyzing the regression results in the Appendix 2, show that the numbers of statistically significant "News" and "Surprise" coefficients are almost equal[13] stating similar importance on bond yields in general level. However, there are variations of the number of significant coefficients between different macroeconomic news. Similarly, the levels of the "News" and "Surprise" coefficients don't indicate any clear distinction in general about which coefficient would have larger impact on bond yields. Again, there are variations between different macroeconomic news where e.g. the "Surprise" coefficients have higher values than the "News" and vice versa.

[12] See e.g. Balduzzi et al. (2001), Kim and Sheen (2001), Andersen et al. (2007) and Andersson et al. (2009)
[13] the "News" coefficients have 39 and the "Surprise" coefficients have 40 statistically significant coefficients at least at 10 percent level

There is no clear evidence in the regression results (see Appendix 2) that the macroeconomic news indicators ("News" and "Surprise" coefficients) would have more statistically significant effect on either of the yield or spreads changes. The yield changes have 41 and spread changes have 38 statistically significant (at least at 10 percent level) "News" or "Surprise" coefficients.

Appendix 2 indicates that the significant coefficients ("News" and "Surprise") are consistently larger i.e. have larger effects on the yield changes rather than spread changes.

Analyzing the Appendix 2 results in the perspective of the different government bond and the corporate bond index, it can be seen that Finland has 19, Sweden 17, Denmark 16, Norway 11 and corporate bond index 16 statistically significant "News" and/or "Surprise" coefficients on daily yield and/or spread changes. This indicates that in general Finnish government bond yields are the most responsive to foreign spillover effect of macroeconomic news. On the other hand, the relationship between macroeconomic news announcements and yield and spread changes seems to be the weakest for Norway government bond yields. These findings are consistent with the less extensive results of Balli (2009) although he reports the results on only eight economic announcements "News" effect on different government bond yield changes.

The Appendix 2 reports that, Finland has 7, Sweden 7, Denmark 5, Norway 4 and corporate bond index 2 statistically significant "Surprise" coefficients on bond yield changes. In this breakdown of results, I can rank the news that has effect purely on the yield changes i.e. excludes the effects from German yields in the spread changes. In addition, the "Surprise" factor is the most studied news indicator on yields and is considered to best capture the news announcement effect in many previous studies (see e.g. Balduzzi et al. 2001, Andersen et al. 2007). According to these results, Finland government bond yields with Sweden are still the most responsive to macroeconomic news. The results report also that the European corporate bond index has the weakest response the news surprise with only 2 statistically significant "Surprise" coefficients on bond yield changes.

There can be found some differences in the yield responses on macroeconomic news between the relatively riskless government bond yields and more (credit) risk-bearing corporate bond index. First, as mentioned above, the corporate bond index yield changes respond least to the news surprises ("Surprise"). Second, the bond index has the least statistically significant "News" or "Surprise" coefficients on yield changes and the most on spread changes. The

number of statistically significant "News" and/or "Surprise" coefficients on yield (spread) changes are as follow: Finland 10 (9), Sweden 11 (6), Norway 8 (3), Denmark 7 (9) and bond index 5 (11). The most likely explanation for these results is the different behavior of credit risk instruments (corporate bond index) compared to the minimum risk instruments i.e. Scandinavian government bonds.

7.3. The effect of the benchmark term structure on bond yields

As discussed in the Chapter 4, I measure the level of the German government term structure of interest rates with the German 3-Month Bubill yield, and the slope with the spread between the 30-year German government bond yield and the 3-month Bubill yield. In the regressions (see equations 3 and 4), I employ daily changes in the level and slope of the term structure as independent variables following the study of e.g. Duffee (1998).

The results for the "Level" and "Slope" coefficients in Appendix 2 confirm the hypothesis **H_3:** There is a negative (positive) relation between the changes in level and slope of the benchmark German government term structure and the changes in bond spreads (yields). These relations are statistically significant consistently in the Appendix 2 results, excluding only few exceptions and are in general consistent with the results of e.g. Longstaff and Schwartz (1995) and Chen et al. (2007) who investigate the U.S. Treasury term structure and bond spreads.

Appendix 2 reports that the significant coefficients on 3-month German Bubill yield ("Level") are positive for each Scandinavian government bond and corporate bond index yield changes during the different economic news announcement days. On the contrary, the significant "Level" coefficients are negative for the bond spread changes. These results indicate that an increase in the 3-month Bubill yield corresponds to a increase (decline) in the bond yields (spreads). These relationships are statistically very significant at a 1 percent level consistently through different yields and spreads except for a few exceptions (e.g. "Level" coefficient on Finland government bond spread changes during some macroeconomic news announcements). These results are in line with earlier studies of e.g. Iwanowski and Chandra (1995), Duffee (1998) and Skinner and Papageorgiou (2001).

The results in the Appendix 2 show that the relation between yield changes and the "Slope" variable (the spread between the 30-year constant-maturity German bond yield and the 3-month Bubill yield) is also clearly positive. Similarly with the "Level" coefficients, the

"Slope" coefficients are negative for the bond spread changes. These relationships are statistically very significant at a 1 percent level consistently through the results except for a few exceptions. The results are again in line with the earlier studies of Duffee (1998) and Skinner and Papageorgiou (2001). However, these results are not consistent with the study of Iwanowski and Chandra (1995) who find no significant relation between the slope and spreads. Duffee (1998) argues that Iwanowski and Chandra (1995) find no significant relation, because of their use of only refreshed corporate bond yield indexes in their analysis.

The coefficient values of the "Level" are generally close to the "Slope" coefficient values and this is consistent across all the regression results. This implies that the long end of the German government interest rate curve drives changes in yields and spreads as much as the short end of the curve.

The results in Appendix 2 report that the coefficients for the "Slope" variable are on average more significant (higher t-value i.e. lower p-value) than the coefficients on the "Level".

The levels and significances of the "Level" and "Slope" coefficients are higher for the government bond and corporate bond index yield changes than for the spread changes during macroeconomic news announcement days, which can be seen from the Appendix 2. This indicates that the benchmark German term structure of interest rates have stronger and more significant effect on the "plain" yield changes than on the spread changes.

A noticeable finding in Appendix 2 results to report, is that the "Level" and "Slope coefficients for Finland and Sweden spread changes are less significant (statistical significance between 5 and 10 percent or above 10 percent) compared to other countries' spread changes (see e.g. the regression results for German CPI and German business confidence). This suggests that benchmark government term structure of interest rates has less effect on Finland and Sweden spread changes over the German 10-year government bond yield.

7.4. Does U.S. macroeconomic news have more significant impact on bond yields than equivalent European countries' news?

Next, I seek to assess if the U.S. macroeconomic news has more significant impact on bond yields than equivalent European countries' (U.S., Germany, UK and France) news as stated in the second hypothesis (**H_2**) in Chapter 5. The **H_2** will be tested by comparing the significance

and the number of statistically significant coefficients of comparable U.S., German, UK and French macroeconomic news to different government bond and corporate bond index yield and spread changes.

As discussed in the Chapter 5, there are several reasons cited why U.S. macroeconomic news effect more on European markets than other European countries' news. First, the U.S. can be perceived as the engine of global growth, which therefore explains its importance for the global financial markets, including Scandinavia and other European countries. Second, it may also be argued that business cycles have become more integrated and globalization therefore has led to a higher degree of interdependence between economies. Third, the U.S. macroeconomic news data are typically released earlier than equivalent Euro area macro announcements (which may lead markets to draw conclusions about the European economies from the U.S. announcements). In this respect, only European countries' releases that cause investors to revise these inferences should lead to market reactions. In other words, these earlier release times and higher news correlation (interdependence between economies) means that financial market participants do not need to wait any more to the same extent for the release of euro area and national (e.g. German) announcements in order to learn about the state of the euro area economies. The market participants can nowadays learn about the European area economies ahead of European countries' news releases by monitoring the U.S. news.

The macroeconomic news announcements used in this study, that are comparable between U.S., Germany, UK and France, are unemployment rates, industrial production, CPI (consumer price index) and business/consumer confidence. The UK business or consumer confidence news is not included in this study due to a missing survey expectations data in the Bloomberg. The Table 6 presents the regression results (based on Equations 3-4) for the aforementioned news which can also be seen from the Appendix 2.

The results in Table 6 indicate that the $\mathbf{H_2}$ cannot be rejected when investigating the "Surprise" coefficient of the macroeconomic news on the yield changes. Previous studies have been investigating this phenomenon from the same aspect.

The U.S. news "Surprise" coefficients have overall the most (9) statistically significant coefficients (at least at 10 percent level) on bond yield changes relative to other comparable

news[14]. These findings are in line with the findings in earlier studies of e.g. Goldberg and Leonard (2003) and Andersson et al. (2009) who investigate the effect of macroeconomic news surprises' effect on bond yields/returns. However, these studies investigate intra-day effects of macroeconomic announcements on bond yields. Some of the stronger U.S. economic news announcement effects reported in the previous studies may not be seen as strongly in the results of this study, as I investigate the economic news announcement effects on daily bond yields. In other words, a good part of the macro news announcements' impact on bond yields might be confined to high-frequency intra-day adjustments which cannot be uncovered at the daily frequency in this study.

Table 6 results report that Scandinavian government bond markets and European corporate bond index react weakest to macroeconomic news about the unemployment. There are only few statistically significant "News" and/or "Surprise" coefficient for each county's unemployment news (three for U.S., one for German and two for UK unemployment news). France unemployment news doesn't seem to influence at all the daily yield and spread changes. Andersson et al. (2009) finds in their study that there is no statistically significant relation between the German and France unemployment news surprise on German bond yields and only weak statistically significant relation for the UK unemployment news. These results are generally in line with the results in my study.

For the industrial production news announcements, the regression results in Table 6 reveal that U.S. and French news has the most influence on the yields (four statistically significant "News" and/or "Surprise" coefficients for U.S. and seven for France). In general, the German and UK industrial production news has no influence on the yields (only one statistically significant "News" and/or "Surprise" coefficient German). Goldberg and Leonard (2003), who study the news "Surprise" effect on yields, report that European markets react to U.S. industrial production and not to German industrial production which is in line with the results in this study.

The impact of consumer price index (CPI) news is mostly insignificant throughout the Table 6 results. However, there can be seen a few statistically significant relationships between the CPI news and bond yield and spread changes (three statistically significant "News" and/or "Surprise" coefficients for U.S., six for German, three for UK and two for France).

[14] Only the UK CPI news "Surprise" effect on the yield changes have more statistically significant coefficients than the US corresponding news (two coefficients against one).

Table 6. Regression results of daily bond yield and spread changes on comparable macroeconomic news

This table presents the regression results only for the macroeconomic news announcement and surprise variables that are comparable across countries (U.S., Germany, UK and France). The left column represents regression independent macroeconomic news announcement variables based on Equations 3-4. The columns 2 to 12 represents the dependent daily yield and spread change variables of four Scandinavian countries (Finland, Sweden, Norway and Denmark) 10-year euro denominated bond yields and a European corporate bond index (the BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield denoted as "Corp". The daily spread change variables are calculated over benchmark German 10-year government bond yield. The "News" variable is the standardized news announcement and the "surprise" variable is the standardized value of the actual news indicator minus the market expectations of that indicator. The summary statistics of the news variables can be seen from Table 3.The dependent daily yield and spread change variables are regressed on macroeconomic news and surprises and on contemporaneous daily changes in the benchmark term structure of interest rates. See Appendix 2 for the coefficient results of the term structure variables. Estimation uses OLS regression. In parentheses are the values of t-statistics, adjusted for Heteroskedasticity-robust standard errors (variant HC1). *** indicates statistical significance at the 1 percent level, ** indicates significance between 1 and 5 percent and * represent significance between 5 and 10 percent.

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
US unemployment										
News	-0,0002 (-0,144)	-0,0001 (-0,037)	-0,0006 (-0,179)	0,0029 (1,343)	0,0022 (0,6815)	-0,0008 (-0,732)	-0,0006 (-0,201)	-0,0012 (-0,362)	0,0020 (1,873)*	0,0015 (0,561)
Surprise	-0,0011 (-0,433)	-0,0058 (-1,777)*	-0,0044 (-1,241)	-0,0019 (-0,746)	0,0004 (0,153)	-0,0003 (-0,407)	-0,0052 (-1,835)*	-0,0037 (-1,253)	-0,0019 (-1,431)	0,0011 (0,490)
GER unemployment										
News	-0,0025 (-1,293)	-0,0030 (-1,059)	0,0021 (0,723)	-0,0002 (-0,138)	-0,0011 (-0,282)	0,0006 (0,638)	0,0002 (0,098)	0,0053 (2,119)**	0,0011 (0,832)	0,0020 (0,605)
Surprise	-0,0001 (-0,062)	-0,0020 (-0,834)	-0,0010 (-0,380)	<-0,0001 (-0,008)	-0,0013 (-0,366)	-0,0012 (-1,174)	-0,0031 (-1,459)	-0,0020 (-0,973)	-0,0005 (-0,575)	-0,0023 (-0,811)
UK unemployment										
News	-0,0005 (-0,277)	0,0004 (0,150)	0,0036 (1,149)	-0,0012 (-0,753)	-0,0047 (-2,051)**	0,0006 (0,337)	0,0016 (0,614)	0,0048 (1,443)	-0,0001 (-0,083)	-0,0034 (-1,598)
Surprise	-0,0039 (-1,925)*	-0,0020 (-0,646)	-0,0015 (-0,482)	-0,0008 (-0,494)	-0,0009 (-0,360)	-0,0010 (-0,375)	0,0009 (0,352)	0,0014 (0,423)	0,0009 (0,588)	0,0019 (0,706)
FR unemployment										
News	0,0013 (0,398)	-0,0023 (-0,646)	-0,0041 (-1,191)	0,0006 (0,301)	-0,0008 (-0,330)	0,0017 (0,555)	-0,0007 (-0,232)	-0,0029 (-0,923)	0,0017 (1,078)	<-0,0001 (-0,024)
Surprise	-0,0030 (-1,147)	0,0011 (0,407)	-0,0049 (-1,540)	-0,0003 (-0,165)	-0,0016 (-0,757)	-0,0008 (-0,363)	0,0023 (0,927)	0,0034 (-1,200)	0,0014 (0,890)	0,0002 (0,121)

Table 6 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
US industrial production										
News	0,0004 (0,123)	0,0003 (0,071)	-0,0044 (-1,396)	-0,0012 (-0,363)	0,0002 (0,090)	-0,0014 (-0,663)	-0,0025 (-0,536)	-0,0025 (-0,536)	-0,0017 (-0,898)	-0,0013 (-0,427)
Surprise	0,0065 (2,428)**	0,0073 (1,836)*	0,0100 (3,051)***	0,0088 (3,306)***	0,0033 (1,455)	0,0016 (0,721)	0,0029 (0,869)	0,0029 (0,869)	0,0016 (0,950)	-0,0016 (-0,614)
GER industrial production										
News	0,0048 (1,770)*	-0,0021 (-0,431)	0,0009 (0,162)	-0,0040 (-1,146)	0,0048 (1,132)	0,0018 (1,075)	-0,0048 (-0,778)	-0,0018 (-0,357)	-0,0068 (-1,445)	0,0015 (0,444)
Surprise	-0,0043 (-1,614)	-0,0055 (-1,108)	-0,0086 (-1,497)	0,0042 (1,240)	-0,0021 (-0,478)	-0,0025 (-1,476)	-0,0040 (-0,537)	-0,0069 (-1,325)	0,0063 (1,590)	0,0002 (0,049)
UK industrial production										
News	-0,0025 (-1,087)	-0,0036 (-0,763)	-0,0035 (-0,884)	0,0010 (0,325)	0,0008 (0,184)	-0,0032 (-1,359)	-0,0043 (-0,900)	-0,0042 (-1,138)	0,0013 (0,613)	0,0002 (0,056)
Surprise	0,0015 (0,551)	0,0025 (0,516)	0,0023 (0,558)	-0,0015 (-0,451)	-0,0035 (-0,900)	0,0027 (1,089)	0,0036 (0,788)	0,0036 (0,936)	-0,0005 (-0,210)	-0,0022 (-0,682)
FR industrial production										
News	0,0092 (2,032)**	0,0116 (1,869)*	-0,0011 (-0,221)	-0,0015 (-0,375)	0,0094 (2,250)**	0,0007 (0,276)	0,0031 (0,575)	-0,0096 (-1,432)	-0,0044 (-1,779)*	0,0009 (0,195)
Surprise	0,0077 (-1,706)*	0,0082 (-1,392)	0,0024 (0,494)	0,0030 (0,782)	0,0086 (-2,237)**	-0,0017 (-0,701)	-0,0021 (-0,448)	0,0085 (1,293)	0,0046 (1,903)*	-0,0026 (-0,572)

Table 6 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
US CPI										
News	-0,0028 (-1,339)	-0,0017 (-0,422)	0,0034 (1,154)	0,0016 (0,577)	0,0001 (0,0582)	-0,0046 (-2,729)***	-0,0034 (-0,9961)	0,0016 (0,386)	-0,0033 (-1,455)	-0,0017 (-0,7798)
Surprise	0,0048 (2,333)**	0,0058 (1,279)	-0,0003 (-0,103)	0,0024 (0,830)	0,0007 (0,2519)	0,0030 (1,835)*	0,0038 (1,127)	-0,0021 (-0,524)	0,0025 (1,311)	-0,0010 (-0,4220)
GER CPI										
News	0,0033 (1,269)	0,0072 (2,613)**	0,0052 (1,483)	0,0040 (1,019)	0,0054 (1,778)*	0,0016 (1,120)	0,0055 (1,938)*	0,0035 (0,994)	0,0017 (0,623)	0,0037 (1,420)
Surprise	0,0014 (-1,000)	-0,0040 (-1,513)	0,0120 (-2,340)**	0,0020 (-0,937)	0,0021 (-0,688)	-0,0006 (-0,422)	-0,0032 (-1,669)*	-0,0112 (-2,046)**	-0,0012 (-1,023)	-0,0013 (-1,380)
UK CPI										
News	0,0026 (1,386)	0,0019 (0,721)	0,0050 (1,645)	0,0032 (1,567)	0,0035 (1,055)	-0,0008 (-0,891)	-0,0015 (-0,675)	0,0015 (0,485)	-0,0002 (-0,201)	<0,0001 (0,001)
Surprise	-0,0026 (-1,084)	0,0047 (-1,680)*	0,0033 (0,750)	0,0047 (-2,270)**	0,0043 (-1,276)	-0,0015 (-0,715)	-0,0036 (-1,560)	0,0044 (1,052)	-0,0031 (-2,539)**	-0,0032 (-1,329)
FR CPI										
News	0,0047 (1,512)	-0,0047 (-1,234)	0,0039 (1,112)	<0,0001 (0,005)	0,0013 (0,501)	0,0011 (0,453)	-0,0083 (-2,135)**	0,0003 (0,105)	-0,0023 (-1,359)	-0,0022 (-1,059)
Surprise	-0,0011 (-0,927)	-0,0002 (-0,076)	0,0008 (0,450)	-0,0008 (-0,522)	0,0009 (0,870)	-0,0007 (-0,778)	0,0001 (0,083)	0,0012 (-0,776)	-0,0010 (-0,693)	0,0014 (1,689)*
US consumer confidence										
News	-0,0005 (-0,244)	0,0014 (0,421)	-0,0067 (-2,377)**	0,0023 (1,039)	0,0041 (0,915)	0,0015 (0,952)	0,0034 (0,996)	-0,0047 (-1,675)*	0,0033 (1,830)*	0,0062 (2,527)**
Surprise	0,0041 (1,787)*	0,0024 (0,937)	0,0049 (1,724)*	0,0040 (2,138)**	0,0037 (1,418)	0,0005 (0,272)	-0,0012 (-0,570)	0,0013 (0,445)	0,0004 (0,232)	<-0,0001 (-0,017)
GER business confidence										
News	-0,0002 (-0,075)	0,0071 (2,457)**	0,0075 (1,896)*	0,0026 (1,381)	-0,0032 (-0,972)	-0,0020 (-1,447)	0,0054 (2,190)**	0,0056 (2,092)**	0,0011 (0,795)	-0,0051 (-2,605)**
Surprise	0,0009 (0,465)	-0,0026 (-0,843)	0,0023 (0,735)	0,0007 (0,382)	0,0056 (1,354)	<-0,0001 (-0,065)	-0,0037 (-1,531)	0,0013 (0,454)	<-0,0001 (-0,029)	0,0045 (2,379)**
FR business confidence										
News	0,0017 (0,586)	0,0001 (0,048)	-0,0006 (-0,205)	0,0027 (1,272)	-0,0005 (-0,163)	0,0025 (1,989)**	0,0009 (0,318)	0,0002 (0,077)	0,0029 (1,690)*	0,0003 (0,242)
Surprise	0,0021 (-0,907)	0,0054 (1,896)*	0,0052 (1,566)	0,0022 (1,144)	0,0013 (0,558)	0,0031 (-2,480)**	0,0043 (1,490)	0,0042 (1,134)	0,0002 (0,129)	0,0003 (0,217)

7.5. Which macroeconomic news affect on bond yields the most?

In this section, I introduce the macroeconomic news that have the most significant effect on the Scandinavian government bond and corporate bond index yields.

The Table 7 presents the top five macroeconomic news announcements that affect bond yields and spreads the most. The table has two different rank categories. The first rank category represents the most significant news in general, based on how many statistically significant (at least at 10 percent level) "News" and "Surprise" coefficients the news have either on bond yield or spread changes. The second rank category shows the most significant news based on how many statistically significant "Surprise" coefficients the news have on bond yield changes. In the second categorization, I can rank the news that has effect purely on the yields that this study investigates i.e. Fin, Swe, Nor, Den and corporate bond index yields. By taking into account only the "Surprise" coefficient, I can compare the results with the majority of previous literature. The the "Surprise" factor is the most studied news indicator on yields and considered to best capture the news announcement effect in the previous literature (see e.g. Balduzzi et al. 2001 and Andersen et al. 2007).

The economic news in the Table 7 have been ranked (the most significant on top) based on the number of statistically significant (at least at 10 percent level) news announcement coefficients. If there is a situation where two or more different news have the same amount of significant coefficients, then the one that has on average the higher coefficient values is placed higher on the table.

According to the results in the Table 7, the most important macroeconomic news in general (based on the significant "News" and "Surprise" coefficients on yield and/or spread changes) is the U.S. nonfarm payroll news, followed by the French industrial production, U.S. consumer confidence, German business confidence and German consumer price index (CPI). The U.S. nonfarm payroll news has clearly the most (10) statistically significant coefficients, of which half consists of "Surprise" coefficients on yield changes.

Table 7 results for the statistically significant "Surprise" coefficients on bond yield changes indicate that the most important news is still the U.S. nonfarm payroll news. The rest of the top five news are U.S. industrial production, U.S. consumer confidence, U.S. initial jobless claims and France industrial production in the mentioned order. One of the most interesting observations here is that the U.S. nonfarm payroll news (the surprise component of the news

announcement) is the only news that has statistically significant effect on all the yield changes. Another interesting observation is that Finland government bond yield change is the only yield change that significantly (statistical significance at least at 10 percent level) responds to all of the five most important news surprises.

To my knowledge there are no other as extensive previous studies in this field of literature, which investigate both the "News" and "Surprise" factors on both the yield and spread changes, as I do in this study. For this reason the most important news based on the results of "News" and "Surprise" coefficients' significance on yield and/or spread changes (i.e. the first rank category) is not that convenient to compare with the result of previous literature.

The result in Table 7 for most important news ("Surprise") on yield changes supports the statement that Scandinavian government bonds and European corporate bond index yields tend to react more strongly to the surprise component on US macroeconomic releases compared to European countries' releases used in this study. These results are in line with the earlier studies of e.g. Goldberg and Leonard (2003) and Andersson et al. (2009) who study the effect of macroeconomic news surprise on German government bond yields.

In their studies Goldberg and Leonard (2003) find U.S. nonfarm payroll news one of the most important and Andersen et al. (2007) and Andersson et al. (2009) find it the most important macroeconomic announcement on bond yields/prices which is in line with my results. Andersen and Bollerslev (1998) reports in their study that the U.S. nonfarm payroll is among the most significant of the announcements for foreign exchange markets, and it is often referred to as the "king" of announcements by market participants.

In addition to U.S. nonfarm payroll news, Goldberg and Leonard (2003), Ehrmann and Fratzscher (2005) and Andersson et al. (2009) find also that news about U.S. consumer confidence is one of the most important macroeconomic announcement on bond yields/prices which is also in the top five news on my results. In addition, Goldberg and Leonard (2003) report also U.S. initial jobless claims as one of the most important news which is in line with my results.

Table 7. The most important macroeconomic news on daily bond yields.

This table presents the regression results of the most important macroeconomic news announcements on daily bond yields. The more important (based on number of statistically significant coefficients at least at 10 percent level) the news is the higher it is on the table. The left column represents regression independent macroeconomic announcement variables based on Equations 3-4. The columns from 2 to forward represents the dependent daily yield or spread change variables of four Scandinavian countries (Finland, Sweden, Norway and Denmark) 10-year euro denominated bond yields and a European corporate bond index (the BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield denoted as "Corp". The daily spread change variables are calculated over benchmark German 10-year government bond yield. The "News" is the standardized news announcement indicator (e.g. unemployment rate) and the "surprise" is the standardized value of the actual news indicator minus the market expectations of that indicator. Summary statistics of the news variables can be seen from Table 3. The estimation uses OLS regression. In parentheses are the values of t-statistics, adjusted for Heteroskedasticity-robust standard errors (variant HC1). *** indicates statistical significance at the 1 percent level, ** indicates significance between 1 and 5 percent and * represent significance between 5 and 10 percent.

	Statistically significant regression result coefficients									
	Fin yield	Fin spread	Swe yield	Swe spread	Nor yield	Nor spread	Den yield	Den spread	Corp yield	Corp spread
US nonfarm payroll										
News		0,003 (2,975)***			-0,0096 (-2,286)**		-0,009 (-2,788)***			0,004 (1,945)*
Surprise	0,0116 (3,227)***		0,0155 (3,554)***		0,0172 (3,827)***		0,0178 (5,018)***	0,0036 (2,403)**	0,0117 (3,374)***	
FR industrial production										
News	0,0092 (2,032)**		0,0116 (1,869)*					-0,0044 (-1,779)*	0,0094 (2,250)**	
Surprise	0,0077 (-1,706)*							0,0046 (1,903)*	0,0086 (-2,237)**	
US consumer confidence										
News					-0,0067 (-2,377)**	-0,0047 (-1,675)*		0,0033 (1,830)*		0,0062 (2,527)**
Surprise	0,0041 (1,787)*				0,0049 (1,724)*		0,0040 (2,138)**			
GER business confidence										
News			0,0071 (2,457)**	0,0054 (2,190)**	0,0075 (1,896)*	0,0056 (2,092)**				-0,0051 (-2,605)**
Surprise										0,0045 (2,379)**
GER CPI										
News			0,0072 (2,613)**	0,0055 (1,938)*					0,0054 (1,778)*	
Surprise				-0,0032 (-1,669)*	0,0120 (-2,340)**					-0,0112 (-2,046)**

Table 7 continued

	Statistically significant regression result "Surprise" coefficients on yield changes				
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield
US nonfarm payroll					
Surprise	0,0116 (3,227)***	0,0155 (3,554)***	0,0172 (3,827)***	0,0178 (5,018)***	0,0117 (3,374)***
US industrial production					
Surprise	0,0065 (2,428)**	0,0073 (1,836)*	0,0100 (3,051)***	0,0088 (3,306)***	
US consumer confidence					
Surprise	0,0041 (1,787)*		0,0049 (1,724)*	0,0040 (2,138)**	
US initial jobless claims					
Surprise	0,0027 (3,374)***	0,0031 (2,807)***		0,0025 (2,849)***	
FR industrial production					
Surprise	0,0077 (-1,706)*				0,0086 (-2,237)**

8. Conclusion

This study has investigated the spillover effects of foreign macroeconomic news to Scandinavian government bond and European-wide corporate bond index yields. In addition, the effect of benchmark term structure of interest rates on the yields during the news announcement dates is studied. Results in the previous literature suggest that a good part of the macro news announcements' impact on bond yields is confined to high-frequency intra-day adjustments. The analysis carried out in this study seeks to investigate if this impact exists and how significant it is on daily government bond yields. I also studied this impact on corporate government bond index in order to reveal possible differences in the behavior of relatively risk-free government bonds and credit risk bearing instruments.

The majority of previous literature studying the relationship between macroeconomic news and bond returns, focuses on the liquid bond futures markets of the U.S. and Germany and investigates news announcement surprises (announcement – excepted value) on either yield or spread changes. I have expanded and contributed to the existing studies by investigating the less liquid and studied Scandinavian government bond markets and European corporate bond index in a more comprehensive way than before by studying both the news announcement and surprise factors' relationship on both the yield and spread changes. Besides this, I have applied a longer data set (longest macroeconomic news data spanning from 1997 to 2011) than most of the previous studies. Furthermore, the research methodologies used in earlier studies differ somewhat and this thesis employs a methodology that is a combination of the previous ones. The methodologies of Duffee (1998), Balduzzi et al. (2001), Andersson et al. (2009) and Balli (2009) all jointly constitute the methodological foundation of this thesis.

The results obtained in this study confirm the first hypothesis ($\mathbf{H_1}$) that some foreign macroeconomic news announcements have statistically significant spillover effect on the daily Scandinavian government bond and European corporate bond index yields. The significances vary across economic news and different yields. Also, the results for the macroeconomic news surprise response coefficients ("Surprise") are consistent with the expectation that yields will rise on signs of stronger than expected economic conditions. These results are in line with previous studies of e.g. Andersen et al., (2007), Faust et al., (2007) and Balli (2009), although two of the former studies investigate intra-day relationships and find more significant results across different macroeconomic news and yields.

The results show that only two macroeconomic news out of 23 (French unemployment and UK industrial production) have no statistically significant effect (at 10 percent level) on any of the daily yield or spread changes. Moreover, the macroeconomic news seem to affect the bond yield and spread changes equally often[15]. However, the news have consistently larger effects on the yield changes rather than spread changes.

The results of the study indicate that Finnish and Swedish government bonds are the most responsive to the foreign macroeconomic news spillover effect[16]. On the other hand the corporate bond index yield changes respond least to the news surprises (the "Surprise" factor). The results reveal also other differences in the behavior between relatively low risk government bond yields and more (credit) risk-bearing corporate bond index as the index has the least statistically significant "News" or "Surprise" coefficients on yield changes and the most on spread changes[17].

The second hypothesis (**H_2**) that some U.S. macroeconomic news has more significant impact on Scandinavian government bond and European corporate bond index yields than equivalent European countries' news, cannot be rejected from the point of view of news surprise effect on yield changes[18]. These findings are in line with the findings in earlier studies of e.g. Goldberg and Leonard (2003) and Andersson et al. (2009). However, no consistent stronger effect i.e. higher coefficient values of the statistically significant U.S. news coefficient over European news can be found from results in this study.

Strong evidence is found to support the third hypothesis (**H_3**) that there is a negative (positive) relation between the changes in level and slope of the benchmark German government term structure of interest rates and the changes in bond spreads (yields) during the macroeconomic news announcement days. These findings are in general consistent with the results of Longstaff and Schwartz (1995), Duffee (1998) and Chen et al. (2007) who investigated the U.S. Treasury term structure and bond spreads.

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[15] The macroeconomic news indicators ("News" and "Surprise") have statistically significant coefficients at least at 10 percent level on 41 yield changes and 38 spread changes.

[16] Finland has 19, Sweden 17, Denmark 16, Norway 11 and corporate bond index 16 statistically significant "News" or "Surprise" coefficients on daily yield or spread changes. Further, the number of statistically significant "Surprise" coefficients on only bond yield changes is Finland 7, Sweden 7, Denmark 5, Norway 4 and corporate bond index 2.

[17] The number of statistically significant "News" or "Surprise" coefficients on yield (spread) changes are as follow: Finland 10 (9), Sweden 11 (6), Norway 8 (3), Denmark 7 (9) and bond index 5 (11).

[18] The U.S. news "Surprise" coefficients have overall the most (9) statistically significant values (at least at 10 percent level) on bond yield changes relative to other comparable news. Only the UK CPI news "Surprise" effect on the yield changes have more statistically significant coefficients than the US corresponding news (two coefficients against one).

The most important macroeconomic news based on the results of this study is the U.S. nonfarm payroll announcements[19]. Andersen et al. (2007) and Andersson et al. (2009) also find the U.S. nonfarm payroll the most important macroeconomic announcement on bond yields/prices when studying the U.S., German and UK markets.

Other important macroeconomic news whilst investigating all the news' statistically significant 'News' and 'Surprise' coefficients on yield and/or spread changes are France industrial production, U.S. consumer confidence, German business confidence and German consumer price index. In addition, when observing the news' surprise effect on plain yield changes, the other important macroeconomic news (in addition to U.S. nonfarm payroll) consist mainly of news about U.S. economy[20].

Among the many possible directions for future work, it would be particularly interesting to separate the effect of "good" and "bad" macroeconomic news surprises (i.e. higher or lower than expected news announcements about the economic condition) using the data in this study and investigate these effects on bond yields. It would be intriguing to extend the study to digital currency (cryptocurrency) markets[21] and to other exotic assets and markets in order to find out if there are significant relationships between these assets and the news about the real economy.

[19] The U.S. nonfarm payroll news has clearly the most (10) statistically significant "News" and "Surprise" coefficients on yield and/or spread changes. The same news have also the most significant "Surprise" coefficients on bond yield changes as it is the only news that has statistically significant effect on all the five bond yield changes.

[20] The other most important news are U.S. nonfarm payroll, U.S. industrial production, U.S. consumer confidence, U.S. initial jobless claims and France industrial production in the mentioned order.

[21] Notable cryptocurrencies: Bitcoin, Ripple and Litecoin. Notable Non-cryptocurrencies: e-gold and Ven.

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10. Appendices

Appendix 1. Summary statistics of variables used in the study

The table presents the summary statistics of all the variables that are used in this study's regressions for each news. In the first column the "A_" represents a certain standardized macroeconomic news announcement and the "S_" represents the corresponding standardized surprise factor of the news. The "level" and "slope" represents the benchmark term structure which are the daily change in German 3-Month Bubill yield and the daily change in spread between the 30-year German government bond yield and the 3-month Bubill yield respectively during the news announcement release days. The table presents also statistics for the daily yield and spread change variables of government bond and corporate bond index yields during the announcement days. The statistics presented are the number of observations, mean, standard deviation, standard error, minimum and maximum.

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_US_Nonfarm payroll	179	0,289	1,000	0,075	-3,234	2,103
S_US_Nonfarm payroll	179	-0,199	1,000	0,075	-3,501	2,708
Level	176	0,016	0,105	0,008	-0,540	0,738
Slope	176	-0,021	0,106	0,008	-0,758	0,551
Fin Yield	177	-0,011	0,051	0,004	-0,176	0,125
Swe Yield	177	-0,012	0,056	0,004	-0,179	0,208
Nor Yield	177	-0,008	0,056	0,004	-0,168	0,210
Den Yield	171	-0,008	0,052	0,004	-0,134	0,125
Bond Yield	177	-0,006	0,046	0,003	-0,123	0,165
Fin Spread	177	0,000	0,013	0,001	-0,050	0,047
Swe Spread	177	-0,002	0,039	0,003	-0,155	0,151
Nor Spread	177	0,002	0,042	0,003	-0,158	0,144
Den Spread	171	0,002	0,017	0,001	-0,082	0,057
Bond Spread	177	0,004	0,026	0,002	-0,090	0,161
A_US_Initial jobless claims	757	4,652	1,000	0,036	3,201	8,332
S_US_Initial jobless claims	757	-0,033	1,000	0,036	-4,270	4,430
Level	741	-0,001	0,076	0,003	-0,442	0,784
Slope	734	0,001	0,085	0,003	-0,780	0,447
Fin Yield	754	0,002	0,046	0,002	-0,158	0,174
Swe Yield	750	0,001	0,048	0,002	-0,240	0,235
Nor Yield	752	0,001	0,048	0,002	-0,245	0,334
Den Yield	725	0,003	0,046	0,002	-0,167	0,195
Bond Yield	754	0,004	0,042	0,002	-0,143	0,208
Fin Spread	754	0,000	0,016	0,001	-0,099	0,095
Swe Spread	750	0,000	0,033	0,001	-0,255	0,161
Nor Spread	752	0,000	0,042	0,002	-0,288	0,424
Den Spread	725	0,001	0,018	0,001	-0,129	0,104
Bond Spread	754	0,002	0,025	0,001	-0,136	0,166
A_US_PPI	169	0,282	1,000	0,077	-3,427	3,916
S_US_PPI	169	0,068	1,000	0,077	-2,517	3,566
Level	165	-0,005	0,063	0,005	-0,376	0,279
Slope	162	0,001	0,077	0,006	-0,394	0,321
Fin Yield	169	-0,005	0,042	0,003	-0,128	0,122
Swe Yield	168	-0,006	0,041	0,003	-0,090	0,100
Nor Yield	168	-0,005	0,046	0,004	-0,138	0,200
Den Yield	163	-0,006	0,040	0,003	-0,122	0,135
Bond Yield	168	-0,003	0,037	0,003	-0,108	0,104
Fin Spread	169	0,000	0,014	0,001	-0,034	0,121
Swe Spread	168	-0,001	0,024	0,002	-0,061	0,109
Nor Spread	168	0,000	0,038	0,003	-0,124	0,109
Den Spread	163	0,001	0,017	0,001	-0,085	0,101
Bond Spread	168	0,002	0,015	0,001	-0,055	0,067

Appendix 1 continued

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_US_Unemployment	179	3,164	1,000	0,075	2,117	5,537
S_US_Unemployment	179	-0,149	1,000	0,075	-3,323	2,658
Level	175	0,016	0,106	0,008	-0,540	0,738
Slope	171	-0,021	0,107	0,008	-0,758	0,551
Fin Yield	177	-0,011	0,051	0,004	-0,176	0,125
Swe Yield	177	-0,012	0,056	0,004	-0,179	0,208
Nor Yield	177	-0,008	0,056	0,004	-0,168	0,210
Den Yield	171	-0,008	0,052	0,004	-0,134	0,125
Bond Yield	177	-0,006	0,046	0,003	-0,123	0,165
Fin Spread	177	0,000	0,013	0,001	-0,050	0,047
Swe Spread	177	-0,002	0,039	0,003	-0,155	0,151
Nor Spread	177	0,002	0,042	0,003	-0,158	0,144
Den Spread	171	0,002	0,017	0,001	-0,082	0,057
Bond Spread	177	0,004	0,026	0,002	-0,090	0,161
A_GER_Unemployment	162	6,824	1,000	0,079	4,930	8,575
S_GER_Unemployment	162	-0,257	1,000	0,079	-3,697	2,773
Level	160	-0,003	0,059	0,005	-0,316	0,227
Slope	159	0,006	0,074	0,006	-0,242	0,370
Fin Yield	162	0,006	0,044	0,003	-0,112	0,193
Swe Yield	162	0,005	0,046	0,004	-0,114	0,202
Nor Yield	162	0,000	0,041	0,003	-0,104	0,135
Den Yield	154	0,005	0,042	0,003	-0,099	0,168
Bond Yield	161	0,003	0,050	0,004	-0,307	0,154
Fin Spread	162	0,000	0,013	0,001	-0,049	0,079
Swe Spread	162	-0,001	0,027	0,002	-0,094	0,080
Nor Spread	162	-0,006	0,033	0,003	-0,108	0,135
Den Spread	154	-0,001	0,014	0,001	-0,045	0,058
Bond Spread	161	-0,003	0,035	0,003	-0,275	0,111
A_UK_Unemployment	115	4,763	1,000	0,093	3,699	6,675
S_UK_Unemployment	115	0,030	1,000	0,093	-2,265	2,265
Level	115	-0,003	0,056	0,005	-0,279	0,279
Slope	115	0,005	0,070	0,007	-0,394	0,219
Fin Yield	115	0,000	0,046	0,004	-0,153	0,104
Swe Yield	115	0,000	0,050	0,005	-0,247	0,109
Nor Yield	115	-0,003	0,050	0,005	-0,215	0,148
Den Yield	109	0,000	0,046	0,004	-0,141	0,103
Bond Yield	115	-0,001	0,043	0,004	-0,139	0,171
Fin Spread	115	0,001	0,017	0,002	-0,061	0,105
Swe Spread	115	0,000	0,028	0,003	-0,107	0,063
Nor Spread	115	-0,003	0,037	0,003	-0,104	0,132
Den Spread	109	-0,002	0,013	0,001	-0,059	0,038
Bond Spread	115	-0,001	0,025	0,002	-0,069	0,151
A_FR_Unemployment	125	8,023	1,000	0,089	6,393	10,229
S_FR_Unemployment	125	-0,507	1,000	0,089	-3,474	1,737
Level	123	-0,005	0,053	0,005	-0,361	0,129
Slope	123	-0,001	0,073	0,007	-0,181	0,458
Fin Yield	125	-0,002	0,041	0,004	-0,096	0,174
Swe Yield	124	-0,003	0,043	0,004	-0,112	0,154
Nor Yield	124	-0,002	0,040	0,004	-0,144	0,163
Den Yield	124	-0,003	0,038	0,003	-0,076	0,160
Bond Yield	123	0,007	0,036	0,003	-0,079	0,137
Fin Spread	123	0,002	0,021	0,002	-0,059	0,118
Swe Spread	122	0,001	0,026	0,002	-0,108	0,090
Nor Spread	122	0,002	0,034	0,003	-0,144	0,089
Den Spread	122	0,001	0,017	0,002	-0,050	0,095
Bond Spread	123	0,011	0,024	0,002	-0,038	0,103

Appendix 1 continued

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_US_Retail sales	127	0,210	1,000	0,089	-3,155	6,053
S_US_Retail sales	127	0,038	1,000	0,089	-2,314	6,654
Level	127	0,003	0,038	0,003	-0,072	0,170
Slope	126	0,002	0,059	0,005	-0,180	0,157
Fin Yield	127	0,005	0,047	0,004	-0,128	0,139
Swe Yield	127	0,007	0,046	0,004	-0,108	0,144
Nor Yield	127	0,001	0,048	0,004	-0,131	0,150
Den Yield	121	0,005	0,046	0,004	-0,116	0,148
Bond Yield	126	0,003	0,041	0,004	-0,108	0,121
Fin Spread	127	0,001	0,019	0,002	-0,068	0,121
Swe Spread	127	0,003	0,031	0,003	-0,061	0,146
Nor Spread	127	-0,003	0,037	0,003	-0,124	0,092
Den Spread	121	0,001	0,020	0,002	-0,040	0,184
Bond Spread	126	-0,001	0,018	0,002	-0,060	0,064
A_US_Durable goods ord.	170	0,026	1,000	0,077	-3,534	3,648
S_US_Durable goods ord.	170	-0,022	1,000	0,077	-3,075	4,050
Level	169	-0,006	0,117	0,009	-0,984	0,784
Slope	166	0,007	0,125	0,010	-0,752	0,974
Fin Yield	170	0,004	0,043	0,003	-0,095	0,166
Swe Yield	170	0,000	0,042	0,003	-0,129	0,158
Nor Yield	169	-0,003	0,048	0,004	-0,267	0,174
Den Yield	163	0,001	0,039	0,003	-0,098	0,136
Bond Yield	170	0,003	0,040	0,003	-0,086	0,208
Fin Spread	170	-0,001	0,015	0,001	-0,063	0,110
Swe Spread	170	-0,004	0,035	0,003	-0,255	0,104
Nor Spread	169	-0,007	0,044	0,003	-0,288	0,106
Den Spread	163	-0,003	0,021	0,002	-0,144	0,034
Bond Spread	170	-0,001	0,018	0,001	-0,066	0,055
A_US_Manufacturers' ord.	178	0,108	1,000	0,075	-3,523	3,335
S_US_Manufacturers' ord.	178	0,075	1,000	0,075	-3,603	2,976
Level	175	-0,002	0,063	0,005	-0,305	0,368
Slope	172	0,002	0,078	0,006	-0,405	0,295
Fin Yield	177	0,000	0,046	0,003	-0,130	0,150
Swe Yield	174	-0,002	0,047	0,004	-0,179	0,112
Nor Yield	176	0,004	0,048	0,004	-0,168	0,175
Den Yield	171	0,000	0,046	0,004	-0,137	0,218
Bond Yield	178	0,002	0,039	0,003	-0,096	0,138
Fin Spread	177	-0,001	0,015	0,001	-0,079	0,069
Swe Spread	174	-0,004	0,039	0,003	-0,155	0,113
Nor Spread	176	0,003	0,042	0,003	-0,144	0,146
Den Spread	171	-0,001	0,022	0,002	-0,082	0,149
Bond Spread	178	0,001	0,025	0,002	-0,071	0,107
A_US_Housing starts	166	2,704	1,000	0,078	0,873	4,337
S_US_Housing starts	166	0,114	1,000	0,078	-3,031	3,067
Level	165	0,004	0,058	0,005	-0,194	0,420
Slope	163	-0,007	0,072	0,006	-0,396	0,194
Fin Yield	166	-0,004	0,041	0,003	-0,176	0,107
Swe Yield	164	-0,004	0,043	0,003	-0,197	0,148
Nor Yield	166	-0,001	0,034	0,003	-0,104	0,117
Den Yield	160	-0,001	0,034	0,003	-0,070	0,115
Bond Yield	166	0,000	0,037	0,003	-0,090	0,171
Fin Spread	166	-0,002	0,015	0,001	-0,141	0,043
Swe Spread	165	-0,002	0,028	0,002	-0,170	0,101
Nor Spread	166	0,001	0,031	0,002	-0,151	0,065
Den Spread	160	0,001	0,014	0,001	-0,041	0,071
Bond Spread	166	0,002	0,022	0,002	-0,078	0,151

Appendix 1 continued

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_US_Trade balance	177	-2,371	1,000	0,075	-4,180	-0,481
S_US_Trade balance	177	-0,008	1,000	0,075	-2,957	3,562
Level	176	-0,002	0,065	0,005	-0,362	0,370
Slope	174	0,007	0,078	0,006	-0,407	0,396
Fin Yield	177	0,000	0,039	0,003	-0,101	0,132
Swe Yield	176	-0,004	0,041	0,003	-0,093	0,126
Nor Yield	177	-0,002	0,038	0,003	-0,097	0,186
Den Yield	171	0,000	0,039	0,003	-0,141	0,138
Bond Yield	177	0,000	0,037	0,003	-0,119	0,149
Fin Spread	177	-0,001	0,019	0,001	-0,119	0,058
Swe Spread	176	-0,005	0,028	0,002	-0,119	0,075
Nor Spread	177	-0,003	0,036	0,003	-0,171	0,092
Den Spread	171	0,000	0,015	0,001	-0,061	0,076
Bond Spread	177	-0,001	0,019	0,001	-0,068	0,058
A_US_Ind. production	179	0,209	1,000	0,075	-4,529	2,750
S_US_Ind. Production	179	-0,093	1,000	0,075	-5,701	3,135
Level	178	-0,004	0,055	0,004	-0,258	0,230
Slope	178	0,002	0,066	0,005	-0,211	0,204
Fin Yield	179	-0,002	0,041	0,003	-0,126	0,132
Swe Yield	178	-0,004	0,046	0,003	-0,191	0,150
Nor Yield	178	-0,001	0,039	0,003	-0,144	0,148
Den Yield	173	-0,001	0,038	0,003	-0,102	0,153
Bond Yield	177	-0,001	0,034	0,003	-0,132	0,119
Fin Spread	179	0,003	0,018	0,001	-0,048	0,127
Swe Spread	179	-0,001	0,031	0,002	-0,172	0,091
Nor Spread	178	0,003	0,038	0,003	-0,098	0,132
Den Spread	173	0,002	0,016	0,001	-0,066	0,090
Bond Spread	177	0,003	0,025	0,002	-0,054	0,199
A_GER_Ind. production	177	0,034	1,000	0,072	-4,039	-0,851
S_GER_Ind. production	177	-0,095	1,000	0,072	-3,073	-1,851
Level	173	0,015	0,093	0,007	-0,168	3,149
Slope	171	-0,018	0,088	0,007	-0,784	4,149
Fin Yield	174	-0,005	0,042	0,003	-0,115	0,149
Swe Yield	173	-0,008	0,042	0,003	-0,194	5,149
Nor Yield	173	-0,004	0,048	0,004	-0,178	6,149
Den Yield	167	-0,004	0,039	0,003	-0,117	7,149
Bond Yield	175	-0,002	0,043	0,003	-0,123	1,149
Fin Spread	171	0,000	0,012	0,001	-0,049	8,149
Swe Spread	171	-0,003	0,036	0,003	-0,245	10,149
Nor Spread	171	0,002	0,044	0,003	-0,229	11,149
Den Spread	165	0,001	0,017	0,001	-0,112	12,149
Bond Spread	175	0,004	0,024	0,002	-0,090	9,149
A_UK_Ind. production	178	-0,114	1,000	0,075	-5,412	4,279
S_UK_Ind. production	178	-0,382	1,000	0,075	-5,581	2,635
Level	176	-0,006	0,051	0,004	-0,316	0,361
Slope	175	0,012	0,066	0,005	-0,310	0,370
Fin Yield	178	0,005	0,042	0,003	-0,115	0,109
Swe Yield	178	0,006	0,043	0,003	-0,112	0,155
Nor Yield	178	0,003	0,044	0,003	-0,102	0,175
Den Yield	172	0,006	0,042	0,003	-0,091	0,139
Bond Yield	177	0,003	0,040	0,003	-0,123	0,130
Fin Spread	178	0,000	0,017	0,001	-0,050	0,146
Swe Spread	178	0,001	0,029	0,002	-0,134	0,106
Nor Spread	178	-0,002	0,034	0,003	-0,140	0,126
Den Spread	172	0,000	0,018	0,001	-0,065	0,100
Bond Spread	177	-0,003	0,019	0,001	-0,065	0,077

Appendix 1 continued

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_FR_Ind. production	173	0,071	1,000	0,076	-2,666	2,838
S_FR_Ind. production	173	-0,121	1,000	0,076	-2,911	3,019
Level	168	0,008	0,091	0,007	-0,362	0,863
Slope	168	-0,007	0,097	0,007	-0,784	0,396
Fin Yield	171	-0,002	0,045	0,003	-0,186	0,132
Swe Yield	170	-0,004	0,046	0,004	-0,155	0,206
Nor Yield	171	-0,003	0,044	0,003	-0,144	0,193
Den Yield	165	-0,003	0,045	0,004	-0,182	0,151
Bond Yield	169	-0,002	0,039	0,003	-0,123	0,149
Fin Spread	170	-0,001	0,014	0,001	-0,072	0,065
Swe Spread	169	-0,002	0,024	0,002	-0,116	0,092
Nor Spread	170	-0,001	0,034	0,003	-0,149	0,104
Den Spread	164	-0,001	0,014	0,001	-0,036	0,095
Bond Spread	169	0,000	0,025	0,002	-0,189	0,086
A_US_CPI	179	0,621	1,000	0,075	-5,324	3,758
S_US_CPI	179	-0,051	1,000	0,075	-3,042	3,042
Level	179	-0,007	0,062	0,005	-0,372	0,203
Slope	179	0,006	0,074	0,006	-0,266	0,409
Fin Yield	179	-0,002	0,041	0,003	-0,118	0,099
Swe Yield	178	-0,003	0,047	0,004	-0,216	0,148
Nor Yield	179	0,001	0,044	0,003	-0,173	0,162
Den Yield	173	-0,001	0,040	0,003	-0,116	0,115
Bond Yield	179	0,001	0,037	0,003	-0,118	0,108
Fin Spread	179	0,000	0,016	0,001	-0,099	0,059
Swe Spread	179	-0,001	0,033	0,002	-0,170	0,084
Nor Spread	179	0,003	0,042	0,003	-0,190	0,137
Den Spread	173	0,000	0,017	0,001	-0,084	0,064
Bond Spread	179	0,003	0,024	0,002	-0,054	0,163
A_GER_CPI	107	0,427	1,000	0,097	-1,758	2,930
S_GER_CPI	107	0,027	1,000	0,097	-6,691	1,912
Level	107	-0,002	0,030	0,003	-0,122	0,098
Slope	107	0,002	0,052	0,005	-0,177	0,199
Fin Yield	107	-0,001	0,039	0,004	-0,108	0,124
Swe Yield	107	-0,003	0,043	0,004	-0,129	0,137
Nor Yield	107	-0,007	0,055	0,005	-0,342	0,188
Den Yield	100	-0,003	0,040	0,004	-0,105	0,173
Bond Yield	106	-0,003	0,032	0,003	-0,068	0,066
Fin Spread	107	-0,001	0,012	0,001	-0,061	0,050
Swe Spread	107	-0,002	0,029	0,003	-0,146	0,073
Nor Spread	107	-0,007	0,046	0,004	-0,276	0,118
Den Spread	100	-0,002	0,016	0,002	-0,121	0,033
Bond Spread	106	-0,002	0,024	0,002	-0,130	0,074
A_UK_CPI	96	0,657	1,000	0,102	-2,223	2,779
S_UK_CPI	96	0,208	1,000	0,102	-2,220	3,330
Level	96	0,000	0,048	0,005	-0,168	0,197
Slope	96	0,001	0,063	0,006	-0,266	0,220
Fin Yield	96	0,003	0,040	0,004	-0,081	0,122
Swe Yield	96	-0,001	0,038	0,004	-0,110	0,083
Nor Yield	96	-0,002	0,042	0,004	-0,123	0,113
Den Yield	90	0,004	0,037	0,004	-0,083	0,093
Bond Yield	96	0,004	0,039	0,004	-0,086	0,109
Fin Spread	96	0,000	0,016	0,002	-0,057	0,121
Swe Spread	96	-0,005	0,022	0,002	-0,063	0,050
Nor Spread	96	-0,005	0,034	0,003	-0,124	0,077
Den Spread	90	-0,001	0,010	0,001	-0,045	0,042
Bond Spread	96	0,000	0,027	0,003	-0,115	0,163

Appendix 1 continued

Macroeconomic news and announcement days' variables	Number of observations	Mean	S.D.	S.E.	Min.	Max.
A_FR_CPI	178	0,530	1,000	0,075	-1,895	3,031
S_FR_CPI	178	-0,019	1,000	0,075	-3,804	2,853
Level	177	-0,009	0,118	0,009	-0,984	0,250
Slope	173	0,006	0,125	0,009	-0,312	0,974
Fin Yield	178	-0,003	0,042	0,003	-0,138	0,105
Swe Yield	178	-0,001	0,046	0,003	-0,149	0,246
Nor Yield	177	-0,003	0,042	0,003	-0,180	0,141
Den Yield	172	-0,003	0,038	0,003	-0,107	0,141
Bond Yield	177	-0,002	0,034	0,003	-0,085	0,109
Fin Spread	178	0,001	0,018	0,001	-0,086	0,105
Swe Spread	178	0,002	0,038	0,003	-0,104	0,351
Nor Spread	177	0,001	0,031	0,002	-0,121	0,085
Den Spread	172	0,001	0,023	0,002	-0,074	0,246
Bond Spread	177	0,001	0,020	0,002	-0,115	0,064
A_US_Consumer conf.	179	3,060	1,000	0,075	0,805	4,661
S_US_Consumer conf.	179	0,017	1,000	0,075	-2,792	2,463
Level	179	0,000	0,055	0,004	-0,361	0,250
Slope	173	-0,009	0,072	0,005	-0,312	0,458
Fin Yield	179	-0,006	0,047	0,004	-0,108	0,191
Swe Yield	179	-0,006	0,045	0,003	-0,114	0,246
Nor Yield	177	-0,003	0,042	0,003	-0,100	0,247
Den Yield	172	-0,005	0,038	0,003	-0,107	0,141
Bond Yield	176	-0,002	0,044	0,003	-0,307	0,154
Fin Spread	179	0,001	0,023	0,002	-0,086	0,188
Swe Spread	179	0,001	0,037	0,003	-0,095	0,351
Nor Spread	177	0,003	0,040	0,003	-0,129	0,324
Den Spread	172	0,001	0,025	0,002	-0,080	0,246
Bond Spread	176	0,004	0,034	0,003	-0,275	0,111
A_GER_Business conf.	118	0,446	1,000	0,092	-1,698	1,951
S_GER_Business conf.	118	-0,074	1,000	0,092	-2,626	2,505
Level	118	-0,003	0,038	0,004	-0,205	0,170
Slope	118	0,004	0,057	0,005	-0,175	0,253
Fin Yield	118	0,001	0,041	0,004	-0,093	0,135
Swe Yield	117	-0,002	0,045	0,004	-0,116	0,155
Nor Yield	118	0,000	0,043	0,004	-0,123	0,163
Den Yield	112	0,002	0,039	0,004	-0,083	0,116
Bond Yield	118	0,002	0,038	0,004	-0,086	0,111
Fin Spread	118	-0,001	0,015	0,001	-0,057	0,121
Swe Spread	117	-0,003	0,026	0,002	-0,063	0,101
Nor Spread	118	-0,002	0,031	0,003	-0,124	0,085
Den Spread	112	0,001	0,014	0,001	-0,033	0,073
Bond Spread	118	0,000	0,023	0,002	-0,115	0,163
A_FR_Business conf.	131	-0,317	1,000	0,087	-2,963	1,559
S_FR_Business conf.	131	-0,031	1,000	0,087	-3,628	5,229
Level	130	-0,019	0,106	0,009	-0,984	0,103
Slope	129	0,024	0,110	0,010	-0,180	0,974
Fin Yield	131	0,004	0,047	0,004	-0,097	0,174
Swe Yield	130	0,000	0,046	0,004	-0,136	0,158
Nor Yield	130	0,000	0,048	0,004	-0,193	0,174
Den Yield	125	0,005	0,043	0,004	-0,117	0,160
Bond Yield	130	0,005	0,042	0,004	-0,098	0,208
Fin Spread	131	-0,002	0,015	0,001	-0,092	0,056
Swe Spread	130	-0,005	0,033	0,003	-0,255	0,059
Nor Spread	130	-0,005	0,041	0,004	-0,288	0,075
Den Spread	125	-0,002	0,018	0,002	-0,129	0,039
Bond Spread	130	-0,001	0,017	0,001	-0,069	0,064

Appendix 2: Regression results of daily bond yield and spread changes on macroeconomic news and benchmark term structure.

The left column represents regression independent variables, adjusted R^2 and standard error categorized by different macroeconomic news. The columns 2 to 12 represents the dependent daily yield and spread change variables of four Scandinavian countries (Finland, Sweden, Norway and Denmark) 10-year euro denominated bond yields and a European corporate bond index (the BofA Merrill Lynch 7-10 Year Euro Corporate Index) yield denoted as "Corp". The daily spread change variables are calculated over benchmark German 10-year government bond yield. The "News" variable is the standardized value of news announcement (e.g. unemployment rate) and the "surprise" variable is the standardized value of the actual news indicator minus the market expectations of that indicator. The "level" and "slope" represents the benchmark term structure of interest rates, which are the daily change in German 3-Month Bubill yield and the daily change in spread between the 30-year German government bond yield and the 3-month Bubill yield respectively on the days when news announcements are released. The summary statistics of all the variables can be seen from Appendix 1.

The dependent daily yield and spread change variables are regressed on specific news announcement's "news" and "surprise" variables and on contemporaneous daily changes in the "level" and "slope". Estimation uses OLS regression and is based on Equations 3-4. In parentheses are the values of t-statistics, adjusted for Heteroskedasticity-robust standard errors (variant HC1). *** indicates statistical significance at the 1 percent level, ** indicates significance between 1 and 5 percent and * represent significance between 5 and 10 percent.

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
Activity and employment										
US nonfarm payroll										
News	-0,0021 (-0,640)	-0,0058 (-1,438)	-0,0096 (-2,286)**	-0,009 (-2,788)***	-0,0019 (-0,6045)	0,003 (2,975)***	-0,0003 (-0,0984)	-0,0037 (-1,103)	-0,0002 (-0,1949)	0,004 (1,945)*
Surprise	0,0116 (3,227)***	0,0155 (3,554)***	0,0172 (3,827)***	0,0178 (5,018)***	0,0117 (3,374)***	-0,0016 (-1,343)	0,0019 (0,5741)	0,0039 (1,086)	0,0036 (2,403)**	-0,0015 (-0,6914)
Level	0,2912 (6,182)***	0,2620 (4,581)***	0,2404 (4,077)***	0,289 (6,201)***	0,2234 (4,892)***	-0,0181 (-1,003)	-0,0486 (-1,076)	-0,0690 (-1,437)	-0,009 (-0,4607)	-0,0887 (-3,078)***
Slope	0,4176 (8,632)***	0,3166 (5,391)***	0,2644 (4,367)***	0,388 (8,157)***	0,3071 (6,547)***	-0,0187 (-1,024)	-0,1207 (-2,601)**	-0,1719 (-3,485)***	-0,0404 (-2,012)**	0,1320 (-4,463)***
Adj. R^2	0,400	0,250	0,215	0,440	0,308	0,074	0,051	0,090	0,059	0,142
Std.Err.	0,040	0,048	0,050	0,039	0,038	0,013	0,038	0,041	0,016	0,024

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
Activity and employment										
US initial jobless claims										
News	0,0004 (0,432)	0,0008 (0,515)	-0,0009 (-0,635)	<-0,0001 (-0,086)	<-0,001 (-0,021)	-0,0007 (-1,010)	-0,0003 (-0,263)	-0,0021 (-1,362)	0,0004 (-0,503)	-0,0012 (-1,542)
Surprise	0,0027 (3,374)***	0,0031 (2,807)***	0,0019 (1,418)	0,0025 (2,849)***	0,0013 (1,003)	0,0001 (0,311)	0,0005 (0,464)	-0,0006 (-0,536)	0,0002 (0,379)	-0,0013 (-1,670)*
Level	0,8718 (26,74)***	0,7415 (17,13)***	0,5845 (11,41)***	0,8779 (30,22)***	0,6768 (17,38)***	-0,0779 (-4,460)***	-0,208 (-4,719)***	-0,3652 (-6,795)***	-0,110 (-4,255)***	-0,2730 (-9,897)***
Slope	0,8641 (28,50)***	0,725 (18,02)***	0,5542 (10,85)***	0,8755 (33,27)***	0,6864 (18,10)***	-0,0772 (-4,446)***	-0,2156 (-5,287)***	-0,3871 (-7,090)***	-0,1086 (-4,599)***	-0,2553 (-9,701)***
Adj. R^2	0,754	0,493	0,294	0,740	0,569	0,045	0,081	0,171	0,068	0,238
Std.Err.	0,022	0,0344	0,040	0,023	0,027	0,015	0,032	0,038	0,017	0,021
US unemployment										
News	-0,0002 (-0,144)	-0,0001 (-0,037)	-0,0006 (-0,179)	0,0029 (1,343)	0,0022 (0,6815)	-0,0008 (-0,732)	-0,0006 (-0,201)	-0,0012 (-0,362)	0,0020 (1,873)*	0,0015 (0,561)
Surprise	-0,0011 (-0,433)	-0,0058 (-1,777)*	-0,0044 (-1,241)	-0,0019 (-0,746)	0,0004 (0,153)	-0,0003 (-0,407)	-0,0052 (-1,835)*	-0,0037 (-1,253)	-0,0019 (-1,431)	0,0011 (0,490)
Level	0,9152 (16,49)***	0,7553 (9,425)***	0,702 (8,124)***	0,9056 (15,22)***	0,7186 (11,04)***	-0,0779 (-2,944)***	-0,2441 (-2,916)***	-0,2905 (-3,437)***	-0,1238 (-3,766)***	-0,2748 (-7,502)***
Slope	0,9325 (18,53)***	0,7362 (10,48)***	0,6685 (8,820)***	0,9016 (15,92)***	0,7217 (12,94)***	-0,0703 (-2,890)***	-0,2729 (-3,952)***	-0,3344 (-4,556)***	-0,1223 (-3,944)***	-0,2817 (-8,621)***
Adj. R^2	0,760	0,399	0,313	0,702	0,550	0,046	0,105	0,136	0,117	0,249
Std.Err.	0,025	0,043	0,046	0,028	0,031	0,013	0,037	0,039	0,015	0,022
GER unemployment										
News	-0,0025 (-1,293)	-0,0030 (-1,059)	0,0021 (0,723)	-0,0002 (-0,138)	-0,0011 (-0,282)	0,0006 (0,638)	0,0002 (0,098)	0,0053 (2,119)**	0,0011 (0,832)	0,0020 (0,605)
Surprise	-0,0001 (-0,062)	-0,0020 (-0,834)	-0,0010 (-0,380)	<-0,0001 (-0,008)	-0,0013 (-0,366)	-0,0012 (-1,174)	-0,0031 (-1,459)	-0,0020 (-0,973)	-0,0005 (-0,575)	-0,0023 (-0,811)
Level	0,9317 (12,37)***	0,8144 (7,252)***	0,5116 (4,589)***	0,9212 (13,72)***	0,7144 (5,966)***	0,0050 (0,166)	-0,1123 (-1,775)*	-0,4151 (-4,322)***	-0,0978 (-2,636)***	-0,2126 (-2,656)***
Slope	0,9047 (13,77)***	0,7846 (7,864)***	0,5397 (7,237)***	0,8850 (16,82)***	0,6766 (6,643)***	0,0207 (0,855)	-0,0994 (-1,961)*	-0,3443 (-4,898)***	-0,1012 (-3,010)***	-0,2074 (-3,238)***
Adj. R^2	0,745	0,508	0,298	0,719	0,313	-0,005	0,015	0,219	0,072	0,051
Std.Err.	0,022	0,032	0,034	0,022	0,041	0,013	0,027	0,030	0,014	0,034

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
UK unemployment										
News	-0,0005 (-0,277)	0,0004 (0,150)	0,0036 (1,149)	-0,0012 (-0,753)	-0,0047 (-2,051)**	0,0006 (0,337)	0,0016 (0,614)	0,0048 (1,443)	-0,0001 (-0,083)	-0,0034 (-1,598)
Surprise	-0,0039 (-1,925)*	-0,0020 (-0,646)	-0,0015 (-0,482)	-0,0008 (-0,494)	-0,0009 (-0,360)	-0,0010 (-0,375)	0,0009 (0,352)	0,0014 (0,423)	0,0009 (0,588)	0,0019 (0,706)
Level	0,8193 (10,07)***	0,7666 (4,238)***	0,7367 (4,608)***	0,7364 (11,75)***	0,6210 (6,294)***	-0,0397 (-1,199)	-0,0924 (-1,307)	-0,1223 (-1,372)	-0,0608 (-2,384)**	-0,2380 (-5,114)***
Slope	0,8746 (17,39)***	0,8083 (8,707)***	0,7142 (7,127)***	0,8864 (18,16)***	0,7282 (11,00)***	-0,0649 (-2,315)**	-0,1312 (-2,320)**	-0,2253 (-3,158)***	-0,0418 (-1,752)*	-0,2114 (-4,675)***
Adj. R^2	0,781	0,5613	0,429	0,810	0,631	0,008	0,022	0,091	-0,006	0,152
Std.Err.	0,022	0,033	0,038	0,020	0,026	0,016	0,028	0,035	0,013	0,023
FR unemployment										
News	0,0013 (0,398)	-0,0023 (-0,646)	-0,0041 (-1,191)	0,0006 (0,301)	-0,0008 (-0,330)	0,0017 (0,555)	-0,0007 (-0,232)	-0,0029 (-0,923)	0,0017 (1,078)	<-0,0001 (-0,024)
Surprise	-0,0030 (-1,147)	0,0011 (0,407)	-0,0049 (-1,540)	-0,0003 (-0,165)	-0,0016 (-0,757)	-0,0008 (-0,363)	0,0023 (0,927)	0,0034 (-1,200)	0,0014 (0,890)	0,0002 (0,121)
Level	0,9151 (8,484)***	0,8270 (7,385)***	0,6155 (5,145)***	0,8434 (9,221)***	0,7025 (7,765)***	-0,0208 (-0,282)	-0,0903 (-1,020)	-0,3091 (-2,887)***	-0,0800 (-1,471)	-0,2280 (-3,465)***
Slope	0,8663 (11,29)***	0,7976 (9,056)***	0,5786 (5,818)***	0,8222 (11,07)***	0,6671 (9,532)***	-0,0836 (-1,694)*	-0,1430 (-2,058)**	-0,3656 (-4,419)***	-0,1216 (-3,099)***	-0,2801 (-5,913)***
Adj. R^2	0,659	0,517	0,310	0,704	0,513	0,037	0,043	0,197	0,082	0,231
Std.Err.	0,024	0,030	0,034	0,021	0,025	0,020	0,026	0,031	0,016	0,021
US retail sales										
News	0,0028 (0,981)	-0,0023 (-0,558)	0,0072 (1,925)*	0,0035 (0,860)	0,0014 (0,703)	0,0030 (1,689)*	-0,0007 (-0,165)	0,0040 (1,026)	0,0068 (2,075)**	-0,0027 (1,193)
Surprise	0,0024 (0,945)	0,0075 (1,729)*	0,0026 (0,721)	0,0004 (0,116)	0,0001 (-0,031)	-0,0012 (-1,181)	0,0035 (0,804)	-0,0016 (-0,544)	-0,0038 (-1,459)	-0,0037 (-1,780)*
Level	1,106 (7,789)***	0,9737 (7,594)***	0,5741 (4,396)***	1,0083 (7,542)***	0,8346 (9,779)***	-0,0046 (-0,034)	-0,1457 (-1,404)	-0,560 (-3,230)***	-0,2077 (-2,034)**	-0,264 (-4,017)***
Slope	0,9834 (20,53)***	0,8663 (13,60)***	0,6677 (8,084)***	0,9467 (13,30)***	0,8490 (21,60)***	-0,0601 (-2,232)**	-0,1892 (-2,800)***	-0,3960 (-5,656)***	-0,1354 (-2,359)**	-0,1969 (-5,619)***
Adj. R^2	0,769	0,640	0,366	0,701	0,797	0,024	0,037	0,205	0,085	0,260
Std.Err.	0,022	0,028	0,038	0,025	0,017	0,018	0,029	0,032	0,019	0,014

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
Activity and employment										
US durable goods orders										
News	0,0029 (0,745)	0,0027 (0,524)	0,0012 (0,248)	0,0050 (1,508)	0,0008 (0,166)	0,0060 (-2,749)***	0,0057 (1,100)	0,0042 (0,747)	0,0030 (0,998)	0,0038 (1,628)
Surprise	0,0028 (0,635)	0,0024 (0,503)	0,0014 (0,269)	0,0046 (1,309)	0,0021 (0,398)	-0,0052 (-2,076)**	-0,0049 (-0,942)	-0,0037 (-0,680)	-0,0029 (-0,885)	-0,0045 (-1,821)*
Level	0,8217 (13,31)***	0,6725 (7,069)***	0,5783 (5,306)***	0,8386 (18,67)***	0,692 (7,894)***	-0,0697 (-1,744)*	-0,2189 (-1,835)*	-0,3131 (-2,154)**	-0,1517 (-2,272)**	-0,1994 (-6,280)***
Slope	0,8550 (14,25)***	0,6677 (6,717)***	0,6080 (5,567)***	0,8191 (17,09)***	0,7277 (8,266)***	-0,0508 (-1,643)*	-0,2380 (-1,981)**	-0,2978 (-2,087)**	-0,1826 (-2,571)**	-0,1780 (-5,577)***
Adj. R^2	0,765	0,476	0,301	0,769	0,621	0,052	0,077	0,069	0,147	0,225
Std.Err.	0,020	0,030	0,040	0,018	0,025	0,015	0,034	0,043	0,020	0,015
US manufacturers' orders										
News	0,0045 (1,911)*	0,0049 (1,286)	0,0074 (1,135)	0,0054 (2,027)**	0,0019 (0,592)	0,0011 (1,450)	0,0015 (0,522)	0,0026 (0,718)	0,0015 (1,023)	-0,0016 (-0,807)
Surprise	-0,0003 (-0,196)	0,0039 (1,029)	-0,0028 (-0,692)	0,0003 (0,138)	0,0002 (0,093)	-0,0009 (-0,878)	0,0032 (1,057)	-0,0016 (-0,478)	-0,0001 (-0,108)	-0,0002 (-0,128)
Level	0,8881 (18,44)***	0,5936 (6,243)***	0,4511 (4,990)***	0,8110 (12,35)***	0,6531 (12,08)***	-0,0126 (-0,405)	-0,3063 (-4,054)***	-0,4495 (-4,661)***	-0,1328 (-2,671)***	-0,246 (-5,255)***
Slope	0,8362 (18,94)***	0,4757 (6,332)***	0,4642 (6,514)***	0,7620 (13,98)***	0,6127 (11,74)***	-0,0286 (-1,179)	-0,3879 (6,243)***	-0,4006 (-5,905)***	-0,1374 (-3,590)***	-0,2516 (-5,480)***
Adj. R^2	0,756	0,266	0,198	0,557	0,527	-0,006	0,241	0,182	0,057	0,211
Std.Err.	0,022	0,040	0,043	0,030	0,027	0,015	0,033	0,383	0,020	0,022
US housing starts										
News	0,0012 (0,751)	0,0047 (2,090)**	0,0032 (1,473)	0,0024 (1,434)	-0,0001 (-0,067)	<-0,0001 (-0,088)	0,0035 (1,850)*	0,0019 (0,878)	0,0008 (0,920)	-0,0015 (-0,840)
Surprise	0,0014 (0,570)	0,0026 (1,022)	-0,0011 (-0,490)	0,0005 (0,375)	-0,0009 (-0,612)	0,0014 (0,673)	-0,0027 (-1,368)	-0,0010 (-0,493)	0,0004 (-1,269)	-0,0009 (-0,559)
Level	0,8704 (13,88)***	0,7178 (7,531)***	0,4767 (4,553)***	0,7800 (9,835)***	0,6611 (10,32)***	0,0349 (0,940)	-0,1203 (-1,719)*	-0,3591 (-3,814)***	-0,0647 (-1,867)*	-0,1744 (-3,241)***
Slope	0,8797 (22,87)***	0,7414 (9,084)***	0,4770 (6,196)***	0,7667 (15,17)***	0,7195 (12,13)***	0,0240 (0,700)	-0,1162 (-2,039)**	-0,3792 (-4,217)***	-0,0941 (-3,298)***	-0,1361 (-3,107)***
Adj. R^2	0,699	0,443	0,276	0,636	0,572	-0,010	0,026	0,218	0,075	0,046
Std.Err.	0,022	0,032	0,028	0,020	0,024	0,015	0,027	0,027	0,013	0,021

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
US trade balance										
News	-0,0014 (-0,664)	-0,0016 (-0,616)	0,0005 (0,247)	-0,0011 (-0,693)	-0,0008 (-0,526)	-0,0030 (-2,155)**	-0,0015 (-0,650)	-0,0010 (-0,409)	-0,0022 (-1,897)*	-0,0023 (-1,785)*
Surprise	-0,0002 (-0,201)	-0,0025 (-1,150)	-0,0010 (-0,452)	-0,0022 (-1,323)	-0,0020 (-0,968)	0,0020 (1,448)	-0,0003 (-0,173)	0,0012 (0,497)	<0,001 (0,082)	0,0003 (0,241)
Level	0,7406 (10,09)***	0,5891 (7,255)***	0,4738 (4,790)***	0,9041 (13,76)***	0,7397 (11,05)***	-0,1360 (-3,251)***	-0,2500 (-2,782)***	-0,4028 (-5,319)***	-0,1007 (-2,693)***	-0,1369 (-3,475)***
Slope	0,7601 (11,49)***	0,6352 (10,19)***	0,4957 (6,092)***	0,8785 (15,23)***	0,6994 (12,19)***	-0,0909 (-2,677)***	-0,1851 (-2,610)***	-0,3553 (-5,780)***	-0,0970 (-3,085)***	-0,1516 (-4,740)***
Adj. R^2	0,679	0,432	0,283	0,705	0,6117	0,058	0,068	0,148	0,045	0,108
Std.Err.	0,021	0,030	0,032	0,020	0,023	0,018	0,027	0,033	0,015	0,017
US industrial production										
News	0,0004 (0,123)	0,0003 (0,071)	-0,0044 (-1,396)	-0,0012 (-0,363)	0,0002 (0,090)	-0,0014 (-0,663)	-0,0025 (-0,536)	-0,0025 (-0,536)	-0,0017 (-0,898)	-0,0013 (-0,427)
Surprise	0,0065 (2,428)**	0,0073 (1,836)*	0,0100 (3,051)***	0,0088 (3,306)***	0,0033 (1,455)	0,0016 (0,721)	0,0029 (0,869)	0,0029 (0,869)	0,0016 (0,950)	-0,0016 (-0,614)
Level	0,8614 (11,84)***	0,7359 (6,911)***	0,4824 (5,135)***	0,7973 (10,43)***	0,6291 (8,954)***	-0,1071 (-2,533)**	-0,2345 (-2,464)**	-0,2345 (-2,464)**	-0,1368 (-2,616)***	-0,3342 (-4,805)***
Slope	0,7982 (14,48)***	0,6623 (8,014)***	0,3980 (4,845)***	0,7255 (12,04)***	0,6144 (10,32)***	-0,0688 (-1,979)**	-0,2092 (-2,729)***	-0,2092 (-2,729)***	-0,1169 (-2,683)***	-0,2509 (-4,950)***
Adj. R^2	0,644	0,366	0,217	0,617	0,526	0,014	0,051	0,051	0,062	0,203
Std.Err.	0,024	0,036	0,034	0,024	0,023	0,018	0,030	0,030	0,015	0,022
GER industrial production										
News	0,0048 (1,770)*	-0,0021 (-0,431)	0,0009 (0,162)	-0,0040 (-1,146)	0,0048 (1,132)	0,0018 (1,075)	-0,0048 (-0,778)	-0,0018 (-0,357)	-0,0068 (-1,445)	0,0015 (0,444)
Surprise	-0,0043 (-1,614)	-0,0055 (-1,108)	-0,0086 (-1,497)	0,0042 (1,240)	-0,0021 (-0,478)	-0,0025 (-1,476)	-0,0040 (-0,537)	-0,0069 (-1,325)	0,0063 (1,590)	0,0002 (0,049)
Level	0,9262 (18,02)***	0,6205 (8,529)***	0,6271 (7,577)***	0,8257 (13,02)***	0,8147 (10,23)***	-0,0361 (-1,455)	-0,3367 (-4,813)***	-0,3318 (-4,436)***	-0,1508 (-4,193)***	-0,1396 (-2,875)***
Slope	0,9128 (17,77)***	0,5840 (8,340)***	0,5697 (7,150)***	0,8198 (13,62)***	0,8090 (10,12)***	-0,0346 (-1,452)	-0,3603 (-4,649)***	-0,3762 (-5,224)***	-0,1427 (-4,080)***	-0,1318 (-2,819)***
Adj. R^2	0,768	0,308	0,254	0,628	0,559	0,004	0,196	0,171	0,122	0,029
Std.Err.	0,020	0,035	0,040	0,023	0,028	0,011	0,0322	0,036	0,016	0,023

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
UK industrial production										
News	-0,0025 (-1,087)	-0,0036 (-0,763)	-0,0035 (-0,884)	0,0010 (0,325)	0,0008 (0,184)	-0,0032 (-1,359)	-0,0043 (-0,900)	-0,0042 (-1,138)	0,0013 (0,613)	0,0002 (0,056)
Surprise	0,0015 (0,551)	0,0025 (0,516)	0,0023 (0,558)	-0,0015 (-0,451)	-0,0035 (-0,900)	0,0027 (1,089)	0,0036 (0,788)	0,0036 (0,936)	-0,0005 (-0,210)	-0,0022 (-0,682)
Level	0,8116 (11,87)***	0,6065 (5,657)***	0,4929 (4,983)***	0,7535 (8,965)***	0,6841 (6,326)***	-0,0130 (-0,289)	-0,2182 (-2,213)**	-0,3317 (-3,137)***	-0,1109 (-2,008)**	-0,1399 (-2,146)**
Slope	0,9006 (16,37)***	0,7414 (9,636)***	0,6106 (7,551)***	0,8504 (12,96)***	0,7892 (9,314)***	-0,0375 (-1,053)	-0,1967 (-2,495)***	-0,3275 (-4,087)***	-0,1198 (-2,500)**	-0,1473 (-2,660)***
Adj. R^2	0,712	0,485	0,299	0,592	0,553	-0,002	0,052	0,111	0,036	0,086
Std.Err.	0,022	0,029	0,036	0,026	0,027	0,017	0,027	0,032	0,018	0,018
FR industrial production										
News	0,0092 (2,032)**	0,0116 (1,869)*	-0,0011 (-0,221)	-0,0015 (-0,375)	0,0094 (2,250)**	0,0007 (0,276)	0,0031 (0,575)	-0,0096 (-1,432)	-0,0044 (-1,779)*	0,0009 (0,195)
Surprise	0,0077 (-1,706)*	0,0082 (-1,392)	0,0024 (0,494)	0,0030 (0,782)	0,0086 (-2,237)**	-0,0017 (-0,701)	-0,0021 (-0,448)	0,0085 (1,293)	0,0046 (1,903)*	-0,0026 (-0,572)
Level	0,8649 (10,65)***	0,7990 (11,67)***	0,6899 (10,75)***	0,9388 (15,23)***	0,6396 (7,285)***	-0,0448 (-1,729)*	-0,1110 (-2,597)**	-0,2199 (-2,094)**	-0,0541 (-2,037)**	-0,2703 (-2,642)***
Slope	0,8768 (10,54)***	0,8372 (12,40)***	0,7011 (11,52)***	0,9675 (16,00)***	0,6515 (6,679)***	-0,0451 (-1,855)*	-0,0849 (-2,119)**	-0,2209 (-2,038)**	-0,0419 (-1,814)*	-0,2706 (-2,485)**
Adj. R^2	0,781	0,681	0,505	0,783	0,582	0,002	0,019	0,078	0,019	0,233
Std.Err.	0,021	0,026	0,032	0,021	0,025	0,014	0,024	0,033	0,014	0,022
Prices										
US CPI										
News	-0,0028 (-1,339)	-0,0017 (-0,422)	0,0034 (1,154)	0,0016 (0,577)	0,0001 (0,0582)	-0,0046 (-2,729)***	-0,0034 (-0,9961)	0,0016 (0,386)	-0,0033 (-1,455)	-0,0017 (-0,7798)
Surprise	0,0048 (2,333)**	0,0058 (1,279)	-0,0003 (-0,103)	0,0024 (0,830)	0,0007 (0,2519)	0,0030 (1,835)*	0,0038 (1,127)	-0,0021 (-0,524)	0,0025 (1,311)	-0,0010 (-0,4220)
Level	0,8785 (21,90)***	0,8091 (8,113)***	0,5498 (6,209)***	0,8219 (15,01)***	0,6039 (7,824)***	-0,0580 (-1,779)*	-0,1256 (-1,888)*	-0,3866 (-4,827)***	-0,1184 (-2,445)**	-0,3324 (-5,218)***
Slope	0,8209 (24,43)***	0,7610 (9,437)***	0,4783 (6,648)***	0,7756 (18,21)***	0,6034 (10,03)***	-0,0605 (-2,217)**	-0,1194 (-2,142)**	-0,4034 (-6,010)***	-0,1169 (-3,073)***	-0,2780 (-5,684)***
Adj. R^2	0,776	0,505	0,234	0,685	0,498	0,055	0,014	0,154	0,083	0,288
Std.Err.	0,019	0,033	0,038	0,022	0,026	0,015	0,032	0,038	0,016	0,020

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
GER CPI										
News	0,0033 (1,269)	0,0072 (2,613)**	0,0052 (1,483)	0,0040 (1,019)	0,0054 (1,778)*	0,0016 (1,120)	0,0055 (1,938)*	0,0035 (0,994)	0,0017 (0,623)	0,0037 (1,420)
Surprise	0,0014 (-1,000)	-0,0040 (-1,513)	0,0120 (-2,340)**	0,0020 (-0,937)	0,0021 (-0,688)	-0,0006 (-0,422)	-0,0032 (-1,669)*	-0,0112 (-2,046)**	-0,0012 (-1,023)	-0,0013 (-1,380)
Level	0,9649 (9,839)***	1,0482 (9,414)***	0,8369 (4,518)***	1,015 (7,968)***	0,6817 (8,718)***	-0,1213 (-1,968)*	-0,0380 (-0,338)	-0,2493 (-1,446)	-0,1101 (-1,488)	-0,4046 (-3,946)***
Slope	0,8427 (9,948)***	0,7936 (12,15)***	0,5706 (5,829)***	0,8466 (8,722)***	0,6831 (9,602)***	-0,1022 (-1,898)*	-0,1513 (-1,878)*	-0,3742 (-3,219)***	-0,1447 (-2,238)**	-0,2617 (-3,266)***
Adj. R^2	0,745	0,683	0,406	0,585	0,508	0,078	0,064	0,136	0,030	0,268
Std.Err.	0,022	0,028	0,041	0,031	0,029	0,014	0,026	0,039	0,022	0,023
UK CPI										
News	0,0026 (1,386)	0,0019 (0,721)	0,0050 (1,645)	0,0032 (1,567)	0,0035 (1,055)	-0,0008 (-0,891)	-0,0015 (-0,675)	0,0015 (0,485)	-0,0002 (-0,201)	<0,0001 (0,001)
Surprise	-0,0026 (-1,084)	0,0047 (-1,680)*	0,0033 (0,750)	0,0047 (-2,270)**	0,0043 (-1,276)	-0,0015 (-0,715)	-0,0036 (-1,560)	0,0044 (1,052)	-0,0031 (-2,539)**	-0,0032 (-1,329)
Level	1,0397 (8,291)***	0,8368 (9,581)***	0,6262 (3,852)***	0,9703 (14,95)***	0,6702 (6,346)***	-0,0011 (-0,009)	-0,2039 (-2,849)***	-0,4145 (-2,799)***	-0,1217 (-3,137)***	-0,3706 (-2,107)**
Slope	0,9043 (16,72)***	0,7696 (11,82)***	0,6350 (9,223)***	0,8952 (19,17)***	0,6500 (8,258)***	-0,0613 (-1,961)*	-0,1960 (-3,674)***	-0,3306 (-4,763)***	-0,0946 (-2,981)***	-0,3156 (-2,921)***
Adj. R^2	0,763	0,591	0,348	0,804	0,409	0,015	0,136	0,123	0,196	0,205
Std.Err.	0,019	0,025	0,034	0,016	0,029	0,016	0,020	0,032	0,009	0,023
FR CPI										
News	0,0047 (1,512)	-0,0047 (-1,234)	0,0039 (1,112)	<0,0001 (0,005)	0,0013 (0,501)	0,0011 (0,453)	-0,0083 (-2,135)**	0,0003 (0,105)	-0,0023 (-1,359)	-0,0022 (-1,059)
Surprise	-0,0011 (-0,927)	-0,0002 (-0,076)	0,0008 (0,450)	-0,0008 (-0,522)	0,0009 (0,870)	-0,0007 (-0,778)	0,0001 (0,083)	0,0012 (-0,776)	-0,0010 (-0,693)	0,0014 (1,689)*
Level	0,9310 (15,15)***	0,8020 (9,936)***	0,6973 (8,043)***	0,8685 (16,65)***	0,6589 (11,05)***	0,0056 (0,125)	-0,1234 (-1,552)	-0,2281 (-2,719)***	-0,0726 (-1,674)*	-0,2665 (-5,547)***
Slope	0,9031 (16,73)***	0,7488 (8,441)***	0,6780 (8,371)***	0,7927 (13,92)***	0,6667 (11,84)***	-0,0107 (-0,288)	-0,1650 (-2,204)***	-0,2358 (-3,015)***	-0,1327 (-2,358)**	-0,2471 (-5,447)***
Adj. R^2	0,720	0,369	0,387	0,615	0,543	-0,006	0,075	0,063	0,157	0,232
Std.Err.	0,021	0,036	0,033	0,024	0,023	0,016	0,036	0,030	0,021	0,017

Appendix 2continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
US PPI										
News	-0,0006 (-0,227)	0,0002 (0,053)	0,0074 (1,215)	-0,0014 (-0,377)	-0,0039 (-1,329)	-0,0023 (-1,322)	-0,0014 (-0,379)	0,0057 (1,020)	<-0,0001 (-0,007)	-0,0053 (-1,643)
Surprise	0,0001 (0,053)	-0,0004 (-0,099)	-0,0087 (-1,404)	0,0030 (0,807)	0,0028 (1,075)	0,0019 (1,295)	0,0012 (0,328)	-0,0069 (-1,219)	0,0020 (0,791)	0,0040 (1,678)*
Level	0,9329 (12,53)***	0,7139 (8,738)***	0,5354 (5,804)***	0,7837 (8,696)***	0,7954 (18,62)***	-0,0015 (-0,034)	-0,2205 (-3,938)***	-0,3990 (-4,721)***	-0,1619 (-2,049)**	-0,1313 (-4,184)***
Slope	0,8829 (19,85)***	0,7247 (10,98)***	0,6154 (8,164)***	0,8065 (11,87)***	0,7810 (21,71)***	-0,043 (-2,126)**	-0,2007 (-4,385)***	-0,3101 (-4,492)***	-0,1291 (-2,388)**	-0,1418 (-5,159)***
Adj. R^2	0,724	0,516	0,297	0,656	0,753	0,035	0,089	0,116	0,082	0,162
Std.Err.	0,022	0,028	0,038	0,023	0,018	0,013	0,023	0,035	0,016	0,013
Forward-looking										
US consumer confidence										
News	-0,0005 (-0,244)	0,0014 (0,421)	-0,0067 (-2,377)**	0,0023 (1,039)	0,0041 (0,915)	0,0015 (0,952)	0,0034 (0,996)	-0,0047 (-1,675)*	0,0033 (1,830)*	0,0062 (2,527)**
Surprise	0,0041 (1,787)*	0,0024 (0,937)	0,0049 (1,724)*	0,0040 (2,138)**	0,0037 (1,418)	0,0005 (0,272)	-0,0012 (-0,570)	0,0013 (0,445)	0,0004 (0,232)	<-0,0001 (-0,017)
Level	0,8977 (16,62)***	0,8196 (7,252)***	0,4219 (4,953)***	0,7946 (10,22)***	0,5696 (6,975)***	0,0401 (0,996)	-0,0379 (0,308)	-0,4355 (5,189)***	-0,0922 (-1,728)*	-0,2868 (-3,904)***
Slope	0,8605 (24,26)***	0,6469 (9,731)***	0,4547 (6,926)***	0,6891 (11,48)***	0,5868 (8,602)***	-0,0271 (-1,334)	-0,2406 (-3,598)***	-0,4329 (-6,692)***	-0,2327 (-5,478)***	-0,3007 (-5,316)***
Adj. R^2	0,657	0,415	0,240	0,618	0,357	0,014	0,162	0,213	0,240	0,148
Std.Err.	0,027	0,034	0,036	0,023	0,035	0,022	0,034	0,036	0,022	0,031
GER business confidence										
News	-0,0002 (-0,075)	0,0071 (2,457)**	0,0075 (1,896)*	0,0026 (1,381)	-0,0032 (-0,972)	-0,0020 (-1,447)	0,0054 (2,190)**	0,0056 (2,092)**	0,0011 (0,795)	-0,0051 (-2,605)**
Surprise	0,0009 (0,465)	-0,0026 (-0,843)	0,0023 (0,735)	0,0007 (0,382)	0,0056 (1,354)	<-0,0001 (-0,065)	-0,0037 (-1,531)	0,0013 (0,454)	<-0,0001 (-0,029)	0,0045 (2,379)**
Level	1,0965 (7,898)***	0,9852 (8,135)***	0,5944 (3,937)***	0,9353 (11,87)***	0,6924 (3,613)***	0,0565 (1,080)	-0,0598 (-0,511)	-0,4447 (-4,385)***	-0,1174 (-2,145)**	-0,3475 (-4,927)***
Slope	0,9048 (15,43)***	0,8672 (9,998)***	0,7137 (9,880)***	0,8753 (16,42)***	0,6808 (5,884)***	-0,0174 (-0,490)	-0,0586 (-0,597)	-0,2085 (-3,031)***	-0,0834 (-2,402)**	-0,2414 (-5,047)***
Adj. R^2	0,794	0,589	0,481	0,756	0,559	0,017	0,040	0,138	0,026	0,225
Std.Err.	0,018	0,029	0,031	0,019	0,026	0,015	0,025	0,029	0,014	0,020

Appendix 2 continued

	Regression result coefficients									
	Fin yield	Swe yield	Nor yield	Den yield	Corp yield	Fin spread	Swe spread	Nor spread	Den spread	Corp spread
FR business confidence										
News	0,0017 (0,586)	0,0001 (0,048)	-0,0006 (-0,205)	0,0027 (1,272)	-0,0005 (-0,163)	0,0025 (1,989)**	0,0009 (0,318)	0,0002 (0,077)	0,0029 (1,690)*	0,0003 (0,242)
Surprise	0,0021 (-0,907)	0,0054 (1,896)*	0,0052 (1,566)	0,0022 (1,144)	0,0013 (0,558)	0,0031 (-2,480)**	0,0043 (1,490)	0,0042 (1,134)	0,0002 (0,129)	0,0003 (0,217)
Level	0,8221 (10,16)***	0,6890 (11,54)***	0,6016 (6,002)***	0,9272 (15,74)***	0,6860 (7,382)***	-0,0709 (-2,664)***	-0,2040 (-3,327)***	-0,2914 (-2,190)**	-0,1289 (-3,282)***	-0,2070 (-4,943)***
Slope	0,8338 (9,937)***	0,6926 (12,02)***	0,5998 (5,866)***	0,9101 (15,82)***	0,7019 (7,287)***	-0,0545 (-2,122)**	-0,1957 (-3,309)***	-0,2885 (-2,179)**	-0,1354 (-3,625)***	-0,1864 (-4,443)***
Adj. R^2	0,732	0,547	0,374	0,760	0,661	0,098	0,068	0,093	0,099	0,304
Std.Err.	0,024	0,031	0,038	0,020	0,024	0,013	0,031	0,039	0,016	0,014