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Do sensitivity for macroeconomic announcements changes in crisis?

A study of Sweden and surprise affects in exchange rates

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Abstract:

This study aims to examine how the sensitivity for macroeconomic announcements surprises changes for the exchange rate in terms of a crisis. Previous research has been biased for U.S announcements and their relation towards emerging market, which has shown that U.S announcements affect more than the domestic. It also suggests that business cycle and uncertainty affect and increase the reaction for announcements. This thesis shift the focus towards a small developed economy, Sweden's relation towards larger countries announcements. By using a new approach and divide the examined time line for the 2008 crisis to compare with a benchmark that represent a normal reaction structure. I found that Swedish announcements has an equal reaction structure in comparison to U.S while is more influential over U.K and German announcements. Clear evidence of an increased sensitivity for surprises exists, and is as large after a crisis has appeared rather than over the business cycle.
Most influential macroeconomic announcements that increase in reaction were policy rates, retail sales, consumer price index, manufacturing price measure index and GDP, which is in line with previous studies.

Keywords: Macroeconomic announcements, surprise affects, exchange rate, Sweden

I. Introduction

Announcements of macroeconomic statistics are an important part of the economic analysis. The announcement provides a receipt of how the economic sentiment stands and is widely used as a tool for governments, central banks, business, analysts and other parts that is connected to the economic wheel to predict, draw conclusions and make decision.

The connection between macroeconomic announcements and the corresponding market reaction on asset prices is solely an important role to study. Previous studies on this subject, using high frequency data by Ederington & Lee, Cai et al among others has shown that unexpected surprises from macroeconomic announcements are quickly incorporated in asset prices. This gives support for the efficient market hypothesis of no investor or trader can repeatedly earn excess returns from trading on announcements. Using daily return has shown lasting affects on assets return (see work by Vrugt 2010).

The business cycle tends to be an important part when interpreting macroeconomic announcements. Cai, Joo and Zhang (2009) and McQueen and Roley (1990) among others have connected the business cycle to the announcement reaction for return on both exchange rates and stocks. Their findings show that market reaction tends to be stronger when the economy is in low parts of the business cycle, or called recession.

There has been a bias in previous studies, a bias that can be summarized towards two main things. The first is towards U.S announcements, which is not that surprising. U.S is the global player that has most influence over global demand and global policies. This bias could also be a result of the availability of U.S announcements statistics, or rather the unavailability of other countries announcements statistics (Vrugt 2010).

The second main bias is towards emerging markets and their impact from global actors (read mostly U.S) announcements, where the case has been to evaluate domestic versus foreign announcement affect on the small emerging market countries. The results in studies like these (read Cai et al (2009) and Andritzky & Bannister (2007)) have been that the emerging market countries are more affected by announcements surprises from U.S than from the domestic equivalence.

In contrast to previous studies I will rather take the perspective of a developed small open economy with high level of exports but still doesn't affect the global demand. This economy described, or country, is Sweden. This thesis purpose is to examine and answer if the sensitivity towards macroeconomic announcements changes with condition on an economic crisis. The sensitivity will be measured and answered by examining two different data-models, which measures changes in small announcements surprises, and regular announcements surprises that market participants act from. By including both domestic and foreign announcements I will

also be able to determine the relationship between Sweden and other larger countries and see if the results exhibit the same reaction structure as previous studies has shown for emerging markets towards larger countries. Or if Sweden as a developed country is more independent where the macroeconomic announcements have an equal influence over the exchange rate as the compared larger countries macroeconomic announcements has.

My finding was that U.S and Swedish announcements surprises have the same impact on the exchange rates, and that there is an increased sensitivity towards unexpected news both over and after the crisis. This increased sensitivity is concentrated to a small number of macro announcements. For the impact on GBPSEK, Swedish and U.K announcements have almost the same influence in a normal reaction structure, while the Swedish announcements tend to increase more in reaction over the crisis.
In EURSEK only Swedish announcements showed signs of increased sensitivity over the crisis and where German announcements had surprisingly small influence. The increased sensitivity was concentrated to following announcements: policy rates, retail sales, consumer price index, manufacturing price measure index and GDP.

My results contribute and give all parts of the economic wheel new tools for interpreting the integration between an economic crisis and macroeconomic announcements. Using a new approach by dividing the time-series for a real economic crisis and compare with a benchmark reaction structure allows for new insights of how market react in a sudden appeared crisis and how market actors interpret the economic receipt that the announcement provides during such times.

The remainder of this thesis is structured as follows: Section II. Theoretical discussion, Section III. Data discussion, Section IV. Methodological approach, Section V. Results, Section VI. General discussion, VII. Conclusion, Section VIII. References and Section IX Appendix.

II.   Theoretical discussion

In around 1970 Eugene F. Fama presented his article "Efficient Capital Markets" that had a huge influence in economic theory. The financial markets classifies as strong efficient, which means that asset prices reflecting all available information, public as well as private. The main conclusion is that no one therefore can repeatedly beat the market acting on new information. When new information (like macroeconomic announcements) becomes available, markets quickly incorporate this into the price (Burton & Fama 1970).

Applying the efficient market hypothesis would imply that expectations becomes very important. If the announcements were in line with expectations, no significant market reaction would come as a result, since it would already be priced. This would mean that investors act rational to information. On the other hand, unexpected surprises should in the very same way generate a market reaction, assuming market participants acting rational and according to the efficient market hypothesis.
However, literature has found evidence that announcements can generate different strong reaction depending on factors such as business cycle, country characteristics and type of announcement. For example in studies on emerging markets has shown that the reaction is greater for foreign macroeconomic announcements than for domestic. The reason for this is that mature market announcements are more reliable source of information and the actions can be taken with greater conviction (Andritzky & Bannister 2007).

However, Andritzky & Bannister ignored a factor that could impact and explain why announcements from mature large countries are greater in their conclusion. That is the level of trade between countries. Since many emerging market countries are dependent on their trading partners imports and investments, it isn't surprising that macroeconomic announcements from their trading-partner is more important. Especially since Andritzky & Bannister (2007) also found evidence of emerging markets focus more on forward-looking data and announcements.

Sweden should have similar dependency to larger countries announcements, with respect of their exposure towards the global market. According to SCB, Sweden´s largest export partners are Germany (10 %), Norway (9,9 %), US (8 %) and on place six, UK (6,1 %). I therefore expect to find a greater reaction towards news from Germany, US and UK. Just like in emerging markets, however there is a big difference worthy pointing out, which might influence the results and separate Sweden from emerging markets. Sweden has a strong domestic demand and is more independent as a country with working institutions, political environment and more efficient market structure, that makes the Swedish economy more predictable, which could explain if a more equal affect appears.

McQueen and Roley (1990) connected the business cycle with macroeconomic announcements and found out that in strong economies positive surprises in real economic data tends to decrease stock prices while the opposite appears in weak phases. Their conclusion from this was that the expected cash flow doesn't increase from unexpected strong macroeconomic news in strong economies, while same strong news in a weak cycle would increase expectations about higher future cash flow and economic activity. This implies that macroeconomic announcements are of greater interest for returns in lower phases of the business cycle. Bonds have been studied in the same way, and despise different characteristics from stocks, Flemming and Remolona (1997) found evidence in the same direction. That the strongest reaction towards macroeconomic announcements happens when market suffers from a higher level of uncertainty and the most important variables was employment, PPI, Policy rate and CPI.

However it's difficult to know exactly where in the business cycle the economy is, and test for breakpoints in the data do not explicitly shows the reaction of an economic crisis. Therefore by dividing the time-series and using a benchmark to compare the normal reaction structure of announcement surprises with conditions for an economic crisis, the sensitivity for such economic conditions or events would be visual. This method hasn't been used or tested in the literature before and by doing so the new ways of analyzing announcements surprises condition for economic crisis is provided.

III.   Data-discussion

Time period for this essay is selected with consideration for two things, first and foremost to fit the purpose of dividing the time series to include both a broad benchmark and a large sample for the period after a crisis. In this case crisis is referred to the 2008 financial crisis that started in U.S but became a global crisis short there after. Secondly the information of announcements and expectations are limited, the collection of estimates from analysts that is broad enough to build aggregate and reliable market expectations is a relative new phenomenon. Therefore from 1995 to 2016 is more than enough for a benchmark timeline as well as for a prior, over and after a crisis sample.

The exchange rate data consists of daily prices from USDSEK, GBPSEK and EURSEK. Daily exchange rate returns are calculated with logarithmic first differences that gave me the stationary daily returns. Any missed daily prices over this period are treated with interpolation method before calculating the return.
Currency SEK is in the denominator on every currency pair. This implies that a negative return on the exchange rate is a relative strengthening of SEK to the compared currency and vice versa if a positive daily return displays. For the estimate of the announcement effect this implies for Swedish variable that showing a negative coefficient is a relative strengthens of the Swedish krona, and vice versa. For the compared currencies, that is in the numerator of the ratio, opposite relationship holds.

There are extensive previous research using both daily returns and high frequency data. Erderington and Lee (1993) found evidence from high-frequency data that some macroeconomic announcements can generate an increased volatility while a new equilibrium is reached within a minute after the information was available. This means that any possible trading or acting on surprises is gone within this timeline. The increased volatility is remained during the first 15 minutes and continuance slightly higher the following hours.
Analyzing daily returns instead would therefore be a good indication for finding a lasting effect. Since the possibility to earn excess profit from the announcements is a matter of seconds it could therefore be a call of luck from an act of gamble instead of closely analysis of the announcement per se (Flemming and Ramelona 1997).

The gathering of macroeconomic announcements data didn't only limit the choice of time period. The frequency of announcement and corresponding expectation data differs among the variables and between countries. This is due to the distinction between the frequency of actual data and expectation data. Since I want to examine the price reaction the efficient market hypothesis implies that expectations prior an announcement are priced in the exchange rate, I need to have both actual and expected data for each of the announcement. For announcements were only actual data could be provided, the announcement was removed from the sample, although

this problem was almost only a concern until expectations was started to be collected, in other words in the beginning of the intended sample.

Here I didn't use interpolation method for any missed expectation data. Because expectation data can only be referred to that specific announcement it corresponds to and by using such method would have only provide a false or biased picture of what that specific announcement surprise has for impact on the exchange rate. As a consequence for this study the frequency and sample size of announcement data differs between macro-variables and among examined countries. This difference plays out as overweight to number of U.S announcements since Bloomberg has more consistently collected expectation data from U.S relative to Swedish, U.K or German announcement. I used the U.S announcement data as a benchmark for which data to be collected from the other countries, however in the light of this shortcoming of finding such data I understand concerns about falling in the same focus as previous studies, only toward U.S announcements. This concern is in my opinion overestimated since the result showed that number of significant variables overall is the same, and I do have data for what previous studies has shown are the most valuable announcements to consider.

Table 1.

	U.S	U.K	Germany	Sweden
Announcement data	30	12	15	12
# Of observations	6342	1696	2191	1552

The result for collected data is presented in above table, and as previous stated and discussed there is overweight for U.S data while data from U.K, Germany and Sweden is more alike (Table 1). For complete information regarding any specific announcements, I refer to the appendix section.

M. Asprem (1989) has shown that there is a varied relationship between stock market return and macroeconomic announcements among countries. His main finding was that countries that had the strongest relationship were France, Germany, Netherland, Switzerland and U.K. All these countries can be referred as mature and large countries that have at least some impact on global demand. Choosing U.S, U.K and Germany as countries announcements to include in this thesis is therefore natural. Adding that the level of trade between Sweden and the other countries are significant high, there should be a good indicator on how Swedish sensitivity for macroeconomic announcements is affected by a global crisis and a drawdown in global demand.

Two types of announcement data are collected, actual release statistics and prior announcement expectation data. Actual release statistic together with date is assembled and ignoring future adjustment of the statistics. Prior-announcement expectation is gathered as an average of analysts reported estimates. This average could be seen as the market consensus and according to the efficient market hypothesis this average represents what should be priced in the currency. One could

argue that the average of market actors estimate of announcement is not sufficient to classify as the whole market expectation of the actual release. It is problematic to measure the whole market expectation, but using the largest provider of professional information services, Bloomberg, that has shown to have market impact and is used in other studies like Vrugt (2010), is the best way to estimate market expectations.

Exchange rate, actual announcements data and associated prior-announcement expectations are all collected from a Bloomberg terminal. Bloomberg terminal is a credible well-used source for investors, analysis and for research papers like this. The reason for this is that Bloomberg has the most market share of all professional actors in the market and has proved to be having a market impact.

The data is checked for stationary by performing an Augmented Dickey Fuller test. The null hypothesis for the ADF-test is that the process has a unit root, meaning that the data is non-stationary. For all my announcement variables and data I could reject the null hypothesis, rather accepting the alternative that the data has no unit root. This means that my data over announcements surprises in this study are stationary (Verbeek 2012). For more information about the stationary-test see table 1 in appendix where full information is presented.

The modeling of collected data was performed to fit the theoretical framework of the efficient market hypothesis which states that the only a market price adjustment occur to unexpected news. In other words, if the market expects a certain outcome of a macroeconomic announcement, the market has already adjusted the price thereafter. In theory, if an outcome (actual release data) of such announcement were in line with market expectations, then no reaction, or price adjustment, would appear.

From the provided theoretical argument I will test two data-models, the first model for announcement unfolds like this:

$$M_{i,\tau}{}^n = \frac{A_{i,\tau}{}^n - E_{i,\tau}{}^n}{\sigma_{n,i}}$$

Where *A* is the actual release for macro-subject *i* announcement at date τ for country *n*. *E* is represented by the expectation for macro-subject *i* and country *n* at date τ. Dividing by $\sigma_{n,i}$ which is the sample standard deviation of $A_{i,\tau}{}^n - E_{i,\tau}{}^n$ for the whole time period, gives a more comparable results between different types of macro-announcements surprises. This method of standardize the surprise from announcements has been used by Balduzzi, Elton and Green (2001) and Vrugt (2010) in previous studies with arguments of its easier to compare the size of the effect different types of announcement has on the exchange rate. It means that the interpretation of the regression results should be like of what one standard deviation surprise affect on the exchange rate return. This model weights small announcements

surprises higher over larger announcements surprises. If the results of this model shows an increased sensitivity it will conclude that even smaller prognostic errors generates affect on exchange rate return. This transformation do not influence the regression result or the level of significant since the sample standard deviation is a constant over the whole time period for the specific subject i. This standardize announcement surprise effect will be referred as "announcement surprise" in the remaining of this thesis.

Since model 1 favors the small surprises, larger surprises would be smaller than true reaction. Therefore in model 2 I simply use actual announcements and expectation data. Model 2 represents what market actors see and act from in the financial terminal.

Model 2, looks like this:

$$M_{i,\tau}{}^{n} = A_{i,\tau}{}^{n} - E_{i,\tau}{}^{n}$$

Where M is the macro variable i at time t for country n, which is equal to actual announcement A for macro variable i at time t for country n minus market expectations E for announcement A.

IV.   Methodological approach

The time-period consists of a benchmark that reaches over the whole sample size of time, 1995 to 2016. This benchmark will act as the normal reaction structure an announcement surprise generates for each of the macro-variables. This will identify which macro-announcements that have significant impact on the exchange rate return. By dividing the time-period in two additional groups I can compare the divided time periods with the benchmark to be able to draw conclusions if the sensitivity of announcements surprises has changed over and after the financial crisis. This method is a new approach and hasn't been made in previous studies. The first time period that will be compared to the benchmark is between 2005 and 2016. This represents foremost the time during the financial crisis and after but also covers the period just before the crisis appeared. This period will answer if the sensitivity has changed from benchmark over a period of crisis, from the top of the business cycle to the bottom and the start of the retracement. While the second time period only will reflect the aftermath of the financial crisis and will answer if the sensitivity towards announcements surprises has changed with respect of a resent crisis.

The model for estimation is the same for both the benchmark time period as well as the other two divided time periods. I will test each currency pair by itself, which will be represented by the index variable. Therefore the variable *index* in the equation model will be the exchange rate for USDSEK, GBPSEK and EURSEK. The announcements variable, as described in previous section are represented by the variable *Macro*.

Model for testing macroeconomic announcements surprises looks like this:

$$Index_t = \beta_1 + \beta_2 Macro^n{}_{i,t} + \beta_3 Macro^n{}_{j,t} + \cdots + \beta_x Macro^n{}_{x,t} + \varepsilon_t$$

This model represents each Macro-announcements *i, j, x* affect on exchange rate return *index*. Where *X* is either data-model 1 or 2. Estimation will provide the impact on daily return on *Index* at time *t* from announcement *Macro* at time *t* for country *n*. One standard deviation miss from market expectation and one percentage miss from expectation will give impact on *Index*. Both domestic and foreign announcements will be included in the same estimation for each specific exchange rate. This means that for EURSEK, both German and Swedish announcements will be included. The same will hold for USDSEK and EURSEK, but with respective countries announcements included.

My model is estimated using an Ordinary Least Squares with Newey-West standard errors. Robust standard errors are included to adjust for unknown form of autocorrelation and heteroskedasticity. Presence of autocorrelation is common found in time-series and so showed initial studies of my sample and model, hence

addressing the problem using Ordinary Least Squares with Newey-West standard errors will provide robust standard errors. Heteroskedasticity is generally no concern in large sample, which my study should subject to since that the divided and smallest sample of time period is daily data from 2009 to 2016. However by performing a Breusch-Pagan-Godfrey heteroskedasticity test some of the estimated models suffered from heteroskedasticity. By using this Ordinary Least Squares approach, correct standard errors will be estimated. A Breusch-Godfrey LM test is performed to check for serial correlation. The null hypothesis is that there is no serial correlation in the model, if p-value is above 0,05, it means that I cannot reject null hypothesis, rather accepting that the model doesn't suffers from serial correlation.

Since I have both domestic and foreign macroeconomic announcements in the same model the number of independent variables tested are quite big. Concerns of multicollinearity are addressed by performing a correlation-matrix to exclude any correlation between the independent variables before estimation. I found that among the Swedish announcements yearly and quarterly GDP as well as import and trade had high correlation between them. This resulted in removing quarterly GDP and import from sample before estimating the model.

Among German announcements high correlation between variables current account and trade were found and removing current account from sample as a result. No suspicious high correlation was found in U.S and U.K announcements.

A Variance inflation factor test was performed on the estimated regression, to ensure no multicollinearity in the final model. The most common restriction for multicollinearity is if the variance inflation factor is larger than 10 (Kutner et al. 2005). However arguments of which level to use is discussed in the literature. O'Brien (2007) argue that a value over 10 or even as high as 40 does not by it self provide enough evidence of removing suspicious variables. Rogerson (2001) suggest over 5 as a limit for multicollinearity. Results VIF-test can be found in appendix.

V.   Results

The results will be presented in two parts, first the benchmark time period, which represents the normal reaction structure towards announcements surprises. The second part will present the results from the divided time period, i.e. for the 2005 time period and for the 2009 time period. The second part result will presents as a comparison against benchmark in order to determine the reaction sensitivity for the 2008 crisis. The tools for this purpose are the two models for announcements surprises described in data-discussion. The interpretation of the model 1 is how one standard deviation surprise affects exchange rate return. For model 2, the interpretation is how one percent announcement surprise from market expectation affects exchange rate return.

Benchmark

As the timeline for benchmark represents the normal reaction structure of announcements surprises, this period and the significant variables found could be interpret as the announcements surprises that normally have an impact on the exchange rate return.

What is clear when only examining number of significant variables is that there is overweight for significant Swedish announcements over U.K and German ditto. There are also fewer Swedish variables that have an affect over USDSEK than in GBPSEK and EURSEK, and where the relationship is a more equal regarding number of influential variables between Swedish and U.S announcements. German announcements have the least number of significant variables while the Swedish has the most for all three exchange rates in EURSEK (Table 1 & 2).
Even though looking at the absolute average affect could show a bias of the results for variables with relative low or high affect it provides an indication of the affect structure for each country and a good outline for later specification of the results. Here I found as in number of significant variables for Sweden over German announcements, the Swedish generates overall a greater impact that is visual for both models. In benchmark there is also an overall equal reaction towards announcements surprises in USDSEK and in GBPSEK (Table 3 & 4).

The most common influential macro-variables for all three exchange rates are retail sales, consumer price index, manufacturing price measure index and GDP.
Starting with the announcements connected to consumption, consumer price index for Sweden is significant for all three exchange rate returns. The announcements surprises generate an impact on all three exchange rates on average -12 basis points in model 1 and around -0,65 basis points in model 2. For the compared countries only U.K announcements have a significant impact in the benchmark period, which reaction showed to be stronger than the Swedish ones of about 18 basis points in

model 1 and 105 basis points in model 2. Meaning that in model 1 a positive one standard deviation surprise generates an appreciation of GBPSEK with 0,18 % and in model 2, a percentage outcome surprise affect GBPSEK with 1,05 %. For Swedish announcements this relationship is negative, which implies that the Krona appreciates and the ratio GBPSEK decreases. In general model 1 have smaller coefficients than model 2, this is due to the standardizing the announcements surprise to focus the affect on smaller market expectation errors.

Retail sales are another announcement that have a widespread impact on return. The Swedish announcement has significant impact over all three exchange rates, however the reaction is quite small and on average is about -0,12 basis point for both models. U.K retail sales have a significant impact of 0,18 basis points in model 1 and 0,25 basis points impact in model 2 while the German and U.S equivalence cannot be proved significant in benchmark period.

Moving on to manufacturing price measure index the Swedish announcements surprise still generates more affect than the compared countries in model 1 but in model 2 the affect is reported very small, while for U.S and German the opposite relation holds. This means that Swedish announcements are more sensitive to small prognostic errors while the U.S and German generates a greater reaction for a percentage miss from expectations.

Policy rates generally do not affect the exchange rate return in the benchmark period, with the exception for Swedish policy announcement in EURSEK, where the affect can be summarized to -26 basis points for a standard deviation surprise and -180 bp for a percentage expectation miss. To some what surprising that U.S, U.K or ECB policy rate announcements doesn't have a significant impact on exchange rate, however it could be the case that in general (benchmark) expectation are more accurate for actual policy rate announcement and therefore no significant affect is presented.

Strongest impact reaction was generated from U.S service PMI where a standard deviation announcement surprise affects USDSEK exchange rate return with 0,44 % in model one and in model two Swedish policy rate surprises generated strongest reaction with a 1,80 % on EURSEK.
Among other significant announcements variables in benchmark I found U.S personal spending, unemployment and import. For U.K industrial production service PMI, and yearly GDP were significant and for German announcements Import was significant.

The Breusch-Godfrey serial correlation LM test cannot be rejected for all three tested exchange rates returns and for both of the models tested, meaning that the model has no serial correlation. From the variance inflation factor test I can conclude that the model isn't affected by multicollinearity. There is some correlation between the variables since the factor is above one, however all variables reported a value under 5

which only can classifies as moderate correlated and isn't a problem for the stability of the estimate.

Figure 1.

Figure 1. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.
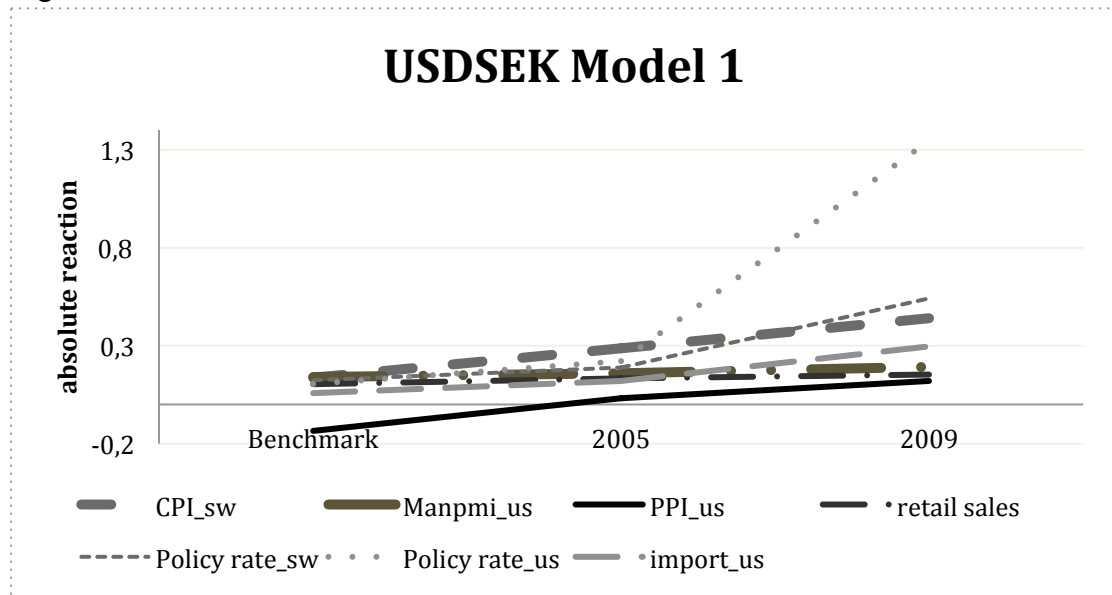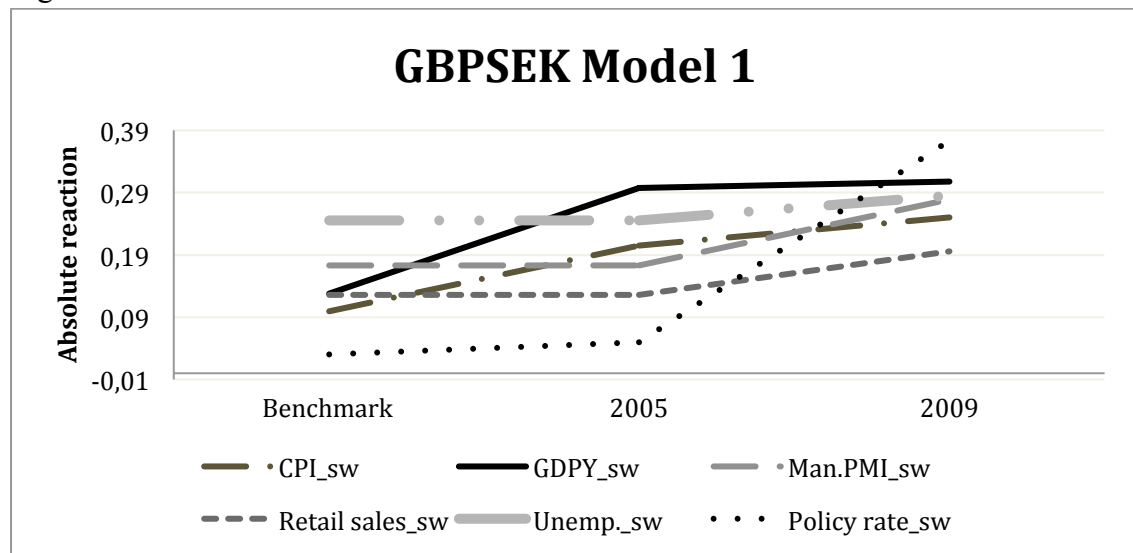
Figure 2.

Figure 2. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.
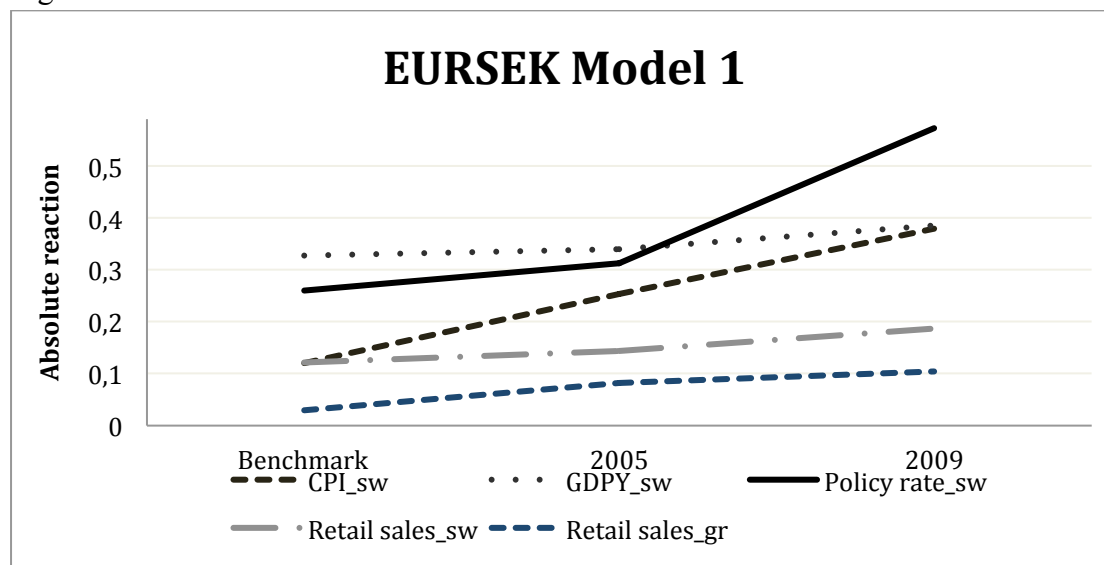
Figure 3.

Figure 3. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

2005 and 2009 time period

While the benchmark time period provided solid evidence of significant macro-economic variables to account for when analyzing announcements affects in general, we move now on to see how sensitive the reaction of announcements surprises are for the crisis.

Number of significant announcements variables has small variations from benchmark. Swedish announcements are still in overweight for GBPSEK and EURSEK, and in USDSEK number of significant variables for U.S went down while Swedish significant variables increases. Therefore Swedish announcements variables have a broader influence on all exchange rates than the compared countries. (Table 2 & 3 appendix)

The absolute average impact reaction increases most in USDSEK for both Swedish and U.S announcements, where U.S has most sensitivity. However the U.S absolute average reaction bias for the large increased reaction in Policy rates announcements, which is most visual in model 2. Sensitivity increases also for Swedish announcements in GPBSEK and EURSEK, while German and U.K announcements in EURSEK is unchanged, and decreases in GBPSEK. Where the reaction increases from benchmark, it is noticeable that the reaction for 2009 time period is greater than for 2005. Meaning that there are signs that sensitivity for announcement surprises is larger for when the first stage in the crisis has appeared (in 2008), than for the period that includes all stages of the crisis (Figure 4 & 5 appendix).

For those variables that exhibit increased sensitivity to the crisis it is clear that the reaction increases over the two divided time periods. First an increased reaction in 2005 against benchmark appears and corresponds to the affect of the business cycle. Then only observing 2009 time period an additional increased reaction appears from period 2005, which represents the time after the crisis. Therefore in general sensitivity is as largest after a crisis rather than over the whole business cycle (Figure 1, 2 and 3)

Since the financial crisis in 2008 begun central banks has used their most important tool for keeping inflation at a stable level (or fighting for higher inflation), the policy rate. The connection to the currency has been important, especially for Sweden whereas the Swedish Riksbank, repeatedly expressed concerns of the Swedish Krona value that in their minds, in relation to the best for Swedish economy is to high (Ingves, Stefan 2015).

The focus on policy rates is visual in the results and the sensitivity has increased over the crisis. The impact affects for Swedish announcements are similar for all three exchange rates. In benchmark, for both models, with small and insignificant influence on GBPSEK and USDSEK, the sensitivity and reaction has increased to a significant -54 basis points in USDSEK and -37 basis points in GBPSEK in model 1. While same reaction structure is visual in model 2 where GBPSEK are affected by a surprise announcement with -260 basis points and for USDSEK this number is -376 basis points.

For U.S the reaction is vastly increased for 2005 and even more in 2009 time period. A percentage difference from expectations will generate an affect of 2,1 % in 2005 and 12,21 % in 2009. However the big coefficient in 2009 time period must be put in relation to the low level and small changes of the policy rate, where a whole 1 percent difference from expectations isn't likely to appear. Therefore it could be more interesting to look at model 1 and the fact that U.S policy rate changes signs and becomes negative, hence a somewhat theoretical contradiction where reaction of a positive announcement surprise depreciate the value of USD. However few announcements have under the 2009 time period been unanticipated by the market and after a long time with low interest rates, when FED decided to raise, it was what the market was waiting for. Therefore the change to negative is more of a sign for market sell off rather than absolute results for crisis in general. Therefore I am careful in the conclusion of U.S policy announcements sensitivity for crisis.

For EURSEK all periods are significant for policy rates announcements, and the reaction has increased from benchmark for both models from -26 basis points in model 1 and -180 basis points in model 2 to 2005 reaction of -31 basis points in model 1 and -217 basis points in model 2. In the period after the crisis has appeared announcements surprises generates and reaction of -57 basis points in model 1 and -391 basis points in model 2. UK and ECB (used for German) policy announcements have no significant affect on any time period.

The second most influential announcement is Consumer price index. My results show an increased reaction for Swedish announcements. The U.K are significant influential for 2005 but not for 2009, but have no changed reaction structure over this period. U.S and German have no significant influence for any time period. Left alone are Swedish announcements where the reaction sensitivity follows the same path as for policy rates. From relative low impact in benchmark to increase in 2005 time period and then increase even more in 2009 time period. This reaction isn't that surprising since inflation, or rather the post-financial crisis lack of it, has been the greatest concern for central banks since the crisis started. The financial market has therefore also focus more towards CPI to forecast how the central banks will act in the future. However, what is surprising is that only Swedish announcement has a significant influence over the exchange rate return.

Retail sales had a broad impact on the benchmark period, which continues to be an influential announcement for exchange rate return in the divided time periods. Especially in EURSEK where both Swedish and German announcement generates a larger affect than benchmark. In GBPSEK Swedish announcement surprise exhibit the same reaction structure as for EURSEK and increases, while U.K and U.S announcements in USDSEK is relatively unchanged.

Manufacturing price measure index as in benchmark was an important and significant variable for all countries, is still an important and significant variable in the divided time periods. However the sensitivity has not changed for all of them, the affect on daily return only shows increased reaction for Swedish announcements in GBPSEK and EURSEK and for U.S announcements in USDSEK. The change in the divided time periods is also quite small in comparison towards policy rate and retail sales.

GDP announcements in 2005 and 2009 compared to benchmark are only significant for Swedish and U.K announcements and the reaction structure shows only a small increased affect against benchmark results. However Swedish announcements tend to be more important for the exchange rate than the compared countries when it comes to small prognostic errors. U.K however increases most in model 2, and a percentage expectation error increase GBPSEK return with 0,8 %.

Other announcements that had an increased sensitivity but wasn't significant for all time periods or for all three exchange rates was observed in U.S imports, Swedish unemployment for GBPSEK and German trade announcements.

Again the Breusch-Godfrey serial correlation LM test cannot be rejected for any of the remaining time periods. This means, as in benchmark, that no serial correlation exists in the model and the estimate. The multicollinearity test in the variance inflation factor is low for all announcements, and as in benchmark, there isn't any multicollinearity in the final model estimated.

Also here all model has a very low R-squared, which is not that surprising since other factors impact the daily return other than announcement surprises and with a large time period the model used cannot explain all the daily returns. However focus is to explain and examine the sensitivity for announcements surprises and not a model for exchange rate return.

VI.   General Discussion

Comparing U.S and Swedish announcements I find more similarities than differences. The reaction structure is similar between them in benchmark as in the time periods for crisis. There are several announcements that have a significant impact on USDSEK, but doesn't necessarily generates a greater reaction in the divided time periods. The increased sensitivity is foremost visual in consumer price index, policy rates and imports, where policy rates is the absolute most important and reactive announcement. UK and Swedish announcements provides a similar affect in benchmark but the sensitivity only increases for Swedish announcements. Consumer price index, GDP, Manufacturing price measure index, retail sales and policy rates are all having increased affect in crisis. Swedish and German announcements are more different. Swedish announcements tend to be more important, influential and increase in reaction over the crisis. Where the German announcements had small and no increased sensitivity over the time periods. The most sensitive announcements were consumer price index, GDP, policy rates and retail sales. The concentration towards the same types of announcements is in line with previous research from Flemming and Ramelona. This also strengthens McQueen and Roleys (1990) connection to the business cycle, although not for all variables included.

The main interesting result in this study is that a factor for a small-developed country seems to be the interaction with the compared country. For Sweden the sensitivity is more reactive in GBPSEK and EURSEK, while the sensitivity for U.K and German announcements is almost nonexistent. Sweden, U.K and Germany have a closer collaboration than Sweden and U.S since the membership in the European union. Because the Swedish economy is focused towards exports and trade a close cooperation could in a European crisis impact the uncertainty of Swedish economy more than from other countries, for example as in my study U.S.

It is problematic for this study that Germany doesn't have its "own" currency, as the other countries in this study has. The euro is not only affected by the performance and outlook of the German economy. It is reasonable to argue that other countries including the whole euro-collaboration affecting the value of the euro more than any individual member/country. In terms of crisis, as the 2008 crisis and the aftermath, the German economy was one of the best performing countries in the euro area. While other countries struggled, it is reasonable to argue that the uncertainty from the euro area determines the value of the euro more than the German performance. This could explain the dampened affect from German announcements in my results. A change or including euro-statistic announcements could have exposed a different result however struggle of finding appropriate data dismissed the euro area from this study.

U.S economy affects the global demand and therefore has a large influence on the exchange rate, however Swedish announcements are found to be equally important

for the return. This separates Swedish from previous studies of emerging markets that showed a unilateral influence from U.S over domestic announcements. As a consequence from higher market efficiency expectations are easier to estimate for Swedish announcements than for some emerging markets, which could be an explanation. Another reason could be that the Swedish economy isn't as dependent on U.S contribution for the global demand as other countries with a more equal response on the exchange rate as a result.

The difference between the two models is in general that the standardized model shifts focus and tries to catch up the small prognostic errors for announcements. Except for the models different interpretation of the results it is no surprise that the coefficients are smaller. The result isn't that much affected by the difference of the two models. For most of the case it even shows the same proportion of sensitivity between benchmark and the divided time series as model 2 did. Although whereas large announcements surprises are dampened, as seen in policy rate and CPI. However the small prognostic errors is visual in the results where the affect differs and is larger from model 2. For example in GBPSEK exchange rate Swedish PPI and U.K service PMI had greater coefficients than for model 2, however non of them changes the reaction structure in the divided time periods. The same thing holds for EURSEK exchange rate for Swedish consumer confidence and industrial production. Equal reaction structure in USDSEK is observed for Swedish manufacturing PMI and retail sales. Although, the only variable that had different reaction for small announcements surprises was Swedish manufacturing PMI in GBPSEK where the reaction pointed out an increased sensitivity.

VII. Conclusions

The financial crisis of 2008 placed the global economy in the worse recession since the great depression. As a consequence it worsen the economic outlook and in general worsen the macroeconomic statistics. By comparing the benchmark results for a normal reaction structure with the divided time periods over the time for the crisis I found that the reaction structure changes. My findings were in line with previous studies from Flemming and Ramelona, Vrught and McQueen and Roley among others that announcement variable are most affected by uncertainty and the business cycle. But the crisis also increased the sensitivity for some variables more than other. U.S announcements are still an important factor and with their global position they affect the rest of the world. This is visual in USDSEK, although the difference from emerging market countries are clear, and as Vrught (2010) points out, its not only U.S announcements that matters. Swedish announcements are equally important and exhibit the same sensitivity structure as for U.S. One common ground for the results was that Swedish announcements tend to be more reactive for crisis than U.K and German. Uncertainty in the region of the EU collaboration seems to strike against Sweden. It could be the case that Sweden's economic characteristics with high export make them more sensitive for announcements surprises in terms of high outside uncertainty. I argue therefore the reason for this is either that Swedish announcements are harder to predict in crisis due to the close relationship with larger trading partners or that the market are more nervous for what implications a global or a close neighbor crisis has on a country like Sweden. The fact that Sweden managed to perform quite well in the crisis relative to other European countries it should therefore be more realistic that Swedish announcements had a low sensitivity instead of the opposite, which strengthens my conclusion of that exchange rate not fully prices Swedish announcements in crisis.

Since Sweden is a quite small economy in association to U.K, Germany and U.S it would be interesting to examine if the same relation follows for other similar countries against the larger more global market actors as in this study. For future research I also think it would be interesting to see if "brexit" affect the GBPSEK exchange rate returns to further examine if close collaboration generates a greater reaction for smaller countries announcements surprises in terms of crisis. That of course depends on whether the relationship between Sweden and U.K is affected from U.K leaving the European union.

VIII.   References

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IX. Appendix

Table 1. Overview of macroeconomic announcement used in this study, data collected from Bloomberg terminal.

Announcement	First obs.	Last obs.	# Of obs.	Unit root t-stat	Prob. 1 %	Reject H0?
US Manufacturing PMI	13-05-01	16-04-01	36	-74,44	-3,43	Yes
US GDPQ	97-06-25	16-03-25	72	-74,45	-3,43	Yes
US Policy Rate	97-05-20	16-03-16	158	-74,53	-3,43	Yes
US Trade	97-03-20	16-04-15	230	-74,44	-3,43	Yes
US Budget Deficit	97-01-21	15-12-31	228	-74,43	-3,43	Yes
US CPI	97-02-19	16-03-16	230	-74,46	-3,43	Yes
US PPI	97-12-12	14-01-15	194	-74,45	-3,43	Yes
US Retail Sales	01-06-13	16-03-15	178	-20,5	-3,43	Yes
US Consumer confidence	97-02-25	16-03-29	230	-74,44	-3,43	Yes
US Unemployment	97-02-07	16-04-01	231	-74,49	-3,43	Yes
US Industrial Production	97-02-14	16-03-16	230	-74,48	-3,43	Yes
US Jobless claims	97-07-03	16-04-07	980	-74,5	-3,43	Yes
US Housing stat	98-03-17	16-03-16	217	-74,45	-3,43	Yes
US existing home sales	05-03-23	16-03-21	133	-74,44	-3,43	Yes
US New Home sales	98-06-02	16-03-23	215	-74,44	-3,43	Yes
US Durable goods sales	97-11-26	16-04-04	219	-74,44	-3,43	Yes
US Inflation expectations	99-05-28	16-04-01	203	-74,56	-3,43	Yes
US current account	98-09-10	16-03-17	71	-74,45	-3,43	Yes
US ADP	06-08-30	16-03-30	116	-74,46	-3,43	Yes
US NFP	97-02-07	16-04-01	231	-74,5	-3,43	Yes
US Service PMI	14-04-03	16-04-05	25	-17,11	-3,43	Yes
US Industrial PMI	97-02-03	16-04-01	231	-74,42	-3,43	Yes
US Imports	98-08-13	16-03-11	212	-74,44	-3,43	Yes
US Personal Spending	97-03-03	16-03-28	230	-74,44	-3,43	Yes
US Non-Manufacturing PMI	08-02-05	16-04-05	99	-74,44	-3,43	Yes
US Personal Income	97-03-03	16-03-28	230	-74,49	-3,43	Yes
US Chicago PMI	97-04-30	16-03-30	228	-74,46	-3,43	Yes
US Capital Utilization	97-02-14	16-03-16	230	-74,45	-3,43	Yes
US Business Inventories	97-07-16	16-03-15	225	-74,45	-3,43	Yes
US Leading Indicator	97-03-04	16-03-17	230	-74,5	-3,43	Yes
UK Manufacturing PMI	13-05-01	16-04-01	36	-74,42	-3,43	Yes
UK GDPQ	98-12-21	16-03-31	70	-74,44	-3,43	Yes
UK Policy rate	98-10-08	16-03-17	210	-12,34	-3,43	Yes
UK Trade	06-10-10	16-04-08	115	-74,44	-3,43	Yes
UK CPI	04-01-20	16-03-22	147	-74,45	-3,43	Yes
UK PPI	97-06-09	16-03-22	226	-74,46	-3,43	Yes
UK Retail sales	97-02-19	16-03-24	230	-74,59	-3,43	Yes
UK Consumer confidence	03-01-30	16-03-30	159	-74,45	-3,43	Yes
UK Unemployment	02-05-15	16-03-16	167	-74,46	-3,43	Yes
UK Industrial production	97-03-12	16-04-08	230	-74,75	-3,43	Yes

UK GDPY	98-12-21	16-03-31	70	-74,44	-3,43	Yes
UK Service PMI	13-05-03	16-04-05	36	-74,44	-3,43	Yes
TY Manufacturing PMI	13-05-02	16-04-01	36	-8,85	-3,43	Yes
TY GDPQ	97-06-05	16-02-23	76	-74,47	-3,43	Yes
TY Policy Rate (ECB)	00-10-05	16-03-10	185	-74,44	-3,43	Yes
TY Trade	02-02-12	16-04-08	171	-74,48	-3,43	Yes
TY CPI	03-02-26	16-03-30	159	-74,44	-3,43	Yes
TY PPI	97-02-24	16-03-18	230	-10,7	-3,43	Yes
TY Retail sales	98-04-16	16-03-31	216	-74,72	-3,43	Yes
TY Consumer confidence	06-07-27	16-02-25	116	-74,46	-3,43	Yes
TY Unemployment	98-10-06	16-03-31	211	-74,58	-3,43	Yes
TY Industrial production	97-04-03	16-04-04	229	-74,49	-3,43	Yes
TY Current account	02-02-12	16-04-08	171	-74,52	-3,43	Yes
TY Business condition	04-02-24	16-03-22	146	-74,47	-3,43	Yes
TY GDPY	99-06-30	15-12-31	61	-74,49	-3,43	Yes
TY Service PMI	13-05-06	16-04-05	36	-74,45	-3,43	Yes
TY Import	03-11-11	16-04-08	148	-74,45	-3,43	Yes
SW Manufacturing PMI	04-12-01	16-04-01	135	-74,43	-3,43	Yes
SW GDPQ	97-06-11	16-02-29	76	-74,44	-3,43	Yes
SW Policy rate	01-07-06	16-02-11	96	-74,52	-3,43	Yes
SW Trade	97-03-25	16-03-29	175	-74,44	-3,43	Yes
SW CPI	97-03-12	16-03-15	229	-74,45	-3,43	Yes
SW PPI	97-03-26	14-05-26	205	-74,48	-3,43	Yes
SW Retail sales	03-04-29	16-03-29	156	-74,45	-3,43	Yes
SW Consumer confidence	13-07-25	16-03-23	33	-74,46	-3,43	Yes
SW Unemployment	07-11-15	16-03-17	101	-74,45	-3,43	Yes
SW Industrial production	04-03-10	16-04-05	146	-74,49	-3,43	Yes
SW GDPY	02-09-25	16-02-29	55	-74,44	-3,43	Yes
SW Import	04-03-25	16-03-29	145	-74,44	-3,43	Yes

Table 1. Shows Macroeconomic announcement, first observation collected, last observation collected, numbers of observations used in this study and the result from the unit root test of Augmented Dickey Fuller test. Rejection of null hypothesis implies stationary data.

Table 2.
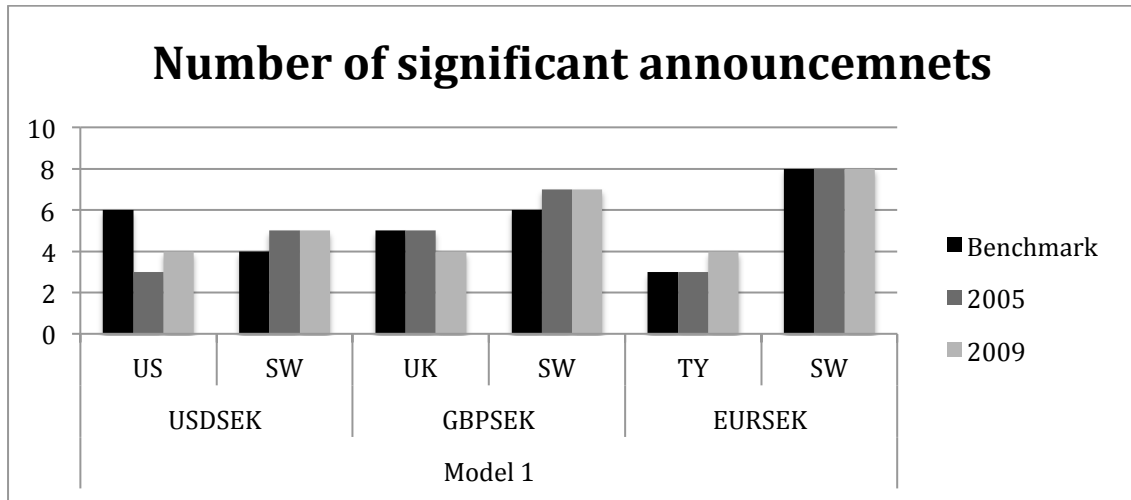
Table 2. Shows number of variable that have a significant influence on the exchange rate return for model 1.

Table 3.
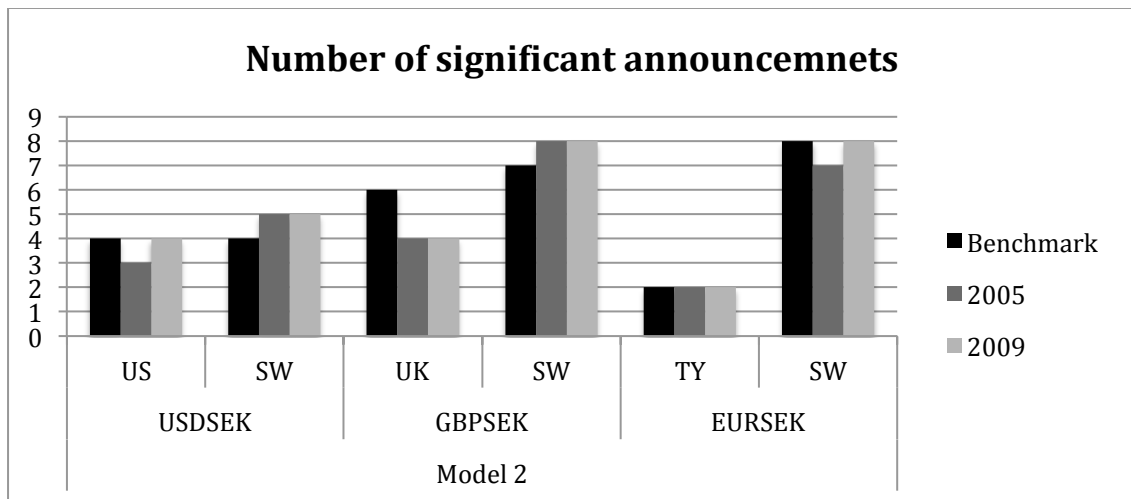
Table 3. Shows number of variables that have a significant influence on the exchange rate return for model 2.

Table 4.
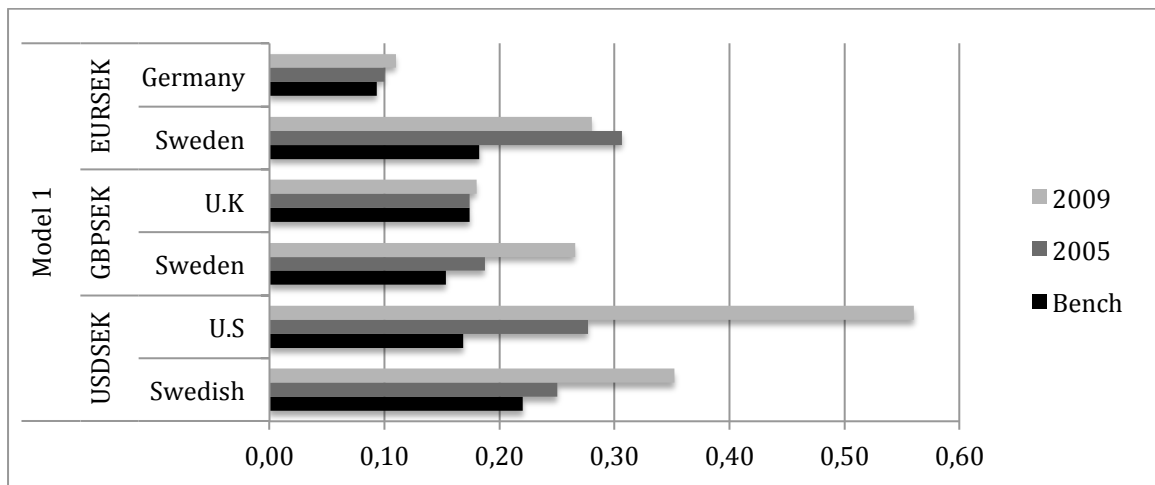
Table 4. Shows the absolute average affect of model 1. Interpretation reads one standard deviation surprise affect on exchange rate return. Only significant variables from each exchange rate are included.

Table 5.
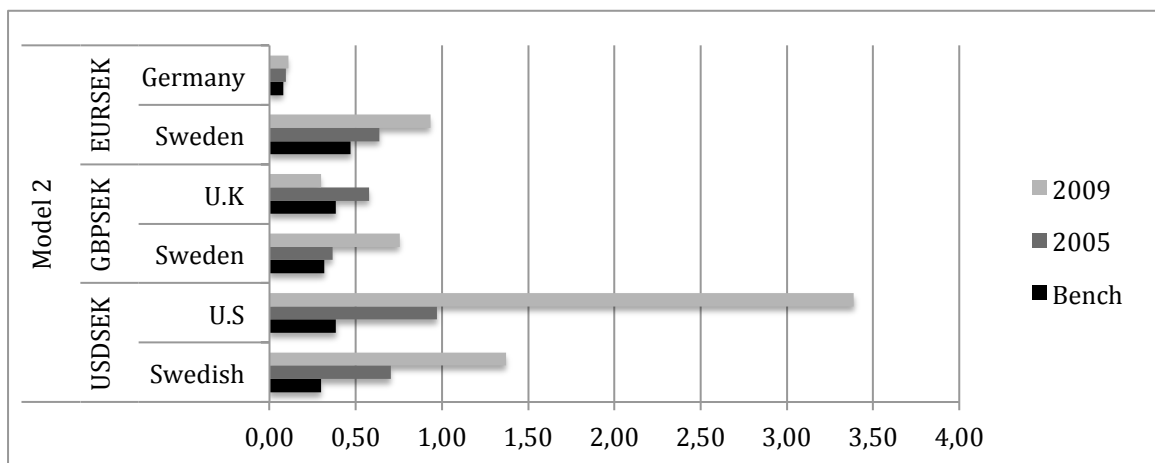
Table 5. Shows the absolute average affect of model 2. Interpretation reads one percentage announcement surprise affect on exchange rate return. Only significant variable from each exchange rate are included.

Figure 1.

USDSEK Model 1

Figure 1. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Figure 2.

GBPSEK Model 1

Figure 2. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Figure 3.

EURSEK Model 1
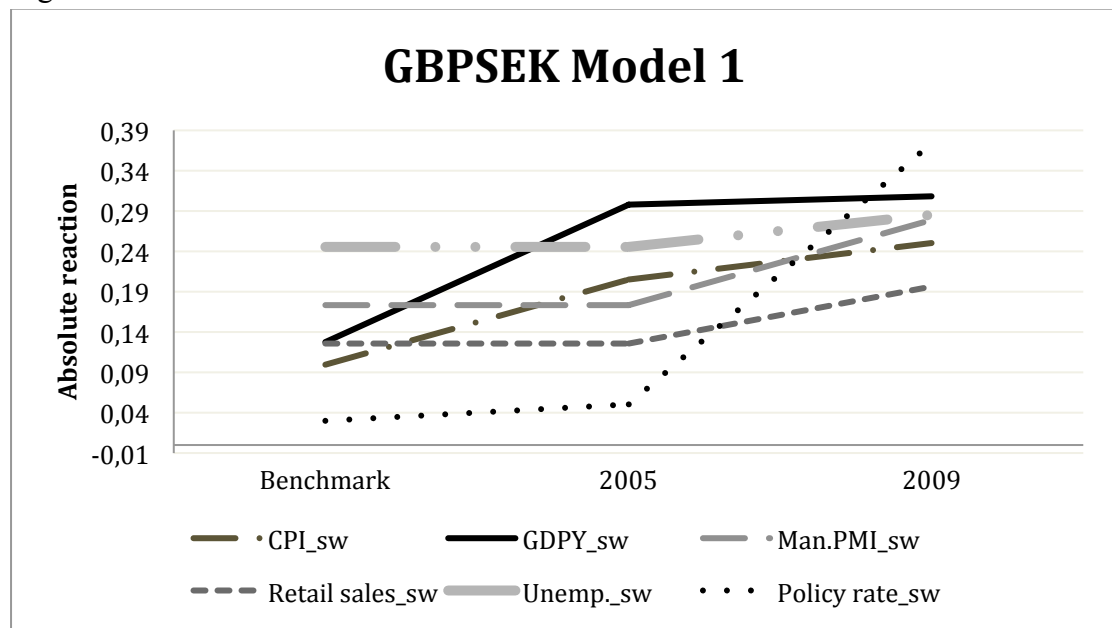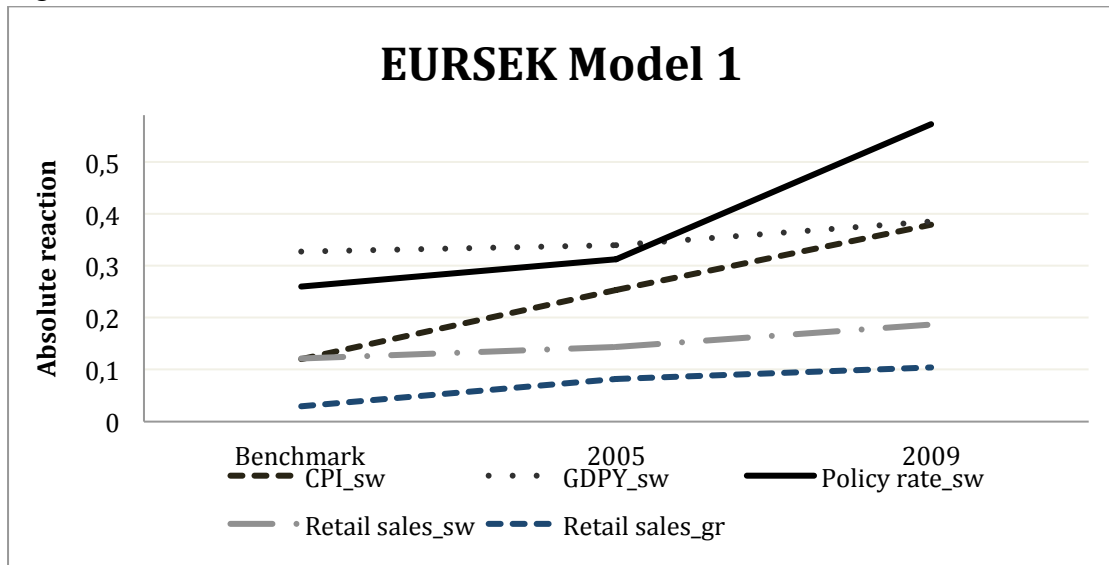
Figure 3. Shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Figure 4.

USDSEK Model 2
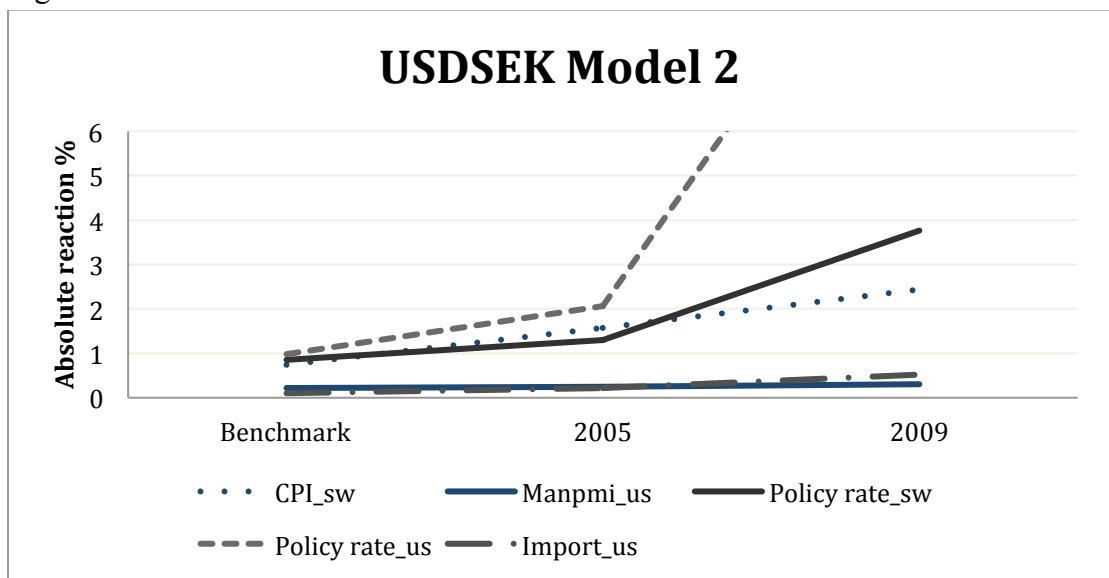
Figure 4 shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Figure 5.

GBPSEK Model 2

Figure 5 shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Figure 6.

EURSEK Model 2

Figure 6 shows the absolute reaction of those variables that has increased sensitivity from benchmark over 2005 and 2009 time period.

Table 12.

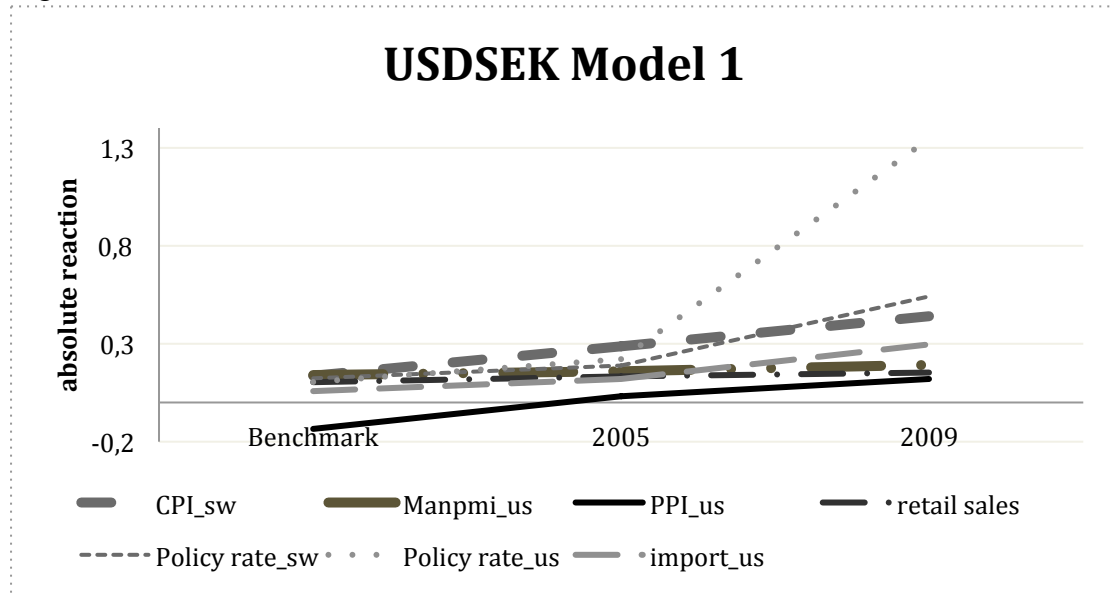| USDSEK	Model 1		
	Benchmark	2005	2009
CPI_sw	-0,1352***	-0,285***	-0,44***
	(0,052)	(0,0799)	(0,0998)
GDPY_sw	-0,3422***	-0,3606***	-0,3494***
	(0,1116)	(0,1172)	(0,1203)
industrial production_us	0,1018*	0,0981	0,0201
	(0,0589)	(0,0817)	(0,1096)
Man.PMI_sw	-0,301***	.-0,297***	-0,2726***
	(0,0815)	(0,0823)	(0,096)
Man.PMI_us	0,1416*	0,1603*	0,1934*
	(0,0854)	(0,092)	(0,1053)
Personal spend_us	0,0928*	-0,0415	0,0431
	(0,0451)	(0,0801)	(0,1081)
PPI_us	-0,1355**	0,0305	0,119
	(0,0625)	(0,0698)	(0,1178)
Retail sales_sw	-0,1029**	-0,1341***	-0,1521**
	(0,0483)	(0,0496)	(0,0678)
Service PMI_us	0,4425**	0,4502**	0,4184**
	(0,1818)	(0,1906)	(0,185)
Unemployment_us	-0,1007**	-0,0813	0,1146
	(0,052)	(0,0694)	(0,0833)
Policy rate_sw	-0,1233	-0,1886*	-0,5416***
	(0,0958)	(0,1117)	(0,1437)
Policy rate_us	0,1045	0,2224***	-1,343***
	(0,0796)	(0,0681)	(0,4109)
Import_us	0,0572	0,1209	0,2948***
	(0,0623)	(0,0833)	(0,0908)
R-squared	0,051088	0,075	0,12124
Adjusted R-squared	0,023049	0,022001	0,040522
S,E, of regression	0,007379	0,007989	0,008156
Breusch-Godfrey LM test	0,7866	0,6072	0,4709
Breusch-Pagan heterosc. test	0	0	0,0771

Regression result model 1 for exchange rate USDSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 13.

Model 1			
GBPSEK	Benchmark	2005	2009
Consumer conf._sw	-0,1767** (0,842)	-0,172** (0,0857)	-0,173** (0,0844)
CPI_sw	-0,0995** (0,0425)	-0,205*** (0,0557)	-0,25*** (0,0627)
CPI_uk	0,1774** (0,0893)	0,1981** (0,0951)	0,1966 (0,135)
GDPY_sw	-0,1276 (0,0809)	-0,298*** (0,101)	-0,308*** (0,105)
GDPY_uk	0,1437** (0,0504)	0,1676** (0,0682)	0,1595* (0,0868)
Industrial prod._uk	0,1279** (0,0551)	-0,085* (0,0495)	0,1218 (0,1079)
Man.PMI_sw	-0,173*** (0,0655)	-0,173*** (0,0665)	-0,279*** (0,0814)
PPI_sw	-0,1112** (0,05)	-0,1112** (0,0614)	-0,123 (0,0778)
Retail sales_sw	-0,1254*** (0,039)	-0,1254*** (0,0425)	-0,196*** (0,0579)
Retail sales_uk	0,1788* (0,0441)	0,1788*** (0,0547)	0,1985** (0,0776)
Service PMI_uk	0,2384*** (0,0885)	0,2384*** (0,0872)	0,2513*** (0,0852)
Unemployment_sw	0,2454*** (0,0764)	0,2454*** (0,0762)	0,2853** (0,0718)
Man.PMI_uk	0,1049 (0,0717)	0,1065 (0,0708)	0,1083* (0,0599)
Policy rate_sw	-0,0342 (0,0797)	-0,05 (0,1052)	-0,374** (0,1763)
R-squared	0,038648	0,060868	0,080658
Adjusted R-squared	0,02331	0,03217	0,03843
S,E, of regression	0,006296	0,006563	0,006912
Breusch-Godfrey LM test	0,8349	0,7187	0,1011
Breusch-Pagan heterosc. test	0,0394	0,5414	0,1851

Regression result model 1 for exchange rate GBPSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 14.

	Model 1		
EURSEK	Benchmark	2005	2009
	.-0,0916*	.-0,0873*	.-0,0896*
Consumer conf._sw	0,0481	0,0477	0,0475
	.-0,1199***	.-0,2531***	.-0,3797***
CPI_sw	0,038	0,0537	0,0699
	.-0,327***	.-0,3393***	.-0,3859***
GDPY_sw	0,0694	0,0757	0,0716
	.-0,0785*	-0,0795	-0,1078
Import_gr	0,0464	0,0503	0,0719
	.-0,1258***	.-0,1381***	.-0,1618***
Industrial prod._sw	0,0362	0,0385	0,0488
	0,0845*	0,086*	0,0975*
Man.PMI_gr	0,0473	0,0488	0,0516
	.-0,2437***	.-0,2412***	.-0,2925***
Man.PMI_sw	0,0521	0,0523	0,061
	.-0,26***	.-0,3126***	.-0,5726***
Policy rate_sw	0,0594	0,0815	0,129
	.-0,1211***	.-0,1434***	.-0,1874***
Retail sales_sw	0,0297	0,0328	0,0478
	-0,0295	.-0,0815*	.-0,1042*
Retail sales_gr	0,0288	0,045	0,0616
	0,1693***	0,1599***	0,1666***
Unemployment_sw	0,0519	0,0518	0,0634
	-0,0248	-0,0573	.-0,0865*
Trade_gr	0,0322	0,0422	0,0522
R-squared	0,054214	0,094134	0,129001
Adjusted R-squared	0,036465	0,063821	0,083414
S,E, of regression	0,004617	0,004538	0,004904
Breusch-Godfrey LM test	0,4041	0,2222	0,1536
Breusch-Pagan heterosc. test	0,0165	0,1178	0,9259

Regression result model 1 for exchange rate EURSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 15.

| | | Model 2 | |
USDSEK	Benchmark	2005	2009
CPI_sw	-0,74214***	-1,567313***	-2,443064***
	(0,285262)	(0,436862)	(0,542096)
Man.PMI_sw	-0,074878***	-0,073896***	-0,067775***
	(0,020263)	(0,020455)	(0,023871)
Man. PMI_us	0,218607***	0,246515*	0,297259*
	(0,131311)	(0,141305)	(0,161682)
Personal spend._us	0,537848**	-0,252794	0,245856
	(0,263336)	(0,465477)	(0,62924)
PPI_sw	-0,28394**	-0,271569	-0,256508
	(0,130995)	(0,16711)	(0,199144)
Retail sales_sw	-0,103957**	-0,135783***	-0,156182**
	(0,048652)	(0,049909)	(0,06836)
Service PMI_us	0,579436**	0,589376***	0,548381**
	(0,238144)	(0,249502)	(0,241896)
Unemployment_us	-0,735198**	-0,561094	-0,098091
	(0,358682)	(0,478594)	(0,600344)
GDPY_sw	-0,418739	-0,441587***	-0,42649***
	(0,136239)	(0,143088)	(0,146438)
Policy rate_sw	-0,853286	-1,294339*	-3,76515***
	(0,667835)	(0,784596)	(0,998019)
Policy rate_us	0,974827	2,066723***	12,21006***
	(0,741553)	(0,633757)	(3,845391)
Import_us	0,099308	0,2105	0,513663***
	(0,108422)	(0,144837)	(0,158204)
R-squared	0,050862	0,074462	0,120258
Adjusted R-squared	0,023543	0,022839	0,041664
S,E, of regression	0,007377	0,007985	0,008151
Breusch-Godfrey LM test	0,6832	0,6832	0,4708
Breusch-Pagan heterosc. test	0	0	0,072

Regression result model 2 for exchange rate USDSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 16.

| | Model 2 | | |
GBPSEK	Benchmark	2005	2009
Consumer conf._sw	-0,076875**	-0,075506**	-0,075937**
	(0,036564)	(0,037321)	(0,036738)
CPI_sw	-0,53**	-1,130221***	-1,377576***
	(0,234288)	(0,306634)	(0,344589)
CPI_uk	1,053935**	1,180642**	1,171809
	(0,530703)	(0,565717)	(0,803361)
GDPY_sw	-0,326466***	-0,370467***	-0,406914***
	(0,093741)	(0,094709)	(0,10771)
GDPY_uk	0,706635***	0,827481**	0,794619*
	(0,248408)	(0,334958)	(0,426152)
Industrial prod._uk	0,200694**	0,187283	0,19071
	(0,086657)	(0,139859)	(0,169911)
Industrial prod._sw	-0,031819	-0,0468*	-0,052458
	(0,027205)	(0,027787)	(0,032683)
Man.PMI_sw	-0,043845***	-0,042079**	-0,072114***
	(0,016356)	(0,016655)	(0,020335)
Man.PMI_uk	0,040806	0,041471	0,041892*
	(0,026748)	(0,026402)	(0,022578)
PPI_Sw	-0,243621**	-0,271027**	-0,273388*
	(0,104494)	(0,128812)	(0,164233)
Policy rate_sw	-0,273225	-0,348072	-2,600732**
	(0,5586)	(0,730338)	(1,224107)
Retail sales_sw	-0,135199***	-0,164502***	-0,214318***
	(0,038831)	(0,042765)	(0,057975)
Retail sales_uk	0,255997***	0,220447***	0,28112**
	(0,062888)	(0,077939)	(0,110513)
Service PMI_uk	0,087337***	0,0856***	0,091934***
	(0,032116)	(0,032336)	(0,031889)
Unemployment_sw	0,891757***	0,841296***	1,029697***
	(0,277056)	(0,276923)	(0,260289)
R-squared	0,0391	0,061911	0,082253
Adjusted R-squared	0,023769	0,033244	0,040098
S,E, of regression	0,006295	0,006559	0,006906
Breusch-Godfrey LM test	0,9007	0,8116	0,1325
Breusch-Pagan heterosc. test	0,0376	0,5424	0,1574

Regression result model 2 for exchange rate GBPSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 17.

EURSEK	Benchmark	2005	2009
	Model 2		
Consumer conf._sw	-0,03981*	-0,03683*	-0,03832*
	(0,020883)	(0,021123)	(0,020855)
CPI_sw	-0,65766***	-1,38009***	-2,06598***
	(0,208385)	(0,293555)	(0,385417)
GDPY_sw	-0,39978***	-0,41672	-0,47707***
	(0,084481)	(0,088526)	(0,082379)
Import_gr	-0,02536*	-0,02592	-0,03323
	(0,01497)	(0,016217)	(0,022771)
Industrial prod._sw	-0,07059***	-0,07676***	-0,09061***
	(0,020344)	(0,021524)	(0,027311)
Man.PMI_gr	0,144764*	0,147789*	0,165242*
	(0,08101)	(0,085031)	(0,089717)
Man.PMI_sw	-0,06067***	-0,05994***	-0,07361***
	(0,012981)	(0,012719)	(0,014982)
Policy rate_sw	-1,80664***	-2,17973***	-3,91653***
	(0,412929)	(0,540184)	(0,897325)
Retail sales_gr	-0,01623	-0,04495*	-0,06004*
	(0,015873)	(0,024652)	(0,033814)
Retail sales_sw	-0,12198***	-0,14159***	-0,19097***
	(0,029919)	(0,033346)	(0,04833)
Unemplyment_sw	0,617075***	0,588317***	0,627995***
	(0,189351)	(0,188277)	(0,233074)
R-squared	0,054214	0,098073	0,133074
Adjusted R-squared	0,036465	0,066907	0,085664
S,E, of regression	0,004617	0,004531	0,004898
Breusch-Godfrey LM test	0,4041	0,4984	0,0633
Breusch-Pagan heterosc. test	0,0165	0,0342	0,3963

Regression result model 2 for exchange rate EURSEK including benchmark and the divided time periods. Displays only the macroeconomic announcements that have a significant impact in at least one time period.

Robust standard errors in parenthesis. P-values: *** = 1 %, ** = 5 %, * = 10 %.

Table 18.

| | Model 1 | | |
USDSEK	Benchmark	2005	2009
CPI_sw	1,550295	1,805587	1,959635
GDPY_sw	1,647414	2,04452	3,239829
industrial production_us	3,713769	2,100892	2,211353
Man.PMI_sw	2,174805	2,481508	2,807549
Man.PMI_us	1,699964	1,885032	2,278048
Personal spend_us	1,639963	2,147468	2,81533
PPI_us	1,82878	2,017139	2,652672
Retail sales_sw	1,505603	1,636675	2,762831
Service PMI_us	1,36251	2,426088	1,594301
Unemployment_us	1,435622	1,748747	2,545895
Policy rate_sw	4,127926	4,630743	3,134724
Policy rate_us	2,662362	3,971265	3,410463
Import_us	1,834415	2,30102	1,688217

Table 18. Variance Inflation Factor test for model 1 in USDSEK estimation.

Table 19.

| | Model 2 | | |
USDSEK	Benchmark	2005	2009
CPI_sw	1,550295	1,805587	1,805587
Man.PMI_sw	2,174805	2,481508	2,481508
Man. PMI_us	1,699964	1,885032	1,885032
Personal spend._us	1,639963	2,147468	2,147468
PPI_sw	1,82878	2,274942	2,274942
Retail sales_sw	1,505603	1,636675	1,636675
Service PMI_us	1,36251	1,375798	1,375798
Unemployment_us	1,435622	1,748747	2,065512
GDPY_sw	1,647414	2,04452	2,04452
Policy rate_sw	4,127926	4,630743	4,630743
Policy rate_us	2,662362	3,971265	3,971265
Import_us	1,834415	2,30102	2,30102

Table 19. Variance Inflation Factor test for model 2 in USDSEK estimation.

Table 20.

	Model 1		
GBPSEK	Benchmark	2005	2009
Consumer conf._sw	1,290102	1,284204	1,322173
CPI_sw	1,140465	1,284697	1,256135
CPI_uk	1,940373	2,035027	2,288099
GDPY_sw	1,271354	1,345185	1,559595
GDPY_uk	1,427751	1,574729	1,705968
Industrial prod._uk	1,586057	2,178274	2,234464
Man.PMI_sw	1,48583	1,555322	1,99869
PPI_sw	1,229709	1,265747	1,51843
Retail sales_sw	1,247706	1,293184	1,776974
Retail sales_uk	1,660688	1,78448	2,232549
Service PMI_uk	1,432265	1,431952	1,5858
Unemployment_sw	1,397823	1,403035	1,172459
Man.PMI_uk	1,472514	1,475798	1,627033
Policy rate_sw	1,888805	2,311833	1,867263

Table 20. Variance Inflation Factor test for model 1 in GBPSEK estimation.

Table 21.

	Model 2		
GBPSEK	Benchmark	2005	2009
Consumer conf._sw	1,290102	1,284204	1,322173
CPI_sw	1,140465	1,284697	1,256135
CPI_uk	1,940373	2,035027	2,288099
GDPY_sw	1,271354	1,345185	1,559595
GDPY_uk	1,427751	1,574729	1,705968
Industrial prod._uk	1,586057	2,178274	2,234464
Industrial prod._sw	1,236097	1,323996	1,375833
Man.PMI_sw	1,48583	1,555322	1,99869
Man.PMI_uk	1,472514	1,475798	1,627033
PPI_Sw	1,229709	1,265747	1,51843
Policy rate_sw	1,888805	2,311833	1,867263
Retail sales_sw	1,247706	1,293184	1,776974
Retail sales_uk	1,660688	1,78448	2,232549
Service PMI_uk	1,432265	1,431952	1,5858
Unemployment_sw	1,397823	1,403035	1,172459

Table 21. Variance Inflation Factor test for model 2 in GBPSEK estimation.

Table 22.

| | Model 1 | | |
EURSEK	Benchmark	2005	2009
Consumer conf._sw	1,220723	1,27841	1,324512
CPI_sw	1,300678	1,549695	1,611713
GDPY_sw	1,778231	1,815413	2,139602
Import_gr	1,579488	1,658139	2,082527
Industrial prod._sw	1,380337	1,732538	1,787177
Man.PMI_gr	1,734098	1,816077	1,864874
Man.PMI_sw	1,785538	1,825327	1,878504
Policy rate_sw	2,883994	4,323172	3,565545
Retail sales_sw	1,674432	1,754408	2,28178
Retail sales_gr	1,395013	1,594585	2,004269
Unemployment_sw	1,29763	1,33078	1,41379
Trade_gr	1,571395	1,770758	2,122854

Table 22. Variance Inflation Factor test for model 1 in EURSEK estimation.

Table 23.

| | Model 2 | | |
EURSEK	Benchmark	2005	2009
Consumer conf._sw	1,220723	1,27841	1,324512
CPI_sw	1,300678	1,549695	1,611713
GDPY_sw	1,778231	1,815413	2,139602
Import_gr	1,579488	1,732538	2,082527
Industrial prod._sw	1,38697	1,456524	1,787177
Man.PMI_gr	1,734098	1,816077	1,864874
Man.PMI_sw	1,785538	1,825327	1,878504
Policy rate_sw	2,883994	4,323172	4,116976
Retail sales_gr	1,395013	1,594585	2,004269
Retail sales_sw	1,674432	1,754408	2,28178
Unemplyment_sw	1,29763	1,33078	1,41379

Table 23. Variance Inflation Factor test for model 2 in EURSEK estimation.