# 5. THE IMPACT OF TRADE ANNOUNCEMENTS ON FINANCIAL MARKETS. AN EVENT STUDY ANALYSIS

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## Abstract

*The financial markets tend to react to a large range of macroeconomic events. We investigate the reaction of currencies to foreign trade announcements for a series of countries with liquid financial markets. Our analysis uses the econometric event study methodology by fitting a FIGARCH model and capturing the reaction of the volatilities of returns around these announcements. We find that the trade announcements have a considerable influence on the currencies considered in this analysis, especially on those with a high degree of liquidity.*

**Keywords:** trade announcements, FIGARCH, event study, financial reaction, periodicity ajustments

**JEL Classification:**G14, G15, E44, C58, F14

## I. Introduction

One of the key conclusions of the modern finance theory is the fact that the advent of new information directly affects asset prices. This led to the formation of a new and rich literature which studies the effects of information on various financial elements such as currencies, equities, bonds and derivatives.

The most consistent block of this literature focuses on the impact generated by macroeconomic announcements on the above-mentioned assets, though there are relevant contributions regarding the impact inducedby other types of information such as earnings announcements (Lu and Wei, 2013) or simply events reported by the media (Engelberg and Parsons, 2011).

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The main purpose of this paper is to highlight the reaction of a series of currencies to foreign trade announcement for several countries which have very liquid financial markets. From a methodological standpoint, our approach is based on an econometric event study that employs a FIGARCH model in order to observe the dynamics of the volatilities of returns around the chosen announcements.

The present study adds to the existing literature in several ways. Firstly, the paper focuses on trade announcements, which represent a topic that has been neglected until present. Secondly, we use a consistent set of events (472 independent cases) that covers various types of announcements and study their effects on 16 financial markets (South Korea, China, Australia, Singapore, India, Sweden, Hungary, Italy, France, Germany, European Countries (aggregate), United Kingdom, Brazil, Poland, United States and Mexico). Thirdly, we employ high frequency data (5 – minute frequency) and adapt the modelling formulation in order to account for periodicity effects.

The remainder of the paper is organized as follows. Section II focuses on the academic literature discussing the relationship between economic news and financial markets, and more specifically the connection between macroeconomic events and currency markets. Section III presents the data and a discussion on the methodological issues. Section IV is dedicated to the presentation of the results, while Section V concludes.

## II. Literature Review

As stated above, the effects of macroeconomic news have been the subject of a substantial wave of academic research that covered a wide set of financial elements. For example, Schwert (1981), Pearce and Roley (1985), Bomfim (2003), Norbert and Matsuda (2006), Rangel (2011) or Rühl and Stein (2014) investigate various implications of macroeconomic announcements on the evolution of equity markets.

The response of bond markets to macroeconomic news has also been scrutinized in a large number of studies among which we mention Ulrich and Wachtel (1981), Fleming and Remolona (1999) and recent contributions by Andritzky *et al*. (2007).

Albu *et al*. (2014a) and Albu *et al*. (2014b) use event study in order to investigate the influence of quantitative easing initiatives on sovereign credit default swaps. Both the analyses produce results that show that the announcements related to these policies have an influence on the dynamics of CDS returns.

Currency reactions to economic phenomena were also given important academic attention in seminal papers that generally used daily frequencies: Ito and Roley (1987), Hardouvelis (1988), or Hogan and Melvin (1994).

From the perspective of our study, key contributions were made by Tanner (1997) and Almeida *et al*. (1998). Although reporting conflicting results about the influence of macroeconomic variables on currencies, these studies incorporate high frequency data.

Albu, Lupu and Călin (2014) put forward an approach that extends a methodology used in the analysis of convergence to a modelling context that allows the investigation of the links between macroeconomic fundamentals and market capitalization.

Lupu and Călin (2014) focus on the association between macroeconomic growth and the dynamics of equity markets for the CEE countries. The research finds a weak

dependence but also indicates concluded linkages for countries such as Slovenia and Latvia.

Anderson *et al*. (2002) conduct an extensive and powerful analysis of the impact of macroeconomic announcements on exchange rates and observe significant news effects and asymmetric response patterns (that is, generally the bad news have a higher influence than the good news).

Fair (2003) uses intradaily data on a large period (1982-2000) in order to demonstrate that the macroeconomic events chosen have an important effect on the US stock and bond markets and on the evolution of a series of currencies (German mark, yen and sterling pound).

In a very interesting approach, Simpson *et al*. (2005) observe the effects of 23 types of announcement on exchange rates and forward premium. The authors find that the exchange rates are influenced by events linked to consumer demand, inflation and internet but aren't sensitive to news on the general state of the economy.

While studying the behaviour of several exchange rates and zero coupon interest rates, Faust *et al*. (2007) observe that various macroeconomic announcements lower risk premium for holding foreign currency.

Evans and Speight (2010) use 5-minute returns for EUR-USD, EUR-GBP and EUR-JPY exchange rates in order to study the reaction of the volatility of euro returns to a set of macroeconomic announcements. The authors use a periodicity adjusted model following the logic of Andersen and Bollerslev (1998) and find that macroeconomic news from the US induces the majority of reactions in volatility.

Discussing the reaction of the JPY-USD exchange rate to Japanese macroeconomic news, Hasimoto and Ito (2010) observe that the issued GDP forecast influences profoundly the exchange rate returns. Other elements with important effects are: business surveys conducted by the BOJ, price indices like CPI and PPI while the trade balance announcements had an insignificant impact. In a study that also focuses on the Japanese macroeconomic announcements, Fatum *et al*. (2012) consider the asymmetric response of the JPY-USD exchange rate with 5 minute frequencies. The paper focuses on the 1999-2006 period, characterized by zero interest rates. Using a model based on a linear function of the lagged values of the returns and lags for the news variables, the author prove their asymmetry hypothesis.

Călin (2015) targets the possible connection between volatility and economic growth, for a set of ten European states. Using a GARCH approach and the MIDAS-ADL model, the author reports a significant and relevant connection between the two studied variables in the case of Germany.

## III. Data and Methodology

The methodology gravitates towards an econometric event study approach. For this purpose we use a FIGARCH (1, 1) model. The FIGARCH model was developed by Baillie *et al*. (1996)and it was built as a mixture between an intergrated fractionary model

and a GARCH[2] process for the conditional dependence. Its tractability lies in the fact that it is able to capture the temporal dependence of volatility.

The general specification of the FIGARCH model is:

$$R_t = \mu_t + \epsilon_t$$

$$\sigma_t^2 = \omega + \left(1 - \beta L - \phi L(1-L)^d\right)\epsilon_t^2 + \beta\sigma_{t-1}^2$$

Where L is estimated from a model with the following representation:

$$\sigma_t^2 = \omega + \sum(\lambda_i \epsilon_{t-1}^2)$$

$\lambda_i$ is a function with $\phi$ and $\beta$ parameters and $\epsilon_t = \sigma_t e_t$, $e_t \sim N(0,1)$.

We use 5-min intervals in which we compute log-returns on the assets covered by our study. The use of volatility models for five-minute returns (and generally at the intra-day frequency) proved to be influenced by the fact that these returns show common volatility dynamics, which are identified in the literature as periodicity. These features are not captured by the regular GARCH-family of models (which are best applied to the daily frequency). Andersen and Bollerslev (1997) and (1998) raised the issue of volatility modelling for the intra-day returns. In this view, in order to apply the correct volatility model to the dynamics of these returns, we use the methodology developed by Boudt, Croux and Laurent (2011) for the adjustment of the five-minute returns with these periodic patterns. Therefore, in our approach, the FIGARCH model is applied to periodicity-adjusted returns, so that our results are not influenced by the common volatility changes during one day, but by the irregular changes possibly determined by the events we are analysing. Once the periodicity is computed and the adjustment is done, we use 500 periods before each event for the calibration of the FIGARCH model.

We calculate the difference between squared returns (as a measure of local variance) for each of these 500 moments and compare these squared returns with the estimated variance (from the FIGARCH model), and then we determine the average value of these differences $\sigma_s^2$. The next step implies building a forecast for the variances in the 25 intervals following the event (25 x 5 minutes= 2 hours and 5 minutes). We now compute the distance between the squared returns in this period (after the event) and the forecast variance in the same interval. If the squared return is greater than $2\sigma_s^2$, then that particular moment is considered significant. We thus count the number of significant moments after each event and then compute an average of the impact of the volatility for the significant moment.

As input data, we use a series of trade announcements as events, and a series of exchange rate prices. The announcements (471 cases) have been collected from the *Trading economics* Platform. They cover the same calendaristic period as the exchange rates. For example, some key events considered in this analysis are the announcements of elements such as: *"Exports YoY"*, *"Imports YoY"*, or *"Trade Balance"*.

[2]For a discussion on GARCH modeling see, for example, Călin *et al*. (2014) or Lupu and Lupu (2007).

Obviously, one trade related event can impact a wide range of currencies pairs. Table 1 presents the number of announcements that are associated to each of the 16 countries included in this investigation.

As mentioned above, for the exchange rates we consider a 5 – minute frequency. The data cover the 1 February 2014 – 30 June 2014 interval and have been collected from the *Datastream* platform. The currency pairs used in this study are the following: EUR/USD, USD/SEK, USD/KRW, AUD/USD, EUR/AUD, EUR/BRL, EUR/SEK, EUR/CNH, USD/BRL, EUR/INR, USD/SGD, USD/PLN, EUR/RUB, EUR/ILS, EUR/HUF, USD/ZAR, USD/NOK, USD/TRY, USD/INR, EUR/MXN, GBP/USD, EUR/GBP, EUR/PLN, EUR/ZAR, EUR/NOK, EUR/JPY, EUR/CHF, EUR/NZD, EUR/TRY, EUR/CAD, USD/CNH, USD/RUB, KRW/JPY, USD/HUF, USD/MXN, USD/ILS, USD/CAD, USD/JPY, NZD/USD, USD/CHF, SGD/JPY.

**Table 1**

**Number of events relative to each country in the analysis**

| Country Code | *Number of events* |
|---|---|
| AU | ***24*** |
| BZ | ***10*** |
| CH | ***12*** |
| EC | ***38*** |
| FR | ***57*** |
| GE | ***57*** |
| HU | ***6*** |
| IN | ***6*** |
| IT | ***76*** |
| MX | ***4*** |
| PD | ***2*** |
| SI | ***12*** |
| SK | ***24*** |
| SW | ***18*** |
| UK | ***2*** |
| US | ***123*** |

Source: Author's calculations

All the computations described in this section have been conducted in *Matlab*.

## IV. Results

Table 2 presents the reactions of the main currency pairs to the events that cover the publication of international trade figures, sorted by their impact strength. We notice that the most important reactions are recorded for the currencies that have the highest liquidity. The currencies are presented in this table according to their reactions in terms of volatility, from the highest to the lowest impact. The values show the percentage of

the volatility impact of each currency out of the sum of all the impacts, computed across abnormal standard deviations around events, as explained in the previous section. We have therefore a ranking of the impacts on volatility for these events when all the currencies were taken into account.

**Table 2**

**The reaction of currencies to international trade related events in terms of volatility changes**

| Currency | Market Reaction | Currency | Market Reaction |
|---|---|---|---|
| EUR/USD | **4.69%** | EUR/GBP | **2.49%** |
| USD/SEK | **4.04%** | EUR/PLN | **2.43%** |
| USD/KRW | **4.03%** | EUR/ZAR | **2.34%** |
| AUD/USD | **3.96%** | EUR/NOK | **2.34%** |
| EUR/AUD | **3.96%** | EUR/JPY | **2.34%** |
| EUR/BRL | **3.94%** | EUR/CHF | **2.33%** |
| EUR/SEK | **3.62%** | EUR/NZD | **2.33%** |
| EUR/CNH | **3.34%** | EUR/TRY | **2.33%** |
| USD/BRL | **3.15%** | EUR/CAD | **2.33%** |
| EUR/INR | **3.14%** | USD/CNH | **1.73%** |
| USD/SGD | **2.90%** | USD/RUB | **1.60%** |
| USD/PLN | **2.85%** | KRW/JPY | **1.29%** |
| EUR/RUB | **2.85%** | USD/HUF | **1.15%** |
| EUR/ILS | **2.83%** | USD/MXN | **1.00%** |
| EUR/HUF | **2.75%** | USD/ILS | **0.75%** |
| USD/ZAR | **2.75%** | USD/CAD | **0.74%** |
| USD/NOK | **2.74%** | USD/JPY | **0.73%** |
| USD/TRY | **2.74%** | NZD/USD | **0.72%** |
| USD/INR | **2.73%** | USD/CHF | **0.72%** |
| EUR/MXN | **2.62%** | SGD/JPY | **0.16%** |
| GBP/USD | **2.51%** | | |

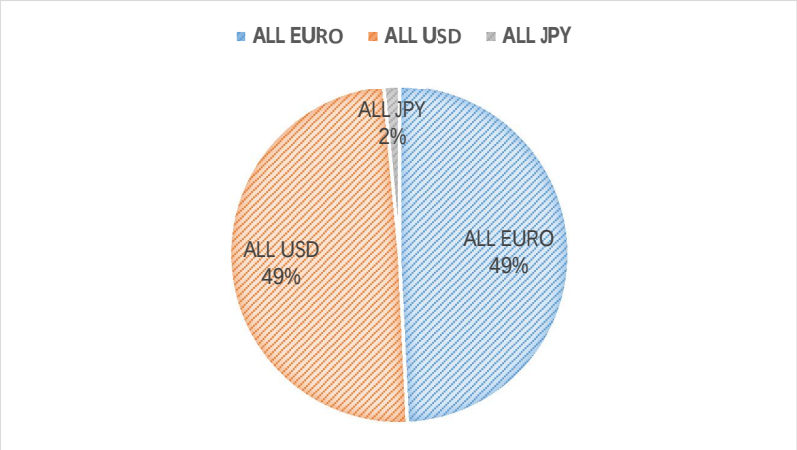
Source: Author's calculations

The set of currencies that exhibited volatility impacts around these events are largely concentrated on the main currencies, i.e. EUR and USD, and in a very small amount to the JPY. Figure 1 shows the proportions of the impact of the studied event announcements for three of the fundamental currencies evolved in our analysis (EURO, USD and JPY).

As far as the events are concerned, we notice that the larger impact is generated by issuance of macroeconomic indicators related to Trade Balance, followed by Imports and Exports-related figures. The least impact on the volatilities of currencies is related to events that disclose data about the Trade Balance with a monthly frequency and Current Account Balance.

**Figure 1**

**Impact on Volatilities of Currencies as Weights Across Major Currencies (EURO, USD and JPY)**

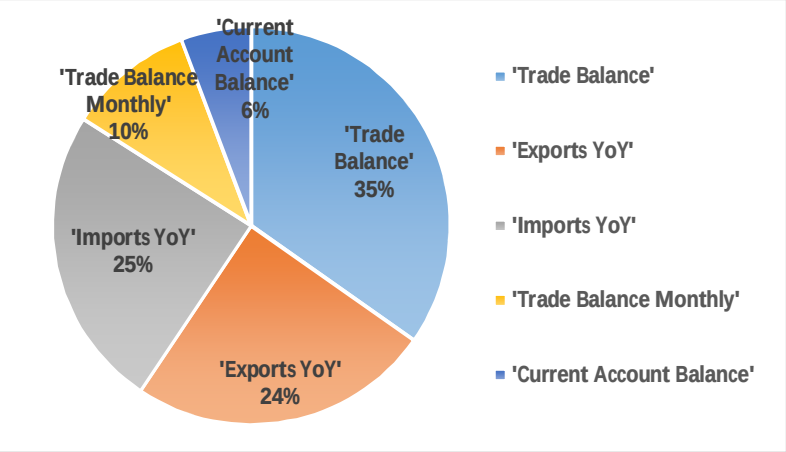



Source: Authors' computation.

Figure 2 summarizes the impact brought by the announcements considering six major categories of events: Trade Balance-related events, Trade Balance with monthlyfrequency, Exports, Imports and events that are specific to the Current Account Balance.

**Figure 2**

**Weight of Impact across Events**




Source: Authors' computation.

In Table 3 we show also the impact of events taking into account the disclosure of Trade Balance, Exports, Imports and Current Account Balance figures for all the analysis. We notice that the most important reaction in the currencies is attributed to the Trade Balance announcements.

**Table 3**

**Weighted Impact across Each Event and Currencies**

| | | |
|---|---|---|
| **Trade Balance** | | |
| | **USD/KRW** | **25.67** |
| | **KRW/JPY** | **19.81** |
| | **EUR/BRL** | **9.53** |
| | **USD/BRL** | **9.45** |
| **Exports YoY** | | |
| | **USD/KRW** | **25.67** |
| | **KRW/JPY** | **19.99** |
| **Imports YoY** | | |
| | **USD/KRW** | **25.67** |
| | **KRW/JPY** | **19.99** |
| **Trade Balance Monthly** | | |
| | **EUR/BRL** | **9.53** |
| | **USD/BRL** | **9.45** |
| **Current Account Balance** | | |
| | **USD/PLN** | **5.33** |
| | **EUR/PLN** | **5.33** |

Source: Authors' calculations.

Other interesting results derive from analysing the impact of the selected events at country levels. For example, in the case of the US the greatest impact is produced by the announcements related to the Bloomberg Consumer Comfort Index. The index measures the perception of the American society regarding three major variables: the current state of the economy, the level of personal finance and whether the economic environment represents a profitable context for trade-related operations. For South Korea, the results indicate that the KRE is mostly influenced by the export-related events and by those related to the trade balance. A similar situation is observed for the pairs containing the Brazilian real. In addition to this, the Brazilian pairs also strongly react to the monthly announcements about the trade balance. The events that cause the greatest impact on the Australian Dollar are associated to the announcements specific to the Australian commodity index, while for the Polish currency the most visible effects are generated by the current account balance events.

## V. Conclusions

In this paper we focused on a large series of trade related announcements in order to investigate their influence on a set of currencies. This approach aims to answer the

existing research question that seeks to determine if there are linkages between macroeconomic phenomena and the evolution of financial assets.

We observe that the events considered in the analysis affect in a considerable manner the evolution of currency pairs involved in the study. The conclusions are being built on two types of approaches: the first aims to determine what currencies react to the macroeconomic news, while the second focuses on what types of announcements that generate the most significant impact.

The results hint to the fact that the most important reactions are recorded for the currencies that have the highest liquidity.

The greatest market reaction is discovered for the following currency pairs: *EUR – USD*, *USD - SEK*, *USD - KRW*, *AUD - USD* and *EUR – AUD*. Besides this fact, in general, the set of currencies that manifested important volatility impacts around the events are largely concentrated around the main currencies (EUR, USD and in some cases JPY).

When discussing the nature of the events, we notice the fact that the largest impact is induced by the announcement of macroeconomic indicators specific to the Trade Balance, followed by the news regarding the evolution of Imports and Exports.

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