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Alexis Stenfors, Portsmouth Business School

Masayuki Susai, Nagasaki University

Portsmouth Business School
http://www.port.ac.uk/portsmouth-business-school/

Algorithmic Trading Behaviour and High-Frequency Liquidity Withdrawal in the FX Spot Market

Alexis Stenfors[**] and Masayuki Susai[*]

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Abstract

This paper studies the frequency and speed of limit order cancellations in the FX spot market for EUR/USD, USD/JPY and EUR/JPY. By investigating both 'market-specific' and 'order-specific' drivers of liquidity withdrawal, we report several findings that could serve to question traditional market microstructure theory as well as conventional anecdotes from financial market participants. Overall, it appears as if limit orders with characteristics more likely to be submitted by algorithmic traders are perceived to be more informed or predatory than orders submitted human traders - thus acting to trigger more, and faster, limit order cancellations.

JEL Classification Numbers: D4, F3

Keywords: market microstructure, limit order book, foreign exchange, high-frequency trading

[**]Alexis Stenfors (corresponding author), Portsmouth Business School, University of Portsmouth, Richmond Building, Portland Street, Portsmouth PO1 3DE, UK. Telephone: +44 (0)23 9284 4183. E-mail: alexis.stenfors@port.ac.uk

[*]Masayuki Susai, Nagasaki University, 4-2-1, Katafuchi, Nagasaki, 850-8506 Japan. E-mail: msusai@nagasaki-u.ac.jp

1. Introduction

Algorithmic trading makes up an increasingly large share of the $5.1 trillion-a-day turnover in the global foreign exchange (FX) market. Although no precise figures are available, it is estimated that around 25% of the FX spot market is done by algorithmic traders (King and Rime, 2010). With this development in mind, the aim of this paper is to study liquidity withdrawal in the FX spot market for the three most actively traded currency pairs in the world: EUR/USD, USD/JPY and EUR/JPY. More specifically, it investigates the underlying drivers of the frequency and speed of limit order cancellations.

Whereas proponents of algorithmic trading generally highlight benefits in terms of efficiency, competition, liquidity and hence lower transaction costs and an enhanced price discovery process (see, for instance, Bershova and Rakhlin, 2013; Broogard et al., 2014; Conrad et al., 2015; Stoll, 2014), the development is not without controversy. Some critics point out that algorithmic traders, and high-frequency traders in particular, by being able to react and anticipate order flow faster, ultimately 'crowd out' the liquidity traditionally provided by human traders at market making banks. At the worst, algorithmic traders could engage in market manipulative practices (such as spoofing and layering), which would be harmful to investors and reduce the quality of the market. Spoofing involves, after all, a submission *as well as* a cancellation of a limit order with the intent to mislead the market.

Although the vast majority of the research so far has been conducted on stock markets, empirical studies and surveys suggest that algorithmic trading in the FX markets has resulted in similar outcomes as in other financial markets: tighter bid-ask spreads, higher turnover, a larger number of (small) orders and a reduction in the average life-time of orders (BIS, 2011; Susai and Yoshida, 2015; Yeo, 2005). Overall, it appears as if algorithmic traders have contributed to better market liquidity in a range of markets, at least during periods of stability. However, by reacting very fast to new information, including to new orders submitted *by others*, markets largely populated with algorithmic traders have also become susceptible to a withdrawal of liquidity at an unprecedented speed and scale (Fong and Liu, 2010; Foucault et al., 2005). Indeed, as Rime (2011) and numerous market participants point out, better

market liquidity has had a tendency to be accompanied by an 'illusion of liquidity' or a 'liquidity mirage'.

Furthermore, given that the FX market, in contrast to the stock market, is over-the-counter (OTC), largely unregulated and free from circuit breakers, it could be argued that it is more prone to systemic risks. In this respect, liquidity withdrawal could act as an 'amplifying mechanism' (BIS, 2017) and, due to the inherently international nature of the FX market, have a more devastating impact on the global financial system (BIS, 2011; Harris, 2013). With central banks increasingly resorting to electronic trading platforms such as the Electronic Broking System (EBS) for currency interventions (Vitale, 2006), the traditional trading relationship between central banks and banks is rapidly changing. Thus, this paper aims to contribute not only to the literature on FX market microstructure, which, due to lack of data, hitherto has featured a relatively limited number of contributions on algorithm trading and high-frequency trading but also add to the on-going debate on currency interventions and the effective regulation of OTC markets.

Having gained access to high-frequency dataset provided by EBS (the most widely used electronic trading platform among market-making banks) from 9-13 September 2011, the purpose of this paper is to empirically investigate the withdrawal of liquidity from the FX spot market. Although the share of algorithmic trading on EBS rose from 2% in 2004 to around 50% in 2010, anecdotal evidence and surveys among banks suggest that the change has been most visible among the major currency pairs. Whereas medium-sized currency pairs also have seen an influx of algorithm trading in recent years, the vast majority of the small currencies are still reliant on the market making function provided by human traders at banks (King and Rime, 2010; BIS, 2011).

Studying both 'market-specific' and 'order-specific' variables as potential causes for the speed and frequency of limit order cancellations, we report several findings that could serve to question traditional market microstructure theory as well as conventional anecdotes from financial market participants. For instance, orders submitted from the opposite side have a tendency to trigger more order cancellations than orders submitted from the same side only if they are larger than the standard size

of 1 million - or if a slightly longer time window is used. In the extremely short term (before human traders have time to react), orders submitted from the opposite side have a tendency to trigger *fewer* order cancellations than orders from the same side. We also find that large and very large limit orders trigger an increase in the speed and frequency of order cancellation only if they are submitted at very aggressive prices. Moreover, medium-sized orders seem to trigger fewer order cancellations than small orders regardless of whether are submitted at aggressive prices or not. It generally appears as if limit orders with characteristics more likely to be submitted by human traders are perceived to be less 'predatory' (unless they are very large *and* aggressive) than orders submitted by algorithmic traders.

The paper is structured as follows. Section 2 provides a brief overview of the related literature. Section 3 describes the data used. Section 4 outlines the model and the empirical results are discussed in Section 5. Following the results using the base model, the results using an extended model is discussed in Section 6. Section 7 concludes.

2. Related Literature

The market microstructure literature on order cancellations, or liquidity withdrawal more generally, is surprisingly thin. To some degree, this can be logically explained. A cancellation or a withdrawal implies, per definition, that a trade has not been done. Why, then, study decisions surrounding 'inaction' in financial markets? However, the topic is by no means new among financial market participants. A new limit order submission does not only involve the choice of price and amount, but also a assessment of state of the market - including the market *reaction* to the limit order submitted. A possible reaction is, naturally, an almost withdrawal of liquidity by others (i.e. a string of limit order cancellations). Likewise, a trader having submitted a limit order not only watches the overall state of the market in relation to that particular order, but might also react to changes in the order book by cancelling and, perhaps, resubmitting the limit order.

However, the dynamics of limit order books is not only of relevance to market participants. It is also of interest to central bankers and regulators and has arguably become more urgent following the rise of algorithmic (and high-frequency) trading. A flash crash, for instance, is not only associated with sudden and violent price moves but also by a rapid disappearance of liquidity, permitting or triggering transactions to take place at prices outside a trading range that would otherwise be considered as 'normal'. The Flash Crash of 2010 or the Pound Flash Crash in October 2016 is, of course, extreme examples. However, an unexpected event in the form of a surprise central bank announcement or intervention may also lead to a sudden withdrawal of liquidity.[1] Typically, the impact of such events on the market liquidity tends to be temporary. However, if market makers become less confident in their ability to not only supply but also demand instant liquidity, overall market quality may suffer in the long run. As order cancellations, regardless of their underlying causes, affect market liquidity (or the perception of it), the issue of liquidity withdrawal is of particular importance in OTC markets such as FX, which rely on voluntary market making – a function traditionally performed by commercial banks, but increasingly populated by high-frequency traders.

Although the important role of order flow for exchange rate determination is well established in the literature (see, for instance, Lyons, 1997; Evans and Lyons, 2002; Bjønnes et al., 2005), the role of limit order cancellations remains an under-research topic not only in FX markets, but also in other liquid financial markets. In fact, traditional theoretical market microstructure models saw limit orders largely as passive trading strategies, whereby informed traders, instead, resorted to market orders (Glosten, 1994; Seppi, 1997). Hence, it could be argued that the withdrawal of liquidity among non-informed and passive traders would add minimal insight into the dynamics of exchange rates or market microstructure theory more generally. More recently, however, theoretical models have accounted for the ability of traders to choose between market orders and limit orders (Foucault, 1999; Parlour, 1998; Rosu, 2009). Seen from this perspective, traders are seen to actively consider whether to submit a market order or a limit order (which may, or may not, be executed). Even though a limit order submitted below [above] the prevailing best bid [ask] price in the

[1] For a good summary of recent events involving sharp intraday moves in the FX market, see BIS

market might be executed in due course (and hence turn out to be more advantageous than a market order), the strategy also contains risks. First, unless it becomes the best quote in the market, there is a risk that it might not be executed at all (Hasbrouck and Saar, 2002; Liu, 2009). This 'non-execution risk' might sometimes induce traders to cancel and resubmit their limit orders closer to the prevailing best bid-ask spread – thereby increasing the probability of being hit by a market order. For instance, Fong and Liu (2010) find that larger and more aggressive limit orders on the Australian Securities Exchange are more likely to be revised or cancelled. Second, a limit order also contains 'free-option risk', i.e. the risk of being picked off by a trader with private information (Copeland and Galai, 1983). Thus, limit orders are associated with monitoring costs, as traders are constantly required to check the 'pulse' of the market in relation to the submitted limit orders (Fong and Liu, 2010; Liu, 2009).

Limit orders have been found not only to have become more prevalent in liquid financial markets but often become preferred as an active trading strategy (Foucault, 1999; Foucault et al., 2005; Rosu, 2009; Yeo, 2005). Indeed, more sophisticated technology and the rise of algorithmic trading has led to a dramatic increase in the number and proportion of limit order submissions. This development has been well documented, for instance on the Paris Bourse (Biais et al., 1995), on NYSE (Harris and Hasbrouck, 1996; Yeo, 2005), the Stockholm Stock Exchange (Hollifield et al., 2004) and on the Island ECN (Hasbrouck and Saar, 2002). Overall, it has resulted in a higher number and proportion of limit order cancellations and revisions, and a shortening of the lifetime of limit orders (see, for instance, Susai and Yoshida, 2014). It is no surprise that events involving violent and sudden price moves have been observed in financial markets increasingly dominated by electronic trading platforms. Trading algorithms cannot only be used to submit market and limit orders more frequently and more rapidly. They can also be used to *withdraw* limit orders more frequently and more rapidly. Thus, whereas the rise of algorithmic trading can be seen through the lens of limit order submissions (which has contributed to the increased liquidity provision in a range of financial markets), the opposite perspective can also be used.

Our study, which puts the emphasis on the frequency and speed of limit order cancellations, is, as far we are aware, the first of its kind. Moreover, the approach

differs significantly from previous studies on order cancellations and revisions. By focusing on the cumulative number of order cancellations within different time windows following each new limit order submission, we strive to capture the 'dual' nature of order cancelling behaviour. On the one hand, liquidity withdrawal may depend on a series of 'market-specific' variables that are independent of the order submission serving as the starting point for the calculation. We account for these factors by using proxies for market activity (Biais et al., 1995), market depth (Yeo, 2005), price volatility (Foucault, 1999), the bid-ask spread (Biais et al., 1995; Foucault, 2007) and the time zone. On the other hand, traders may also react differently depending on the characteristics of incoming orders to the market. To incorporate these 'order-specific' factors, we therefore also study variables linked to the strategic behaviour of the trader submitting the order. Here, we include measures of price aggressiveness, size, direction and order-splitting strategies. Traders not only chose between market orders and limit orders. When submitting a limit order, a trader also needs to select the appropriate aggressiveness and size of the order. Whereas a market order, per definition, is an aggressive order as the intention is to execute a trade immediately at the prevailing best market price, the probability of a limit order being executed is dependent on how far away it is submitted from the market price (see, for instance, Griffiths et al., 2000; Cao et al., 2004; Ranaldo 2004). However, as Lo and Sapp (2010) find, more aggressive limit orders in the FX market tend to be smaller in size, suggesting that there is a strategic trade-off between aggressiveness and size. A large limit order might be interpreted as market-moving and therefore trigger other traders to cancel their limit orders – thereby decreasing the likelihood of being filled. Indeed, several studies show that traders adopt order-splitting strategies in attempts to disguise the 'true' size of the limit order, thereby allowing them to submit relatively more aggressive orders without having the corresponding negative impact on the liquidity of the market. Following the logic of Keim and Madhavan (1995, 1996), order-spitting strategies might be 'informed traders' as well as 'liquidity traders'. Whereas an informed trader would prefer to disguise his private information as signalled by a large order submission, a trader demanding liquidity would want to hide his 'full amount' to avoid front-running.[2] In sum, high-frequency liquidity withdrawal is a multifaceted phenomenon and can stem from a multitude of sources.

[2] On orders and order-splitting strategies, see, for instance: Pérold 1988; Engle et al., 2012; Chan and Lakonishok, 1995; Pérold 1988; Yeo, 2005.

These can range from the overall state of the market at a particular moment in time to strategic limit order submission behaviour intended to achieve a trade execution at the best possible price - or perhaps even a trading strategy to assess the impact on liquidity provision by *others*.

3. Data

We use a high-frequency dataset from 21:00:00 (GMT) on 8 September 2010 to 20:59:59 (GMT) on 13 September 2010 (including the weekend) obtained from EBS, the most widely used electronic trading platform among market-making banks. The share of algorithmic trading on EBS rose from just 2% in 2004 to around 50% in 2010, and anecdotal evidence and surveys among banks suggest that the change has been most visible among the major currency pairs. Whereas medium-sized currency pairs also have seen an influx of algorithm trading in recent years, the vast majority of the small currencies are still reliant on the market making function provided by human traders at banks (King and Rime, 2010; BIS, 2011). We study the three most actively traded currency pairs (EUR/USD, USD/JPY and EUR/JPY respectively), which, due to the extremely large turnover, have been at the forefront of algorithmic trading in the FX spot market.

On EBS, traders can either initiate a quote (i.e., submit a limit order) or match a posted quote (i.e., submit a market order). In the dataset we have acquired, all data entries are assigned one of five indicators (QS, QD, HS, HAD or DSM). A new limit order begins with QS (i.e., a limit order submission) and ends with QD (i.e., a limit order cancellation). A hit begins with HS and ends with HAD. When two counterparties are matched in a transaction on EBS, the information for the transaction is recorded as a DSM. A unique 20-digit Trader ID is attached to each indicator, allowing us to match order submissions and order cancellations. However, the identities or institutions are not revealed.

Having filtered the dataset for limit order submissions and limit order cancellations only, and removed all new limit orders that do not have a corresponding cancellation within the same day (less than 0.005% of all limit order submissions), we are left with

1,419,673, 787,252 and 751,263 limit orders for EUR/USD, USD/JPY and EUR/JPY respectively. In sum, the total limit order book for the three trading days amounts to approximately €1.8 trillion for EUR/USD, $1.0 trillion for USD/JPY and €0.9 trillion for EUR/JPY (see Table 1).

Table 1: Overview of limit order submissions

Currency pair	Date	QS	Min	Max	Total	Low	High
EUR/USD	09 Sep 2010	482,309	€1,000,000	€156,000,000	€608,354,000,000	1.2662	1.27665
EUR/USD	10 Sep 2010	453,673	€1,000,000	€250,000,000	€592,884,000,000	1.26430	1.27475
EUR/USD	13 Sep 2010	483,691	€1,000,000	€250,000,000	€617,565,000,000	1.27040	1.28930
USD/JPY	09 Sep 2010	268,744	$1,000,000	$250,000,000	$329,375,000,000	83.490	84.035
USD/JPY	10 Sep 2010	302,618	$1,000,000	$200,000,000	$395,575,000,000	83.750	84.500
USD/JPY	13 Sep 2010	215,890	$1,000,000	$250,000,000	$295,072,000,000	83.500	84.365
EUR/JPY	09 Sep 2010	249,181	€1,000,000	€100,000,000	€285,071,000,000	105.965	106.955
EUR/JPY	10 Sep 2010	264,240	€1,000,000	€100,000,000	€319,260,000,000	106.255	107.400
EUR/JPY	13 Sep 2010	237,842	€1,000,000	€100,000,000	€292,708,000,000	106.930	107.940

Sources: EBS and authors' calculations. Notes: QS = Limit order submissions. Low [High] = Lowest [Highest] mid-market price.

Next, for every single limit order submission, we calculate the number of limit buy and sell order cancellations, respectively, within pre-specified time windows. Given that computer algorithms have the ability to react faster than humans, we have chosen seven different time windows (0.1, 0.2, 0.5, 1, 5, 10, 60 seconds) to investigate potential differences when allowing for human traders to have time to react – thus providing a deeper insight into the dynamics of the liquidity withdrawal process.

4. The model

We run a total of 126 regressions using the following model:

$$\sum_{t(i)}^{t(i)+w} LOC_i^d = \alpha_i + \beta_1 Act_i + \beta_2 Dep_i + \beta_3 Vol_i + \beta_4 BA_i + \beta_5 Agg_i + \delta_1 TZ1_i + \delta_2 TZ2_i + \delta_3 TZ3_i$$
$$\delta_4 SLO_i + \delta_5 M_i + \delta_6 L_i + \delta_7 XL_i + \delta_8 OPP_i \quad (1)$$

The dependent variable is the number of limit buy or sell order cancellations (LOC^d), within a specified time window (w), where w = 0.1, 0.2, 0.5, 1, 5, 10 or 60 seconds following a new limit order submission (LOS_i). Limit buy order cancellations are denoted as LOC^B and limit sell order cancellations are denoted as LOC^S.

The number of order cancellations might be influenced by a range of factors. Some henceforth referred to as 'market-specific' variables, relate to the market in which the orders are submitted and not (directly) related to the limit order submissions themselves. The other group, which we refer to as 'order-specific' variables, are included to capture the specific characteristics of the new limit order submissions (and more related to strategic trading), which might trigger more or fewer cancellations.

4.1 Market-specific variables

The main factor determining the number of limit order cancellations is, of course, the number of limit order submitted previously. We refer to this as 'market activity', where $Act_i = \sum_{t(i)-60s}^{t(i)} LOS_i$, and as a proxy, we use the number of limit order submissions submitted to the EBS platform in the respective currency pair during the previous 60 seconds. A higher level of market activity should, *ceteris paribus*, result in a higher number of limit order cancellations.

The number of order cancellations might also depend on the depth of the market. We measure 'market depth' as the sum of the total amount (A) of outstanding limit buy and sell orders at the best market bid (bb) and ask (ba) prices respectively, immediately prior to the limit order submission i. Hence, $Dep_i = \sum_{t(0)}^{t(i-1)} A^{bb} + \sum_{t(0)}^{t(i-1)} A^{ba}$. A deeper market ought to trigger more order cancellations for two reasons. First, an increase in the depth on the same side of the market should trigger competing traders to cancel and resubmit their orders at more competitive price levels (Biais et al., 1985; Hall and Hautsch, 2006, 2007). Second, an increase in the depth on the opposite side of the market should increase the likelihood that traders cancel and resubmit their orders at a different price due to the expected change in the cost of transacting (Goettler et al., 2005; Lo and Sapp, 2010).

Given the extremely short time windows used in our estimation, we also apply a very short-term measure of volatility. Hence, 'volatility' is measured using the mid-market price of the best limit buy and sell orders (bm) at each second during a 60-second interval prior to the new limit order submission, i.e. Vol_i =

$\sqrt{252 * 24 * 60 * \sigma(\sum_{t(i)-61s}^{t(i)-1s}((p_{t(i)-1s}^{bm}/p_{t(i)-2s}^{bm}) - 1))}$. Theoretically, higher short-term volatility should result in more order cancellations, as traders become more induced to reassess whether their orders are submitted at an appropriate price (and therefore cancel and resubmit their orders at different prices). This logic is similar to Foucault (1999) and Foucault et al. (2005), where price volatility is connected to a change in information asymmetry among market participants. However, it could also be argued that higher volatility increases the likelihood of orders being filled, thus acting to reduce the withdrawal of liquidity from the market.

Moreover, liquidity withdrawal could be a function of the market liquidity at the time. Here, we use the standard bid-ask spread, i.e. the difference between the best ask and bid prices, $(p_{t-1}^{ba} - p_{t-1}^{bb})$ measured vis-à-vis the mid price, p_{i-1}^{bm}, on the EBS platform immediately prior to the limit order submission. Thus, $BA_i = (p_{t-1}^{ba} - p_{t-1}^{bb})/p_{i-1}^{bm}$. The impact of the prevailing bid-ask spread on the number of order cancellations is not clear. On the one hand, a wide bid-ask spread might indicate uncertainty in the market (Foucault et al., 2007), thus acting to reduce the number of order submissions and cancellations. On the other hand, a wide bid-ask spread might induce traders to supply liquidity at better price levels, in other words, to cancel and improve the prices at which their limit orders are submitted (Lo and Sapp, 2010).

Although EUR/USD, USD/JPY and EUR/JPY truly can be classified as currency pairs that trade 24 hours a day, the London market is considerably more active and that of Tokyo and New York (see Table 2). Hence, we use three dummy variables (TZ1, TZ2 and TZ3) to account for this variation, where:

TZ1 = 21:00:00–02:59:00 (GMT)
TZ2 = 03:00:00–08:59:00 (GMT)
TZ3 = 09:00:00–14:59:00 (GMT)
TZ4 = 15:00:00–20:59:00 (GMT)

Table 2: Intraday distribution of limit order submissions and cancellations

Currency pair	Date	TZ1	TZ2	TZ3	TZ4
EUR/USD	09 Sep 2010	9.5%	27.8%	43.8%	18.8%
EUR/USD	10 Sep 2010	11.6%	26.0%	42.6%	19.9%
EUR/USD	13 Sep 2010	11.3%	23.2%	41.7%	23.7%
USD/JPY	09 Sep 2010	17.1%	22.7%	39.9%	20.2%
USD/JPY	10 Sep 2010	18.4%	24.7%	40.5%	16.4%
USD/JPY	13 Sep 2010	14.5%	23.3%	35.9%	26.3%
EUR/JPY	09 Sep 2010	9.4%	22.9%	44.6%	23.1%
EUR/JPY	10 Sep 2010	11.0%	23.0%	42.9%	23.2%
EUR/JPY	13 Sep 2010	8.7%	24.0%	43.1%	24.2%

Sources: EBS and authors' calculations.

Similarly to the logic for the proxy for the short-term market activity, we would expect the sign for the London time zone (*TZ3*) to be positive, the early Tokyo time zone (*TZ1*) to be negative and late Tokyo time zone (*TZ2*) to have little impact.

4.2 Order-specific variables

The order-specific independent variables are included to capture the strategic behaviour of traders submitting (and cancelling) limit orders.

'Price aggressiveness' of the limit order submission i, where p_i denotes the limit order price, is measured vis-à-vis the mid price, p_{i-1}^{bm} prior to the order submission: $Agg_i = |(p_i - p_{i-1}^{bm})|/\, p_{i-1}^{bm}$. The variable takes a value between 1.0000 (if the order is submitted at the mid-market price) and 0.0000 (if the order is submitted at 1% or further away from the mid-price).[3] A limit order submitted at an aggressive price should result in more limit order cancellations for two reasons. First, an aggressive buy [sell] order should trigger some traders with sell [buy] orders to cancel their orders and, in anticipation of an advantageous market price move, resubmit them at a higher [lower] price. Second, an aggressive buy [sell] order should trigger some traders with buy [sell] orders to cancel their orders and, in anticipation of a disadvantageous market price move, resubmit them at a higher [lower] price.

According to Lo and Sapp (2010), traders not only consider price aggressiveness when submitting limit orders but also the amount. Anecdotal evidence from traders

[3] By capping the price aggressiveness at 1%, orders submitted very far away from the market and therefore extremely likely to be filled (such as at 0.00 or 9999.99) are less likely to bias the results.

strongly suggests that large orders are more likely to influence the market price (and hence more likely to trigger order cancellations) than small orders. Although our dataset contains some very large limit orders indeed (the largest orders being €250 million, $250 million and €100 million for EUR/USD, USD/JPY and EUR/JPY respectively), the overwhelming majority is for precisely the minimum amount allowed on the electronic platform, namely $1 million or €1 million (see Table 3).

Table 3: Amounts and split orders

Currency pair	Date	Small	Medium	Large	Very large	Split order
EUR/USD	09 Sep 2010	421,638	54,329	4,117	2,225	84,516
EUR/USD	10 Sep 2010	387,128	59,972	4,070	2,503	79,529
EURUSD	13 Sep 2010	419,322	57,043	4,971	2,355	83,196
USD/JPY	09 Sep 2010	234,267	32,176	1,483	818	54,322
USD/JPY	10 Sep 2010	259,773	36,388	5,112	1,345	59,354
USD/JPY	13 Sep 2010	178,390	32,486	4,098	916	47,216
EUR/JPY	09 Sep 2010	224,621	23,549	747	264	64,006
EUR/JPY	10 Sep 2010	233,674	27,588	2,669	309	66,043
EUR/JPY	13 Sep 2010	207,534	26,637	3,051	620	59,622

Sources: EBS and authors' calculations

To capture the potential impact of large orders, we use three dummy variables. M_i, a 'medium-sized limit order', is a dummy variable for order amounts larger than ($ or €) 1 million but smaller than ($ or €) 5 million. A medium-sized limit order should, *ceteris paribus*, trigger more and faster limit order cancellations, as the amount is larger than the $1 million or €1 million 'baseline limit order'. L_i, a 'large limit order', is a dummy variable for order amounts larger than or equal to ($ or €) 5 million but smaller than ($ or €) 10 million. A large limit order should trigger more and faster limit order cancellations, as the amount is larger than the baseline limit order. XL_i , a 'very large limit order' is a dummy variable for order amounts larger than or equal to ($ or €) 10 million. Again, a very large limit order should trigger more and faster limit order cancellations, as the amount is larger than the baseline limit order.

However, as a result of the (anticipated) market reaction following a large order submission, a well-established trading strategy is that of order-splitting. Assuming that other traders react more (and faster) to large limit orders, a string of relatively small order submissions could act to disguise the 'true' order size and hence trigger a more muted market reaction. Algorithmic traders have a greater ability than human traders to split large orders into many small orders. As consequence, a high number and proportion of very small orders is often observed in financial markets where algorithmic trading is prominent. In our model, SLO_i , a 'split limit order', is a dummy

variable. To be counted as a split order, all of the following four criteria need to hold. First, the price of limit order submission, p_i, is the same as the price of limit order, p_j, where $j \neq i$. Second, the direction of limit order submission i (i.e. bid or ask) is the same as the direction of limit order submission j. Third, limit order i and limit order j are submitted within less than 0.1 seconds of each other. [4] Fourth, no other orders are submitted or cancelled in between the submissions of limit order i and limit order j. If an order splitting-strategy is used to conceal the 'true' (larger) order size, it should, ceteris paribus, have no impact on the subsequent number and speed of limit order cancellations. However, if the order-splitting strategy is detected by other traders, it should result in more order cancellations.

Finally, OPP_i, an 'opposite order' is a dummy variable for limit order submissions from the other side of the market. It is generally assumed that traders with private information takes into account the prevailing and future liquidity on the *other side*, as this is a key factor in determining the ability to execute large orders at a fair price. Consequently, traders are typically assumed to react to incoming large orders from the other side by cancelling their orders (and then, perhaps, resubmitting their orders at a more favourable price to them). A somewhat similar logic could, however, also be applied to traders reacting to an incoming large order from the *same* side. As such a limit order might move the market away from them simply by being submitted, they, too, would be more inclined to cancel their orders (in order to resubmit and them at a rate closer to the best market price at the time). In our model, we account for such behaviour.

4.3 Estimation and diagnostics

For estimating the base model and the extended model (see Section 5), we use OLS. For robustness, we check the residual diagnostics, especially heteroscedasticity test. In these diagnostics, we use the Breusch-Pagan-Godfrey test. With the diagnostics of the residuals, we also estimate both models using a TOBIT regression (because the

[4] Our classification of a split limit order is more conservative than that of Yeo (2005) on the stock market. Obviously, orders submitted within more than 0.1 seconds of each other or at different prices might still be part of an order-splitting strategy. However, given that our methodology already results in around 20% of all orders being classified as split limit orders, we do not believe a less conservative measure is necessary to capture potential differences.

dependent variable in our model ranges from 0 to positive, it might better to use TOBIT). However, having checked and found no significant differences between the results using OLS (Tables 6-41) and TOBIT (Tables 42-77), we have opted for OLS. Further, the Breush-Pagan-Godfrey test tells us that null hypothesis of no heteroskedasticity against heteroskedasticity is rejected in all estimations. Consequently, we use White heteroskedasticity-consistent standard errors and covariance in our estimations.

5. Empirical Results

5.1 Dependent variable

The estimation results are shown in Tables 6-23. The most striking, but perhaps not too surprising, result concerns the dependent variable: the number of limit order cancellations. Given the level of trading activity in the three market, and the number of limit order submission, the mean dependent variable is very large considering the relatively short time windows chosen. For instance, 9 September 2010 contained 268,928 EUR/USD limit order cancellations. Assuming an equal number of buy and sell orders, this represents an average of 0.156 buy [sell] order cancellations per 0.1 seconds, 1.556 buy [sell] order cancellations per 1.0 seconds[5] and 93.378 buy [sell] order cancellations per 60.0 seconds. However, as Table 6 shows, the mean dependent variable is considerably higher for the corresponding time windows: 2.119 [2.035] limit order cancellations within 0.1 seconds, 10.106 [9.635] within 1.0 seconds and 265.628 [253.496] within 60.0 seconds. A very similar pattern is displayed for all our estimations.

However it is not the frequency of the cancellations, in itself, that stands out. Rather, it is the speed at which the extreme frequency decreases and then 'normalises'. Table 4 illustrates this phenomenon, by depicting the number of limit order cancellations within each time window as a ratio of the number of limit order cancellations within 0.1 seconds.

[5] 268,928/2/(24*60*60*10) = 1.556

Table 4: Ratio of limit order cancellations within 0.1 seconds

Currency pair / Date	Order type	≤0.1s	>0.1s ≤0.2s	>0.2s ≤0.5s	>0.5s ≤1.0s	>1.0s ≤5.0s	>5.0s ≤10.0s	>10.0s ≤60.0s
EUR/USD	Buy	1.00	0.65	0.54	0.30	0.23	0.22	0.20
09 Sep 2010	Sell	1.00	0.65	0.53	0.30	0.23	0.22	0.20
EUR/USD	Buy	1.00	0.62	0.51	0.29	0.24	0.22	0.20
10 Sep 2010	Sell	1.00	0.62	0.51	0.29	0.23	0.22	0.20
EUR/USD	Buy	1.00	0.62	0.55	0.32	0.26	0.24	0.22
13 Sep 2010	Sell	1.00	0.61	0.54	0.32	0.26	0.24	0.22
USD/JPY	Buy	1.00	0.65	0.58	0.34	0.28	0.26	0.25
09 Sep 2010	Sell	1.00	0.65	0.57	0.34	0.27	0.26	0.25
USD/JPY	Buy	1.00	0.60	0.49	0.23	0.18	0.17	0.15
10 Sep 2010	Sell	1.00	0.60	0.48	0.24	0.18	0.17	0.15
USD/JPY	Buy	1.00	0.57	0.47	0.21	0.15	0.14	0.12
13 Sep 2010	Sell	1.00	0.57	0.47	0.21	0.15	0.14	0.12
EUR/JPY	Buy	1.00	0.65	0.58	0.34	0.28	0.26	0.25
09 Sep 2010	Sell	1.00	0.65	0.57	0.34	0.27	0.26	0.25
EUR/JPY	Buy	1.00	0.68	0.60	0.36	0.29	0.28	0.26
10 Sep 2010	Sell	1.00	0.66	0.58	0.35	0.28	0.27	0.27
EUR/JPY	Buy	1.00	0.66	0.61	0.34	0.27	0.26	0.24
13 Sep 2010	Sell	1.00	0.65	0.58	0.33	0.26	0.25	0.24

Sources: EBS and authors' calculations.

As can be seen, liquidity withdrawal is at its most extreme within a few hundred milliseconds (or "faster than a human can blink") of each new limit order submission. Once human traders plausibly could have had time to react, the cancellation frequency has all but normalised, and little change is observed between 1 and 60 seconds. Thus, the frequency distribution of order cancellations in the FX spot market seems to follow a power law, similarly to what has been in sizes of stock market orders (see, for instance, Gopikrishnan et al., 2000; Maslow and Mills, 2001).

5.2 Market-specific variables

As the empirical results in Tables 6-23 show, market activity is the logical (and main) driver of order cancellations in the EUR/USD, USD/JPY and EUR/JPY FX spot markets. Likewise, the London time zone dummy is positive and significant for all days, currency pairs and time windows, and the early Tokyo time zone negative and significant (with the exception of USD/JPY for some time windows).

The sign of market depth is also consistently positive for all 126 estimations. In other words, order cancellations are clearly positively correlated with the total amount of buy and sell orders submitted at the best bid and ask prices at the time of a new order submission.

The bid-ask spread is a consistently (negative) predictor of the number of order cancellations. Put differently, the more liquidity is added to the market (in terms of tightening the bid-ask spread), the more liquidity is withdrawn from the market. However, the impact of short-term volatility on the number order cancellations is highly inconsistent. For 13 September, the sign is positive and significantly positive for all three currency pairs and time windows. This would suggest that traders have a tendency to withdraw liquidity as volatility increases, consistent with the logic of Foucault (1999) and Foucault et al. (2005). However, on 9 September, the relationship only holds for time windows above 5 seconds, and for 10 September the relationship is, overall, significantly *negative*.

5.3 Order-specific variables

Intuitively, we would expect traders to react faster and stronger to new orders submitted from the *other* side of the order book. If a buy [sell] initiative is more likely to lead to a higher [lower] price (see, Bjønnes et al., 2005), a limit buy [sell] order ought to cause more limit order cancellations on the opposite side as sellers [buyers] incorporate the new information and revise their expectations. This should cause more cancellations and, perhaps, resubmissions at a higher [lower] price. Traders on the same side also revise their expectations (and consequently cancel and resubmit their orders), but are, *ceteris paribus*, less likely to be picked off. In this respect, the empirical results highly are interesting. On the one hand, for time windows of 0.5 seconds and longer, and consistently throughout the three trading days and for all currency pairs, the relationship is positive strongly significant: a limit buy [sell] order triggers more limit sell [buy] order cancellations. However, the relationship is the opposite for the extremely short time windows (0.1 and 0.2 seconds). For 35 out of these 36 estimations, a limit buy [sell] order triggers more limit buy [sell] order cancellations. This might appear counter-intuitive. However, as Biais et al. (1995) show, using data from the Paris Bourse, cancellations on the bid [ask] of the book tend to be more frequent following a market buy [sell] order. This could be due to the fact that traders can use market orders to check for hidden orders and the depth of the market on the opposite side – and then cancel their limit orders if it is found to be thin. The same logic could be applied to limit orders. By submitting and cancelling limit buy [sell] orders (and the resubmitting at a higher [lower] price) information can

be extracted about the dynamics of the order book. Given the speed at which this takes place (within 0.2 seconds), however, one would expect that this is related to algorithmic trading.

Theoretically, as well as anecdotally, we should expect large limit order submissions to trigger more cancellations. Interestingly, our results, more often than not, indicate the opposite. Medium-sized (2-4 million) and large (5-9 million) EUR/USD limit order submissions trigger fewer cancellations within the shorter time windows (up to 10 seconds) throughout. When studying a longer time horizon (60 seconds), medium-sized orders occasionally trigger more order cancellations. However, the results for large and very large (>10 million) orders are inconsistent. Even very large order submissions cause fewer order cancellations when looking at an extremely short time window (0.1 seconds). The results for USD/JPY are relatively similar. Medium-sized and large orders trigger fewer cancellations (the sign is negative and strongly significant for time windows up to 10 seconds). Very large orders trigger fewer cancellations within the extremely short 0.1-second window, whereas the results further out are inconsistent or not significant. With regards to EUR/JPY, medium-sized, large and very large order submissions resulted in more cancellations for up to 1 second on all three trading days. Again, once a longer time window is used, the pattern is different.

The empirical results for the split orders are also interesting. An informed trader would normally resort to an order-splitting strategy to disguise a larger amount. If successfully submitted (i.e. undetected by other market participants), such a strategy should not result in more order cancellations than normal. However, our empirical results show that the sign tends to be positive and strongly significant in most cases, suggesting that order-splitting has a tendency to increase the number of order cancellations.

An explanation for this pattern can probably be found in the market microstructure of EBS itself. Whereas order-splitting strategies have become increasingly common in the trading of a range of assets on numerous electronic platforms, the 1-million minimum order rule on EBS acts as an important floor for the ‘race to the bottom’. A remarkably high proportion (86.8%) of all orders in our dataset consist of precisely 1

million. In fact, the proportion of split orders (despite the fact that we use a very conservative definition) is higher (20.2%) than the combination of limit orders larger than 1 million. In such a setting, it is quite logical that a trader submitting a 2-million limit order might be perceived as *less* informed or predatory than a trader submitting two 1-million limit orders at the same price and in less than 0.1 seconds after each other.

The results involving larger orders (or larger orders disguised as split orders) are, in themselves, puzzling, as we should expect that a large order automatically should be interpreted as information-rich, and hence act to result in a string of order cancellations on both sides of the market. Instead, the empirical results indicate that the market is either surprisingly slow in reacting to larger orders (highly unlikely), or that very large orders indeed are required to be submitted for the market to react. Split orders are very frequently submitted - yet seem to be detected and 'interpreted' as large orders. Alternatively, the results could be interpreted as if traders do not perceive amounts larger than 1 million as 'informed' or 'predatory' in the first instance. Rather, order size has to be put in relation to price aggressiveness. Indeed, the empirical results for price aggressiveness are, in themselves, striking when seen in isolation. In 112 out of the 126 estimations, the sign is *negative* and strongly significant.

6. Extended model

The empirical results for size and price aggressiveness of the limit order submissions require further investigation, as the variables cannot be in isolation from each other. Indeed, Lo and Sapp (2010) find evidence of a trade-off between size and aggressiveness among orders submitted by traders in the FX spot market for US dollars against Deutschemarks and Canadian dollars in 1997 – an observation which is also strongly supported by market participants. Nonetheless, our data suggests that the relationship between the size and the price aggressiveness of limit order submissions is neither inverse nor stable across currency pairs or over time. Table 5 shows the average price aggressiveness of the different order submission types using a scale from 1 to 4, where:

4 [very aggressive] = if the new limit order submission price p_i *improves* the best bid-ask spread ($p_{t-1}^{ba} - p_{t-1}^{bb}$).

3 [aggressive] = if the new limit order submission price p_i *matches* the best bid-ask spread ($p_{t-1}^{ba} - p_{t-1}^{bb}$).

2 [moderately aggressive] = if the new limit order submission price p_i is *outside, but within 2 pips* of the best bid-ask spread ($p_{t-1}^{ba} - p_{t-1}^{bb}$).

1 [not aggressive] = if the new limit order submission price p_i is *more than 2 pips away* from the best bid-ask spread ($p_{t-1}^{ba} - p_{t-1}^{bb}$).

As can be seen, medium-size orders tend to be somewhat less aggressive than small orders, whereas large and very large orders tend to be *more* aggressive. Split orders, on the other hand, are consistently relatively aggressive.

Table 5: Order aggressiveness and size

Currency pair	Date	Small	Medium	Large	Very large	Split
EUR/USD	09-Sep	2.0158	2.0687	2.9896	3.0112	2.4314
EUR/USD	10-Sep	2.0850	1.9430	3.0182	2.9608	2.5255
EUR/USD	13-Sep	2.1941	2.1976	3.0855	2.9512	2.6916
USD/JPY	09-Sep	2.1634	1.9754	2.8812	2.8093	2.5233
USD/JPY	10-Sep	2.1298	1.9285	1.9658	2.8149	2.4735
USD/JPY	13-Sep	2.2719	1.9786	2.0835	2.6889	2.5746
EUR/JPY	09-Sep	2.4442	1.8143	2.7470	2.5038	2.5087
EUR/JPY	10-Sep	2.4971	1.7559	1.6478	2.3139	2.5746
EUR/JPY	13-Sep	2.4798	1.7020	1.6726	1.6306	2.5650

Sources: EBS and authors' calculations.

To account for this, we run another 126 regressions with an extended model as follows:

$$\sum_{t(i)}^{t(i)+w} LOC_i^d = \alpha_i + \beta_1 Act_i + \beta_2 Dep_i + \beta_3 Vol_i + \beta_4 BA_i + \beta_5 Agg_i + \delta_1 TZ1_i + \delta_2 TZ2_i + \delta_3 TZ3_i$$
$$\delta_4 SLO_i + \delta_5 M_i + \delta_6 L_i + \delta_7 XL_i + \delta_8 OPP_i + \delta_9 OPP_i * M_i + \delta_{10} OPP_i * L_i + \delta_{11} OPP_i * XL_i +$$
$$\delta_{12} A2_i * SLO_i + \delta_{13} A3_i * SLO_i + \delta_{14} A4_i * SLO_i + \delta_{15} A2_i * M_i + \delta_{16} A3_i * M_i + \delta_{17} A4_i * M_i +$$
$$\delta_{18} A2_i * L_i + \delta_{19} A3_i * L_i + \delta_{20} A4_i * L_i + \delta_{21} A2_i * XL_i + \delta_{22} A3_i * XL_i + \delta_{23} A4_i * XL_i \quad (2)$$

In the extended model we include a series of dummy variables for medium-sized, large, very large and split orders that very aggressive (*A4*), aggressive (*A3*) or moderately aggressive (*A2*). We also use three dummy variables to capture the

reaction to medium-sized, large and very large limit orders submitted from the opposite side, and would expect the reaction to these to be stronger.

The overall results from the extended model are fairly similar to those of the base model. However, the extra dummy variables provide deeper insights into the impact of the order-specific variables and can be summarised as follows (see Tables 24-41).

First, orders submitted from the opposite side have a tendency to trigger more order cancellations than orders submitted from the same side *only if* they are larger than the standard size of 1 million. Otherwise, order cancellations follow a clear, but interesting, pattern where a limit buy [sell] order triggers more limit buy [sell] orders within 0.1 and 0.2 seconds, but more limit sell [buy] within 0.5, 1, 5, 10 and 60 seconds.

Second, the impact of large (5-9 million) and very large orders (>10 million) on the subsequent number of order cancellations is positive and significant *only if* the orders are submitted at very aggressive prices (within the prevailing bid-ask spread). The relationship is clear for USD/JPY and EUR/USD for time windows up to 10 seconds, but considerably less stable for EUR/JPY.

Third, medium-sized orders (2-4 million) seem to trigger fewer order cancellations than small orders (1 million) *regardless of* whether are submitted at aggressive prices or not. Thus, only the combination of a very large *and* very aggressive order triggers a large number of order cancellations.

7. Concluding discussion

In this paper, we have investigated the drivers of limit order cancellations in the FX spot market for EUR/USD, USD/JPY and EUR/JPY under three 'normal' trading days. Using different time windows ranging from 0.1 seconds to 1 minute, we find that proxies for market activity and market depth are clearly positively correlated with future order cancellations, whereas the bid-ask spread is a consistently negative predictor. However, the results for variables linked to the specific characteristics of new limit order submissions often seem to contradict the market microstructure

literature and conventional ‘market wisdom’. Orders submitted from the opposite side have a tendency to trigger more order cancellations than orders submitted from the same side *only if* they are larger than the standard size of 1 million - or if a slightly longer time window is used. In the extremely short term, orders submitted from the opposite side have a tendency to trigger fewer order cancellations than orders from the same side. We also find that large and very large limit orders trigger an increase in the speed and frequency of order cancellation *only if* they are submitted at very aggressive prices. Moreover, medium-sized orders seem to trigger fewer order cancellations than small orders regardless of whether are submitted at aggressive prices or not.

The reasons for these patterns are not clear. However, a significant part can probably be attributed to the growing share of algorithmic trading in the FX spot market for the currency pairs studied, in conjunction with the 1-million lower bound for order submissions on the electronic platform EBS. The increasing use of order-splitting strategies and extremely frequent submission, cancellation and resubmission of 1-million limit orders might have served to alter the perception of what could be regarded as an informed order that is more likely to trigger a future price movement. Put bluntly, orders over 1 million, which are more likely to be submitted by human traders, are perceived to be less ‘predatory’ (unless they are very large *and* aggressive) than orders relying on trading algorithms to disguise the true size and thus market-moving information.

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Table 6: Base model (OLS), EUR/USD, 9 September 2010, Buy order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.415653		3.923095		7.552301		11.09627		34.14066		61.05544		309.1979	
Constant	4.02194**	(0.161929)	5.441152**	(0.23481)	10.38046**	(0.408343)	14.06027**	(0.570422)	34.40114**	(1.367939)	50.34222**	(2.092119)	140.8117**	(7.971688)
Time zone 1 (dummy)	-0.46258**	(0.01715)	-0.518415**	(0.025339)	-0.437785**	(0.041706)	-0.299581**	(0.053978)	-0.637555**	(0.103856)	-2.227256**	(0.15366)	-25.55482**	(0.535053)
Time zone 2 (dummy)	-0.432062**	(0.013855)	-0.443896**	(0.019579)	-0.144385**	(0.031992)	0.287297**	(0.043487)	2.859911**	(0.098624)	4.890715**	(0.151243)	38.00421**	(0.561471)
Time zone 3 (dummy)	-0.075559**	(0.014198)	0.044873*	(0.019977)	0.510619**	(0.032319)	0.865534**	(0.044012)	3.166681**	(0.097566)	5.755587**	(0.149078)	49.93712**	(0.539145)
Market activity	0.00061**	(0.000014)	0.001208**	(0.0000206)	0.003052**	(0.0000356)	0.006567**	(0.0000506)	0.03429**	(0.00013)	0.06695**	(0.000197)	0.345322**	(0.000711)
Aggressiveness	-1.010293**	(0.166023)	-0.938819**	(0.240977)	-2.613829**	(0.41847)	-4.765574**	(0.583517)	-20.38308**	(1.397604)	-31.13211**	(2.136816)	-69.68547**	(8.152435)
Market Depth	0.060649**	(0.00095)	0.096296**	(0.001543)	0.151762**	(0.002386)	0.196015**	(0.00291)	0.368613**	(0.005002)	0.504635**	(0.006938)	1.150721**	(0.022791)
Volatility	0.003913**	(0.001081)	0.008337**	(0.002053)	0.006821	(0.004294)	0.021573	(0.011866)	0.103791*	(0.052043)	0.188913	(0.103287)	1.258014	(0.733546)
Split (dummy)	-0.095881**	(0.013805)	0.015337	(0.020002)	0.276273**	(0.034153)	0.253374**	(0.047142)	-0.087674	(0.110716)	-0.392014*	(0.170618)	-0.278929	(0.627559)
Bid-ask spread	-185.1831**	(2.437555)	-295.958**	(3.847539)	-490.271**	(6.426467)	-603.0116**	(7.945313)	-893.3418**	(13.46369)	-1081.11**	(18.41313)	-2088.581**	(61.70071)
Opposite (dummy)	0.022838*	(0.009219)	0.114853**	(0.013289)	-0.28117**	(0.022364)	-0.491748**	(0.030693)	-1.544935**	(0.07185)	-2.112617**	(0.110397)	-5.549849**	(0.408689)
Medium (dummy)	-0.49764**	(0.014246)	-0.620886**	(0.020762)	-1.014467**	(0.034979)	-1.118538**	(0.048731)	-1.033133**	(0.11808)	-0.46271*	(0.182825)	8.01578**	(0.692798)
Large (dummy)	-1.124125**	(0.045848)	-0.965011**	(0.073883)	-1.785036**	(0.118827)	-2.331862**	(0.159501)	-3.489621**	(0.385052)	-3.808639**	(0.607049)	-4.462581	(2.338118)
X-Large (dummy)	-0.67836**	(0.092686)	0.535371**	(0.158683)	0.709142**	(0.243193)	0.625152*	(0.302517)	2.058928**	(0.621759)	3.010102**	(0.929006)	6.571073*	(3.106137)
Adjusted R-squared	0.11015		0.135499		0.145952		0.165146		0.304782		0.391185		0.550784	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 7: Base model (OLS), EUR/USD, 9 September 2010, Sell order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.353959		3.823379		7.310413		10.67668		32.74714		58.60092		297.4585	
Constant	4.494749**	(0.163454)	6.122286**	(0.238755)	9.811441**	(0.394503)	12.53336**	(0.538078)	28.98195**	(1.230868)	42.15418**	(1.878195)	116.8852**	(7.199374)
Time zone 1 (dummy)	-0.505966**	(0.016547)	-0.49646**	(0.024472)	-0.378947**	(0.042615)	-0.208341**	(0.05604)	-0.388333**	(0.104172)	-1.986166**	(0.154003)	-21.27018**	(0.536645)
Time zone 2 (dummy)	-0.509056**	(0.013605)	-0.536364**	(0.019473)	-0.418007**	(0.032101)	-0.18056**	(0.043749)	1.5884**	(0.096318)	2.543214**	(0.146422)	26.15584**	(0.529556)
Time zone 3 (dummy)	-0.166828**	(0.014325)	-0.093468**	(0.020501)	0.151691**	(0.033159)	0.318727**	(0.044713)	2.119857**	(0.09651)	3.923827**	(0.146831)	41.45057**	(0.530718)
Market activity	0.000541**	(0.0000132)	0.001071**	(0.0000195)	0.002857**	(0.0000338)	0.006174**	(0.0000473)	0.032245**	(0.000112)	0.06311**	(0.00017)	0.334509**	(0.00063)
Aggressiveness	-1.476692**	(0.167099)	-1.614841**	(0.244276)	-2.006283**	(0.403439)	-3.168641**	(0.549225)	-14.54601**	(1.255499)	-21.72827**	(1.915664)	-47.09434**	(7.354011)
Market Depth	0.060844**	(0.000885)	0.09976**	(0.001407)	0.155603**	(0.002188)	0.198995**	(0.002657)	0.38229**	(0.004665)	0.507884**	(0.006295)	1.293501**	(0.020734)
Volatility	0.001716*	(0.000722)	0.004293**	(0.001314)	0.002921	(0.002259)	0.011372	(0.007123)	0.05142	(0.031134)	0.097555	(0.066775)	0.834686	(0.546966)
Split (dummy)	-0.086484**	(0.013549)	0.013699	(0.019886)	0.214372**	(0.033532)	0.197067**	(0.04576)	-0.255951*	(0.103528)	-0.612696**	(0.157862)	-1.125547*	(0.569445)
Bid-ask spread	-185.0385**	(2.385031)	-300.2495**	(3.827263)	-490.2941**	(6.332438)	-591.6874**	(7.691099)	-881.1906**	(12.97249)	-1048.081**	(17.25802)	-2062.598**	(54.87543)
Opposite (dummy)	0.067597**	(0.008941)	0.178907**	(0.012998)	-0.208638**	(0.021874)	-0.447167**	(0.029725)	-1.345729**	(0.067283)	-2.017223**	(0.102314)	-3.003304**	(0.37185)
Medium (dummy)	-0.483918**	(0.013973)	-0.6079**	(0.020506)	-0.998672**	(0.034181)	-1.117017**	(0.047014)	-1.051796**	(0.110663)	-0.501913**	(0.169647)	7.212858**	(0.632058)
Large (dummy)	-1.211926**	(0.041814)	-1.008478**	(0.069439)	-1.786938**	(0.111485)	-2.235376**	(0.150956)	-3.006504**	(0.364989)	-2.886404**	(0.56831)	-2.428431	(2.116071)
X-Large (dummy)	-0.817054**	(0.084888)	0.245407	(0.148946)	0.39459	(0.23417)	0.262944	(0.289911)	1.307971*	(0.576315)	1.585611	(0.843059)	4.308773	(2.813502)
Adjusted R-squared	0.113346		0.1389		0.144876		0.160592		0.307011		0.396979		0.577103	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 8: Base model (OLS), EUR/USD, 10 September 2010, Buy order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.317173		3.762483		7.308781		10.61193		32.40497		57.89397		294.6523	
Constant	3.543251**	(0.1743)	4.19395**	(0.26042)	9.033827**	(0.45753)	11.76253**	(0.598294)	23.19376**	(1.289094)	33.58398**	(1.928406)	97.03938**	(6.550276)
Time zone 1 (dummy)	-0.696255**	(0.015133)	-0.964578**	(0.021701)	-1.512232**	(0.037516)	-1.643125**	(0.050446)	-0.670382**	(0.11716)	-0.308436	(0.179994)	-12.34288**	(0.650383)
Time zone 2 (dummy)	-0.695161**	(0.01346)	-0.909203**	(0.019235)	-1.284488**	(0.033113)	-1.344033**	(0.044634)	-0.004746	(0.099466)	1.294589**	(0.152744)	20.25307**	(0.553486)
Time zone 3 (dummy)	-0.040607**	(0.013739)	0.014153	(0.019605)	0.045415	(0.032986)	0.198491**	(0.043752)	2.748107**	(0.095097)	5.402328**	(0.145109)	45.09919**	(0.530882)
Market activity	0.000597**	(0.0000248)	0.001116**	(0.000037)	0.003065**	(0.0000634)	0.006038**	(0.0000835)	0.032062**	(0.000181)	0.062168**	(0.000277)	0.355213**	(0.000968)
Aggressiveness	-0.277141	(0.165724)	0.882376**	(0.244362)	0.265046	(0.428287)	-0.445894	(0.566616)	-6.306349**	(1.263571)	-11.31075**	(1.905926)	-15.37684*	(6.587285)
Market Depth	0.026374**	(0.000614)	0.043057**	(0.000961)	0.066232**	(0.001603)	0.083735**	(0.00197)	0.210285**	(0.00392)	0.388087**	(0.005837)	1.612546**	(0.022649)
Volatility	5.825096**	(1.213657)	8.556444**	(1.833851)	13.12027**	(3.104948)	29.93155**	(4.035712)	80.69838**	(8.613992)	152.7542**	(13.60994)	-1265.336**	(50.54768)
Split (dummy)	0.160451**	(0.011772)	0.296634**	(0.017063)	0.612714**	(0.029168)	0.686904**	(0.039936)	0.358259**	(0.092925)	0.431157**	(0.142567)	4.114449**	(0.50442)
Bid-ask spread	-195.0896**	(3.246139)	-320.4967**	(5.248275)	-562.7014**	(9.16133)	-682.5297**	(11.16079)	-1056.196**	(18.28137)	-1411.593**	(24.54469)	-2667.353**	(58.31349)
Opposite (dummy)	0.086586**	(0.008749)	0.250648**	(0.012539)	-0.172063**	(0.021495)	-0.387961**	(0.029373)	-1.295905**	(0.069411)	-1.931141**	(0.106319)	-4.286159**	(0.373688)
Medium (dummy)	-0.506244**	(0.012416)	-0.609921**	(0.018173)	-0.97413**	(0.031466)	-1.060532**	(0.043791)	-1.157827**	(0.10612)	-1.216216**	(0.163838)	3.285611**	(0.579165)
Large (dummy)	-0.99334**	(0.042502)	-0.906255**	(0.065399)	-1.871691**	(0.108345)	-2.335198**	(0.146833)	-3.676233**	(0.356349)	-4.583261**	(0.570915)	-7.30586**	(2.02502)
X-Large (dummy)	-0.641986**	(0.073704)	0.417987**	(0.121733)	0.389951*	(0.187114)	0.59522*	(0.240544)	0.680337	(0.543011)	1.158259	(0.838255)	2.160461	(2.821909)
Adjusted R-squared	0.15738		0.197026		0.21497		0.212292		0.307199		0.388252		0.570106	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 9: Base model (OLS), EUR/USD, 10 September 2010, Sell order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.243669		3.632582		7.049843		10.25431		31.28285		56.0166		285.1196	
Constant	3.580681**	(0.168456)	4.561511**	(0.251765)	8.740345**	(0.442114)	11.40066**	(0.588721)	21.65377**	(1.251906)	31.50785**	(1.881381)	101.3883**	(6.447967)
Time zone 1 (dummy)	-0.59993**	(0.01469)	-0.775569**	(0.021171)	-1.163685**	(0.037004)	-1.207893**	(0.051222)	0.144074	(0.123331)	1.136895**	(0.195289)	-10.59065**	(0.693515)
Time zone 2 (dummy)	-0.598991**	(0.013033)	-0.734303**	(0.018516)	-1.007197**	(0.032519)	-1.124374**	(0.044416)	0.317079**	(0.093261)	1.613132**	(0.140207)	20.60355**	(0.504192)
Time zone 3 (dummy)	-0.070604**	(0.013058)	-0.034109	(0.018303)	-0.108583**	(0.031191)	-0.103189*	(0.042061)	2.05948**	(0.087978)	4.085639**	(0.131777)	33.64651**	(0.480674)
Market activity	0.000568**	(0.000025)	0.001044**	(0.0000376)	0.002857**	(0.000064)	0.005839**	(0.0000848)	0.030604**	(0.000182)	0.059814**	(0.000276)	0.344393**	(0.000985)
Aggressiveness	-0.444778**	(0.159597)	0.285941	(0.234139)	0.143655	(0.412597)	-0.523471	(0.556642)	-5.862966**	(1.22328)	-11.08486**	(1.858676)	-23.51185**	(6.478565)
Market Depth	0.027835**	(0.000729)	0.046158**	(0.001238)	0.075397**	(0.001864)	0.096507**	(0.002219)	0.214427**	(0.004208)	0.360062**	(0.006311)	1.469894**	(0.022667)
Volatility	8.568652**	(1.216565)	14.5792**	(1.849879)	27.36574**	(3.171853)	47.65462**	(4.183595)	151.6741**	(9.185932)	301.4348**	(14.19311)	-750.6577**	(52.1357)
Split (dummy)	0.158599**	(0.011475)	0.275405**	(0.016373)	0.549328**	(0.028382)	0.611291**	(0.039386)	0.408505**	(0.090213)	0.47897**	(0.138473)	3.698499**	(0.488262)
Bid-ask spread	-194.4664**	(3.174619)	-322.2187**	(5.260244)	-573.548**	(9.004312)	-705.097**	(11.10091)	-1082.303**	(18.2044)	-1441.103**	(24.05301)	-2787.608**	(59.77698)
Opposite (dummy)	0.026105**	(0.00849)	0.138435**	(0.012109)	-0.294562**	(0.021044)	-0.561874**	(0.029182)	-1.437827**	(0.06766)	-2.101904**	(0.103742)	-4.426274**	(0.365392)
Medium (dummy)	-0.494529**	(0.012083)	-0.612629**	(0.017505)	-0.96485**	(0.030658)	-1.066753**	(0.042974)	-1.248966**	(0.102101)	-1.277356**	(0.158137)	2.519629**	(0.56354)
Large (dummy)	-0.973678**	(0.042959)	-0.876782**	(0.066969)	-1.861772**	(0.109284)	-2.363325**	(0.148096)	-3.461391**	(0.35063)	-3.975026**	(0.55982)	-4.828289*	(1.97653)
X-Large (dummy)	-0.716814**	(0.069968)	0.208427	(0.113391)	0.143255	(0.179483)	0.168506	(0.234164)	0.821632	(0.549148)	1.259923	(0.842222)	3.823743	(2.850962)
Adjusted R-squared	0.161093		0.204763		0.223619		0.219099		0.311234		0.391776		0.565157	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 10: Base model (OLS), EUR/USD, 13 September 2010, Buy order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.350088		3.814855		7.676221		11.40888		35.64559		64.40226		325.7092	
Constant	4.277738**	(0.164364)	4.99067**	(0.228533)	12.51756**	(0.438846)	16.3379**	(0.616682)	29.13807**	(1.470399)	40.80525**	(2.305383)	113.5136**	(8.754388)
Time zone 1 (dummy)	-0.484027**	(0.015881)	-0.513689**	(0.023209)	-0.803239**	(0.041652)	-0.766951**	(0.056015)	-0.063866	(0.119575)	0.99377**	(0.190362)	-7.271696**	(0.696626)
Time zone 2 (dummy)	-0.632642**	(0.013012)	-0.758776**	(0.018587)	-1.278131**	(0.032477)	-1.406761**	(0.044059)	-1.281747**	(0.096111)	-0.772419**	(0.14984)	4.560989**	(0.541605)
Time zone 3 (dummy)	-0.174953**	(0.013131)	-0.165895**	(0.018647)	-0.302595**	(0.033209)	-0.130916**	(0.046841)	1.326225**	(0.124967)	4.298264**	(0.193557)	60.88521**	(0.699335)
Market activity	0.000965**	(0.0000133)	0.001821**	(0.0000204)	0.004539**	(0.0000382)	0.008475**	(0.0000575)	0.03912**	(0.000189)	0.07418**	(0.000283)	0.350272**	(0.001064)
Aggressiveness	-1.501419**	(0.16597)	-0.828423**	(0.230497)	-4.782414**	(0.44305)	-6.896051**	(0.623094)	-15.37568**	(1.488092)	-22.92155**	(2.332837)	-50.6962**	(8.855764)
Market Depth	0.023321**	(0.000731)	0.03538**	(0.001145)	0.056748**	(0.001873)	0.070981**	(0.002361)	0.202559**	(0.005038)	0.442742**	(0.008037)	2.373618**	(0.032032)
Volatility	0.078671**	(0.013602)	0.123241**	(0.022015)	0.212585**	(0.038964)	0.250613**	(0.04699)	0.359581**	(0.079461)	0.541373**	(0.124246)	1.203012**	(0.420301)
Split (dummy)	0.038877**	(0.012032)	0.167806**	(0.017327)	0.517524**	(0.031131)	0.537952**	(0.043329)	0.38227**	(0.105432)	0.125224	(0.168171)	0.292035	(0.659587)
Bid-ask spread	-139.3441**	(2.076096)	-223.1367**	(3.400564)	-397.5563**	(6.266054)	-481.8023**	(7.692075)	-785.2933**	(13.2599)	-1208.037**	(19.73232)	-3581.169**	(84.99244)
Opposite (dummy)	-0.017012	(0.009201)	0.046059**	(0.013175)	-0.543971**	(0.02347)	-0.854512**	(0.032763)	-2.102668**	(0.079911)	-2.923119**	(0.126979)	-6.333684**	(0.493165)
Medium (dummy)	-0.413356**	(0.013684)	-0.459328**	(0.019991)	-0.780159**	(0.035794)	-0.939697**	(0.051009)	-1.166005**	(0.129994)	-1.199244**	(0.208406)	0.762166	(0.815008)
Large (dummy)	-0.794447**	(0.043737)	-0.648983**	(0.065226)	-1.354156**	(0.114787)	-1.69891**	(0.166742)	-2.279335**	(0.427376)	-3.110511**	(0.686109)	-6.031751*	(2.678712)
X-Large (dummy)	-0.074365	(0.087794)	0.832325**	(0.137503)	0.92146**	(0.230785)	0.909644**	(0.299554)	1.014036	(0.642857)	0.511105	(1.03529)	-5.495179	(4.054203)
Adjusted R-squared	0.096471		0.125871		0.165752		0.209531		0.415161		0.502632		0.617256	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 11: Base model (OLS), EUR/USD, 13 September 2010, Sell order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.322464		3.749633		7.525732		11.19346		35.0878		63.39116		324.1757	
Constant	5.088559**	(0.171583)	6.216158**	(0.243419)	11.96713**	(0.433809)	15.06254**	(0.596742)	27.86583**	(1.399799)	39.17681**	(2.167088)	119.59**	(8.748625)
Time zone 1 (dummy)	-0.495497**	(0.015726)	-0.498796**	(0.022777)	-0.792014**	(0.039798)	-0.78482**	(0.053167)	-0.247467*	(0.112191)	0.749365**	(0.177538)	-4.512674**	(0.673662)
Time zone 2 (dummy)	-0.681733**	(0.012709)	-0.813596**	(0.018311)	-1.27031**	(0.03198)	-1.46064**	(0.042758)	-1.387054**	(0.093222)	-1.082382**	(0.144179)	2.453855**	(0.524746)
Time zone 3 (dummy)	-0.183078**	(0.013817)	-0.195607**	(0.019761)	-0.25151**	(0.032829)	-0.065915	(0.045374)	1.857383**	(0.118681)	5.431598**	(0.185134)	68.90915**	(0.692306)
Market activity	0.001024**	(0.000016)	0.001898**	(0.0000248)	0.004356**	(0.000039)	0.008228**	(0.0000569)	0.038169**	(0.000181)	0.072473**	(0.000278)	0.348569**	(0.001129)
Aggressiveness	-2.340953**	(0.17324)	-2.174343**	(0.245707)	-4.471782**	(0.438085)	-5.909145**	(0.602899)	-14.81023**	(1.415581)	-22.79405**	(2.190593)	-64.38803**	(8.845673)
Market Depth	0.020254**	(0.000669)	0.03169**	(0.00106)	0.055813**	(0.001816)	0.072838**	(0.002314)	0.202767**	(0.004851)	0.447052**	(0.007879)	2.393561**	(0.03152)
Volatility	0.0762**	(0.013542)	0.119505**	(0.021029)	0.204757**	(0.036861)	0.245677**	(0.046671)	0.345446**	(0.080629)	0.483973**	(0.127769)	1.100509**	(0.425469)
Split (dummy)	0.021015	(0.01205)	0.137289**	(0.017448)	0.494248**	(0.030656)	0.509524**	(0.042143)	0.349754**	(0.101099)	0.128929	(0.159909)	-0.875267	(0.656102)
Bid-ask spread	-145.0533**	(2.1423)	-227.6025**	(3.270505)	-394.7863**	(5.87789)	-489.2943**	(7.02325)	-795.4625**	(12.67481)	-1188.642**	(18.37475)	-3469.705**	(78.16168)
Opposite (dummy)	0.105169**	(0.009164)	0.248517**	(0.013172)	-0.17253**	(0.022875)	-0.313419**	(0.031601)	-0.761**	(0.076145)	-1.036802**	(0.120172)	-1.248503*	(0.488034)
Medium (dummy)	-0.380447**	(0.013885)	-0.416623**	(0.020435)	-0.726066**	(0.035198)	-0.835117**	(0.049517)	-0.901041**	(0.124588)	-0.648462**	(0.198952)	2.021775*	(0.814653)
Large (dummy)	-0.887824**	(0.041655)	-0.779618**	(0.0642)	-1.441777**	(0.112642)	-1.835744**	(0.161826)	-2.589938**	(0.406746)	-3.374775**	(0.645606)	-8.904854**	(2.602849)
X-Large (dummy)	-0.19102*	(0.083685)	0.664106**	(0.133224)	0.609887**	(0.21895)	0.662781*	(0.287465)	0.419504	(0.604581)	-0.523808	(0.95546)	-8.176194*	(4.107372)
Adjusted R-squared	0.103649		0.130387		0.1653		0.216443		0.430602		0.522799		0.624273	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 12: Base model (OLS), USD/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.074868		3.282654		6.118167		8.268619		20.43948		34.38295		158.9355	
Constant	4.236728**	(0.144972)	5.560132**	(0.204595)	9.875034**	(0.351711)	12.02744**	(0.456079)	19.97465**	(0.889275)	30.56419**	(1.374158)	91.40512**	(5.132904)
Time zone 1 (dummy)	-0.721461**	(0.019483)	-0.788384**	(0.027894)	-0.782012**	(0.047339)	-0.552113**	(0.062236)	-0.786357**	(0.11284)	-1.044804**	(0.17194)	-3.338427**	(0.528011)
Time zone 2 (dummy)	-0.444773**	(0.018704)	-0.399802**	(0.026624)	-0.040344	(0.045523)	0.176499**	(0.058481)	-0.405935**	(0.103098)	-1.38516**	(0.155343)	-3.465727**	(0.47055)
Time zone 3 (dummy)	0.047591*	(0.02006)	0.225999**	(0.02897)	0.635996**	(0.046599)	1.008215**	(0.059259)	1.841451**	(0.10744)	3.255309**	(0.163927)	37.68276**	(0.52656)
Market activity	0.001077**	(0.0000343)	0.00201**	(0.0000523)	0.004652**	(0.0000898)	0.007799**	(0.000111)	0.034361**	(0.000217)	0.064149**	(0.000362)	0.302665**	(0.002011)
Aggressiveness	-1.292548**	(0.147623)	-1.151638**	(0.209099)	-2.031375**	(0.358406)	-2.581146**	(0.463142)	-5.755282**	(0.905384)	-11.36815**	(1.396881)	-35.15396**	(5.249584)
Market Depth	0.031797**	(0.001192)	0.050321**	(0.001871)	0.073828**	(0.00286)	0.087327**	(0.003358)	0.113018**	(0.00467)	0.117075**	(0.006138)	0.110413**	(0.016947)
Volatility	-0.754197*	(0.366212)	-1.39516*	(0.631812)	-2.507314*	(1.104861)	-2.38277*	(1.111792)	2.983604	(1.615373)	10.63643*	(4.688369)	111.9511*	(46.12919)
Split (dummy)	0.142908**	(0.014839)	0.238698**	(0.021299)	0.534437**	(0.036032)	0.594944**	(0.046539)	0.405018**	(0.087002)	0.015657	(0.129127)	-0.756826	(0.408274)
Bid-ask spread	-107.3294**	(2.116451)	-176.9262**	(3.105828)	-310.9117**	(5.363547)	-370.7425**	(6.58497)	-488.7074**	(9.941543)	-568.4997**	(11.78468)	-832.7275**	(30.7932)
Opposite (dummy)	0.000478	(0.011717)	0.102336**	(0.016918)	-0.335903**	(0.028676)	-0.533187**	(0.037052)	-1.005429**	(0.069752)	-1.268972**	(0.10409)	-3.309727**	(0.332688)
Medium (dummy)	-0.738242**	(0.016474)	-0.926241**	(0.024228)	-1.457336**	(0.041134)	-1.672405**	(0.053897)	-1.99279**	(0.108417)	-1.993116**	(0.166194)	-1.88808**	(0.534837)
Large (dummy)	-1.147237**	(0.065809)	-1.100481**	(0.099948)	-1.822096**	(0.168236)	-2.07328**	(0.223854)	-1.918461**	(0.50518)	-1.965871**	(0.746082)	1.755926	(2.636017)
X-Large (dummy)	-0.556133**	(0.153361)	0.241203	(0.250234)	0.736791	(0.398228)	0.938839	(0.48507)	1.688392*	(0.806491)	1.740244	(1.113538)	5.110513	(3.423679)
Adjusted R-squared	0.085011		0.102497		0.11423		0.117859		0.22827		0.297503		0.500545	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 13: Base model (OLS), USD/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.12024		3.326846		6.256875		8.444012		20.95471		35.36334		163.9378	
Constant	4.611698**	(0.150423)	5.962014**	(0.204397)	10.16354**	(0.352852)	11.61293**	(0.439652)	18.33746**	(0.855972)	28.47241**	(1.31034)	91.54364**	(5.041416)
Time zone 1 (dummy)	-0.767004**	(0.019231)	-0.85397**	(0.027422)	-0.847357**	(0.046574)	-0.580351**	(0.059454)	-0.652986**	(0.109243)	-0.929789**	(0.165407)	-2.870233**	(0.529175)
Time zone 2 (dummy)	-0.512466**	(0.018472)	-0.488212**	(0.026197)	-0.171727**	(0.044218)	0.089856	(0.055882)	-0.757038**	(0.098701)	-2.219386**	(0.147893)	-6.588029**	(0.463829)
Time zone 3 (dummy)	0.084869**	(0.019592)	0.242197**	(0.027999)	0.804642**	(0.046164)	1.138334**	(0.056971)	1.695304**	(0.102656)	3.086763**	(0.155924)	36.30833**	(0.518479)
Market activity	0.001178**	(0.0000346)	0.002173**	(0.0000526)	0.004781**	(0.0000928)	0.00809**	(0.000114)	0.036124**	(0.000223)	0.066819**	(0.000365)	0.308719**	(0.002208)
Aggressiveness	-1.590889**	(0.152821)	-1.438084**	(0.208017)	-2.129853**	(0.359168)	-2.036171**	(0.447012)	-4.044602**	(0.872052)	-8.931263**	(1.333215)	-32.82917**	(5.156553)
Market Depth	0.030125**	(0.001118)	0.04549**	(0.001718)	0.073299**	(0.00281)	0.087495**	(0.003274)	0.127548**	(0.004774)	0.145475**	(0.006328)	0.191179**	(0.017887)
Volatility	-0.967466*	(0.411355)	-1.579179*	(0.683482)	-2.831062*	(1.206382)	-2.934319*	(1.262671)	1.718099	(1.263414)	8.778985*	(4.035533)	125.3285*	(51.64928)
Split (dummy)	0.124227**	(0.014808)	0.185274**	(0.020712)	0.508452**	(0.036079)	0.587641**	(0.046101)	0.463319**	(0.086522)	0.060315	(0.128892)	-0.924537*	(0.41787)
Bid-ask spread	-110.1081**	(1.909771)	-179.2309**	(2.943952)	-321.4331**	(5.250383)	-380.3262**	(6.345535)	-502.9878**	(9.327234)	-586.5948**	(11.95801)	-849.1881**	(30.86179)
Opposite (dummy)	0.023566*	(0.011675)	0.139705**	(0.016454)	-0.247961**	(0.028527)	-0.372541**	(0.036476)	-1.0194**	(0.06919)	-1.525256**	(0.103656)	-2.317582**	(0.341622)
Medium (dummy)	-0.747166**	(0.016537)	-0.914574**	(0.02402)	-1.483648**	(0.041474)	-1.705129**	(0.053582)	-1.966383**	(0.108828)	-1.999887**	(0.166116)	-2.088077**	(0.548808)
Large (dummy)	-1.297574**	(0.064947)	-1.250915**	(0.099986)	-2.043966**	(0.167023)	-2.323564**	(0.226888)	-2.326867**	(0.497553)	-2.292245**	(0.749642)	3.375333	(2.762404)
X-Large (dummy)	-0.61056**	(0.152355)	0.425556	(0.245448)	0.69072	(0.391719)	0.822313	(0.473828)	1.459444	(0.786412)	1.703644	(1.089224)	5.601478	(3.507344)
Adjusted R-squared	0.092947		0.11349		0.124177		0.128499		0.246685		0.316281		0.496419	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 14: Base model (OLS), USD/JPY, 10 September 2010, Buy order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.079064		3.32351		6.349491		8.790904		23.49144		40.66563		193.7892	
Constant	3.39963**	(0.125295)	4.399373**	(0.173963)	8.149223**	(0.309201)	9.388224**	(0.397935)	14.66784**	(0.811996)	20.04408**	(1.212389)	63.64068**	(4.265992)
Time zone 1 (dummy)	-0.938377**	(0.01723)	-1.166295**	(0.024281)	-1.594947**	(0.040682)	-1.565128**	(0.052145)	0.145258	(0.099288)	1.780833**	(0.152741)	6.521987**	(0.55046)
Time zone 2 (dummy)	-0.487208**	(0.01788)	-0.518091**	(0.025612)	-0.471196**	(0.044378)	-0.200207**	(0.057496)	2.324341**	(0.106089)	4.415741**	(0.161197)	13.04852**	(0.571126)
Time zone 3 (dummy)	0.164005**	(0.018505)	0.336657**	(0.025948)	0.858472**	(0.042988)	1.299015**	(0.053966)	4.636008**	(0.093818)	8.644817**	(0.137044)	53.26509**	(0.485519)
Market activity	0.0013**	(0.0000421)	0.002466**	(0.000068)	0.005461**	(0.000131)	0.009061**	(0.00018)	0.038552**	(0.000466)	0.075205**	(0.000827)	0.366643**	(0.003566)
Aggressiveness	-0.467493**	(0.126611)	0.105336	(0.175772)	0.061256	(0.312055)	0.79121*	(0.401035)	0.735608	(0.818752)	0.234912	(1.216831)	9.945935*	(4.253764)
Market Depth	0.023755**	(0.00066)	0.034599**	(0.000967)	0.058352**	(0.001752)	0.067143**	(0.002138)	0.124356**	(0.003671)	0.210077**	(0.005926)	0.485168**	(0.016925)
Volatility	-13.95622**	(1.312261)	-28.54035**	(2.163313)	-64.97038**	(4.354086)	-93.82383**	(6.076509)	-274.9339**	(15.99702)	-511.4922**	(29.01166)	-2285.68**	(125.6945)
Split (dummy)	0.25782**	(0.0144)	0.432539**	(0.020373)	0.947136**	(0.035246)	1.129361**	(0.045857)	1.360379**	(0.089435)	1.562289**	(0.13457)	1.887501**	(0.47078)
Bid-ask spread	-96.44304**	(1.588851)	-156.2911**	(2.408288)	-273.3039**	(4.158993)	-325.1847**	(4.850578)	-450.5617**	(7.329323)	-552.8661**	(10.36247)	-950.3292**	(26.29484)
Opposite (dummy)	0.000828	(0.010711)	0.106726**	(0.015245)	-0.370991**	(0.026469)	-0.604388**	(0.034672)	-1.298837**	(0.069123)	-1.82017**	(0.104061)	-4.791369**	(0.364759)
Medium (dummy)	-0.589769**	(0.015702)	-0.703599**	(0.022972)	-1.212869**	(0.039939)	-1.383196**	(0.052658)	-1.39888**	(0.108229)	-1.248324**	(0.166267)	0.078477	(0.606803)
Large (dummy)	-1.201161**	(0.032583)	-1.417775**	(0.050177)	-2.352195**	(0.084391)	-2.624604**	(0.115005)	-3.231732**	(0.261175)	-3.771563**	(0.411165)	-4.693116**	(1.549348)
X-Large (dummy)	-0.816782**	(0.095943)	0.047247	(0.165437)	0.672595*	(0.273846)	0.829356*	(0.335814)	1.634062**	(0.588633)	2.314772*	(0.899657)	1.126485	(2.785027)
Adjusted R-squared	0.09203		0.111284		0.123006		0.129084		0.258104		0.352325		0.527165	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 15: Base model (OLS), USD/JPY, 10 September 2010, Sell order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.053522		3.276574		6.261114		8.681702		23.38941		40.56598		193.9386	
Constant	3.537798**	(0.127164)	4.614259**	(0.178039)	7.721222**	(0.308703)	8.652497**	(0.390254)	13.08115**	(0.796367)	17.1939**	(1.198352)	58.27435**	(4.43541)
Time zone 1 (dummy)	-0.904551**	(0.016999)	-1.088054**	(0.023743)	-1.345676**	(0.039715)	-1.291987**	(0.052263)	1.096429**	(0.099709)	3.4561**	(0.154465)	16.28861**	(0.582093)
Time zone 2 (dummy)	-0.537243**	(0.01751)	-0.574747**	(0.024779)	-0.447033**	(0.042694)	-0.340219**	(0.05558)	1.789483**	(0.103021)	3.138543**	(0.158909)	10.02057**	(0.602426)
Time zone 3 (dummy)	0.233989**	(0.018157)	0.442489**	(0.025319)	1.10489**	(0.042662)	1.438683**	(0.054454)	5.076718**	(0.095303)	9.269043**	(0.141346)	58.64357**	(0.494414)
Market activity	0.001319**	(0.0000425)	0.002443**	(0.0000641)	0.005407**	(0.000119)	0.009277**	(0.000166)	0.040498**	(0.000458)	0.079095**	(0.000829)	0.390523**	(0.003991)
Aggressiveness	-0.691963**	(0.128143)	-0.270146	(0.179504)	-0.0953	(0.311711)	0.837272*	(0.393311)	1.012148	(0.801594)	1.206452	(1.199911)	7.240603	(4.399028)
Market Depth	0.019721**	(0.00063)	0.030678**	(0.000958)	0.051364**	(0.001764)	0.05989**	(0.00217)	0.102044**	(0.003521)	0.183257**	(0.005598)	0.475258**	(0.018793)
Volatility	-11.02912**	(1.232995)	-22.4089**	(1.917226)	-51.93754**	(3.808315)	-80.78614**	(5.492429)	-269.8564**	(15.70376)	-518.797**	(29.32638)	-2611.986**	(143)
Split (dummy)	0.210825**	(0.014244)	0.351738**	(0.020207)	0.822613**	(0.035172)	0.998696**	(0.045594)	1.125726**	(0.088417)	1.309331**	(0.133843)	0.943203*	(0.476382)
Bid-ask spread	-96.2466**	(1.70349)	-157.1669**	(2.421883)	-261.8365**	(4.296886)	-313.0041**	(5.011469)	-426.8134**	(7.466373)	-531.5856**	(9.864127)	-940.0634**	(26.65076)
Opposite (dummy)	0.084427**	(0.010669)	0.19817**	(0.01515)	-0.142483**	(0.026332)	-0.266779**	(0.034257)	-0.781903**	(0.068154)	-0.978466**	(0.102915)	-1.145758**	(0.368853)
Medium (dummy)	-0.567**	(0.015831)	-0.6806**	(0.022996)	-1.181955**	(0.039957)	-1.290373**	(0.052327)	-1.324895**	(0.107517)	-1.277361**	(0.164646)	-0.23049	(0.607915)
Large (dummy)	-1.149915**	(0.033624)	-1.356557**	(0.051683)	-2.251219**	(0.084991)	-2.512562**	(0.113867)	-3.046961**	(0.259574)	-3.39895**	(0.405207)	-4.508032**	(1.548982)
X-Large (dummy)	-0.562686**	(0.099463)	0.273105	(0.163379)	0.784691**	(0.262545)	1.039774**	(0.33494)	1.792685**	(0.591819)	2.463509**	(0.897551)	3.811167	(2.809748)
Adjusted R-squared	0.095757		0.116552		0.122941		0.134261		0.283368		0.38223		0.548625	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 16: Base model (OLS), USD/JPY, 13 September 2010, Buy order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.712089		2.692118		5.123314		6.933803		17.24934		28.97267		132.6353	
Constant	3.919519**	(0.144991)	5.261695**	(0.20181)	9.854368**	(0.345083)	11.69465**	(0.436725)	19.31446**	(0.8389)	26.98787**	(1.192172)	84.48246**	(3.933451)
Time zone 1 (dummy)	-0.649367**	(0.016673)	-0.746038**	(0.023018)	-1.155827**	(0.037547)	-1.34778**	(0.047913)	-3.306812**	(0.094141)	-5.429605**	(0.137999)	-27.66126**	(0.467404)
Time zone 2 (dummy)	-0.360911**	(0.016981)	-0.384389**	(0.02361)	-0.393904**	(0.039587)	-0.438141**	(0.050521)	-1.889649**	(0.0995)	-3.624275**	(0.142015)	-18.84399**	(0.445381)
Time zone 3 (dummy)	0.123439**	(0.016455)	0.291568**	(0.02281)	0.610446**	(0.035942)	0.65934**	(0.045348)	-0.219941*	(0.092771)	-0.430358**	(0.136255)	1.038555*	(0.466535)
Market activity	0.000971**	(0.0000365)	0.001753**	(0.0000519)	0.004053**	(0.0000833)	0.007362**	(0.000109)	0.031926**	(0.000246)	0.060807**	(0.000372)	0.298877**	(0.001275)
Aggressiveness	-1.310008**	(0.147044)	-1.330061**	(0.205096)	-2.64022**	(0.351046)	-2.93029**	(0.444859)	-4.80581**	(0.853684)	-7.32901**	(1.212723)	-18.89208**	(3.99623)
Market Depth	0.023697**	(0.000827)	0.034953**	(0.001208)	0.055089**	(0.001887)	0.069987**	(0.002379)	0.127386**	(0.004428)	0.203137**	(0.006758)	0.745369**	(0.022311)
Volatility	0.728433**	(0.041433)	1.137569**	(0.064893)	1.967227**	(0.112354)	2.316563**	(0.134212)	3.061192**	(0.198885)	3.601678**	(0.27502)	6.413459**	(0.908338)
Split (dummy)	0.085843**	(0.014136)	0.147884**	(0.019671)	0.564918**	(0.032559)	0.632936**	(0.041696)	0.827992**	(0.082692)	0.891742**	(0.120111)	2.533358**	(0.399579)
Bid-ask spread	-106.7987**	(1.347274)	-169.9676**	(1.936961)	-297.3559**	(3.079731)	-355.5729**	(3.752648)	-500.272**	(6.190956)	-630.8282**	(8.779195)	-1455.315**	(26.76427)
Opposite (dummy)	0.005546	(0.011375)	0.096121**	(0.015978)	-0.406109**	(0.026248)	-0.58607**	(0.033598)	-1.107926**	(0.066284)	-1.275422**	(0.096467)	-1.035465**	(0.318)
Medium (dummy)	-0.50283**	(0.015602)	-0.623532**	(0.022276)	-0.991791**	(0.036922)	-1.176733**	(0.047351)	-1.23198**	(0.096534)	-1.326757**	(0.141733)	1.495192**	(0.475313)
Large (dummy)	-0.917101**	(0.035345)	-1.023593**	(0.053022)	-1.839884**	(0.08475)	-2.190518**	(0.110731)	-2.57845**	(0.235644)	-2.310787**	(0.351318)	5.436275**	(1.209856)
X-Large (dummy)	-0.623408**	(0.123656)	-0.223684	(0.187081)	-0.25275	(0.295222)	-0.382056	(0.348183)	-0.957232	(0.613951)	-0.797074	(0.910343)	0.870903	(2.989605)
Adjusted R-squared	0.10105		0.121299		0.144902		0.150831		0.230078		0.307435		0.475954	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 17: Base model (OLS), USD/JPY, 13 September 2010, Sell order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.751116		2.75391		5.229516		7.066118		17.61148		29.72717		135.5574	
Constant	4.523086**	(0.160737)	5.920593**	(0.221415)	10.46407**	(0.365253)	12.42701**	(0.463491)	20.18122**	(0.889084)	27.19921**	(1.28178)	80.0943**	(4.255892)
Time zone 1 (dummy)	-0.551693**	(0.017009)	-0.594933**	(0.023932)	-0.806236**	(0.039022)	-0.817714**	(0.04983)	-1.853347**	(0.099283)	-2.796771**	(0.14816)	-16.54403**	(0.514451)
Time zone 2 (dummy)	-0.319862**	(0.016822)	-0.283282**	(0.024782)	-0.278499**	(0.04061)	-0.211842**	(0.051818)	-1.560008**	(0.101465)	-2.851462**	(0.146972)	-17.34884**	(0.479795)
Time zone 3 (dummy)	0.170812**	(0.016209)	0.362098**	(0.022772)	0.774308**	(0.036395)	0.898768**	(0.046142)	0.089101	(0.09639)	-0.163774	(0.144362)	1.471563**	(0.509512)
Market activity	0.001091**	(0.0000386)	0.001913**	(0.0000564)	0.004323**	(0.0000906)	0.007904**	(0.000119)	0.034971**	(0.000281)	0.067035**	(0.000431)	0.320867**	(0.001475)
Aggressiveness	-2.016006**	(0.163294)	-2.139918**	(0.225353)	-3.468597**	(0.37148)	-3.988405**	(0.471665)	-6.405788**	(0.902857)	-8.602969**	(1.300659)	-18.32791**	(4.316568)
Market Depth	0.022779**	(0.000854)	0.036519**	(0.001325)	0.058679**	(0.00205)	0.071419**	(0.002485)	0.123736**	(0.004573)	0.199817**	(0.006902)	0.809134**	(0.024555)
Volatility	0.719825**	(0.04094)	1.147205**	(0.064733)	1.972804**	(0.113703)	2.315516**	(0.137086)	2.977034**	(0.207304)	3.447927**	(0.307923)	5.613344**	(1.105112)
Split (dummy)	0.095514**	(0.013985)	0.152645**	(0.020008)	0.560516**	(0.033243)	0.639853**	(0.042696)	0.692722**	(0.086382)	0.668251**	(0.127388)	2.226203**	(0.430556)
Bid-ask spread	-106.121**	(1.312804)	-171.6362**	(1.945023)	-303.1218**	(3.135464)	-361.8632**	(3.803005)	-506.0286**	(6.428368)	-648.9795**	(9.205139)	-1487.458**	(28.5854)
Opposite (dummy)	0.125659**	(0.011492)	0.252638**	(0.016522)	-0.175154**	(0.027007)	-0.334848**	(0.034603)	-1.035158**	(0.070078)	-1.592225**	(0.102799)	-4.400093**	(0.3418)
Medium (dummy)	-0.527912**	(0.015637)	-0.655018**	(0.022703)	-1.043416**	(0.037501)	-1.190431**	(0.048386)	-1.436969**	(0.101082)	-1.564197**	(0.149144)	0.229284	(0.502604)
Large (dummy)	-1.034251**	(0.033241)	-1.215774**	(0.052188)	-2.128222**	(0.083705)	-2.449108**	(0.110518)	-2.959125**	(0.241585)	-2.907837**	(0.366698)	3.09897*	(1.268546)
X-Large (dummy)	-0.507166**	(0.132617)	-0.073079	(0.194697)	-0.078086	(0.309401)	-0.107696	(0.36611)	-0.563278	(0.652683)	-0.421159	(0.972613)	2.339383	(3.285488)
Adjusted R-squared	0.100236		0.117933		0.141559		0.147554		0.227236		0.305994		0.463303	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 18: Base model (OLS), EUR/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	5.519153**	(0.311731)	7.130057**	(0.41241)	11.11001**	(0.649979)	14.26371**	(0.870909)	27.16848**	(1.691616)	35.52772**	(2.397521)	107.6175**	(7.941359)
Time zone 1 (dummy)	-0.244655**	(0.01042)	-0.283719**	(0.014621)	-0.371541**	(0.024563)	-0.405255**	(0.033276)	-0.972305**	(0.067833)	-2.100553**	(0.102992)	-12.94134**	(0.380532)
Time zone 2 (dummy)	-0.161857**	(0.009903)	-0.215098**	(0.014005)	-0.202102**	(0.024389)	-0.136958**	(0.032922)	0.31288**	(0.065707)	0.733429**	(0.100254)	13.49537**	(0.370029)
Time zone 3 (dummy)	-0.046886**	(0.009584)	-0.060235**	(0.013328)	-0.051216*	(0.021936)	0.045003	(0.030251)	1.115861**	(0.062768)	2.253346**	(0.096359)	24.64684**	(0.329354)
Market activity	0.001042**	(0.0000321)	0.001809**	(0.0000448)	0.004047**	(0.0000751)	0.007291**	(0.000105)	0.032751**	(0.000251)	0.064215**	(0.000401)	0.334813**	(0.001901)
Aggressiveness	-4.418402**	(0.31609)	-5.346832**	(0.418194)	-7.415598**	(0.659731)	-9.623296**	(0.883628)	-19.18225**	(1.716224)	-24.43337**	(2.431243)	-71.22888**	(8.058718)
Market Depth	0.019084**	(0.001569)	0.0446**	(0.002654)	0.091316**	(0.005428)	0.116516**	(0.006654)	0.119476**	(0.008229)	0.118042**	(0.010711)	0.221861**	(0.030781)
Volatility	-3.705702**	(0.495353)	-4.44856**	(0.710449)	-7.844088**	(1.211405)	-5.951346**	(1.693058)	14.16028**	(4.417153)	42.49155**	(7.502907)	552.458**	(43.82903)
Split (dummy)	-0.127108**	(0.007722)	-0.12303**	(0.010887)	-0.036318*	(0.01828)	-0.0335	(0.024793)	-0.108541*	(0.05237)	-0.269404**	(0.079162)	0.221103	(0.281595)
Bid-ask spread	-26.67914**	(0.518017)	-49.02849**	(0.803694)	-92.10658**	(1.357791)	-113.8619**	(1.736512)	-157.8346**	(3.210503)	-187.211**	(4.762451)	-620.8872**	(17.34138)
Opposite (dummy)	0.268725**	(0.006675)	0.400565**	(0.009315)	-0.0752**	(0.015465)	-0.25357**	(0.02105)	-1.002672**	(0.044518)	-1.436576**	(0.067479)	-3.508732**	(0.23997)
Medium (dummy)	-0.1049**	(0.012276)	-0.187101**	(0.01711)	-0.291927**	(0.027795)	-0.366963**	(0.037614)	-0.636388**	(0.080649)	-0.852001**	(0.122723)	-0.344055	(0.427342)
Large (dummy)	-0.444933**	(0.059581)	-0.51431**	(0.10006)	-0.94201**	(0.146776)	-1.078196**	(0.189171)	-1.931412**	(0.396442)	-2.428205**	(0.618449)	-8.192365**	(2.332616)
X-Large (dummy)	-0.605081**	(0.097976)	-0.639643**	(0.224364)	-0.905868*	(0.394917)	-0.85195	(0.532113)	-0.718966	(0.791614)	-0.512351	(1.188299)	-0.243304	(4.134921)
Adjusted R-squared	0.044427		0.065017		0.082635		0.10636		0.278702		0.385276		0.606546	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 19: Base model (OLS), EUR/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	5.519153**	(0.311731)	7.130057**	(0.41241)	11.11001**	(0.649979)	14.26371**	(0.870909)	27.16848**	(1.691616)	35.52772**	(2.397521)	107.6175**	(7.941359)
Time zone 1 (dummy)	-0.244655**	(0.01042)	-0.283719**	(0.014621)	-0.371541**	(0.024563)	-0.405255**	(0.033276)	-0.972305**	(0.067833)	-2.100553**	(0.102992)	-12.94134**	(0.380532)
Time zone 2 (dummy)	-0.161857**	(0.009903)	-0.215098**	(0.014005)	-0.202102**	(0.024389)	-0.136958**	(0.032922)	0.31288**	(0.065707)	0.733429**	(0.100254)	13.49537**	(0.370029)
Time zone 3 (dummy)	-0.046886**	(0.009584)	-0.060235**	(0.013328)	-0.051216*	(0.021936)	0.045003	(0.030251)	1.115861**	(0.062768)	2.253346**	(0.096359)	24.64684**	(0.329354)
Market activity	0.001042**	(0.0000321)	0.001809**	(0.0000448)	0.004047**	(0.0000751)	0.007291**	(0.000105)	0.032751**	(0.000251)	0.064215**	(0.000401)	0.334813**	(0.001901)
Aggressiveness	-4.418402**	(0.31609)	-5.346832**	(0.418194)	-7.415598**	(0.659731)	-9.623296**	(0.883628)	-19.18225**	(1.716224)	-24.43337**	(2.431243)	-71.22888**	(8.058718)
Market Depth	0.019084**	(0.001569)	0.0446**	(0.002654)	0.091316**	(0.005428)	0.116516**	(0.006654)	0.119476**	(0.008229)	0.118042**	(0.010711)	0.221861**	(0.030781)
Volatility	-3.705702**	(0.495353)	-4.44856**	(0.710449)	-7.844088**	(1.211405)	-5.951346**	(1.693058)	14.16028**	(4.417153)	42.49155**	(7.502907)	552.458**	(43.82903)
Split (dummy)	-0.127108**	(0.007722)	-0.12303**	(0.010887)	-0.036318*	(0.01828)	-0.0335	(0.024793)	-0.108541*	(0.05237)	-0.269404**	(0.079162)	0.221103	(0.281595)
Bid-ask spread	-26.67914**	(0.518017)	-49.02849**	(0.803694)	-92.10658**	(1.357791)	-113.8619**	(1.736512)	-157.8346**	(3.210503)	-187.211**	(4.762451)	-620.8872**	(17.34138)
Opposite (dummy)	0.268725**	(0.006675)	0.400565**	(0.009315)	-0.0752**	(0.015465)	-0.25357**	(0.02105)	-1.002672**	(0.044518)	-1.436576**	(0.067479)	-3.508732**	(0.23997)
Medium (dummy)	-0.1049**	(0.012276)	-0.187101**	(0.01711)	-0.291927**	(0.027795)	-0.366963**	(0.037614)	-0.636388**	(0.080649)	-0.852001**	(0.122723)	-0.344055	(0.427342)
Large (dummy)	-0.444933**	(0.059581)	-0.51431**	(0.10006)	-0.94201**	(0.146776)	-1.078196**	(0.189171)	-1.931412**	(0.396442)	-2.428205**	(0.618449)	-8.192365**	(2.332616)
X-Large (dummy)	-0.605081**	(0.097976)	-0.639643**	(0.224364)	-0.905868*	(0.394917)	-0.85195	(0.532113)	-0.718966	(0.791614)	-0.512351	(1.188299)	-0.243304	(4.134921)
Adjusted R-squared	0.044427		0.065017		0.082635		0.10636		0.278702		0.385276		0.606546	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 20: Base model (OLS), EUR/JPY, 10 September 2010, Buy order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.002233		1.679326		3.491534		5.279688		16.99086		31.0228		163.1273	
Constant	4.737287**	(0.276423)	6.400923**	(0.371794)	10.05589**	(0.600781)	12.33487**	(0.762963)	21.50636**	(1.499442)	29.15424**	(2.139637)	75.63344**	(6.348359)
Time zone 1 (dummy)	-0.275187**	(0.009774)	-0.358158**	(0.013579)	-0.564591**	(0.022445)	-0.635683**	(0.03031)	-0.310403**	(0.064503)	-0.160989	(0.098079)	-1.991427**	(0.349265)
Time zone 2 (dummy)	-0.277958**	(0.009484)	-0.398061**	(0.013261)	-0.628483**	(0.02209)	-0.696199**	(0.029795)	0.199678**	(0.062006)	1.194232**	(0.093957)	11.19971**	(0.339775)
Time zone 3 (dummy)	-0.064741**	(0.009387)	-0.037432**	(0.013115)	0.058344**	(0.021988)	0.168998**	(0.02956)	2.107708**	(0.060661)	4.255964**	(0.09128)	31.23035**	(0.327706)
Market activity	0.000869**	(0.0000281)	0.001533**	(0.0000407)	0.003692**	(0.0000698)	0.007087**	(0.0000963)	0.035932**	(0.000209)	0.072135**	(0.000331)	0.41196**	(0.001334)
Aggressiveness	-3.631435**	(0.280344)	-4.492043**	(0.376984)	-5.99765**	(0.608742)	-6.919545**	(0.772631)	-11.87404**	(1.518941)	-14.85781**	(2.166987)	-22.52002**	(6.414306)
Market Depth	0.006504**	(0.000864)	0.01218**	(0.001215)	0.025392**	(0.002032)	0.037643**	(0.002778)	0.094209**	(0.006111)	0.196571**	(0.00959)	1.334773**	(0.035813)
Volatility	0.673786	(0.587952)	0.378674	(0.876963)	0.093106	(1.529739)	-6.055078**	(2.088415)	-77.99375**	(4.499723)	-188.7414**	(7.114512)	-1379.902**	(30.04173)
Split (dummy)	-0.08153**	(0.007405)	-0.042377**	(0.01047)	0.11883**	(0.017765)	0.180067**	(0.024294)	0.303747**	(0.05235)	0.385617**	(0.08016)	1.301573**	(0.29106)
Bid-ask spread	-22.21252**	(0.470204)	-41.38676**	(0.760798)	-80.90014**	(1.391114)	-105.3739**	(1.846439)	-163.9972**	(3.448739)	-223.9003**	(5.205742)	-635.1107**	(19.38002)
Opposite (dummy)	0.260205**	(0.006308)	0.384788**	(0.008864)	-0.129756**	(0.014896)	-0.358686**	(0.020338)	-1.140165**	(0.043915)	-1.730273**	(0.067317)	-3.916944**	(0.244257)
Medium (dummy)	-0.031169**	(0.011571)	-0.081717**	(0.01613)	-0.171072**	(0.026599)	-0.147989**	(0.036608)	-0.189611*	(0.080505)	-0.21814	(0.123271)	2.421772**	(0.451818)
Large (dummy)	-0.314515**	(0.03108)	-0.306662**	(0.044909)	-0.500705**	(0.075698)	-0.494224**	(0.107106)	0.182993	(0.245684)	0.405811	(0.374983)	6.245922**	(1.292565)
X-Large (dummy)	-0.660692**	(0.061373)	-0.997321**	(0.101197)	-1.742001**	(0.172977)	-1.839395**	(0.243042)	-3.572012**	(0.553407)	-4.746787**	(0.942728)	-18.25949**	(3.438701)
Adjusted R-squared	0.046621		0.067583		0.09635		0.129336		0.338295		0.448774		0.662591	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 21: Base model (OLS), EUR/JPY, 10 September 2010, Sell order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.003728		1.667249		3.402038		5.138411		16.46182		30.00322		159.0628	
Constant	5.41778**	(0.303657)	6.743615**	(0.387795)	10.55598**	(0.615008)	12.80953**	(0.774233)	22.52896**	(1.458895)	28.71809**	(2.091232)	89.96721**	(6.470252)
Time zone 1 (dummy)	-0.342949**	(0.009799)	-0.447057**	(0.013551)	-0.804058**	(0.022352)	-1.005093**	(0.030027)	-1.384621**	(0.062997)	-2.102521**	(0.095083)	-12.58075**	(0.352793)
Time zone 2 (dummy)	-0.300984**	(0.009488)	-0.419159**	(0.013091)	-0.729805**	(0.02173)	-0.865583**	(0.029444)	-0.636061**	(0.061144)	-0.586057**	(0.092218)	-0.934996**	(0.347346)
Time zone 3 (dummy)	-0.066013**	(0.009445)	-0.03789**	(0.013022)	-0.098168**	(0.021495)	-0.081665**	(0.029137)	0.909557**	(0.059275)	1.957178**	(0.088692)	16.71561**	(0.337117)
Market activity	0.000878**	(0.0000285)	0.001528**	(0.00004)	0.003858**	(0.0000683)	0.007343**	(0.0000935)	0.036327**	(0.000201)	0.072994**	(0.000311)	0.41254**	(0.001284)
Aggressiveness	-4.29846**	(0.308093)	-4.911728**	(0.393344)	-6.686757**	(0.623479)	-7.609908**	(0.784779)	-12.8867**	(1.478655)	-14.45782**	(2.118999)	-31.99779**	(6.543276)
Market Depth	0.007835**	(0.000926)	0.013971**	(0.001343)	0.022339**	(0.002141)	0.026397**	(0.002752)	0.043536**	(0.005639)	0.07607**	(0.008361)	0.938851**	(0.03302)
Volatility	-1.282461*	(0.579856)	-1.010331	(0.841086)	-3.749958*	(1.467955)	-10.89942**	(2.006375)	-94.24821**	(4.214977)	-214.0351**	(6.526593)	-1377.656**	(28.44758)
Split (dummy)	-0.100849**	(0.007489)	-0.070405**	(0.010531)	0.056274**	(0.017615)	0.105676**	(0.024156)	0.214953**	(0.051263)	0.362346**	(0.076932)	1.401695**	(0.281455)
Bid-ask spread	-21.59654**	(0.457618)	-38.09601**	(0.713314)	-71.36064**	(1.272412)	-92.20814**	(1.698006)	-128.6996**	(3.158502)	-153.5876**	(4.547269)	-500.2503**	(17.76715)
Opposite (dummy)	0.281266**	(0.006331)	0.428739**	(0.008839)	-0.011508	(0.014711)	-0.194152**	(0.020141)	-0.936917**	(0.042845)	-1.363116**	(0.06432)	-3.080307**	(0.235989)
Medium (dummy)	-0.05035**	(0.011643)	-0.096938**	(0.016101)	-0.156657**	(0.0266)	-0.17329**	(0.036567)	-0.205146**	(0.078128)	-0.018681	(0.11725)	2.946352**	(0.435076)
Large (dummy)	-0.315024**	(0.029866)	-0.269035**	(0.045995)	-0.463506**	(0.078324)	-0.474769**	(0.111597)	0.126927	(0.242113)	0.389184	(0.358424)	5.795835**	(1.283923)
X-Large (dummy)	-0.601705**	(0.081561)	-0.7668**	(0.134997)	-1.301159**	(0.23034)	-1.351076**	(0.291066)	-2.440196**	(0.57116)	-3.277658**	(0.889706)	-16.57095**	(3.074439)
Adjusted R-squared	0.04782		0.066681		0.092041		0.125083		0.333611		0.456475		0.666619	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 22: Base model (OLS), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95882		1.593369		3.359089		4.980163		15.37131		27.82783		144.0147	
Constant	5.315152**	(0.355616)	6.316288**	(0.432413)	9.547501**	(0.68045)	11.465**	(0.845486)	18.01952**	(1.559563)	26.09314**	(2.252334)	65.59289**	(7.39992)
Time zone 1 (dummy)	-0.244525**	(0.00976)	-0.281047**	(0.013442)	-0.625599**	(0.022467)	-0.896722**	(0.02995)	-3.335828**	(0.063322)	-6.550741**	(0.098072)	-41.19106**	(0.383543)
Time zone 2 (dummy)	-0.010236	(0.008964)	0.029958*	(0.012313)	0.024918	(0.02087)	0.036418	(0.028061)	-0.674861**	(0.062879)	-1.93856**	(0.097636)	-9.777385**	(0.374419)
Time zone 3 (dummy)	0.06737**	(0.008702)	0.147618**	(0.012022)	0.359274**	(0.020181)	0.517255**	(0.02712)	1.168293**	(0.061508)	2.621156**	(0.097582)	25.09324**	(0.363663)
Market activity	0.003402**	(0.000107)	0.00665**	(0.000152)	0.015306**	(0.000264)	0.028478**	(0.000368)	0.126436**	(0.000902)	0.236399**	(0.0014)	1.084467**	(0.005398)
Aggressiveness	-4.256792**	(0.360371)	-4.538385**	(0.438021)	-5.709296**	(0.689265)	-6.533074**	(0.856524)	-9.20468**	(1.580278)	-13.00234**	(2.281698)	-10.91075	(7.500587)
Market Depth	0.007986**	(0.000656)	0.016821**	(0.000981)	0.03065**	(0.001703)	0.040482**	(0.002264)	0.104088**	(0.004942)	0.162896**	(0.007203)	0.662395**	(0.025203)
Volatility	1.034101*	(0.44911)	1.979031**	(0.650153)	12.53384**	(1.104354)	25.89777**	(1.49993)	152.1217**	(3.257131)	325.2853**	(5.02116)	1922.728**	(18.61645)
Split (dummy)	-0.148517**	(0.007508)	-0.137175**	(0.010586)	-0.022501	(0.018357)	0.020339	(0.024889)	0.084331	(0.053232)	0.19636*	(0.082059)	2.613808**	(0.316247)
Bid-ask spread	-24.97357**	(0.544625)	-46.16576**	(0.843458)	-89.71506**	(1.531788)	-113.3373**	(2.010351)	-184.9586**	(3.725824)	-271.6003**	(5.651863)	-924.4806**	(21.84307)
Opposite (dummy)	0.216033**	(0.006471)	0.31429**	(0.009013)	-0.279082**	(0.015323)	-0.537724**	(0.020681)	-1.279955**	(0.044308)	-1.632638**	(0.068357)	-2.414574**	(0.262632)
Medium (dummy)	-0.090861**	(0.011184)	-0.194153**	(0.015273)	-0.328228**	(0.025441)	-0.329732**	(0.034749)	-0.270619**	(0.076064)	-0.033069	(0.118456)	4.693769**	(0.453961)
Large (dummy)	-0.270922**	(0.026655)	-0.294249**	(0.038233)	-0.502695**	(0.067915)	-0.467056**	(0.095386)	0.007644	(0.212651)	0.874876**	(0.332673)	8.59406**	(1.247235)
X-Large (dummy)	-0.324023**	(0.06366)	-0.326009**	(0.100135)	-0.505133**	(0.176892)	-0.464453*	(0.230667)	0.613431	(0.494018)	2.667945**	(0.789666)	24.14533**	(3.425995)
Adjusted R-squared	0.040263		0.060981		0.087054		0.112922		0.268576		0.355613		0.490036	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 23: Base model (OLS), EUR/JPY, 13 September 2010, Sell order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95219		1.569979		3.232644		4.798213		14.80236		26.78061		139.1414	
Constant	5.627048**	(0.377354)	6.696782**	(0.463034)	9.769898**	(0.69952)	11.75243**	(0.838672)	19.0225**	(1.641791)	25.67383**	(2.221717)	67.29194**	(7.409575)
Time zone 1 (dummy)	-0.33417**	(0.009666)	-0.43017**	(0.013409)	-0.828736**	(0.022054)	-1.176735**	(0.029143)	-3.865132**	(0.06163)	-7.54181**	(0.095441)	-45.32897**	(0.379481)
Time zone 2 (dummy)	-0.039756**	(0.009151)	-0.019815	(0.012719)	0.035986	(0.021702)	0.048805	(0.029186)	-0.683237**	(0.065282)	-2.163255**	(0.099659)	-12.06869**	(0.375458)
Time zone 3 (dummy)	0.040354**	(0.008974)	0.078426**	(0.012394)	0.183883**	(0.020448)	0.290895**	(0.027396)	0.642616**	(0.061939)	1.484176**	(0.096631)	18.06708**	(0.371271)
Market activity	0.003074**	(0.000108)	0.006217**	(0.000151)	0.014564**	(0.000253)	0.02732**	(0.000351)	0.12215**	(0.000867)	0.230203**	(0.001382)	1.051791**	(0.005792)
Aggressiveness	-4.552518**	(0.382531)	-4.889859**	(0.469181)	-5.899982**	(0.708467)	-6.813534**	(0.849218)	-10.07595**	(1.662419)	-11.70076**	(2.247993)	-8.341676	(7.499134)
Market Depth	0.004476**	(0.000628)	0.008596**	(0.000912)	0.017616**	(0.001611)	0.027222**	(0.002251)	0.071184**	(0.004723)	0.105153**	(0.006893)	0.5704**	(0.025774)
Volatility	0.741314	(0.439911)	1.162432	(0.616735)	4.805796**	(1.067715)	13.0172**	(1.438817)	122.0375**	(3.582142)	260.6352**	(5.884034)	1809.169**	(20.51912)
Split (dummy)	-0.116005**	(0.007779)	-0.091552**	(0.010856)	0.003674	(0.018304)	0.017363	(0.02463)	0.122072*	(0.053675)	0.23134**	(0.081842)	2.569821**	(0.314066)
Bid-ask spread	-23.91584**	(0.542834)	-43.30011**	(0.861111)	-81.68222**	(1.514721)	-100.2254**	(1.88088)	-160.5313**	(3.544404)	-236.777**	(5.18486)	-919.7992**	(19.74223)
Opposite (dummy)	0.237383**	(0.006478)	0.340726**	(0.008989)	-0.187257**	(0.015159)	-0.381868**	(0.020426)	-1.032695**	(0.044647)	-1.526679**	(0.068097)	-3.706265**	(0.261303)
Medium (dummy)	-0.079103**	(0.011193)	-0.169175**	(0.015226)	-0.291693**	(0.024961)	-0.279715**	(0.033932)	-0.103945	(0.076424)	0.305668**	(0.117953)	6.108055**	(0.45374)
Large (dummy)	-0.262479**	(0.026889)	-0.234372**	(0.039506)	-0.310452**	(0.067456)	-0.209571*	(0.094247)	0.497131*	(0.212217)	1.350024**	(0.327874)	10.36549**	(1.222351)
X-Large (dummy)	-0.304112**	(0.063093)	-0.285635**	(0.102573)	-0.410152*	(0.174896)	-0.317095	(0.240637)	1.667341**	(0.53483)	4.259922**	(0.845441)	30.46969**	(3.7003)
Adjusted R-squared	0.037542		0.055121		0.073989		0.096944		0.241816		0.331316		0.471391	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 24: Extended model (OLS), EUR/USD, 9 September 2010, Buy order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.415653		3.923095		7.552301		11.09627		34.14066		61.05544		309.1979	
Constant	3.934429**	(0.16204)	5.369859**	(0.235226)	10.31378**	(0.409451)	13.96865**	(0.572019)	33.92535**	(1.370501)	49.664**	(2.095824)	137.582**	(7.982218)
Time zone 1 (dummy)	-0.457376**	(0.017204)	-0.512932**	(0.025382)	-0.428046**	(0.041798)	-0.288042**	(0.05412)	-0.631829**	(0.104218)	-2.214237**	(0.154223)	-25.46251**	(0.537315)
Time zone 2 (dummy)	-0.428446**	(0.013887)	-0.444778**	(0.019606)	-0.14715**	(0.032049)	0.284863**	(0.043579)	2.859415**	(0.098815)	4.909629**	(0.151564)	38.22238**	(0.562861)
Time zone 3 (dummy)	-0.074692**	(0.014195)	0.043037*	(0.019951)	0.506804**	(0.032297)	0.861988**	(0.044003)	3.165488**	(0.09761)	5.768614**	(0.149213)	50.09145**	(0.539878)
Market activity	0.000608**	(0.000014)	0.001208**	(0.0000206)	0.003055**	(0.0000356)	0.00657**	(0.0000506)	0.034287**	(0.00013)	0.066936**	(0.000197)	0.345156**	(0.000711)
Aggressiveness	-0.93436**	(0.166028)	-0.891765**	(0.241147)	-2.577409**	(0.419163)	-4.715141**	(0.584614)	-19.97023**	(1.399424)	-30.54361**	(2.139867)	-66.61466**	(8.16244)
Market Depth	0.060525**	(0.000952)	0.095988**	(0.001544)	0.15116**	(0.002387)	0.195362**	(0.002911)	0.367598**	(0.005007)	0.503426**	(0.006947)	1.149308**	(0.022815)
Volatility	0.003703**	(0.00107)	0.007664**	(0.001998)	0.005866	(0.004216)	0.020644	(0.011732)	0.103099*	(0.051797)	0.188476	(0.102993)	1.259481	(0.73339)
Split (dummy)	0.012069	(0.04238)	0.366324**	(0.065093)	0.914122**	(0.1109)	1.06779**	(0.147614)	1.669861**	(0.325069)	2.006024**	(0.486756)	4.883438**	(1.778151)
Bid-ask spread	-183.6872**	(2.471547)	-291.6842**	(3.879842)	-484.9363**	(6.502115)	-597.8525**	(8.053326)	-889.0702**	(13.68956)	-1077.911**	(18.72587)	-2093.039**	(62.80975)
Opposite (dummy)	0.023589*	(0.00993)	0.098967**	(0.014244)	-0.296512**	(0.023979)	-0.481066**	(0.032862)	-1.439765**	(0.076543)	-1.936318**	(0.117441)	-5.088617**	(0.4331)
Medium (dummy)	-0.448342**	(0.030143)	-0.652063**	(0.043772)	-1.109206**	(0.072775)	-1.08708**	(0.099347)	-0.424118	(0.237688)	1.032747**	(0.368926)	18.568**	(1.432162)
Large (dummy)	-2.001774**	(0.091538)	-3.191876**	(0.140541)	-5.127691**	(0.243921)	-5.886488**	(0.347815)	-8.254681**	(0.898976)	-9.190399**	(1.457408)	-8.193972	(5.627597)
X-Large (dummy)	-2.1236**	(0.188834)	-3.355248**	(0.26631)	-4.594006**	(0.476887)	-4.674413**	(0.629995)	-2.919563	(1.674222)	-4.034682	(2.505866)	7.958219	(8.844738)
Opposite * Medium (dummy)	-0.107073**	(0.028059)	-0.099568*	(0.041028)	-0.197909**	(0.06958)	-0.439831**	(0.097213)	-1.147407**	(0.236571)	-1.617133**	(0.366194)	-3.442927*	(1.388414)
Opposite * Large (dummy)	0.814936**	(0.086765)	1.647949**	(0.136148)	2.315637**	(0.222615)	2.469455**	(0.306386)	3.227711**	(0.765194)	3.42398**	(1.21206)	14.08719**	(4.687845)
Opposite * X-Large (dummy)	1.306713**	(0.166681)	2.410092**	(0.268792)	2.091876**	(0.426825)	1.539843**	(0.552411)	-2.760007*	(1.218511)	-5.401467**	(1.839443)	-14.77671*	(6.202936)
Split * Agg 2 (dummy)	-0.018349	(0.046868)	-0.340431**	(0.071004)	-0.781456**	(0.120676)	-1.066421**	(0.161205)	-2.207868**	(0.357956)	-3.11628**	(0.539191)	-5.956995**	(1.973521)
Split * Agg 3 (dummy)	-0.180249**	(0.046061)	-0.43458**	(0.070248)	-0.62288**	(0.120444)	-0.739125**	(0.161997)	-1.801112**	(0.36244)	-2.321694**	(0.545989)	-5.498679**	(1.992942)
Split * Agg 4 (dummy)	-0.56126**	(0.067586)	-0.657774**	(0.101192)	-1.104659**	(0.167946)	-1.220142**	(0.229747)	-1.853247**	(0.530304)	-2.311046**	(0.821677)	-4.641576	(3.11584)
Medium * Agg 2 (dummy)	0.122101**	(0.033115)	0.152221**	(0.04833)	0.310337**	(0.080927)	0.308106**	(0.111883)	0.060354	(0.270314)	-0.706402	(0.419474)	-11.87004**	(1.617116)
Medium * Agg 3 (dummy)	-0.15545**	(0.038922)	-0.070584	(0.058035)	0.075319	(0.099406)	0.093521	(0.139992)	0.047779	(0.346039)	-1.185248*	(0.533063)	-10.64244**	(2.053294)
Medium * Agg 4 (dummy)	-0.196233**	(0.046955)	0.303517**	(0.072716)	0.543526**	(0.123688)	0.499116**	(0.170881)	-0.546449	(0.40388)	-1.581855*	(0.63028)	-17.81309**	(2.382252)
Large * Agg 2 (dummy)	0.044436	(0.13253)	0.256694	(0.214498)	0.434134	(0.370971)	0.551521	(0.523524)	1.371899	(1.347351)	2.611924	(2.176257)	-13.2275	(8.489372)
Large * Agg 3 (dummy)	-0.122389	(0.119322)	0.110996	(0.188456)	0.223497	(0.323446)	0.078667	(0.454056)	1.971767	(1.206385)	3.664118	(1.975393)	-4.4962	(7.711299)
Large * Agg 4 (dummy)	1.031013**	(0.110855)	2.760539**	(0.172614)	4.262231**	(0.292606)	4.549369**	(0.408266)	5.245141**	(1.021664)	5.306041**	(1.649889)	-1.882397	(6.50805)
X-Large * Agg 2 (dummy)	-0.043557	(0.193169)	-0.010953	(0.292486)	0.256707	(0.54002)	0.2103	(0.733799)	2.19432	(1.904205)	5.15486	(2.911181)	-5.761193	(10.47649)
X-Large * Agg 3 (dummy)	-0.936929**	(0.193767)	-0.886314**	(0.28625)	-0.900285	(0.513069)	-1.234801	(0.708846)	-0.0228	(1.974112)	2.912074	(3.015884)	-11.52853	(10.2702)
X-Large * Agg 4 (dummy)	2.426317**	(0.23771)	6.703486**	(0.361863)	10.17679**	(0.607485)	10.98457**	(0.794238)	13.49059**	(1.958047)	18.15393**	(2.964502)	22.41178*	(10.11779)
Adjusted R-squared	0.111903		0.13923		0.148665		0.166829		0.305154		0.391405		0.550924	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 25: Extended model (OLS), EUR/USD, 9 September 2010, Sell order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.353959		3.823379		7.310413		10.67668		32.74714		58.60092		297.4585	
Constant	4.452991**	(0.163686)	6.110087**	(0.239242)	9.851736**	(0.395598)	12.55337**	(0.539611)	28.64959**	(1.232558)	41.66184**	(1.880962)	113.8959**	(7.205673)
Time zone 1 (dummy)	-0.502809**	(0.016613)	-0.497535**	(0.024538)	-0.37729**	(0.042718)	-0.20382**	(0.056174)	-0.382534**	(0.104536)	-1.971021**	(0.154517)	-21.20587**	(0.538473)
Time zone 2 (dummy)	-0.507602**	(0.013637)	-0.542473**	(0.019501)	-0.429484**	(0.03215)	-0.192261**	(0.043821)	1.58493**	(0.096489)	2.558869**	(0.1467)	26.34776**	(0.530824)
Time zone 3 (dummy)	-0.167065**	(0.014326)	-0.097621**	(0.020478)	0.143909**	(0.033131)	0.310803**	(0.044697)	2.118826**	(0.096539)	3.936753**	(0.146917)	41.59358**	(0.531202)
Market activity	0.000541**	(0.0000132)	0.001075**	(0.0000195)	0.002866**	(0.0000338)	0.006184**	(0.0000473)	0.032244**	(0.000112)	0.063097**	(0.00017)	0.334349**	(0.00063)
Aggressiveness	-1.41589**	(0.167261)	-1.591377**	(0.244617)	-2.015644**	(0.404277)	-3.152832**	(0.550467)	-14.14991**	(1.256815)	-21.15369**	(1.918012)	-43.95085**	(7.359772)
Market Depth	0.060754**	(0.000886)	0.099642**	(0.001406)	0.155091**	(0.002186)	0.19834**	(0.002656)	0.381225**	(0.004669)	0.506688**	(0.006301)	1.293355**	(0.020756)
Volatility	0.001706**	(0.00062)	0.003974**	(0.001104)	0.002447	(0.002143)	0.010833	(0.006969)	0.050919	(0.030938)	0.097156	(0.066554)	0.835411	(0.546873)
Split (dummy)	-0.033156	(0.042381)	0.296869**	(0.065521)	0.835601**	(0.107484)	1.112383**	(0.140896)	1.644072**	(0.295793)	2.063857**	(0.442171)	4.810321**	(1.613882)
Bid-ask spread	-184.046**	(2.426988)	-296.2066**	(3.868592)	-485.9314**	(6.42583)	-587.4778**	(7.813339)	-878.253**	(13.19998)	-1046.116**	(17.56309)	-2059.911**	(55.80176)
Opposite (dummy)	0.015613	(0.009607)	0.093851**	(0.013902)	-0.327833**	(0.023456)	-0.569817**	(0.031844)	-1.471157**	(0.071642)	-2.165901**	(0.108767)	-3.303048**	(0.393838)
Medium (dummy)	-0.72598**	(0.031353)	-1.045037**	(0.046509)	-1.711972**	(0.076173)	-1.867509**	(0.103814)	-1.321621**	(0.240601)	-0.096596	(0.3683)	15.55079**	(1.412157)
Large (dummy)	-2.097274**	(0.092968)	-3.393109**	(0.149997)	-5.311768**	(0.259862)	-5.892707**	(0.374495)	-5.858512**	(0.915812)	-6.243039**	(1.490384)	3.869908	(5.758113)
X-Large (dummy)	-2.635782**	(0.151366)	-4.25419**	(0.256666)	-6.482782**	(0.436744)	-6.674666**	(0.614246)	-6.453558**	(1.676115)	-9.225716**	(2.62319)	-3.634909	(8.488046)
Opposite * Medium (dummy)	0.332152**	(0.027808)	0.521599**	(0.040865)	0.814435**	(0.067925)	0.889676**	(0.093389)	0.976128**	(0.220356)	1.107576**	(0.337954)	1.539314	(1.265125)
Opposite * Large (dummy)	0.850546**	(0.081726)	1.786624**	(0.129738)	2.468714**	(0.208799)	2.515748**	(0.289302)	1.137955	(0.724973)	0.848534	(1.132951)	-6.282841	(4.236538)
Opposite * X-Large (dummy)	1.565818**	(0.159932)	3.04915**	(0.25907)	4.148384**	(0.411804)	3.656976**	(0.526448)	3.51472**	(1.124841)	4.229879*	(1.665616)	8.122485	(5.601523)
Split * Agg 2 (dummy)	0.026212	(0.046791)	-0.262378**	(0.071547)	-0.847366**	(0.117459)	-1.293441**	(0.154593)	-2.507985**	(0.327952)	-3.606229**	(0.492149)	-6.505394**	(1.788478)
Split * Agg 3 (dummy)	-0.097916*	(0.045881)	-0.36295**	(0.070308)	-0.52511**	(0.11672)	-0.74309**	(0.154907)	-1.808241**	(0.331503)	-2.439387**	(0.497763)	-6.816873**	(1.810325)
Split * Agg 4 (dummy)	-0.503634**	(0.064104)	-0.532532**	(0.098653)	-0.973983**	(0.163287)	-1.266374**	(0.220121)	-1.985887**	(0.489291)	-2.637685**	(0.762176)	-5.178511	(2.841676)
Medium * Agg 2 (dummy)	0.27013**	(0.033075)	0.341691**	(0.048512)	0.464906**	(0.07928)	0.432723**	(0.107955)	-0.392146	(0.252397)	-1.416576**	(0.387946)	-13.09386**	(1.474135)
Medium * Agg 3 (dummy)	-0.102834**	(0.037897)	-0.058903	(0.05658)	0.294881**	(0.096837)	0.357555**	(0.135643)	0.108718	(0.324805)	-1.068157*	(0.494556)	-10.70996**	(1.874426)
Medium * Agg 4 (dummy)	-0.212836**	(0.045436)	0.40107**	(0.07103)	0.641984**	(0.120318)	0.704684**	(0.163968)	-0.472271	(0.381664)	-1.358927*	(0.592612)	-15.3044**	(2.177237)
Large * Agg 2 (dummy)	0.029043	(0.115532)	0.142959	(0.19496)	0.356152	(0.351389)	0.473279	(0.502611)	0.759479	(1.300346)	2.312941	(2.030794)	-11.27254	(7.843429)
Large * Agg 3 (dummy)	-0.077687	(0.10632)	0.244913	(0.174016)	0.350898	(0.302921)	0.097204	(0.435633)	0.792928	(1.140145)	2.524254	(1.829543)	-6.323759	(6.823823)
Large * Agg 4 (dummy)	1.004003**	(0.101858)	2.928479**	(0.162136)	4.455173**	(0.275075)	4.737631**	(0.391599)	4.114175**	(0.960914)	4.351756**	(1.54444)	-1.294732	(5.878523)
X-Large * Agg 2 (dummy)	0.38724*	(0.151936)	0.617142*	(0.261173)	1.257505**	(0.479127)	1.065795	(0.67579)	1.778048	(1.716754)	4.545151	(2.729403)	-5.749949	(9.389816)
X-Large * Agg 3 (dummy)	-0.544383**	(0.15114)	-0.477576	(0.254319)	-0.173871	(0.452271)	-0.383285	(0.6487)	-0.19181	(1.800121)	1.13866	(2.750931)	-15.43021	(9.1857)
X-Large * Agg 4 (dummy)	2.517664**	(0.209303)	6.754934**	(0.342903)	10.44185**	(0.5578)	11.34324**	(0.737252)	12.93723**	(1.789434)	17.0449**	(2.747476)	19.92141*	(9.061674)
Adjusted R-squared	0.115323		0.142784		0.147882		0.162525		0.3074		0.397222		0.577248	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 26: Extended model (OLS), EUR/USD, 10 September 2010, Buy order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.317173		3.762483		7.308781		10.61193		32.40497		57.89397		294.6523	
Constant	3.574419**	(0.174665)	4.315859**	(0.260633)	9.272821**	(0.459119)	12.00088**	(0.600675)	23.32662**	(1.294838)	33.8582**	(1.937136)	98.58738**	(6.572526)
Time zone 1 (dummy)	-0.684609**	(0.015159)	-0.947919**	(0.021723)	-1.484046**	(0.037566)	-1.612684**	(0.05051)	-0.624126**	(0.117396)	-0.240405	(0.180292)	-12.16769**	(0.651509)
Time zone 2 (dummy)	-0.689366**	(0.013491)	-0.904865**	(0.019276)	-1.273927**	(0.033193)	-1.332405**	(0.044738)	0.024472	(0.099753)	1.346702**	(0.153136)	20.40988**	(0.554529)
Time zone 3 (dummy)	-0.038792**	(0.013738)	0.018634	(0.019589)	0.055503	(0.032973)	0.208875**	(0.043756)	2.762112**	(0.095209)	5.420072**	(0.145297)	45.10014**	(0.531534)
Market activity	0.000597**	(0.0000248)	0.001129**	(0.0000369)	0.003082**	(0.0000633)	0.006058**	(0.0000835)	0.032067**	(0.000181)	0.062157**	(0.000277)	0.355122**	(0.000969)
Aggressiveness	-0.309199	(0.166014)	0.744558**	(0.244599)	0.003252	(0.429679)	-0.713139	(0.568705)	-6.431737**	(1.268476)	-11.57098**	(1.913432)	-16.83175*	(6.608471)
Market Depth	0.026415**	(0.000614)	0.043115**	(0.000959)	0.066088**	(0.0016)	0.083511**	(0.001966)	0.209221**	(0.003917)	0.386426**	(0.005839)	1.611333**	(0.022716)
Volatility	5.870959**	(1.208735)	8.191966**	(1.821042)	12.63702**	(3.087623)	29.3358**	(4.019751)	80.56996**	(8.612694)	153.0733**	(13.61588)	-1262.828**	(50.566)
Split (dummy)	-0.27489**	(0.04851)	-0.171492*	(0.072112)	-0.127326	(0.120293)	0.104718	(0.162491)	0.285038	(0.361828)	-0.111551	(0.545937)	-0.732046	(1.836337)
Bid-ask spread	-193.6548**	(3.289137)	-316.6694**	(5.296102)	-557.964**	(9.279313)	-677.3573**	(11.31468)	-1054.919**	(18.63856)	-1414.049**	(25.07522)	-2682.008**	(59.5255)
Opposite (dummy)	0.050875**	(0.009569)	0.198959**	(0.013638)	-0.232782**	(0.023358)	-0.44211**	(0.031819)	-1.339501**	(0.074803)	-1.933632**	(0.114334)	-4.416474**	(0.401393)
Medium (dummy)	-0.644366**	(0.022863)	-0.922456**	(0.033251)	-1.443569**	(0.05744)	-1.49318**	(0.08048)	-1.356799**	(0.196665)	-1.082097**	(0.302469)	4.669898**	(1.080378)
Large (dummy)	-1.787522**	(0.089213)	-2.584687**	(0.143354)	-4.410666**	(0.247133)	-5.398793**	(0.325371)	-7.423115**	(0.837207)	-7.944475**	(1.408545)	-11.73764*	(4.880627)
X-Large (dummy)	-1.818298**	(0.121119)	-2.82953**	(0.191733)	-4.506783**	(0.311367)	-4.814592**	(0.445001)	-5.763127**	(1.234097)	-6.283096**	(1.852841)	1.949832	(7.163735)
Opposite * Medium (dummy)	0.178375**	(0.024268)	0.23069**	(0.035574)	0.27297**	(0.061801)	0.21767*	(0.086227)	0.103422	(0.209449)	-0.134546	(0.323241)	1.05245	(1.144053)
Opposite * Large (dummy)	0.698588**	(0.08116)	1.066746**	(0.122747)	1.301182**	(0.206387)	1.431923**	(0.28635)	1.893895**	(0.711254)	0.734351	(1.145046)	1.01522	(4.090195)
Opposite * X-Large (dummy)	1.085191**	(0.136224)	2.025654**	(0.212377)	2.093663**	(0.332079)	1.863742**	(0.440733)	1.365127	(1.077291)	0.951952	(1.673108)	-7.450742	(5.627803)
Split * Agg 2 (dummy)	0.58096**	(0.051815)	0.607294**	(0.076912)	0.812825**	(0.128209)	0.590723**	(0.173295)	-0.308887	(0.386267)	-0.233877	(0.583069)	2.467706	(1.971859)
Split * Agg 3 (dummy)	0.400044**	(0.05031)	0.411972**	(0.074692)	0.72446**	(0.125149)	0.580684**	(0.169231)	0.266163	(0.378116)	1.064844	(0.571667)	7.091359**	(1.934714)
Split * Agg 4 (dummy)	0.270695**	(0.082918)	0.804327**	(0.121744)	1.57182**	(0.205921)	1.757319**	(0.274029)	1.65454**	(0.601366)	2.374513*	(0.935467)	8.568356*	(3.348961)
Medium * Agg 2 (dummy)	0.267002**	(0.026822)	0.426587**	(0.038911)	0.653797**	(0.06715)	0.647453**	(0.094052)	0.606419**	(0.230012)	0.362861	(0.354204)	-2.794975*	(1.250088)
Medium * Agg 3 (dummy)	-0.140631**	(0.030244)	0.10432*	(0.045695)	0.416505**	(0.081918)	0.371692**	(0.115193)	0.185176	(0.285533)	-0.047218	(0.444721)	-2.336017	(1.577831)
Medium * Agg 4 (dummy)	-0.269957**	(0.042156)	0.302812**	(0.065715)	0.308684**	(0.114693)	0.307362	(0.157905)	-1.234646**	(0.360992)	-2.189648**	(0.558503)	-5.430969**	(2.023446)
Large * Agg 2 (dummy)	-0.127975	(0.112008)	-0.139988	(0.187576)	-0.167076	(0.328465)	0.359195	(0.466584)	0.542501	(1.262582)	0.122328	(1.975826)	-4.823821	(7.272136)
Large * Agg 3 (dummy)	-0.015684	(0.109415)	0.431705*	(0.182698)	1.073498**	(0.313658)	1.45069**	(0.437092)	3.537355**	(1.14024)	5.394131**	(1.895748)	0.137539	(6.632862)
Large * Agg 4 (dummy)	0.939093**	(0.104673)	2.158257**	(0.162517)	3.382025**	(0.279885)	4.02028**	(0.378741)	4.094709**	(0.949066)	3.841883*	(1.569722)	8.569992	(5.516302)
X-Large * Agg 2 (dummy)	-0.124977	(0.144071)	-0.116838	(0.229226)	0.169481	(0.375412)	-0.028231	(0.548226)	1.78263	(1.678701)	2.501858	(2.598974)	-1.455112	(8.828502)
X-Large * Agg 3 (dummy)	-0.518742**	(0.134603)	-0.056805	(0.22815)	0.860818*	(0.388886)	1.421483*	(0.572339)	3.49074*	(1.689837)	4.413515	(2.513703)	-6.341607	(8.91822)
X-Large * Agg 4 (dummy)	1.695153**	(0.17493)	4.999876**	(0.272388)	8.03585**	(0.430684)	9.23934**	(0.58313)	10.36982**	(1.499009)	12.3135**	(2.244219)	12.81094	(8.26926)
Adjusted R-squared	0.15925		0.199899		0.216978		0.213596		0.307426		0.388382		0.570152	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 27: Extended model (OLS), EUR/USD, 10 September 2010, Sell order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.243669		3.632582		7.049843		10.25431		31.28285		56.0166		285.1196	
Constant	3.596211**	(0.168748)	4.651881**	(0.252034)	8.923153**	(0.443652)	11.57646**	(0.591095)	21.58872**	(1.257441)	31.49927**	(1.889627)	102.0569**	(6.471104)
Time zone 1 (dummy)	-0.595273**	(0.0147)	-0.769581**	(0.021173)	-1.147828**	(0.037025)	-1.188904**	(0.051269)	0.171118	(0.123535)	1.179326**	(0.19555)	-10.47911**	(0.694747)
Time zone 2 (dummy)	-0.595752**	(0.013056)	-0.733493**	(0.018555)	-1.000226**	(0.03259)	-1.115506**	(0.044533)	0.335426**	(0.093564)	1.6487**	(0.140611)	20.70947**	(0.505221)
Time zone 3 (dummy)	-0.068482**	(0.013048)	-0.029243	(0.018272)	-0.096834**	(0.031162)	-0.091567*	(0.042047)	2.069359**	(0.088068)	4.096834**	(0.131948)	33.62348**	(0.481311)
Market activity	0.000567**	(0.000025)	0.001056**	(0.0000375)	0.002875**	(0.0000639)	0.005859**	(0.0000847)	0.030613**	(0.000183)	0.059806**	(0.000276)	0.344316**	(0.000986)
Aggressiveness	-0.459586**	(0.159778)	0.190063	(0.234344)	-0.040752	(0.41379)	-0.701609	(0.558557)	-5.760349**	(1.227783)	-10.9866**	(1.865506)	-24.11449**	(6.500121)
Market Depth	0.027948**	(0.00073)	0.046342**	(0.00124)	0.075437**	(0.001864)	0.096433**	(0.002218)	0.213294**	(0.004208)	0.358181**	(0.006314)	1.468336**	(0.022729)
Volatility	8.597673**	(1.209858)	14.16521**	(1.83567)	26.78538**	(3.15496)	46.99198**	(4.168684)	151.3488**	(9.187124)	301.5928**	(14.20186)	-748.6651**	(52.16017)
Split (dummy)	-0.282231**	(0.042933)	-0.077802	(0.067362)	0.103499	(0.123946)	0.295717	(0.167256)	1.065255**	(0.363184)	1.009254	(0.555817)	0.147138	(1.787185)
Bid-ask spread	-192.8112**	(3.21211)	-318.3**	(5.306938)	-568.9333**	(9.12165)	-700.3844**	(11.26262)	-1081.412**	(18.57008)	-1444.536**	(24.58088)	-2798.786**	(60.98867)
Opposite (dummy)	-0.012233	(0.009271)	0.071015**	(0.013163)	-0.387977**	(0.022881)	-0.652953**	(0.031687)	-1.504503**	(0.073064)	-2.191289**	(0.111771)	-4.449626**	(0.392793)
Medium (dummy)	-0.624009**	(0.022292)	-0.939922**	(0.032147)	-1.509795**	(0.056307)	-1.577709**	(0.079628)	-1.521397**	(0.190864)	-1.403876**	(0.296244)	4.777533**	(1.054661)
Large (dummy)	-2.044083**	(0.091017)	-3.252902**	(0.144281)	-5.445363**	(0.25014)	-6.511073**	(0.347025)	-7.047735**	(0.883137)	-7.831422**	(1.440638)	-8.714668	(5.106268)
X-Large (dummy)	-2.126396**	(0.113381)	-3.249627**	(0.189601)	-4.936664**	(0.363744)	-5.294033**	(0.51715)	-3.922606**	(1.469728)	-3.589685	(2.243868)	-1.003135	(7.742246)
Opposite * Medium (dummy)	0.17044**	(0.023571)	0.302315**	(0.034179)	0.41395**	(0.06019)	0.398382**	(0.08462)	0.424722*	(0.201847)	0.607354	(0.312275)	-0.046051	(1.113447)
Opposite * Large (dummy)	0.861765**	(0.084542)	1.666005**	(0.127444)	2.609553**	(0.2074)	2.857449**	(0.28643)	1.987662**	(0.695501)	2.74506*	(1.107865)	4.481005	(3.986315)
Opposite * X-Large (dummy)	1.406566**	(0.133467)	2.393263**	(0.20324)	3.081675**	(0.323343)	2.793398**	(0.433457)	-0.421338	(1.080902)	-1.451835	(1.669641)	0.957341	(5.655769)
Split * Agg 2 (dummy)	0.655731**	(0.046523)	0.544302**	(0.071953)	0.538313**	(0.131255)	0.338361	(0.17743)	-1.00368**	(0.386556)	-1.256189*	(0.590647)	2.172784	(1.916959)
Split * Agg 3 (dummy)	0.353245**	(0.044844)	0.247113**	(0.069916)	0.381591**	(0.128249)	0.282664	(0.173409)	-0.54432	(0.377974)	-0.128455	(0.578896)	5.167484**	(1.88153)
Split * Agg 4 (dummy)	0.303827**	(0.078817)	0.67295**	(0.116152)	1.265701**	(0.204282)	1.286066**	(0.273568)	0.344407	(0.590839)	0.282204	(0.935096)	3.149531	(3.243572)
Medium * Agg 2 (dummy)	0.254259**	(0.02586)	0.386397**	(0.037001)	0.675748**	(0.065069)	0.649278**	(0.091981)	0.380701	(0.220695)	0.022647	(0.340192)	-3.38526**	(1.214487)
Medium * Agg 3 (dummy)	-0.148552**	(0.030156)	0.042757	(0.044953)	0.349901**	(0.080467)	0.279114*	(0.113712)	0.06921	(0.275663)	-0.013064	(0.431492)	-3.27374*	(1.532859)
Medium * Agg 4 (dummy)	-0.283686**	(0.041336)	0.312522**	(0.064263)	0.36175**	(0.112672)	0.310111*	(0.153785)	-1.094047**	(0.352568)	-2.135163**	(0.549852)	-4.87734*	(1.997713)
Large * Agg 2 (dummy)	0.203676	(0.128831)	0.414492*	(0.202276)	0.372337	(0.342523)	0.875452	(0.473672)	1.375693	(1.259207)	0.696203	(1.971146)	-2.021136	(7.074373)
Large * Agg 3 (dummy)	0.288753**	(0.109893)	0.809819**	(0.175791)	1.460237**	(0.315486)	2.022036**	(0.442486)	3.54381**	(1.137273)	5.454146**	(1.879577)	1.1768	(6.397066)
Large * Agg 4 (dummy)	1.087827**	(0.107025)	2.592477**	(0.166951)	3.764447**	(0.284863)	4.297026**	(0.38189)	3.394176**	(0.934075)	2.611199	(1.541269)	3.087801	(5.32379)
X-Large * Agg 2 (dummy)	0.1569	(0.135019)	0.386482	(0.214053)	0.516405	(0.405584)	0.403197	(0.591406)	1.036977	(1.709008)	2.023843	(2.656133)	-0.939205	(8.798547)
X-Large * Agg 3 (dummy)	-0.119646	(0.126831)	0.573647**	(0.222753)	1.140194**	(0.411261)	1.602953**	(0.596815)	4.209896*	(1.756192)	5.038968	(2.690496)	-3.024992	(9.081537)
X-Large * Agg 4 (dummy)	1.686535**	(0.164643)	4.793345**	(0.256274)	7.348745**	(0.438095)	8.317764**	(0.595176)	8.537494**	(1.515264)	9.048721**	(2.321396)	11.65305	(8.265498)
Adjusted R-squared	0.163254		0.207714		0.225624		0.220288		0.311387		0.391867		0.565177	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 28: Extended model (OLS), EUR/USD, 13 September 2010, Buy order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.350088		3.814855		7.676221		11.40888		35.64559		64.40226		325.7092	
Constant	4.075446**	(0.164074)	4.692166**	(0.228947)	12.091**	(0.43876)	15.83547**	(0.617249)	28.39147**	(1.473653)	39.616**	(2.310983)	111.6151**	(8.7816)
Time zone 1 (dummy)	-0.499079**	(0.015911)	-0.54622**	(0.023226)	-0.858454**	(0.041723)	-0.834622**	(0.056146)	-0.171443	(0.119945)	0.847196**	(0.190943)	-7.438967**	(0.700133)
Time zone 2 (dummy)	-0.635106**	(0.013008)	-0.773392**	(0.018549)	-1.307427**	(0.032432)	-1.446121**	(0.044017)	-1.347311**	(0.096382)	-0.846027**	(0.150274)	4.617113**	(0.543905)
Time zone 3 (dummy)	-0.169538**	(0.013153)	-0.162661**	(0.018666)	-0.305747**	(0.033273)	-0.139647**	(0.046922)	1.298934**	(0.125202)	4.273182**	(0.193895)	60.89524**	(0.700861)
Market activity	0.000962**	(0.0000133)	0.001819**	(0.0000204)	0.004538**	(0.0000382)	0.008474**	(0.0000575)	0.039113**	(0.000189)	0.074157**	(0.000283)	0.350128**	(0.001063)
Aggressiveness	-1.296908**	(0.165308)	-0.528142*	(0.230291)	-4.381555**	(0.441932)	-6.433221**	(0.622536)	-14.78917**	(1.490257)	-22.03265**	(2.336993)	-49.97107**	(8.87764)
Market Depth	0.023348**	(0.000729)	0.035186**	(0.001141)	0.056185**	(0.001866)	0.07019**	(0.002354)	0.201652**	(0.005035)	0.442216**	(0.008035)	2.377996**	(0.032037)
Volatility	0.074637**	(0.014535)	0.116139**	(0.023782)	0.202839**	(0.04125)	0.240245**	(0.049492)	0.350462**	(0.081319)	0.53199**	(0.124751)	1.194974**	(0.415095)
Split (dummy)	0.60365**	(0.064837)	1.279275**	(0.095189)	2.275665**	(0.159559)	2.757628**	(0.211658)	3.659177**	(0.423355)	4.175026**	(0.651267)	0.140032	(2.278445)
Bid-ask spread	-136.5222**	(2.071297)	-218.2062**	(3.387817)	-390.7387**	(6.272494)	-474.7046**	(7.713007)	-777.8106**	(13.34883)	-1196.104**	(19.85938)	-3552.581**	(86.00204)
Opposite (dummy)	-0.058894**	(0.010327)	-0.008729	(0.014731)	-0.540541**	(0.026175)	-0.806666**	(0.036349)	-1.766028**	(0.087917)	-2.353065**	(0.139392)	-4.432774**	(0.538389)
Medium (dummy)	-0.280609**	(0.032605)	-0.428515**	(0.047898)	-0.622612**	(0.084635)	-0.627024**	(0.119268)	-0.061233	(0.296188)	1.019642*	(0.478244)	9.275599**	(1.875625)
Large (dummy)	-2.356709**	(0.092279)	-3.591924**	(0.139166)	-5.781916**	(0.258808)	-6.795531**	(0.383866)	-9.447052**	(0.95839)	-11.35416**	(1.603819)	-25.57227**	(6.719444)
X-Large (dummy)	-2.656924**	(0.17109)	-4.091782**	(0.250539)	-6.401878**	(0.41282)	-7.348453**	(0.558084)	-5.113798**	(1.452186)	-4.19269	(2.38221)	7.170712	(9.21922)
Opposite * Medium (dummy)	0.164293**	(0.028878)	0.263858**	(0.04227)	0.223177**	(0.075249)	0.133132	(0.10674)	-0.694405*	(0.269845)	-1.436677**	(0.431495)	-5.624521**	(1.687239)
Opposite * Large (dummy)	1.245964**	(0.097848)	2.0005**	(0.137414)	2.477476**	(0.239823)	2.535319**	(0.352507)	1.660134	(0.905393)	0.459381	(1.453673)	0.352485	(5.490698)
Opposite * X-Large (dummy)	1.796653**	(0.190497)	2.87484**	(0.275878)	3.268893**	(0.464759)	2.740972**	(0.609498)	-0.400269	(1.335408)	-5.207009*	(2.175083)	-19.11581*	(8.47176)
Split * Agg 2 (dummy)	-0.39573**	(0.066773)	-0.930597**	(0.097801)	-1.611183**	(0.164567)	-2.160072**	(0.218905)	-3.315035**	(0.447529)	-3.584289**	(0.692446)	3.679059	(2.459077)
Split * Agg 3 (dummy)	-0.672706**	(0.06757)	-1.294913**	(0.09909)	-2.311653**	(0.166784)	-2.918249**	(0.222135)	-4.981634**	(0.453042)	-6.795773**	(0.69982)	-8.819147**	(2.501567)
Split * Agg 4 (dummy)	-0.84096**	(0.067699)	-1.464184**	(0.099527)	-1.717285**	(0.169673)	-1.929806**	(0.227462)	-1.695541**	(0.471978)	-2.099111**	(0.72886)	6.604985*	(2.61551)
Medium * Agg 2 (dummy)	-0.221629**	(0.033902)	-0.248507**	(0.049556)	-0.434674**	(0.088237)	-0.56484**	(0.12524)	-1.107144**	(0.314294)	-2.089214**	(0.504866)	-7.082837**	(1.962863)
Medium * Agg 3 (dummy)	-0.481042**	(0.043593)	-0.408622**	(0.066387)	-0.467764**	(0.118749)	-0.668588**	(0.168876)	-1.332729**	(0.425714)	-2.896322**	(0.686558)	-12.58395**	(2.738147)
Medium * Agg 4 (dummy)	-0.366165**	(0.039214)	-0.051315	(0.058637)	-0.15353	(0.104416)	-0.315746*	(0.148773)	-0.67385	(0.382422)	-1.453483*	(0.615522)	-6.782755**	(2.42035)
Large * Agg 2 (dummy)	0.692768**	(0.156911)	1.160656**	(0.231653)	1.849963**	(0.418396)	2.511559**	(0.605814)	7.417176**	(1.600594)	11.80955**	(2.551555)	42.78799**	(9.846818)
Large * Agg 3 (dummy)	0.102721	(0.11526)	0.708249**	(0.18338)	1.667099**	(0.351002)	2.013347**	(0.536879)	5.22546**	(1.378188)	7.963405**	(2.348284)	32.96218**	(9.52509)
Large * Agg 4 (dummy)	1.563103**	(0.100228)	3.126719**	(0.147752)	4.962432**	(0.268963)	5.870909**	(0.402132)	8.304776**	(1.009649)	9.560535**	(1.695542)	15.41554*	(6.991264)
X-Large * Agg 2 (dummy)	0.387843*	(0.15335)	0.656725**	(0.229133)	1.315861**	(0.414332)	1.942676**	(0.641509)	2.366407	(1.837846)	6.007486*	(3.038226)	19.02108	(13.2674)
X-Large * Agg 3 (dummy)	-0.349462*	(0.168128)	0.234093	(0.286806)	1.115163*	(0.450972)	2.36483**	(0.65938)	1.460554	(1.873157)	2.063559	(2.941247)	-28.20922*	(13.40239)
X-Large * Agg 4 (dummy)	3.197062**	(0.207213)	6.475977**	(0.297954)	10.39233**	(0.482411)	12.2785**	(0.630699)	11.53669**	(1.528362)	12.49124**	(2.473626)	-3.429276	(9.607018)
Adjusted R-squared	0.099233		0.129662		0.168341		0.211258		0.415611		0.502925		0.617406	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 29: Extended model (OLS), EUR/USD, 13 September 2010, Sell order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.322464		3.749633		7.525732		11.19346		35.0878		63.39116		324.1757	
Constant	4.960249**	(0.171232)	6.084349**	(0.243516)	11.70568**	(0.434299)	14.75016**	(0.597528)	27.30048**	(1.402491)	38.31059**	(2.171824)	118.8818**	(8.771619)
Time zone 1 (dummy)	-0.505906**	(0.015781)	-0.521022**	(0.022829)	-0.824851**	(0.039917)	-0.824548**	(0.053302)	-0.319027**	(0.112566)	0.653448**	(0.178068)	-4.598082**	(0.676885)
Time zone 2 (dummy)	-0.680069**	(0.012738)	-0.818611**	(0.018323)	-1.283348**	(0.031915)	-1.48076**	(0.042718)	-1.430806**	(0.093473)	-1.125645**	(0.144641)	2.559079**	(0.527013)
Time zone 3 (dummy)	-0.177287**	(0.01385)	-0.191267**	(0.019802)	-0.247924**	(0.032903)	-0.065651	(0.045459)	1.84938**	(0.11894)	5.432555**	(0.18547)	68.96934**	(0.693861)
Market activity	0.001021**	(0.000016)	0.001896**	(0.0000248)	0.004356**	(0.000039)	0.008229**	(0.0000569)	0.038164**	(0.000181)	0.072456**	(0.000278)	0.348434**	(0.001129)
Aggressiveness	-2.206045**	(0.172638)	-2.02583**	(0.245351)	-4.208247**	(0.437623)	-5.591481**	(0.602779)	-14.194**	(1.417648)	-21.8822**	(2.19469)	-63.40369**	(8.865174)
Market Depth	0.020144**	(0.000668)	0.031331**	(0.001056)	0.055149**	(0.001811)	0.071973**	(0.00231)	0.201934**	(0.004851)	0.446765**	(0.007884)	2.398663**	(0.031548)
Volatility	0.074269**	(0.013523)	0.115683**	(0.021053)	0.199044**	(0.037194)	0.239333**	(0.047253)	0.339256**	(0.081011)	0.476921**	(0.126945)	1.096647**	(0.41795)
Split (dummy)	0.29854**	(0.056465)	0.607503**	(0.081634)	1.428989**	(0.154004)	1.754115**	(0.194919)	2.735803**	(0.392938)	2.926487**	(0.594762)	-2.810104	(2.226773)
Bid-ask spread	-142.5563**	(2.146135)	-223.0343**	(3.267201)	-388.5592**	(5.891192)	-482.8337**	(7.046791)	-787.9497**	(12.76247)	-1176.399**	(18.49584)	-3439.63**	(79.08563)
Opposite (dummy)	0.059947**	(0.010268)	0.162657**	(0.014678)	-0.237197**	(0.02543)	-0.37321**	(0.034972)	-0.885142**	(0.083612)	-1.22609**	(0.131574)	-2.379656**	(0.531232)
Medium (dummy)	-0.277127**	(0.031656)	-0.377988**	(0.046578)	-0.660862**	(0.080111)	-0.650646**	(0.113193)	-0.485624	(0.279617)	0.285397	(0.443842)	5.200321**	(1.781967)
Large (dummy)	-1.785571**	(0.076463)	-2.703912**	(0.118952)	-4.656217**	(0.23399)	-5.693353**	(0.35717)	-8.863393**	(0.894976)	-11.19053**	(1.500823)	-29.17121**	(6.234348)
X-Large (dummy)	-1.876311**	(0.096064)	-2.796317**	(0.150109)	-5.130836**	(0.271255)	-6.541895**	(0.410403)	-8.2376**	(1.13326)	-12.38335**	(1.760168)	-14.27938	(8.271968)
Opposite * Medium (dummy)	0.180703**	(0.028918)	0.256645**	(0.042595)	0.329992**	(0.073743)	0.337938**	(0.103639)	0.818435**	(0.258813)	1.230182**	(0.412359)	5.461156**	(1.682808)
Opposite * Large (dummy)	0.297257**	(0.085847)	0.667366**	(0.128154)	0.857014**	(0.228506)	0.713794*	(0.340838)	1.153023	(0.859031)	2.341983	(1.357702)	6.26981	(5.366004)
Opposite * X-Large (dummy)	1.008271**	(0.168437)	1.604991**	(0.258336)	2.245401**	(0.429664)	2.791121**	(0.57758)	4.436989**	(1.264503)	7.271843**	(2.013758)	16.24323	(8.563202)
Split * Agg 2 (dummy)	-0.100616	(0.058943)	-0.261069**	(0.085134)	-0.720584**	(0.158841)	-1.082499**	(0.202564)	-2.112622**	(0.416913)	-1.93504**	(0.636057)	6.342755**	(2.41134)
Split * Agg 3 (dummy)	-0.508382**	(0.059005)	-0.841896**	(0.085337)	-1.128129**	(0.161366)	-1.380316**	(0.20592)	-2.752735**	(0.424124)	-3.514455**	(0.644527)	-3.100323	(2.454003)
Split * Agg 4 (dummy)	-0.335171**	(0.061047)	-0.454071**	(0.088569)	-1.294473**	(0.164955)	-1.656973**	(0.21105)	-2.979576**	(0.438955)	-4.020781**	(0.668075)	1.830505	(2.564791)
Medium * Agg 2 (dummy)	-0.181342**	(0.033804)	-0.250348**	(0.050164)	-0.376751**	(0.086194)	-0.540631**	(0.120965)	-1.285846**	(0.300504)	-2.321064**	(0.481353)	-7.824982**	(1.962798)
Medium * Agg 3 (dummy)	-0.391219**	(0.044168)	-0.353447**	(0.065763)	-0.282446*	(0.117008)	-0.393607*	(0.166004)	-0.507498	(0.422556)	-1.838132**	(0.669004)	-9.935881**	(2.75829)
Medium * Agg 4 (dummy)	-0.402359**	(0.038854)	-0.102638	(0.05916)	-0.170486	(0.101916)	-0.373947**	(0.143524)	-1.080459**	(0.364972)	-1.750235**	(0.586081)	-7.639236**	(2.422441)
Large * Agg 2 (dummy)	0.369348**	(0.135375)	0.641513**	(0.21482)	1.244611**	(0.398663)	2.224452**	(0.590299)	6.951454**	(1.556408)	9.752177**	(2.385773)	38.64055**	(9.556909)
Large * Agg 3 (dummy)	0.571041**	(0.11299)	1.097423**	(0.174087)	2.192338**	(0.343589)	2.716921**	(0.512961)	5.132633**	(1.302374)	6.890083**	(2.227716)	30.42399**	(9.160737)
Large * Agg 4 (dummy)	1.152431**	(0.089626)	2.496363**	(0.138977)	4.250573**	(0.269484)	5.175406**	(0.393119)	7.384161**	(0.980949)	8.017979**	(1.607553)	13.43374	(6.876535)
X-Large * Agg 2 (dummy)	-0.116406	(0.125269)	-0.005266	(0.210976)	0.370073	(0.373556)	0.98826	(0.586942)	3.29782	(1.757817)	7.994876**	(2.859934)	22.56838	(13.6395)
X-Large * Agg 3 (dummy)	0.317941*	(0.133556)	0.884475**	(0.217709)	1.49458**	(0.399342)	2.825463**	(0.611243)	2.970096	(1.681644)	3.324973	(2.65263)	-28.09423*	(13.64632)
X-Large * Agg 4 (dummy)	2.451852**	(0.162113)	5.29972**	(0.249523)	9.032865**	(0.435742)	10.894**	(0.607017)	11.45265**	(1.43397)	13.5426**	(2.265451)	-2.697767	(9.486936)
Adjusted R-squared	0.105498		0.13311		0.167368		0.217812		0.430881		0.52298		0.624366	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 30: Extended model (OLS), USD/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.074868		3.282654		6.118167		8.268619		20.43948		34.38295		158.9355	
Constant	4.20129**	(0.144627)	5.50132**	(0.203572)	9.878473**	(0.350581)	12.03975**	(0.455011)	19.74902**	(0.884565)	29.96318**	(1.365532)	90.36151**	(5.121666)
Time zone 1 (dummy)	-0.724631**	(0.019625)	-0.805923**	(0.028056)	-0.799206**	(0.047534)	-0.565312**	(0.062451)	-0.814072**	(0.113375)	-1.099489**	(0.172586)	-3.405318**	(0.529932)
Time zone 2 (dummy)	-0.447064**	(0.018787)	-0.411774**	(0.026732)	-0.053801	(0.045668)	0.161943**	(0.058662)	-0.439117**	(0.103435)	-1.447925**	(0.155805)	-3.611532**	(0.471457)
Time zone 3 (dummy)	0.046537*	(0.020055)	0.22197**	(0.028928)	0.630552**	(0.046557)	1.002022**	(0.059232)	1.829111**	(0.107409)	3.23356**	(0.163914)	37.63293**	(0.526531)
Market activity	0.001075**	(0.0000343)	0.002005**	(0.0000524)	0.004645**	(0.0000898)	0.007789**	(0.000111)	0.034335**	(0.000217)	0.064102**	(0.000362)	0.302533**	(0.002009)
Aggressiveness	-1.257546**	(0.147198)	-1.106163**	(0.207828)	-2.045503**	(0.356824)	-2.601043**	(0.461529)	-5.545201**	(0.900265)	-10.79115**	(1.38768)	-34.17266**	(5.239262)
Market Depth	0.031626**	(0.001195)	0.049959**	(0.001874)	0.072849**	(0.00286)	0.086069**	(0.003357)	0.111427**	(0.004672)	0.115149**	(0.006146)	0.107149**	(0.016973)
Volatility	-0.755657*	(0.366213)	-1.425701*	(0.636694)	-2.547625*	(1.112282)	-2.427717*	(1.120159)	2.93852	(1.601439)	10.57897*	(4.668518)	111.7686*	(46.07686)
Split (dummy)	0.381615**	(0.069506)	0.931958**	(0.110886)	1.382246**	(0.184758)	1.576471**	(0.225006)	2.365413**	(0.369577)	3.330665**	(0.546774)	4.847302**	(1.62237)
Bid-ask spread	-106.6065**	(2.166069)	-174.8196**	(3.161353)	-308.7829**	(5.486884)	-369.4198**	(6.758788)	-486.7133**	(10.21386)	-565.5621**	(12.09556)	-839.6542**	(31.60057)
Opposite (dummy)	-0.004747	(0.012748)	0.107878**	(0.01835)	-0.318878**	(0.031101)	-0.491886**	(0.040109)	-0.902086**	(0.074748)	-1.084811**	(0.111092)	-2.614373**	(0.354385)
Medium (dummy)	-0.843252**	(0.034817)	-1.066041**	(0.051649)	-1.605685**	(0.08841)	-1.574727**	(0.116825)	-1.40608**	(0.227257)	-0.649736	(0.349335)	6.587622**	(1.158398)
Large (dummy)	-1.834277**	(0.085367)	-2.75139**	(0.130268)	-4.80936**	(0.21882)	-5.653145**	(0.329684)	-7.20663**	(0.999149)	-7.775457**	(1.659975)	-8.401084	(4.970377)
X-Large (dummy)	-1.953507**	(0.155191)	-3.070401**	(0.2548)	-5.418794**	(0.462341)	-6.248874**	(0.649611)	-8.1248**	(1.309896)	-10.49675**	(1.871743)	-15.70771*	(6.680845)
Opposite * Medium (dummy)	0.002402	(0.031967)	-0.118635*	(0.04696)	-0.286974**	(0.080318)	-0.511039**	(0.105562)	-1.027592**	(0.212853)	-1.670676**	(0.326484)	-5.856559**	(1.048743)
Opposite * Large (dummy)	0.501454**	(0.127027)	0.854647**	(0.18469)	1.365978**	(0.304058)	1.552331**	(0.415296)	1.758332	(0.99403)	1.167966	(1.479523)	-6.527366	(5.294568)
Opposite * X-Large (dummy)	0.907882**	(0.289179)	1.786983**	(0.443335)	3.205899**	(0.676212)	3.217171**	(0.832573)	3.544197*	(1.460508)	4.532134*	(2.069596)	10.54642	(6.710582)
Split * Agg 2 (dummy)	-0.250443**	(0.073501)	-0.778933**	(0.115846)	-1.133269**	(0.193214)	-1.443527**	(0.23627)	-2.42836**	(0.393025)	-3.782663**	(0.579798)	-7.819599**	(1.730228)
Split * Agg 3 (dummy)	-0.259652**	(0.071959)	-0.728807**	(0.114309)	-0.775353**	(0.190456)	-0.815967**	(0.232541)	-1.933689**	(0.383675)	-3.452816**	(0.566914)	-4.97884**	(1.688292)
Split * Agg 4 (dummy)	-0.295325*	(0.132142)	-0.317056	(0.194784)	-0.428867	(0.325881)	-0.348342	(0.399635)	-1.031275	(0.706423)	-2.787102**	(1.030412)	0.601942	(3.901463)
Medium * Agg 2 (dummy)	0.161229**	(0.036046)	0.200648**	(0.05352)	0.341165**	(0.091809)	0.166815	(0.121472)	-0.203796	(0.241367)	-0.963203**	(0.370594)	-8.734471**	(1.199145)
Medium * Agg 3 (dummy)	0.125023**	(0.045977)	0.256675**	(0.068367)	0.456524**	(0.11665)	0.28562	(0.153209)	0.211758	(0.314848)	-0.171579	(0.484932)	-6.071355**	(1.547172)
Medium * Agg 4 (dummy)	0.035674	(0.062258)	0.708149**	(0.09425)	0.798651**	(0.156177)	0.545273**	(0.201485)	-0.561083	(0.41009)	-1.471465*	(0.646154)	-7.927172**	(2.251222)
Large * Agg 2 (dummy)	0.102854	(0.110692)	0.271358	(0.213199)	0.307518	(0.363293)	0.54796	(0.57885)	5.026976**	(1.680429)	6.376612*	(2.660496)	26.58176**	(9.654092)
Large * Agg 3 (dummy)	-0.131929	(0.103113)	-0.073751	(0.167272)	0.040289	(0.298607)	0.617101	(0.511385)	3.534552*	(1.545026)	6.128853*	(2.435748)	21.83025*	(8.679242)
Large * Agg 4 (dummy)	0.955405**	(0.140746)	2.56064**	(0.2039)	4.782133**	(0.33929)	5.559636**	(0.45965)	6.877825**	(1.132851)	7.350863**	(1.747209)	14.03561*	(5.864365)
X-Large * Agg 2 (dummy)	-0.182302	(0.17028)	-0.412429	(0.282767)	-0.772397	(0.515273)	-0.517822	(0.787025)	1.030276	(2.014282)	1.524932	(3.028833)	3.894679	(10.65978)
X-Large * Agg 3 (dummy)	-0.684571**	(0.151438)	-0.560089*	(0.250554)	-0.228249	(0.471852)	-0.022158	(0.669)	0.17873	(1.557333)	0.928827	(2.372899)	-4.573322	(8.814271)
X-Large * Agg 4 (dummy)	2.780993**	(0.337382)	6.42373**	(0.520669)	11.62984**	(0.819562)	13.9277**	(1.028785)	19.35649**	(1.823088)	23.56946**	(2.513491)	39.72034**	(8.592211)
Adjusted R-squared	0.086033		0.105097		0.116905		0.120094		0.229259		0.298191		0.500906	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 31: Extended model (OLS), USD/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.12024		3.326846		6.256875		8.444012		20.95471		35.36334		163.9378	
Constant	4.605786**	(0.150686)	5.971807**	(0.203849)	10.26527**	(0.352792)	11.76373**	(0.439818)	18.24348**	(0.85296)	28.04979**	(1.303607)	91.17129**	(5.040024)
Time zone 1 (dummy)	-0.762694**	(0.019325)	-0.861194**	(0.027544)	-0.849258**	(0.046785)	-0.576761**	(0.05973)	-0.653076**	(0.109778)	-0.94265**	(0.166117)	-2.804777**	(0.531093)
Time zone 2 (dummy)	-0.509779**	(0.018519)	-0.492757**	(0.026263)	-0.174262**	(0.044356)	0.087622	(0.056065)	-0.771647**	(0.099032)	-2.255854**	(0.148354)	-6.654648**	(0.464797)
Time zone 3 (dummy)	0.08535**	(0.019581)	0.24093**	(0.027955)	0.803461**	(0.046125)	1.137544**	(0.056948)	1.695388**	(0.102646)	3.084861**	(0.155941)	36.33114**	(0.5185)
Market activity	0.001179**	(0.0000346)	0.002172**	(0.0000526)	0.00478**	(0.0000928)	0.008087**	(0.000114)	0.0361**	(0.000223)	0.066769**	(0.000364)	0.308562**	(0.002206)
Aggressiveness	-1.578842**	(0.153016)	-1.450144**	(0.20727)	-2.220246**	(0.358813)	-2.161904**	(0.446832)	-3.951**	(0.868529)	-8.513642**	(1.325525)	-32.5276**	(5.153164)
Market Depth	0.030045**	(0.001121)	0.04522**	(0.00172)	0.072461**	(0.00281)	0.086243**	(0.003271)	0.125855**	(0.004775)	0.143109**	(0.006334)	0.185806**	(0.017913)
Volatility	-0.968969*	(0.411767)	-1.610652*	(0.689482)	-2.870222*	(1.21492)	-2.973725*	(1.272761)	1.701237	(1.250435)	8.779882*	(4.015871)	125.3395*	(51.59509)
Split (dummy)	0.208627**	(0.068319)	0.603986**	(0.103983)	1.069494**	(0.175943)	1.249261**	(0.214778)	2.103472**	(0.354331)	2.897938**	(0.532285)	2.46621	(1.642062)
Bid-ask spread	-109.7339**	(1.950534)	-177.4206**	(2.990266)	-320.133**	(5.365948)	-380.1987**	(6.508629)	-502.7902**	(9.570159)	-586.8069**	(12.27728)	-865.6303**	(31.64688)
Opposite (dummy)	0.001238	(0.012705)	0.110501**	(0.017807)	-0.28228**	(0.030899)	-0.394144**	(0.03943)	-0.939601**	(0.073995)	-1.345151**	(0.110547)	-1.510373**	(0.36381)
Medium (dummy)	-0.91475**	(0.033515)	-1.208239**	(0.049848)	-1.924361**	(0.08661)	-2.035547**	(0.112593)	-1.484462**	(0.225456)	-0.490865	(0.348591)	8.412417**	(1.150427)
Large (dummy)	-1.962641**	(0.087321)	-2.921844**	(0.143776)	-5.188001**	(0.262284)	-5.955797**	(0.385387)	-7.842692**	(0.924042)	-8.379862**	(1.481625)	-15.70292**	(5.499385)
X-Large (dummy)	-2.254116**	(0.218788)	-3.198254**	(0.318272)	-4.636989**	(0.522868)	-5.671013**	(0.652955)	-6.556111**	(1.354059)	-7.754384**	(1.976426)	-10.58724	(7.492054)
Opposite * Medium (dummy)	0.128958**	(0.032145)	0.155666**	(0.046825)	0.187016*	(0.081001)	0.102228	(0.104964)	-0.721992**	(0.213778)	-1.527191**	(0.326276)	-6.67178**	(1.076492)
Opposite * Large (dummy)	0.561535**	(0.124003)	0.992947**	(0.184086)	1.811112**	(0.303799)	1.697691**	(0.423389)	1.715085	(0.976528)	1.713335	(1.481717)	8.285046	(5.544251)
Opposite * X-Large (dummy)	1.270574**	(0.282651)	1.558678**	(0.418132)	1.171604	(0.666542)	1.222546	(0.816228)	-0.227053	(1.442361)	-1.938712	(2.037798)	-7.751994	(6.89989)
Split * Agg 2 (dummy)	-0.099296	(0.072423)	-0.50216**	(0.109103)	-0.892399**	(0.185188)	-1.213425**	(0.226618)	-2.255024**	(0.378377)	-3.580556**	(0.566073)	-6.448442**	(1.755083)
Split * Agg 3 (dummy)	-0.084736	(0.070713)	-0.425035**	(0.107264)	-0.427828*	(0.181795)	-0.399697	(0.222496)	-1.455515**	(0.368788)	-2.700798**	(0.552821)	-1.742334	(1.710105)
Split * Agg 4 (dummy)	-0.195047	(0.129705)	0.044616	(0.196588)	0.022809	(0.320889)	0.0648	(0.393606)	-0.555456	(0.683448)	-1.822476	(1.016667)	3.733715	(3.936151)
Medium * Agg 2 (dummy)	0.213313**	(0.036187)	0.27964**	(0.053176)	0.508756**	(0.092336)	0.417759**	(0.120008)	-0.138616	(0.241299)	-1.137658**	(0.367863)	-10.75356**	(1.230235)
Medium * Agg 3 (dummy)	0.043423	(0.044131)	0.224023**	(0.066746)	0.417827**	(0.115899)	0.411216**	(0.151919)	-0.110007	(0.314397)	-0.733246	(0.485454)	-8.918166**	(1.582759)
Medium * Agg 4 (dummy)	-0.057655	(0.060664)	0.622152**	(0.091628)	0.732125**	(0.155531)	0.553524**	(0.200187)	-0.763231	(0.405218)	-2.129507**	(0.634908)	-10.02856**	(2.299822)
Large * Agg 2 (dummy)	0.248199	(0.204323)	0.440665	(0.286344)	0.542294	(0.432013)	0.699526	(0.591495)	4.904723**	(1.605314)	5.091038*	(2.55024)	29.08981**	(9.995967)
Large * Agg 3 (dummy)	0.094744	(0.126016)	0.164384	(0.184164)	0.449113	(0.3411)	1.175014	(0.60787)	4.674998**	(1.528105)	7.742592**	(2.472637)	28.08325**	(8.987659)
Large * Agg 4 (dummy)	0.704987**	(0.129901)	2.2867**	(0.202246)	4.359012**	(0.34552)	5.190643**	(0.487437)	6.90972**	(1.142889)	6.953467**	(1.793297)	14.23029*	(6.021578)
X-Large * Agg 2 (dummy)	-0.172153	(0.209883)	-0.28763	(0.290134)	-0.831636	(0.485308)	-0.298066	(0.697491)	1.181411	(1.88846)	1.817974	(2.885344)	12.21138	(11.17788)
X-Large * Agg 3 (dummy)	-0.642193**	(0.184655)	-0.492015	(0.280111)	-0.237093	(0.493635)	0.139	(0.67023)	0.908942	(1.662223)	2.221146	(2.45526)	2.268857	(9.002448)
X-Large * Agg 4 (dummy)	2.755104**	(0.36397)	7.141143**	(0.525637)	11.78992**	(0.824963)	14.18189**	(0.997122)	18.87178**	(1.785168)	23.66668**	(2.515164)	44.18848**	(8.651829)
Adjusted R-squared	0.093967		0.116187		0.126649		0.130635		0.247543		0.316916		0.496876	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 32: Extended model (OLS), USD/JPY, 10 September 2010, Buy order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.079064		3.32351		6.349491		8.790904		23.49144		40.66563		193.7892	
Constant	3.358982**	(0.125889)	4.358547**	(0.174599)	8.121131**	(0.310649)	9.33189**	(0.399944)	14.26142**	(0.813429)	18.93315**	(1.211279)	62.50157**	(4.278086)
Time zone 1 (dummy)	-0.943878**	(0.017212)	-1.186685**	(0.024211)	-1.624922**	(0.040517)	-1.598441**	(0.052017)	0.103017	(0.099408)	1.700284**	(0.15296)	6.587772**	(0.551191)
Time zone 2 (dummy)	-0.491231**	(0.017845)	-0.53348**	(0.025519)	-0.495993**	(0.044164)	-0.232095**	(0.057276)	2.268362**	(0.106029)	4.309987**	(0.161194)	13.03024**	(0.571443)
Time zone 3 (dummy)	0.163791**	(0.018473)	0.335365**	(0.025864)	0.857872**	(0.042836)	1.298738**	(0.053815)	4.629445**	(0.093761)	8.620354**	(0.13698)	53.2829**	(0.485796)
Market activity	0.001302**	(0.0000422)	0.00248**	(0.0000685)	0.005482**	(0.000132)	0.009084**	(0.000181)	0.038572**	(0.000468)	0.07523**	(0.00083)	0.36661**	(0.003568)
Aggressiveness	-0.440543**	(0.126892)	0.118018	(0.175849)	0.057426	(0.312208)	0.821274*	(0.401645)	1.085408	(0.818864)	1.251113	(1.213845)	10.87102*	(4.263056)
Market Depth	0.023779**	(0.00066)	0.034499**	(0.00096)	0.058**	(0.001743)	0.066616**	(0.002128)	0.123586**	(0.003667)	0.209884**	(0.005931)	0.485142**	(0.016994)
Volatility	-14.19887**	(1.32005)	-29.39021**	(2.193967)	-66.37471**	(4.41186)	-95.34903**	(6.143077)	-276.5737**	(16.08624)	-513.5827**	(29.13577)	-2285.345**	(125.7796)
Split (dummy)	0.456231**	(0.060981)	1.009664**	(0.092019)	2.034336**	(0.172898)	2.69213**	(0.216458)	4.246318**	(0.366797)	6.898334**	(0.53682)	8.007705**	(1.722679)
Bid-ask spread	-94.99594**	(1.619467)	-152.746**	(2.437104)	-268.213**	(4.223673)	-320.5084**	(4.935135)	-445.2919**	(7.458802)	-544.3564**	(10.49757)	-957.3738**	(26.80464)
Opposite (dummy)	0.006744	(0.01172)	0.118362**	(0.016567)	-0.359327**	(0.028783)	-0.574837**	(0.037653)	-1.159199**	(0.07456)	-1.579898**	(0.111717)	-4.131793**	(0.388177)
Medium (dummy)	-0.686595**	(0.030771)	-0.938747**	(0.044584)	-1.673526**	(0.07778)	-1.853257**	(0.10148)	-1.387932**	(0.208311)	-0.856473**	(0.318926)	1.737415	(1.134552)
Large (dummy)	-1.53264**	(0.047823)	-2.163066**	(0.073151)	-3.724573**	(0.128184)	-4.271588**	(0.17873)	-5.428803**	(0.423169)	-6.136972**	(0.664564)	-4.285854	(2.590175)
X-Large (dummy)	-1.868625**	(0.133356)	-2.865584**	(0.211538)	-4.562795**	(0.339959)	-4.901266**	(0.460872)	-5.828019**	(0.981296)	-4.53349**	(1.672454)	-0.106839	(6.043442)
Opposite * Medium (dummy)	-0.109686**	(0.030653)	-0.17413**	(0.044866)	-0.229086**	(0.078214)	-0.396033**	(0.103355)	-1.324752**	(0.213205)	-2.176024**	(0.327969)	-5.170012**	(1.1989)
Opposite * Large (dummy)	0.164997**	(0.063649)	0.207769*	(0.095081)	0.528613**	(0.158927)	0.772021**	(0.220436)	1.363244**	(0.516269)	1.492317	(0.816492)	0.29262	(3.091426)
Opposite * X-Large (dummy)	0.778399**	(0.199836)	1.29824**	(0.317057)	1.903338**	(0.482852)	1.639682**	(0.60114)	-0.800722	(1.105532)	-2.893162	(1.695483)	-10.61803*	(5.387874)
Split * Agg 2 (dummy)	-0.145386*	(0.064445)	-0.556816**	(0.096322)	-1.223725**	(0.17916)	-1.887174**	(0.224859)	-3.324279**	(0.387096)	-5.643287**	(0.569005)	-8.240467**	(1.849706)
Split * Agg 3 (dummy)	-0.275832**	(0.063978)	-0.695099**	(0.096072)	-1.173104**	(0.179958)	-1.585434**	(0.225686)	-3.019244**	(0.384677)	-5.89953**	(0.563337)	-5.278196**	(1.816897)
Split * Agg 4 (dummy)	-0.077083	(0.124288)	-0.048193	(0.174477)	-0.147196	(0.309787)	-0.337531	(0.414967)	-1.588118*	(0.752032)	-4.82157**	(1.105692)	-8.055458*	(3.738908)
Medium * Agg 2 (dummy)	0.261141**	(0.033388)	0.396482**	(0.048836)	0.73309**	(0.085722)	0.861959**	(0.113059)	0.950709**	(0.233591)	0.939607**	(0.359373)	2.691753*	(1.322039)
Medium * Agg 3 (dummy)	0.160032**	(0.042772)	0.519199**	(0.063941)	0.932274**	(0.112465)	1.11106**	(0.150975)	0.78032*	(0.309072)	0.439083	(0.47541)	-1.951112	(1.739405)
Medium * Agg 4 (dummy)	0.131403*	(0.053172)	0.81685**	(0.079665)	1.412256**	(0.131647)	1.55789**	(0.174025)	1.1681**	(0.37233)	1.525744*	(0.595302)	1.007943	(2.096802)
Large * Agg 2 (dummy)	0.199874*	(0.094417)	0.25218	(0.138147)	0.228155	(0.232573)	0.185183	(0.336798)	1.191722	(0.803672)	1.109565	(1.34524)	-2.930771	(4.751673)
Large * Agg 3 (dummy)	0.014607	(0.123725)	0.05848	(0.190094)	-0.034815	(0.324046)	0.037448	(0.437676)	1.688897	(1.017909)	2.337144	(1.595423)	-5.558592	(5.450748)
Large * Agg 4 (dummy)	0.964269**	(0.095069)	2.624495**	(0.142706)	4.669079**	(0.224527)	5.288267**	(0.296174)	5.175393**	(0.647769)	5.312883**	(1.004219)	0.855915	(3.789832)
X-Large * Agg 2 (dummy)	-0.051665	(0.125632)	-0.104622	(0.194208)	-0.356286	(0.335084)	-0.670763	(0.509838)	1.178338	(1.287746)	0.058651	(2.203871)	-8.870353	(8.898152)
X-Large * Agg 3 (dummy)	-0.367289**	(0.12101)	-0.126608	(0.196727)	-0.238529	(0.353654)	-0.264884	(0.5251)	1.229801	(1.289895)	-0.80492	(2.203156)	-11.38939	(7.57414)
X-Large * Agg 4 (dummy)	1.836124**	(0.229372)	5.543731**	(0.363987)	10.45426**	(0.561967)	11.97657**	(0.710089)	17.39155**	(1.302628)	19.51811**	(2.075519)	21.99192**	(7.00894)
Adjusted R-squared	0.093118		0.114739		0.126793		0.132131		0.259269		0.353164		0.527279	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 33: Extended model (OLS), USD/JPY, 10 September 2010, Sell order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.053522		3.276574		6.261114		8.681702		23.38941		40.56598		193.9386	
Constant	3.472101**	(0.127426)	4.548537**	(0.178364)	7.612277**	(0.31003)	8.508773**	(0.391529)	12.50645**	(0.796564)	15.98849**	(1.197476)	56.71413**	(4.447593)
Time zone 1 (dummy)	-0.912046**	(0.016984)	-1.108783**	(0.023682)	-1.37882**	(0.039485)	-1.326693**	(0.052075)	1.045074**	(0.099783)	3.367008**	(0.154692)	16.26981**	(0.582564)
Time zone 2 (dummy)	-0.542871**	(0.017472)	-0.590565**	(0.024684)	-0.475866**	(0.042408)	-0.373896**	(0.055309)	1.727711**	(0.102945)	3.031436**	(0.158957)	9.961904**	(0.602653)
Time zone 3 (dummy)	0.232835**	(0.018135)	0.44053**	(0.025252)	1.102343**	(0.042471)	1.435757**	(0.054267)	5.060664**	(0.095213)	9.232106**	(0.141246)	58.6133**	(0.494621)
Market activity	0.001321**	(0.0000427)	0.002455**	(0.0000646)	0.005427**	(0.00012)	0.009295**	(0.000167)	0.040503**	(0.00046)	0.079094**	(0.000832)	0.390423**	(0.003993)
Aggressiveness	-0.635169**	(0.128005)	-0.218084	(0.179122)	0.004616	(0.311133)	0.97789*	(0.392617)	1.575266*	(0.800145)	2.391536*	(1.197062)	8.636179	(4.40775)
Market Depth	0.019821**	(0.000627)	0.030708**	(0.000951)	0.051189**	(0.001754)	0.059578**	(0.00216)	0.101563**	(0.003515)	0.183262**	(0.005604)	0.475671**	(0.018883)
Volatility	-11.33027**	(1.241035)	-23.29113**	(1.945139)	-53.41303**	(3.863648)	-82.37061**	(5.556869)	-271.5571**	(15.78925)	-520.8615**	(29.43816)	-2612.582**	(143.1027)
Split (dummy)	0.487335**	(0.060238)	1.031947**	(0.095633)	2.234769**	(0.181982)	2.859377**	(0.222234)	4.425095**	(0.361145)	6.76208**	(0.522682)	8.291619**	(1.731266)
Bid-ask spread	-94.46531**	(1.735641)	-153.5072**	(2.450305)	-256.4799**	(4.369464)	-307.8588**	(5.101791)	-419.9987**	(7.595239)	-521.617**	(9.990713)	-939.817**	(27.1737)
Opposite (dummy)	0.077572**	(0.011641)	0.180432**	(0.016427)	-0.170367**	(0.028607)	-0.282781**	(0.037167)	-0.733125**	(0.073409)	-0.883441**	(0.110482)	-0.564174	(0.393312)
Medium (dummy)	-0.756425**	(0.030537)	-1.04631**	(0.044342)	-1.827273**	(0.077291)	-1.982833**	(0.100715)	-1.869038**	(0.207462)	-1.684805**	(0.321936)	0.77797	(1.19102)
Large (dummy)	-1.491079**	(0.049035)	-2.177926**	(0.072507)	-3.659757**	(0.120831)	-4.07037**	(0.168309)	-4.640695**	(0.412259)	-5.271421**	(0.651595)	-6.92587**	(2.60774)
X-Large (dummy)	-1.72541**	(0.101187)	-2.673204**	(0.157619)	-4.569919**	(0.270537)	-5.353437**	(0.379384)	-7.658803**	(0.867562)	-9.042676**	(1.516631)	-11.89417	(6.189797)
Opposite * Medium (dummy)	0.018611	(0.031011)	0.038318	(0.045072)	0.0625	(0.078279)	-0.070028	(0.102601)	-0.531561*	(0.211415)	-0.942954**	(0.32436)	-5.659083**	(1.200423)
Opposite * Large (dummy)	0.144131*	(0.065896)	0.428887**	(0.098585)	0.690208**	(0.159787)	0.819322**	(0.218537)	0.440281	(0.513563)	0.660991	(0.804598)	3.694951	(3.086574)
Opposite * X-Large (dummy)	0.86724**	(0.183084)	1.508092**	(0.282523)	1.967173**	(0.444424)	2.26362**	(0.584096)	2.462984*	(1.122683)	4.006543*	(1.712694)	9.9171	(5.459048)
Split * Agg 2 (dummy)	-0.194523**	(0.063559)	-0.64694**	(0.099717)	-1.530703**	(0.187297)	-2.14083**	(0.229934)	-3.55127**	(0.381005)	-5.557852**	(0.555512)	-8.927303**	(1.860908)
Split * Agg 3 (dummy)	-0.392561**	(0.063167)	-0.829191**	(0.099535)	-1.570106**	(0.18926)	-1.975934**	(0.231586)	-3.659849**	(0.379095)	-6.219815**	(0.549893)	-7.188627**	(1.829063)
Split * Agg 4 (dummy)	-0.060566	(0.128352)	-0.015541	(0.182683)	-0.269762	(0.31934)	-0.275859	(0.418923)	-1.726649*	(0.736969)	-4.512793**	(1.085956)	-7.985225*	(3.782497)
Medium * Agg 2 (dummy)	0.292154**	(0.033727)	0.429706**	(0.049224)	0.776334**	(0.08595)	0.955384**	(0.112169)	1.121368**	(0.231598)	1.09469**	(0.355889)	3.307182*	(1.322822)
Medium * Agg 3 (dummy)	0.227395**	(0.043227)	0.556866**	(0.0645)	1.00768**	(0.114001)	1.149533**	(0.150865)	1.127761**	(0.30741)	0.945596*	(0.47144)	-0.294497	(1.743969)
Medium * Agg 4 (dummy)	0.13298*	(0.054673)	0.800338**	(0.080135)	1.357049**	(0.133009)	1.500905**	(0.1752)	1.033115**	(0.372896)	1.400551*	(0.589111)	3.4991	(2.102083)
Large * Agg 2 (dummy)	0.281093**	(0.088597)	0.205607	(0.127479)	0.221217	(0.226768)	0.22004	(0.330068)	0.913899	(0.822042)	1.793	(1.357169)	2.465119	(4.925052)
Large * Agg 3 (dummy)	0.01706	(0.117357)	-0.005996	(0.178101)	-0.154631	(0.304643)	-0.233806	(0.41183)	0.991141	(0.983868)	1.322416	(1.531491)	-2.974303	(5.349021)
Large * Agg 4 (dummy)	1.041278**	(0.100528)	2.582352**	(0.15063)	4.636695**	(0.229349)	5.039342**	(0.296631)	5.149223**	(0.631341)	5.299302**	(0.979379)	2.751098	(3.774726)
X-Large * Agg 2 (dummy)	-0.002999	(0.17323)	-0.13604	(0.23856)	-0.041207	(0.388766)	-0.426514	(0.532045)	1.919207	(1.267869)	2.945569	(2.160142)	2.245552	(9.246618)
X-Large * Agg 3 (dummy)	-0.557958**	(0.126139)	-0.440463*	(0.207674)	-0.289691	(0.348718)	-0.03156	(0.524727)	1.635893	(1.317972)	0.463707	(2.207186)	-6.345325	(7.695082)
X-Large * Agg 4 (dummy)	1.888538**	(0.211721)	5.222861**	(0.326152)	10.16554**	(0.514166)	12.17498**	(0.677489)	17.63047**	(1.289862)	20.78343**	(2.04261)	26.34048**	(7.030564)
Adjusted R-squared	0.097173		0.120153		0.126929		0.137522		0.284543		0.383016		0.548744	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 34: Extended model (OLS), USD/JPY, 13 September 2010, Buy order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.712089		2.692118		5.123314		6.933803		17.24934		28.97267		132.6353	
Constant	3.881591**	(0.145461)	5.223898**	(0.202725)	9.960312**	(0.348041)	11.81991**	(0.439743)	19.32833**	(0.841943)	26.86694**	(1.195282)	85.42895**	(0.953782)
Time zone 1 (dummy)	-0.652323**	(0.016703)	-0.759682**	(0.023015)	-1.169582**	(0.037485)	-1.359877**	(0.047899)	-3.314631**	(0.094285)	-5.433205**	(0.138332)	-27.46641**	(0.468522)
Time zone 2 (dummy)	-0.363748**	(0.017015)	-0.387983**	(0.023601)	-0.388525**	(0.039528)	-0.431859**	(0.050476)	-1.900154**	(0.099415)	-3.640018**	(0.141944)	-18.79598**	(0.446284)
Time zone 3 (dummy)	0.1269**	(0.016461)	0.301428**	(0.022806)	0.623955**	(0.035928)	0.672767**	(0.04535)	-0.215259*	(0.092865)	-0.429814**	(0.136354)	0.94838*	(0.466895)
Market activity	0.000979**	(0.0000365)	0.001772**	(0.0000518)	0.004073**	(0.0000832)	0.00738**	(0.000109)	0.031934**	(0.000246)	0.060798**	(0.000372)	0.298534**	(0.001275)
Aggressiveness	-1.307365**	(0.14749)	-1.364839**	(0.20594)	-2.823006**	(0.353882)	-3.123758**	(0.447729)	-4.871146**	(0.856425)	-7.257729**	(1.215292)	-19.44988**	(4.017825)
Market Depth	0.023727**	(0.000832)	0.034888**	(0.001213)	0.054648**	(0.001892)	0.069432**	(0.002388)	0.126924**	(0.004452)	0.20303**	(0.006797)	0.747944**	(0.02242)
Volatility	0.710451**	(0.040244)	1.100169**	(0.062465)	1.923758**	(0.109308)	2.276264**	(0.131383)	3.027644**	(0.195728)	3.577704**	(0.272577)	6.733618**	(0.912454)
Split (dummy)	-0.153127*	(0.061885)	-0.143303	(0.092554)	-0.321606*	(0.150376)	-0.193316	(0.189301)	0.497631	(0.354354)	0.978461	(0.523316)	-0.656677	(1.626417)
Bid-ask spread	-104.3233**	(1.367319)	-164.979**	(1.962014)	-291.6055**	(3.137565)	-350.3084**	(3.83342)	-496.3104**	(6.329486)	-628.4518**	(8.965535)	-1503.741**	(27.38315)
Opposite (dummy)	0.004907	(0.012682)	0.098786**	(0.01771)	-0.42528**	(0.029047)	-0.607585**	(0.037178)	-1.107989**	(0.072748)	-1.231377**	(0.105529)	-0.640982	(0.345523)
Medium (dummy)	-0.37415**	(0.031516)	-0.459659**	(0.045673)	-0.792736**	(0.074712)	-0.970988**	(0.095384)	-0.490424*	(0.194881)	-0.317757	(0.286467)	5.65162**	(0.92557)
Large (dummy)	-1.160861**	(0.063932)	-1.750718**	(0.091354)	-3.07078**	(0.146508)	-3.385582**	(0.203156)	-4.018593**	(0.424475)	-3.597761**	(0.646685)	11.12764**	(2.192724)
X-Large (dummy)	-1.594402**	(0.104672)	-2.421095**	(0.151289)	-4.219624**	(0.260814)	-5.053489**	(0.345841)	-6.240713**	(0.95859)	-5.35475**	(1.648585)	6.50249	(6.308679)
Opposite * Medium (dummy)	-0.028673	(0.029804)	-0.104083*	(0.042738)	-0.041086	(0.071445)	-0.051068	(0.091724)	-0.291109	(0.187352)	-0.571174*	(0.275444)	-2.97959**	(0.926967)
Opposite * Large (dummy)	0.209427**	(0.068598)	0.505587**	(0.1001)	0.938167**	(0.161137)	1.049247**	(0.214118)	2.024627**	(0.462714)	1.92077**	(0.694265)	-0.786538	(2.408959)
Opposite * X-Large (dummy)	0.502408*	(0.235446)	0.871728**	(0.335776)	1.180276*	(0.517758)	1.23457*	(0.615744)	0.645396	(1.163227)	1.058961	(1.755708)	16.49502**	(5.874442)
Split * Agg 2 (dummy)	0.438267**	(0.066598)	0.545176**	(0.098522)	1.025693**	(0.159445)	0.844624**	(0.200414)	0.20624	(0.375246)	-0.332126	(0.552496)	-1.165368	(1.724348)
Split * Agg 3 (dummy)	0.149895*	(0.063741)	0.170677	(0.095109)	0.880235**	(0.154952)	0.8836**	(0.195474)	0.426764	(0.367557)	0.074457	(0.542619)	6.104082**	(1.69673)
Split * Agg 4 (dummy)	0.271674*	(0.113535)	0.624997**	(0.160884)	1.561521**	(0.263981)	1.606176**	(0.332333)	1.532399*	(0.692979)	0.227332	(0.990112)	3.650878	(3.338278)
Medium * Agg 2 (dummy)	-0.164835**	(0.033102)	-0.254403**	(0.047984)	-0.387594**	(0.079585)	-0.393193**	(0.101396)	-0.975662**	(0.207463)	-1.143201**	(0.304531)	-3.038828**	(1.010813)
Medium * Agg 3 (dummy)	-0.175134**	(0.041376)	-0.101353	(0.060859)	-0.038111	(0.104187)	-0.010007	(0.135049)	-0.536417	(0.277066)	-0.719053	(0.410496)	-2.763798*	(1.370991)
Medium * Agg 4 (dummy)	-0.227659**	(0.052989)	0.184651*	(0.07903)	0.277804*	(0.13251)	0.301118	(0.171852)	-0.653737	(0.341938)	-0.96972	(0.510709)	-6.752107**	(1.747017)
Large * Agg 2 (dummy)	-0.073876	(0.072612)	-0.021691	(0.109605)	0.071587	(0.177851)	-0.168617	(0.240734)	-0.73199	(0.55292)	-0.753801	(0.842516)	-5.966942*	(2.91024)
Large * Agg 3 (dummy)	-0.104053	(0.106319)	-0.013438	(0.164767)	-0.159432	(0.268998)	-0.641006	(0.350996)	-0.37469	(0.884406)	-0.446005	(1.325226)	-16.01414**	(4.43858)
Large * Agg 4 (dummy)	0.744708**	(0.109577)	2.142628**	(0.155563)	3.375514**	(0.243278)	3.422482**	(0.311097)	2.771262**	(0.624795)	2.376843**	(0.913055)	-10.50619**	(3.222154)
X-Large * Agg 2 (dummy)	-0.011259	(0.127036)	-0.042209	(0.186319)	0.322667	(0.374584)	0.636484	(0.512686)	1.219125	(1.365836)	0.581906	(2.18057)	-12.57048	(9.434766)
X-Large * Agg 3 (dummy)	-0.506624**	(0.156452)	-0.400801	(0.222813)	-0.221165	(0.392629)	-0.102051	(0.524714)	-0.510917	(1.309605)	-4.8933*	(2.14432)	-40.42269**	(7.780748)
X-Large * Agg 4 (dummy)	2.472399**	(0.299425)	5.424696**	(0.433388)	9.76607**	(0.677801)	11.47113**	(0.806985)	13.97959**	(1.542049)	14.627**	(2.382466)	-4.975183	(7.874214)
Adjusted R-squared	0.102892		0.124914		0.148376		0.153458		0.230935		0.307914		0.476397	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 35: Extended model (OLS), USD/JPY, 13 September 2010, Sell order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.751116		2.75391		5.229516		7.066118		17.61148		29.72717		135.5574	
Constant	4.50685**	(0.161835)	5.912462**	(0.222961)	10.59323**	(0.369054)	12.57022**	(0.467526)	20.11266**	(0.893291)	26.9287**	(1.285161)	80.99309**	(4.278525)
Time zone 1 (dummy)	-0.55357**	(0.017021)	-0.607901**	(0.023898)	-0.818328**	(0.038935)	-0.827045**	(0.049784)	-1.863153**	(0.099411)	-2.803226**	(0.148504)	-16.35239**	(0.515647)
Time zone 2 (dummy)	-0.321061**	(0.016804)	-0.284795**	(0.024693)	-0.271639**	(0.040451)	-0.2036**	(0.051705)	-1.571752**	(0.101367)	-2.870881**	(0.147011)	-17.30076**	(0.480894)
Time zone 3 (dummy)	0.173748**	(0.0162)	0.371311**	(0.022753)	0.784448**	(0.036371)	0.907547**	(0.046138)	0.091006	(0.09643)	-0.162813	(0.144419)	1.382286**	(0.509885)
Market activity	0.001099**	(0.0000386)	0.001931**	(0.0000564)	0.004341**	(0.0000906)	0.007918**	(0.000119)	0.03498**	(0.000281)	0.067033**	(0.000432)	0.320527**	(0.001475)
Aggressiveness	-2.032945**	(0.16429)	-2.198266**	(0.22666)	-3.667617**	(0.374915)	-4.202878**	(0.475289)	-6.442815**	(0.906099)	-8.46135**	(1.303093)	-18.81975**	(4.338476)
Market Depth	0.022757**	(0.000858)	0.036374**	(0.001331)	0.058083**	(0.002055)	0.07073**	(0.002494)	0.122966**	(0.004599)	0.199395**	(0.006941)	0.812272**	(0.024684)
Volatility	0.705267**	(0.039944)	1.115465**	(0.062536)	1.941201**	(0.111261)	2.290714**	(0.134943)	2.961956**	(0.204936)	3.441742**	(0.306144)	5.975913**	(1.106194)
Split (dummy)	-0.223233**	(0.061974)	-0.188185*	(0.09249)	-0.359447*	(0.159208)	-0.225695	(0.198907)	0.620868	(0.392002)	1.182856*	(0.543288)	-0.71153	(1.725987)
Bid-ask spread	-104.0368**	(1.330321)	-167.2292**	(1.966581)	-298.7655**	(3.195643)	-358.3305**	(3.887079)	-503.2117**	(6.588684)	-646.7959**	(9.409425)	-1536.7**	(29.22048)
Opposite (dummy)	0.130163**	(0.012835)	0.258207**	(0.018382)	-0.165404**	(0.029984)	-0.298561**	(0.038369)	-0.876804**	(0.077131)	-1.361755**	(0.11282)	-4.032266**	(0.373047)
Medium (dummy)	-0.378684**	(0.032501)	-0.507833**	(0.047637)	-0.760306**	(0.079048)	-0.79822**	(0.100811)	-0.303064	(0.210387)	-0.090214	(0.3016)	4.249653**	(0.985294)
Large (dummy)	-1.158745**	(0.054343)	-1.772175**	(0.080801)	-3.126118**	(0.134258)	-3.430629**	(0.184136)	-3.762343**	(0.415533)	-3.9994**	(0.628165)	5.382006*	(2.164406)
X-Large (dummy)	-2.344523**	(0.204601)	-3.643906**	(0.283987)	-5.869997**	(0.44277)	-6.380557**	(0.559389)	-7.308292**	(1.154826)	-5.240952**	(1.947303)	25.88954**	(7.888032)
Opposite * Medium (dummy)	-0.081626**	(0.030163)	-0.132439**	(0.043821)	-0.213808**	(0.072539)	-0.382204**	(0.093642)	-1.110223**	(0.195932)	-1.656739**	(0.289473)	-2.567697**	(0.978161)
Opposite * Large (dummy)	0.110514	(0.065643)	0.361633**	(0.100998)	0.772946**	(0.161478)	0.808761**	(0.215477)	0.332746	(0.473441)	1.148627	(0.723455)	3.994942	(2.517908)
Opposite * X-Large (dummy)	1.296949**	(0.253775)	2.111602**	(0.343466)	3.012602**	(0.526882)	2.944817**	(0.636755)	2.076159	(1.199952)	0.379918	(1.830544)	-13.86416*	(6.367869)
Split * Agg 2 (dummy)	0.473298**	(0.06633)	0.516771**	(0.09848)	0.911801**	(0.167968)	0.701796**	(0.20974)	-0.29447	(0.411855)	-0.932058	(0.575222)	-1.709628	(1.834221)
Split * Agg 3 (dummy)	0.261721**	(0.063877)	0.264277**	(0.095116)	0.989998**	(0.163713)	1.013285**	(0.204849)	0.245204	(0.404843)	-0.341573	(0.563625)	5.956986**	(1.803789)
Split * Agg 4 (dummy)	0.357298**	(0.108434)	0.793853**	(0.159082)	1.808034**	(0.280201)	2.107588**	(0.359999)	2.321228**	(0.761534)	1.180097	(1.072087)	5.157926	(3.62283)
Medium * Agg 2 (dummy)	-0.162306**	(0.033403)	-0.223633**	(0.048744)	-0.405619**	(0.080611)	-0.438987**	(0.103385)	-0.99697**	(0.218602)	-1.028112**	(0.318857)	-3.17734**	(1.064071)
Medium * Agg 3 (dummy)	-0.119125**	(0.043456)	0.021857	(0.06434)	0.167342	(0.107204)	0.178406	(0.138718)	-0.199256	(0.290537)	-0.448433	(0.430565)	-2.854746*	(1.435549)
Medium * Agg 4 (dummy)	-0.21056**	(0.056058)	0.236606**	(0.082592)	0.119425	(0.134399)	0.064505	(0.17383)	-0.906627*	(0.359136)	-1.240386*	(0.539509)	-6.377602**	(1.832028)
Large * Agg 2 (dummy)	-0.121614	(0.066606)	-0.09365	(0.103779)	0.031613	(0.177801)	-0.048462	(0.244585)	-0.386378	(0.554509)	-0.639283	(0.849933)	-4.165542	(3.012141)
Large * Agg 3 (dummy)	-0.140841	(0.100986)	-0.045781	(0.163975)	-0.221179	(0.265464)	-0.50088	(0.354552)	0.799971	(0.994892)	1.314326	(1.446543)	-12.31553*	(4.855294)
Large * Agg 4 (dummy)	0.542334**	(0.103815)	1.903827**	(0.155587)	2.979022**	(0.237212)	3.035754**	(0.308556)	3.167809**	(0.641128)	2.841649**	(0.982118)	-8.971327**	(3.383962)
X-Large * Agg 2 (dummy)	0.185292	(0.163211)	0.290304	(0.246739)	0.467175	(0.379722)	0.603298	(0.523986)	0.483472	(1.363647)	-0.652157	(2.424238)	-15.08342	(10.67035)
X-Large * Agg 3 (dummy)	-0.299408	(0.155523)	0.100254	(0.241014)	0.239488	(0.397008)	0.072759	(0.538014)	-0.830729	(1.286351)	-4.973611*	(2.229245)	-47.2691**	(8.486502)
X-Large * Agg 4 (dummy)	3.350698**	(0.362812)	6.699995**	(0.481901)	11.43131**	(0.719705)	12.93542**	(0.861894)	16.22809**	(1.607631)	16.65799**	(2.468159)	-7.514683	(8.846898)
Adjusted R-squared	0.102376		0.121707		0.145397		0.150502		0.228354		0.306611		0.463717	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 36: Extended model (OLS), EUR/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	5.699184**	(0.323777)	7.339621**	(0.427058)	11.62701**	(0.679858)	14.8724**	(0.906214)	27.86307**	(1.736767)	36.21879**	(2.448625)	107.9016**	(8.029608)
Time zone 1 (dummy)	-0.242869**	(0.010492)	-0.281492**	(0.01475)	-0.369687**	(0.02481)	-0.407287**	(0.033565)	-0.980763**	(0.068171)	-2.115454**	(0.103496)	-12.86123**	(0.381602)
Time zone 2 (dummy)	-0.157897**	(0.009952)	-0.211153**	(0.01409)	-0.194928**	(0.024536)	-0.130696**	(0.033094)	0.32086**	(0.065979)	0.737092**	(0.100679)	13.6066**	(0.370898)
Time zone 3 (dummy)	-0.044954**	(0.009582)	-0.058558**	(0.013327)	-0.048304*	(0.021937)	0.047125	(0.030256)	1.115996**	(0.062772)	2.25173**	(0.096381)	24.67093**	(0.329336)
Market activity	0.001035**	(0.0000322)	0.001802**	(0.0000449)	0.004033**	(0.0000752)	0.00728**	(0.000105)	0.032747**	(0.000251)	0.064229**	(0.000401)	0.334648**	(0.001901)
Aggressiveness	-4.592688**	(0.328013)	-5.558409**	(0.432518)	-7.908633**	(0.688779)	-10.20323**	(0.917966)	-19.82155**	(1.760304)	-25.07118**	(2.480844)	-71.35292**	(8.140318)
Market Depth	0.018215**	(0.001624)	0.044075**	(0.002747)	0.089887**	(0.005618)	0.114373**	(0.006874)	0.116066**	(0.008448)	0.113391**	(0.010977)	0.223561**	(0.031322)
Volatility	-3.645503**	(0.496079)	-4.413034**	(0.711964)	-7.779866**	(1.21386)	-5.937319**	(1.69694)	14.03959**	(4.419283)	42.14073**	(7.503389)	554.1195**	(43.82405)
Split (dummy)	-0.318861**	(0.026871)	-0.357268**	(0.038686)	-0.552521**	(0.067505)	-0.497061**	(0.091631)	-0.220561	(0.177942)	-0.01024	(0.275096)	0.786464	(0.953729)
Bid-ask spread	-27.51148**	(0.533755)	-49.57879**	(0.828021)	-93.42632**	(1.409466)	-115.0717**	(1.798184)	-158.5323**	(3.307919)	-186.8306**	(4.89381)	-628.6707**	(17.90256)
Opposite (dummy)	0.292228**	(0.007016)	0.422927**	(0.009778)	-0.074086**	(0.016286)	-0.258865**	(0.022162)	-1.066296**	(0.046761)	-1.520829**	(0.07084)	-3.61745**	(0.252591)
Medium (dummy)	0.030801	(0.024206)	-0.025511	(0.033413)	-0.244846**	(0.053458)	-0.32353**	(0.071665)	-0.854329**	(0.15303)	-1.178239**	(0.233608)	0.209141	(0.833335)
Large (dummy)	-0.706294**	(0.070704)	-1.302377**	(0.115966)	-2.480933**	(0.192749)	-3.186888**	(0.276432)	-5.110417**	(0.704165)	-6.827479**	(1.071769)	-15.83925**	(4.373466)
X-Large (dummy)	-0.80693**	(0.107716)	-1.516546**	(0.196218)	-2.986277**	(0.348573)	-3.734456**	(0.456345)	-4.952632**	(1.014967)	-5.123056**	(1.738655)	-0.399783	(7.498837)
Opposite * Medium (dummy)	-0.221518**	(0.023739)	-0.23448**	(0.032942)	-0.007972	(0.05314)	0.038552	(0.071747)	0.625488**	(0.155168)	0.833164**	(0.236213)	1.054235	(0.829023)
Opposite * Large (dummy)	0.076019	(0.114809)	0.454569*	(0.181151)	1.079584**	(0.266919)	1.681587**	(0.348745)	2.752014**	(0.783258)	2.980748*	(1.228811)	10.87054*	(4.919289)
Opposite * X-Large (dummy)	0.138299	(0.172366)	0.916515*	(0.376877)	2.304845**	(0.656928)	3.002867**	(0.897529)	2.65528	(1.442329)	1.290836	(2.295852)	-5.696758	(8.034615)
Split * Agg 2 (dummy)	0.146384**	(0.028364)	0.207008**	(0.040836)	0.447706**	(0.070496)	0.329041**	(0.095746)	-0.166575	(0.18928)	-0.646127*	(0.291809)	-1.113681	(1.014404)
Split * Agg 3 (dummy)	0.263237**	(0.028512)	0.291908**	(0.041029)	0.655478**	(0.072361)	0.643065**	(0.097736)	0.343407	(0.188658)	-0.024461	(0.290046)	-0.157148	(1.00838)
Split * Agg 4 (dummy)	0.148828**	(0.037924)	0.263669**	(0.054852)	0.522447**	(0.092966)	0.527238**	(0.128934)	0.357115	(0.273477)	0.268612	(0.423541)	-0.430563	(1.507629)
Medium * Agg 2 (dummy)	0.003662	(0.024877)	-0.031866	(0.034734)	0.002861	(0.055953)	-0.032772	(0.075528)	-0.06306	(0.16142)	-0.082586	(0.245511)	-0.821203	(0.855237)
Medium * Agg 3 (dummy)	-0.110298	(0.064497)	-0.139841	(0.08826)	-0.221729	(0.140524)	-0.226428	(0.183074)	-0.890659*	(0.353029)	-0.557156	(0.556715)	-6.131836**	(2.06468)
Medium * Agg 4 (dummy)	-0.247033**	(0.043258)	-0.239073**	(0.06511)	-0.408369**	(0.106088)	-0.409921**	(0.140556)	-0.345495	(0.310872)	-0.35837	(0.469485)	-5.601675**	(1.685688)
Large * Agg 2 (dummy)	-0.067907	(0.131607)	-0.252028	(0.199486)	-0.366214	(0.372166)	-0.623764	(0.604886)	-0.053889	(1.511038)	0.261902	(2.627088)	7.714413	(12.65459)
Large * Agg 3 (dummy)	-0.060168	(0.112493)	-0.217561	(0.198828)	-0.581799*	(0.283431)	-0.979834*	(0.462628)	-1.314774	(1.050568)	-1.460888	(1.707409)	-5.905639	(6.449258)
Large * Agg 4 (dummy)	0.441681**	(0.118783)	1.11292**	(0.192693)	1.972641**	(0.283202)	2.529158**	(0.371945)	3.451809**	(0.878628)	5.633953**	(1.381737)	2.836268	(5.130366)
X-Large * Agg 2 (dummy)	-0.048717	(0.187472)	-0.034886	(0.445234)	0.232151	(0.905646)	1.481244	(1.099578)	6.119463	(3.226246)	9.885633	(5.55787)	28.64098	(21.55218)
X-Large * Agg 3 (dummy)	-0.642471**	(0.150821)	-1.750355**	(0.296778)	-3.431964**	(0.570206)	-4.238922**	(0.838195)	-3.765875*	(1.68691)	-2.331896	(2.712596)	-17.59705	(9.919822)
X-Large * Agg 4 (dummy)	0.652344**	(0.227053)	1.871609**	(0.497538)	3.900613**	(0.850838)	5.234364**	(1.156214)	8.29637**	(1.708652)	9.889276**	(2.670397)	9.986114	(9.128785)
Adjusted R-squared	0.045519		0.066043		0.083938		0.107409		0.279061		0.385469		0.606589	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 37: Extended model (OLS), EUR/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	5.699184**	(0.323777)	7.339621**	(0.427058)	11.62701**	(0.679858)	14.8724**	(0.906214)	27.86307**	(1.736767)	36.21879**	(2.448625)	107.9016**	(8.029608)
Time zone 1 (dummy)	-0.242869**	(0.010492)	-0.281492**	(0.01475)	-0.369687**	(0.02481)	-0.407287**	(0.033565)	-0.980763**	(0.068171)	-2.115454**	(0.103496)	-12.86123**	(0.381602)
Time zone 2 (dummy)	-0.157897**	(0.009952)	-0.211153**	(0.01409)	-0.194928**	(0.024536)	-0.130696**	(0.033094)	0.32086**	(0.065979)	0.737092**	(0.100679)	13.6066**	(0.370898)
Time zone 3 (dummy)	-0.044954**	(0.009582)	-0.058558**	(0.013327)	-0.048304*	(0.021937)	0.047125	(0.030256)	1.115996**	(0.062772)	2.25173**	(0.096381)	24.67093**	(0.329336)
Market activity	0.001035**	(0.0000322)	0.001802**	(0.0000449)	0.004033**	(0.0000752)	0.00728**	(0.000105)	0.032747**	(0.000251)	0.064229**	(0.000401)	0.334648**	(0.001901)
Aggressiveness	-4.592688**	(0.328013)	-5.558409**	(0.432518)	-7.908633**	(0.688779)	-10.20323**	(0.917966)	-19.82155**	(1.760304)	-25.07118**	(2.480844)	-71.35292**	(8.140318)
Market Depth	0.018215**	(0.001624)	0.044075**	(0.002747)	0.089887**	(0.005618)	0.114373**	(0.006874)	0.116066**	(0.008448)	0.113391**	(0.010977)	0.223561**	(0.031322)
Volatility	-3.645503**	(0.496079)	-4.413034**	(0.711964)	-7.779866**	(1.21386)	-5.937319**	(1.69694)	14.03959**	(4.419283)	42.14073**	(7.503389)	554.1195**	(43.82405)
Split (dummy)	-0.318861**	(0.026871)	-0.357268**	(0.038686)	-0.552521**	(0.067505)	-0.497061**	(0.091631)	-0.220561	(0.177942)	-0.01024	(0.275096)	0.786464	(0.953729)
Bid-ask spread	-27.51148**	(0.533755)	-49.57879**	(0.828021)	-93.42632**	(1.409466)	-115.0717**	(1.798184)	-158.5323**	(3.307919)	-186.8306**	(4.89381)	-628.6707**	(17.90256)
Opposite (dummy)	0.292228**	(0.007016)	0.422927**	(0.009778)	-0.074086**	(0.016286)	-0.258865**	(0.022162)	-1.066296**	(0.046761)	-1.520829**	(0.07084)	-3.61745**	(0.252591)
Medium (dummy)	0.030801	(0.024206)	-0.025511	(0.033413)	-0.244846**	(0.053458)	-0.32353**	(0.071665)	-0.854329**	(0.15303)	-1.178239**	(0.233608)	0.209141	(0.833335)
Large (dummy)	-0.706294**	(0.070704)	-1.302377**	(0.115966)	-2.480933**	(0.192749)	-3.186888**	(0.276432)	-5.110417**	(0.704165)	-6.827479**	(1.071769)	-15.83925**	(4.373466)
X-Large (dummy)	-0.80693**	(0.107716)	-1.516546**	(0.196218)	-2.986277**	(0.348573)	-3.734456**	(0.456345)	-4.952632**	(1.014967)	-5.123056**	(1.738655)	-0.399783	(7.498837)
Opposite * Medium (dummy)	-0.221518**	(0.023739)	-0.23448**	(0.032942)	-0.007972	(0.05314)	0.038552	(0.071747)	0.625488**	(0.155168)	0.833164**	(0.236213)	1.054235	(0.829023)
Opposite * Large (dummy)	0.076019	(0.114809)	0.454569*	(0.181151)	1.079584**	(0.266919)	1.681587**	(0.348745)	2.752014**	(0.783258)	2.980748*	(1.228811)	10.87054*	(4.919289)
Opposite * X-Large (dummy)	0.138299	(0.172366)	0.916515*	(0.376877)	2.304845**	(0.656928)	3.002867**	(0.897529)	2.65528	(1.442329)	1.290836	(2.295852)	-5.696758	(8.034615)
Split * Agg 2 (dummy)	0.146384**	(0.028364)	0.207008**	(0.040836)	0.447706**	(0.070496)	0.329041**	(0.095746)	-0.166575	(0.18928)	-0.646127*	(0.291809)	-1.113681	(1.014404)
Split * Agg 3 (dummy)	0.263237**	(0.028512)	0.291908**	(0.041029)	0.655478**	(0.072361)	0.643065**	(0.097736)	0.343407	(0.188658)	-0.024461	(0.290046)	-0.157148	(1.00838)
Split * Agg 4 (dummy)	0.148828**	(0.037924)	0.263669**	(0.054852)	0.522447**	(0.092966)	0.527238**	(0.128934)	0.357115	(0.273477)	0.268612	(0.423541)	-0.430563	(1.507629)
Medium * Agg 2 (dummy)	0.003662	(0.024877)	-0.031866	(0.034734)	0.002861	(0.055953)	-0.032772	(0.075528)	-0.06306	(0.16142)	-0.082586	(0.245511)	-0.821203	(0.855237)
Medium * Agg 3 (dummy)	-0.110298	(0.064497)	-0.139841	(0.08826)	-0.221729	(0.140524)	-0.226428	(0.183074)	-0.890659*	(0.353029)	-0.557156	(0.556715)	-6.131836**	(2.06468)
Medium * Agg 4 (dummy)	-0.247033**	(0.043258)	-0.239073**	(0.06511)	-0.408369**	(0.106088)	-0.409921**	(0.140556)	-0.345495	(0.310872)	-0.35837	(0.469485)	-5.601675**	(1.685688)
Large * Agg 2 (dummy)	-0.067907	(0.131607)	-0.252028	(0.199486)	-0.366214	(0.372166)	-0.623764	(0.604886)	-0.053889	(1.511038)	0.261902	(2.627088)	7.714413	(12.65459)
Large * Agg 3 (dummy)	-0.060168	(0.112493)	-0.217561	(0.198828)	-0.581799*	(0.283431)	-0.979834*	(0.462628)	-1.314774	(1.050568)	-1.460888	(1.707409)	-5.905639	(6.449258)
Large * Agg 4 (dummy)	0.441681**	(0.118783)	1.11292**	(0.192693)	1.972641**	(0.283202)	2.529158**	(0.371945)	3.451809**	(0.878628)	5.633953**	(1.381737)	2.836268	(5.130366)
X-Large * Agg 2 (dummy)	-0.048717	(0.187472)	-0.034886	(0.445234)	0.232151	(0.905646)	1.481244	(1.099578)	6.119463	(3.226246)	9.885633	(5.55787)	28.64098	(21.55218)
X-Large * Agg 3 (dummy)	-0.642471**	(0.150821)	-1.750355**	(0.296778)	-3.431964**	(0.570206)	-4.238922**	(0.838195)	-3.765875*	(1.68691)	-2.331896	(2.712596)	-17.59705	(9.919822)
X-Large * Agg 4 (dummy)	0.652344**	(0.227053)	1.871609**	(0.497538)	3.900613**	(0.850838)	5.234364**	(1.156214)	8.29637**	(1.708652)	9.889276**	(2.670397)	9.986114	(9.128785)
Adjusted R-squared	0.045519		0.066043		0.083938		0.107409		0.279061		0.385469		0.606589	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 38: Extended model (OLS), EUR/JPY, 10 September 2010, Buy order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.002233		1.679326		3.491534		5.279688		16.99086		31.0228		163.1273	
Constant	5.030824**	(0.291183)	6.721938**	(0.388275)	10.77515**	(0.633764)	13.17875**	(0.800358)	22.57501**	(1.546017)	30.25992**	(2.188661)	78.30643**	(6.438693)
Time zone 1 (dummy)	-0.286048**	(0.009834)	-0.370767**	(0.013657)	-0.593128**	(0.022593)	-0.671253**	(0.030514)	-0.349249**	(0.064951)	-0.194209*	(0.098791)	-1.931931**	(0.351781)
Time zone 2 (dummy)	-0.283599**	(0.009495)	-0.404871**	(0.013274)	-0.643762**	(0.022125)	-0.715224**	(0.029852)	0.179793**	(0.062189)	1.179476**	(0.09427)	11.26707**	(0.341022)
Time zone 3 (dummy)	-0.064729**	(0.009381)	-0.037685**	(0.013109)	0.056283*	(0.021976)	0.166154**	(0.029549)	2.10292**	(0.060658)	4.250969**	(0.091268)	31.25198**	(0.327663)
Market activity	0.00086**	(0.0000283)	0.001525**	(0.0000408)	0.003674**	(0.0000701)	0.007071**	(0.0000966)	0.03588**	(0.000209)	0.072039**	(0.000332)	0.41139**	(0.001336)
Aggressiveness	-3.911972**	(0.295184)	-4.798669**	(0.39349)	-6.654786**	(0.641832)	-7.682457**	(0.810063)	-12.81087**	(1.565072)	-15.7876**	(2.214895)	-24.78483**	(6.497989)
Market Depth	0.004739**	(0.00089)	0.010187**	(0.001255)	0.021226**	(0.002096)	0.032386**	(0.002847)	0.089885**	(0.006284)	0.193736**	(0.009848)	1.358339**	(0.03669)
Volatility	0.731136	(0.591419)	0.404686	(0.879812)	0.1977	(1.537885)	-6.020092**	(2.096292)	-77.37426**	(4.515507)	-187.3904**	(7.140576)	-1372.068**	(30.14719)
Split (dummy)	-0.346368**	(0.025096)	-0.344672**	(0.037641)	-0.54258**	(0.062964)	-0.553346**	(0.086085)	-0.729002**	(0.180216)	-0.716904**	(0.27226)	-2.363145*	(1.046776)
Bid-ask spread	-23.1392**	(0.489926)	-42.31596**	(0.792092)	-82.79309**	(1.459109)	-107.4545**	(1.931372)	-167.2044**	(3.594383)	-228.5243**	(5.42638)	-657.1157**	(20.23222)
Opposite (dummy)	0.294211**	(0.006643)	0.419913**	(0.00934)	-0.123482**	(0.015732)	-0.366407**	(0.021435)	-1.223889**	(0.046109)	-1.871275**	(0.070699)	-4.280457**	(0.256094)
Medium (dummy)	0.03994	(0.022571)	-0.009893	(0.030917)	-0.305056**	(0.049859)	-0.413511**	(0.068146)	-0.670283**	(0.150683)	-0.85491**	(0.230579)	1.164807	(0.854426)
Large (dummy)	-0.298781**	(0.05584)	-0.317349**	(0.080408)	-0.866611**	(0.130327)	-0.928608**	(0.182012)	-0.942464*	(0.420338)	-0.991676	(0.627714)	3.966789	(2.171912)
X-Large (dummy)	-0.534176**	(0.10218)	-1.010693**	(0.147533)	-2.105682**	(0.265324)	-2.803971**	(0.368065)	-4.870028**	(0.875375)	-5.959677**	(1.427517)	-3.020739	(5.451501)
Opposite * Medium (dummy)	-0.263866**	(0.02277)	-0.27301**	(0.031519)	-0.005838	(0.05128)	0.131901	(0.070465)	0.757128**	(0.155275)	1.266148**	(0.237289)	3.036775**	(0.869288)
Opposite * Large (dummy)	-0.182758**	(0.062812)	-0.174117	(0.090382)	0.354919*	(0.151307)	0.463513*	(0.213943)	1.470025**	(0.490997)	1.742991*	(0.746257)	6.893737**	(2.562479)
Opposite * X-Large (dummy)	-0.174221	(0.123043)	-0.071845	(0.206164)	0.511611	(0.352265)	1.210827*	(0.487759)	2.473213*	(1.061869)	3.916694*	(1.828027)	-0.819882	(6.50421)
Split * Agg 2 (dummy)	0.161115**	(0.026834)	0.192538**	(0.040221)	0.443372**	(0.067329)	0.471617**	(0.092121)	0.7572**	(0.193282)	0.809947**	(0.292447)	3.283827**	(1.11835)
Split * Agg 3 (dummy)	0.378061**	(0.02657)	0.42751**	(0.039478)	0.919688**	(0.066122)	1.037386**	(0.090313)	1.379375**	(0.1896)	1.48244**	(0.28665)	4.473746**	(1.095045)
Split * Agg 4 (dummy)	0.18515**	(0.034274)	0.187657**	(0.049779)	0.430863**	(0.084734)	0.439162**	(0.116377)	0.798429**	(0.252275)	0.805948*	(0.386923)	3.826417**	(1.4409)
Medium * Agg 2 (dummy)	0.116494**	(0.022996)	0.116481**	(0.031973)	0.256176**	(0.051969)	0.349909**	(0.071685)	0.259979	(0.159049)	0.18625	(0.243483)	0.785105	(0.895164)
Medium * Agg 3 (dummy)	0.04777	(0.056533)	0.089217	(0.080365)	0.159379	(0.134125)	0.263507	(0.177355)	0.127729	(0.398977)	-0.309453	(0.59425)	-10.3655**	(2.216901)
Medium * Agg 4 (dummy)	0.01412	(0.05127)	0.072703	(0.072325)	0.054298	(0.121198)	0.246898	(0.16564)	-0.610256	(0.331453)	-1.451867**	(0.509157)	-5.335569**	(2.050994)
Large * Agg 2 (dummy)	0.251174**	(0.069843)	0.319951**	(0.100262)	0.530077**	(0.169481)	0.622175**	(0.241672)	0.927728	(0.551217)	1.48056	(0.832861)	-0.345173	(2.772766)
Large * Agg 3 (dummy)	0.423797	(0.326226)	0.13443	(0.382218)	-0.262965	(0.551207)	-0.404684	(0.695816)	2.13368	(1.681429)	5.055619*	(2.545431)	9.288497	(7.943359)
Large * Agg 4 (dummy)	-0.06717	(0.101585)	0.013472	(0.150933)	0.324048	(0.264266)	0.193057	(0.362695)	0.31194	(0.808983)	-0.911412	(1.27284)	-14.60121**	(4.777284)
X-Large * Agg 2 (dummy)	0.01368	(0.149505)	0.281227	(0.292256)	0.197848	(0.463869)	0.797674	(0.721666)	4.495563*	(1.794668)	6.471941*	(2.997576)	7.07958	(10.12435)
X-Large * Agg 3 (dummy)	-0.282763*	(0.138546)	-0.37664	(0.208014)	-0.505499	(0.42954)	-0.025586	(0.697835)	-2.455891	(1.310714)	-6.134212**	(2.142726)	-51.5963**	(9.52521)
X-Large * Agg 4 (dummy)	0.096346	(0.164105)	0.389588	(0.294663)	0.811964	(0.479972)	1.288747*	(0.609882)	0.592161	(1.384995)	-0.611999	(2.424013)	-23.6955**	(8.141724)
Adjusted R-squared	0.048733		0.068798		0.097672		0.13029		0.338603		0.448974		0.662725	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 39: Extended model (OLS), EUR/JPY, 10 September 2010, Sell order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.003728		1.667249		3.402038		5.138411		16.46182		30.00322		159.0628	
Constant	5.819301**	(0.324193)	7.285996**	(0.41443)	11.46591**	(0.656241)	13.76021**	(0.817032)	23.40994**	(1.498326)	29.37982**	(2.127102)	91.98722**	(6.548013)
Time zone 1 (dummy)	-0.360414**	(0.00987)	-0.471714**	(0.013655)	-0.840935**	(0.022507)	-1.046547**	(0.030233)	-1.416812**	(0.063425)	-2.114394**	(0.095743)	-12.50761**	(0.355399)
Time zone 2 (dummy)	-0.30996**	(0.009514)	-0.431851**	(0.013124)	-0.749093**	(0.021783)	-0.887919**	(0.029526)	-0.653442**	(0.06135)	-0.590999**	(0.09252)	-0.865277*	(0.348702)
Time zone 3 (dummy)	-0.066692**	(0.009434)	-0.038337**	(0.013008)	-0.09883**	(0.021474)	-0.083156**	(0.029119)	0.907916**	(0.059273)	1.957415**	(0.088692)	16.74201**	(0.337153)
Market activity	0.00087**	(0.0000286)	0.001527**	(0.0000401)	0.003849**	(0.0000685)	0.007343**	(0.0000937)	0.036308**	(0.000202)	0.072942**	(0.000312)	0.412109**	(0.001287)
Aggressiveness	-4.677998**	(0.328758)	-5.429243**	(0.420142)	-7.523415**	(0.664937)	-8.480897**	(0.827661)	-13.64826**	(1.51748)	-14.98121**	(2.153638)	-33.66736**	(6.614468)
Market Depth	0.005567**	(0.000956)	0.011127**	(0.001383)	0.017272**	(0.002202)	0.020508**	(0.002825)	0.037218**	(0.005786)	0.071468**	(0.008584)	0.947114**	(0.033805)
Volatility	-1.212222*	(0.584549)	-1.089776	(0.84446)	-3.820198**	(1.475028)	-11.1425**	(2.01028)	-94.17828**	(4.223995)	-213.483**	(6.539907)	-1372.297**	(28.54161)
Split (dummy)	-0.363024**	(0.023478)	-0.360541**	(0.034635)	-0.553265**	(0.06066)	-0.576026**	(0.08312)	-0.486468**	(0.178514)	-0.343127	(0.265861)	-1.33929	(0.982546)
Bid-ask spread	-22.49781**	(0.479532)	-38.94435**	(0.742049)	-73.10744**	(1.329231)	-93.77342**	(1.763952)	-130.8204**	(3.271186)	-156.4413**	(4.698418)	-519.0609**	(18.49974)
Opposite (dummy)	0.300389**	(0.006651)	0.447339**	(0.009296)	-0.024521	(0.015495)	-0.21229**	(0.021198)	-1.007792**	(0.045048)	-1.468244**	(0.067618)	-3.217216**	(0.247618)
Medium (dummy)	0.042092*	(0.020656)	-0.021457	(0.028186)	-0.268637**	(0.045876)	-0.367054**	(0.062927)	-0.481829**	(0.136799)	-0.326305	(0.208953)	2.015221*	(0.792194)
Large (dummy)	-0.257414**	(0.046546)	-0.269297**	(0.071711)	-0.728553**	(0.120363)	-0.780109**	(0.169553)	-0.703205	(0.388444)	-0.733671	(0.575893)	8.335902**	(2.141019)
X-Large (dummy)	-0.733484**	(0.087751)	-1.108534**	(0.150057)	-2.287545**	(0.267516)	-2.517548**	(0.405375)	-4.725583**	(0.893865)	-5.201626**	(1.53674)	-14.75202**	(5.616693)
Opposite * Medium (dummy)	-0.206985**	(0.021847)	-0.225157**	(0.030354)	-0.016364	(0.050952)	0.019224	(0.07052)	0.45782**	(0.151288)	0.74568**	(0.226252)	0.966652	(0.837012)
Opposite * Large (dummy)	-0.18658**	(0.059325)	-0.086086	(0.091846)	0.336318*	(0.156906)	0.387506	(0.224589)	1.16269*	(0.48339)	1.982599**	(0.714183)	0.101934	(2.546804)
Opposite * X-Large (dummy)	0.112367	(0.152521)	0.301357	(0.251276)	0.740233	(0.421815)	0.430947	(0.536788)	0.528018	(1.108154)	-0.830015	(1.728072)	3.434819	(5.864806)
Split * Agg 2 (dummy)	0.104692**	(0.024955)	0.074166*	(0.03689)	0.292569**	(0.064675)	0.370249**	(0.088931)	0.418761*	(0.190952)	0.527364	(0.284997)	2.4073*	(1.054129)
Split * Agg 3 (dummy)	0.407683**	(0.025212)	0.468825**	(0.036826)	0.907303**	(0.06412)	0.988812**	(0.087695)	1.017205**	(0.187716)	0.981403**	(0.279444)	3.506956**	(1.031264)
Split * Agg 4 (dummy)	0.242012**	(0.033788)	0.361813**	(0.04946)	0.594761**	(0.084506)	0.593931**	(0.115857)	0.43189	(0.249613)	0.226868	(0.374516)	2.046909	(1.366847)
Medium * Agg 2 (dummy)	0.037759	(0.022202)	0.060024	(0.030814)	0.216002**	(0.051763)	0.287815**	(0.071692)	0.153491	(0.155016)	0.069224	(0.231835)	1.999663*	(0.86095)
Medium * Agg 3 (dummy)	0.081953	(0.059813)	0.177355*	(0.082027)	0.230121	(0.132664)	0.474093*	(0.184294)	-0.267296	(0.371997)	-1.373001*	(0.545909)	-11.40731**	(2.066476)
Medium * Agg 4 (dummy)	-0.164684**	(0.044733)	0.05304	(0.0679)	0.092672	(0.115539)	0.437204**	(0.16123)	-0.2548	(0.315721)	-0.765139	(0.484726)	-3.373956	(1.923776)
Large * Agg 2 (dummy)	0.052761	(0.061507)	0.054534	(0.095335)	0.258127	(0.17212)	0.365658	(0.250743)	0.759731	(0.536412)	0.813982	(0.795846)	-4.190408	(2.761806)
Large * Agg 3 (dummy)	0.122859	(0.207745)	0.053367	(0.415754)	-0.136757	(0.630333)	-0.006678	(0.821219)	1.682829	(1.647427)	1.563147	(2.477546)	3.724477	(6.872855)
Large * Agg 4 (dummy)	0.194205	(0.129056)	0.314458	(0.189803)	0.40741	(0.285552)	0.17429	(0.374379)	0.070683	(0.794187)	-1.113619	(1.183945)	-13.62119**	(4.487166)
X-Large * Agg 2 (dummy)	-0.237424*	(0.11344)	-0.415849*	(0.196103)	-0.240283	(0.463803)	-0.396275	(0.610843)	2.290493	(1.727559)	4.064198	(2.564145)	7.81089	(9.041215)
X-Large * Agg 3 (dummy)	-0.362159**	(0.10803)	-0.663774**	(0.203725)	-0.543094	(0.370622)	0.112016	(0.531307)	1.014966	(1.385352)	0.334194	(2.076611)	-23.80166**	(9.025376)
X-Large * Agg 4 (dummy)	0.630881**	(0.237924)	1.267848**	(0.381815)	2.665442**	(0.633931)	3.523255**	(0.781345)	5.83614**	(1.432687)	6.755727**	(2.250447)	-1.194097	(7.065184)
Adjusted R-squared	0.050374		0.06869		0.093826		0.126125		0.333826		0.456579		0.666709	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 40: Extended model (OLS), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95882		1.593369		3.359089		4.980163		15.37131		27.82783		144.0147	
Constant	5.483067**	(0.371429)	6.537868**	(0.451084)	10.16853**	(0.717231)	12.10783**	(0.880943)	19.14269**	(1.609007)	27.26646**	(2.303262)	68.99566**	(7.4537)
Time zone 1 (dummy)	-0.243304**	(0.00984)	-0.282475**	(0.013569)	-0.632548**	(0.022705)	-0.900996**	(0.030259)	-3.312783**	(0.063891)	-6.477613**	(0.098874)	-40.56853**	(0.386581)
Time zone 2 (dummy)	-0.009464	(0.00898)	0.029871*	(0.012344)	0.024748	(0.020924)	0.038957	(0.028138)	-0.655281**	(0.063071)	-1.895151**	(0.097929)	-9.446**	(0.375259)
Time zone 3 (dummy)	0.070188**	(0.008712)	0.151394**	(0.012026)	0.371879**	(0.020189)	0.531949**	(0.027144)	1.196174**	(0.061588)	2.648336**	(0.097745)	25.17774**	(0.364212)
Market activity	0.003384**	(0.000107)	0.006633**	(0.000152)	0.015321**	(0.000264)	0.028501**	(0.000368)	0.126434**	(0.000903)	0.236301**	(0.001401)	1.083239**	(0.005396)
Aggressiveness	-4.424309**	(0.376323)	-4.760013**	(0.456829)	-6.296959**	(0.726343)	-7.124207**	(0.892164)	-10.21429**	(1.629643)	-13.99212**	(2.332379)	-13.37939	(7.551389)
Market Depth	0.0071**	(0.000662)	0.015699**	(0.000987)	0.027961**	(0.001706)	0.037425**	(0.002272)	0.10083**	(0.004978)	0.160725**	(0.007262)	0.663722**	(0.025399)
Volatility	1.026897*	(0.449396)	1.96843**	(0.650084)	12.35117**	(1.102101)	25.67248**	(1.497248)	151.69**	(3.255545)	324.722**	(5.018479)	1920.949**	(18.53348)
Split (dummy)	-0.235313**	(0.028425)	-0.169238**	(0.043519)	-0.34324**	(0.074575)	-0.307728**	(0.106267)	-0.963998**	(0.215316)	-1.766756**	(0.309377)	-7.153052**	(1.175528)
Bid-ask spread	-25.53192**	(0.563833)	-46.70293**	(0.870358)	-90.76688**	(1.578441)	-114.6684**	(2.069386)	-188.584**	(3.84598)	-278.3982**	(5.853302)	-971.4013**	(22.88165)
Opposite (dummy)	0.241989**	(0.006884)	0.341866**	(0.009616)	-0.293721**	(0.0164)	-0.576148**	(0.022083)	-1.383324**	(0.047107)	-1.77673**	(0.072492)	-2.770506**	(0.278424)
Medium (dummy)	0.057798**	(0.020662)	-0.042676	(0.027513)	-0.381352**	(0.044345)	-0.498115**	(0.060358)	-0.629856**	(0.133015)	-0.38155	(0.208303)	4.348853**	(0.806912)
Large (dummy)	-0.269411**	(0.045553)	-0.351317**	(0.063176)	-0.796915**	(0.113677)	-0.867611**	(0.161559)	-0.592132	(0.367007)	-0.000203	(0.573766)	4.695618*	(2.107014)
X-Large (dummy)	-0.487192**	(0.08143)	-0.615393**	(0.135821)	-1.311055**	(0.242035)	-1.287018**	(0.332625)	0.217957	(0.722536)	1.957716	(1.191389)	25.56443**	(5.09662)
Opposite * Medium (dummy)	-0.231144**	(0.021319)	-0.258516**	(0.029083)	0.030899	(0.048551)	0.2155**	(0.066548)	0.696705**	(0.146095)	0.970614**	(0.227946)	2.051235*	(0.872629)
Opposite * Large (dummy)	-0.112434*	(0.054107)	-0.0365	(0.077645)	0.453809**	(0.135644)	0.64457**	(0.190631)	1.388495**	(0.424998)	2.097398**	(0.66813)	7.045963**	(2.516849)
Opposite * X-Large (dummy)	0.087832	(0.130276)	0.101532	(0.199466)	0.793717*	(0.348988)	0.975516*	(0.457232)	0.710906	(1.003377)	0.981963	(1.592198)	5.404162	(6.90015)
Split * Agg 2 (dummy)	-0.001935	(0.029575)	-0.093231*	(0.045166)	0.091894	(0.07778)	0.085483	(0.110663)	0.772784**	(0.225419)	1.853651**	(0.326195)	9.934387**	(1.241611)
Split * Agg 3 (dummy)	0.176614**	(0.029733)	0.141214**	(0.045141)	0.552532**	(0.077485)	0.584751**	(0.109804)	1.422169**	(0.223369)	2.358334**	(0.322544)	11.30603**	(1.225941)
Split * Agg 4 (dummy)	-0.01221	(0.03589)	-0.044243	(0.054137)	0.060864	(0.093367)	-0.063479	(0.132103)	0.574866*	(0.279821)	1.168494**	(0.414826)	6.010791**	(1.595561)
Medium * Agg 2 (dummy)	-0.042027*	(0.021265)	-0.028533	(0.028785)	0.052038	(0.047746)	0.100185	(0.065696)	0.116717	(0.14522)	0.055261	(0.227363)	1.452807	(0.874542)
Medium * Agg 3 (dummy)	0.10507	(0.068991)	0.204723*	(0.096744)	0.668629**	(0.169425)	0.704236**	(0.219941)	0.079583	(0.439172)	-1.2857*	(0.651625)	-13.5207**	(2.318933)
Medium * Agg 4 (dummy)	-0.214697**	(0.043236)	-0.189854**	(0.065122)	-0.067804	(0.108834)	-0.124876	(0.14901)	-0.863021**	(0.319605)	-2.242473**	(0.489546)	-17.66027**	(1.773354)
Large * Agg 2 (dummy)	0.074126	(0.055243)	0.090999	(0.077492)	-0.004745	(0.135152)	-0.001718	(0.192542)	-0.277213	(0.441799)	0.012823	(0.695438)	4.777454	(2.656326)
Large * Agg 3 (dummy)	0.353092	(0.198625)	0.280745	(0.265124)	0.560091	(0.512519)	0.82647	(0.71251)	1.386991	(1.300711)	1.649662	(2.131624)	2.828002	(7.388566)
Large * Agg 4 (dummy)	0.19705	(0.133284)	0.472961*	(0.215327)	1.093511**	(0.376234)	1.212285*	(0.479043)	0.536921	(0.88186)	-1.977968	(1.327369)	-18.74003**	(4.836668)
X-Large * Agg 2 (dummy)	0.413554**	(0.153883)	0.818635**	(0.242205)	1.072192**	(0.369564)	0.885797	(0.502217)	0.588523	(1.169758)	2.171852	(1.91653)	5.699629	(8.263977)
X-Large * Agg 3 (dummy)	-0.432343**	(0.12644)	-0.913207**	(0.213151)	-1.570011**	(0.323212)	-2.441903**	(0.476068)	-2.425422	(2.07808)	-3.060947	(3.077729)	-33.93387*	(13.82514)
X-Large * Agg 4 (dummy)	0.476059	(0.324086)	0.871332	(0.496607)	2.859836**	(1.026366)	3.147729**	(1.196595)	0.789711	(2.103432)	-1.041231	(2.926144)	-37.35133**	(11.65208)
Adjusted R-squared	0.041739		0.062098		0.088322		0.113804		0.268943		0.355923		0.490635	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 41: Extended model (OLS), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95219		1.569979		3.232644		4.798213		14.80236		26.78061		139.1414	
Constant	5.823785**	(0.39262)	6.945578**	(0.481203)	10.33149**	(0.73318)	12.41257**	(0.875391)	19.71393**	(1.682445)	26.56122**	(2.267133)	69.60838**	(7.444562)
Time zone 1 (dummy)	-0.33313**	(0.009744)	-0.431919**	(0.013537)	-0.832947**	(0.022265)	-1.178073**	(0.029412)	-3.840339**	(0.062139)	-7.473766**	(0.096165)	-44.7144**	(0.381972)
Time zone 2 (dummy)	-0.037508**	(0.009172)	-0.01861	(0.012748)	0.035656	(0.021743)	0.050492	(0.029247)	-0.672175**	(0.065459)	-2.134264**	(0.099947)	-11.77115**	(0.376346)
Time zone 3 (dummy)	0.046152**	(0.009007)	0.085173**	(0.012423)	0.195142**	(0.020476)	0.304761**	(0.027434)	0.656359**	(0.062025)	1.500026**	(0.096804)	18.12685**	(0.371848)
Market activity	0.003081**	(0.000108)	0.006231**	(0.000151)	0.014574**	(0.000253)	0.027327**	(0.000351)	0.122089**	(0.000867)	0.230017**	(0.001382)	1.050312**	(0.005789)
Aggressiveness	-4.752787**	(0.39797)	-5.142944**	(0.487537)	-6.439514**	(0.742482)	-7.438588**	(0.886298)	-10.67491**	(1.703179)	-12.42484**	(2.293442)	-9.818349	(7.532402)
Market Depth	0.003594**	(0.000631)	0.007448**	(0.000914)	0.01536**	(0.001613)	0.024401**	(0.002256)	0.068479**	(0.004755)	0.103316**	(0.006949)	0.574789**	(0.026012)
Volatility	0.688171	(0.440239)	1.098059	(0.617266)	4.673695**	(1.067051)	12.86277**	(1.436898)	121.8966**	(3.579182)	260.4651**	(5.879121)	1808.376**	(20.45045)
Split (dummy)	-0.220916**	(0.029195)	-0.172846**	(0.041924)	-0.352777**	(0.070201)	-0.326897**	(0.096517)	-0.519187*	(0.206986)	-1.115532**	(0.305392)	-6.065005**	(1.164083)
Bid-ask spread	-24.40309**	(0.557323)	-43.7331**	(0.88402)	-82.62395**	(1.561188)	-101.6415**	(1.941409)	-163.6407**	(3.658947)	-242.8787**	(5.361349)	-963.7721**	(20.62746)
Opposite (dummy)	0.262796**	(0.006899)	0.367284**	(0.009592)	-0.188542**	(0.016229)	-0.389102**	(0.021821)	-1.094497**	(0.047433)	-1.637695**	(0.072164)	-3.961018**	(0.276645)
Medium (dummy)	0.047126*	(0.020109)	-0.051271	(0.026583)	-0.300195**	(0.042376)	-0.350108**	(0.057764)	-0.288809*	(0.132658)	0.064937	(0.205543)	6.320126**	(0.784603)
Large (dummy)	-0.238629**	(0.039706)	-0.257628**	(0.061022)	-0.452921**	(0.110761)	-0.385522*	(0.155784)	0.431384	(0.371849)	1.417231*	(0.574953)	10.96564**	(2.061463)
X-Large (dummy)	-0.343657**	(0.11398)	-0.409551*	(0.194035)	-0.631516*	(0.320078)	-0.516498	(0.416565)	1.337823	(0.982606)	4.349968**	(1.522326)	39.74613**	(6.817199)
Opposite * Medium (dummy)	-0.205494**	(0.021527)	-0.218133**	(0.029186)	0.020825	(0.047725)	0.073574	(0.065074)	0.521386**	(0.147163)	0.96542**	(0.22728)	2.50124**	(0.87228)
Opposite * Large (dummy)	-0.090367	(0.052864)	-0.06442	(0.078147)	0.088529	(0.135949)	0.179373	(0.190341)	0.539631	(0.426572)	0.615009	(0.662704)	0.64074	(2.467132)
Opposite * X-Large (dummy)	-0.086509	(0.128764)	-0.028242	(0.210377)	0.125702	(0.355991)	0.044328	(0.48551)	0.40765	(1.103797)	0.409069	(1.723365)	-4.463211	(7.51095)
Split * Agg 2 (dummy)	0.021805	(0.030591)	-0.031122	(0.044003)	0.154463*	(0.073737)	0.083528	(0.101155)	0.396518	(0.217595)	1.131699**	(0.322086)	8.728769**	(1.229184)
Split * Agg 3 (dummy)	0.187202**	(0.030606)	0.182312**	(0.043747)	0.566755**	(0.073237)	0.607373**	(0.100418)	0.961973**	(0.215598)	1.750379**	(0.318994)	10.12428**	(1.213581)
Split * Agg 4 (dummy)	0.018743	(0.037279)	-0.002891	(0.053777)	0.148586	(0.090641)	0.081359	(0.124509)	0.176448	(0.274714)	0.775765	(0.413067)	5.087461**	(1.582313)
Medium * Agg 2 (dummy)	-0.044205*	(0.021375)	-0.030613	(0.028715)	-0.025853	(0.046745)	0.060222	(0.064098)	-0.004207	(0.146631)	-0.108733	(0.227436)	0.093641	(0.8747)
Medium * Agg 3 (dummy)	0.165239*	(0.067707)	0.259624**	(0.094892)	0.579373**	(0.164202)	0.467132*	(0.207708)	-0.536428	(0.426531)	-1.503069*	(0.623599)	-13.99794**	(2.261046)
Medium * Agg 4 (dummy)	-0.131749**	(0.043322)	-0.034735	(0.064925)	-0.026375	(0.107264)	-0.072609	(0.142366)	-0.833493**	(0.311099)	-2.277803**	(0.465537)	-18.75444**	(1.74376)
Large * Agg 2 (dummy)	0.028746	(0.054918)	0.114902	(0.081506)	0.179459	(0.139139)	0.149815	(0.197001)	-0.359035	(0.445696)	-0.426756	(0.693688)	1.021925	(2.608129)
Large * Agg 3 (dummy)	0.603662*	(0.260926)	0.458161	(0.304617)	0.508189	(0.493454)	0.514666	(0.661999)	1.239194	(1.288029)	1.319662	(1.980028)	5.083273	(7.385428)
Large * Agg 4 (dummy)	-0.064155	(0.108628)	-0.02214	(0.178377)	0.191109	(0.3176)	0.167585	(0.40969)	-1.47263	(0.836104)	-3.489911**	(1.257857)	-20.26456**	(4.594912)
X-Large * Agg 2 (dummy)	0.098938	(0.13783)	0.110916	(0.20461)	0.002222	(0.356669)	0.000836	(0.5376)	0.199758	(1.272473)	0.46347	(2.024912)	-0.164959	(9.026852)
X-Large * Agg 3 (dummy)	-0.428779**	(0.106985)	-0.938322**	(0.195806)	-2.083177**	(0.339945)	-2.625875**	(0.567211)	-1.640842	(2.720462)	-5.208886	(3.413534)	-47.13359**	(12.80102)
X-Large * Agg 4 (dummy)	0.93895*	(0.367987)	1.72986**	(0.626029)	2.871383**	(1.048625)	3.436843**	(1.297196)	1.733723	(2.139095)	-1.543882	(3.060498)	-46.34707**	(11.15192)
Adjusted R-squared	0.038771		0.056029		0.074977		0.097698		0.242032		0.33156		0.471987	

Sources: EBS and authors' calculations. Notes: White heteroskedasticity-consistent standard errors & covariance. */** denotes statistical significance at 95%/99% level.

Table 42: Base model (TOBIT), EUR/USD, 9 September 2010, Buy order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.415833		3.923394		7.552876		11.09711		34.14328		61.06026		309.2231	
Constant	4.198132**	(0.238808)	4.832463**	(0.30141)	9.201203**	(0.453226)	12.90341**	(0.590621)	33.22109**	(1.289472)	49.15371**	(1.964993)	139.8831**	(7.225048)
Time zone 1 (dummy)	-0.895379**	(0.028009)	-0.826409**	(0.034876)	-0.725204**	(0.052423)	-0.663432**	(0.068517)	-0.984719**	(0.149263)	-2.492622**	(0.227195)	-25.6879**	(0.837333)
Time zone 2 (dummy)	-0.601972**	(0.02018)	-0.486276**	(0.025347)	-0.100063**	(0.038337)	0.369454**	(0.050202)	2.960404**	(0.110117)	4.960852**	(0.167912)	37.98396**	(0.619618)
Time zone 3 (dummy)	-0.076677**	(0.018968)	0.107729**	(0.023899)	0.637423**	(0.036209)	1.026187**	(0.04744)	3.306371**	(0.104203)	5.840808**	(0.158949)	49.91428**	(0.58666)
Market activity	0.001071**	(0.0000177)	0.001737**	(0.0000223)	0.003703**	(0.0000339)	0.007284**	(0.0000444)	0.03466**	(0.0000978)	0.067131**	(0.000149)	0.345326**	(0.000551)
Aggressiveness	-1.838913**	(0.24368)	-0.911007**	(0.307517)	-1.984679**	(0.462336)	-4.195583**	(0.602427)	-19.48758**	(1.315103)	-30.05814**	(2.004024)	-68.69846**	(7.368297)
Market Depth	0.073024**	(0.000619)	0.1071**	(0.000785)	0.161531**	(0.001195)	0.205284**	(0.00157)	0.374288**	(0.003464)	0.508483**	(0.005287)	1.151277**	(0.01952)
Volatility	-0.088455	(0.094687)	-0.110669	(0.10504)	-0.180484	(0.146292)	-0.181377	(0.146202)	0.059665	(0.173584)	0.108739	(0.264403)	1.260551	(0.935623)
Split (dummy)	-0.054692**	(0.020371)	0.170232**	(0.025506)	0.463017**	(0.038645)	0.414794**	(0.050697)	-0.040006	(0.111633)	-0.375646*	(0.170341)	-0.29151	(0.628727)
Bid-ask spread	-269.4925**	(1.402807)	-377.3192**	(1.761317)	-562.8669**	(2.664066)	-663.6333**	(3.483854)	-918.6404**	(7.654589)	-1096.44**	(11.67453)	-2090.931**	(43.07155)
Opposite (dummy)	-0.154702**	(0.013307)	-0.022188	(0.016695)	-0.508882**	(0.025252)	-0.708422**	(0.033076)	-1.641613**	(0.072632)	-2.157037**	(0.110782)	-5.553948**	(0.408846)
Medium (dummy)	-0.79483**	(0.021395)	-0.850035**	(0.026731)	-1.198336**	(0.040327)	-1.256035**	(0.052762)	-1.076569**	(0.115801)	-0.496706**	(0.176646)	8.009943**	(0.651925)
Large (dummy)	-1.975715**	(0.07517)	-1.526383**	(0.09206)	-2.371723**	(0.138655)	-2.825836**	(0.181019)	-3.776282**	(0.395935)	-4.021458**	(0.603452)	-4.546123*	(2.225403)
X-Large (dummy)	-1.428469**	(0.101269)	0.155177	(0.123936)	0.332961	(0.187343)	0.243391	(0.245457)	1.930332**	(0.537625)	2.855892**	(0.820245)	6.343843*	(3.026718)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 43: Base model (TOBIT), EUR/USD, 9 September 2010, Sell order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.354142		3.823675		7.310977		10.67749		32.7497		58.6056		297.483	
Constant	4.328841**	(0.234071)	5.108258**	(0.297325)	7.895363**	(0.447698)	10.46489**	(0.576913)	27.27556**	(1.209576)	40.58492**	(1.822985)	115.6592**	(6.582193)
Time zone 1 (dummy)	-0.909554**	(0.027342)	-0.690646**	(0.034247)	-0.460678**	(0.051391)	-0.322572**	(0.066486)	-0.540497**	(0.139672)	-2.119381**	(0.21046)	-21.44524**	(0.761857)
Time zone 2 (dummy)	-0.687907**	(0.019715)	-0.556579**	(0.024954)	-0.352257**	(0.037691)	-0.059881	(0.04883)	1.758634**	(0.1031)	2.674386**	(0.15557)	26.13693**	(0.563736)
Time zone 3 (dummy)	-0.209313**	(0.01854)	-0.04907*	(0.023543)	0.254688**	(0.035614)	0.473022**	(0.04616)	2.290799**	(0.097577)	4.046508**	(0.147271)	41.4262**	(0.53375)
Market activity	0.00099**	(0.0000175)	0.001589**	(0.000022)	0.003522**	(0.0000333)	0.006911**	(0.0000432)	0.032613**	(0.0000916)	0.0633**	(0.000138)	0.334549**	(0.000501)
Aggressiveness	-1.925379**	(0.238638)	-1.200459**	(0.303084)	-0.668994	(0.456289)	-1.740766**	(0.587918)	-13.16448**	(1.232506)	-20.31183**	(1.857524)	-45.79366**	(6.706645)
Market Depth	0.074448**	(0.000605)	0.112294**	(0.000772)	0.1671**	(0.001174)	0.209595**	(0.001526)	0.387626**	(0.003243)	0.511224**	(0.004898)	1.294144**	(0.017759)
Volatility	-0.126483	(0.200506)	-0.147899	(0.166255)	-0.215307	(0.188675)	-0.219912	(0.16853)	-0.37711	(0.280785)	-0.491796	(0.383744)	-0.689192	(1.120034)
Split (dummy)	-0.068703**	(0.01994)	0.133112**	(0.02514)	0.36664**	(0.038013)	0.319515**	(0.049324)	-0.215303*	(0.104507)	-0.601168**	(0.157807)	-1.139161*	(0.572026)
Bid-ask spread	-269.5484**	(1.372969)	-379.4914**	(1.730907)	-559.3951**	(2.614489)	-648.0782**	(3.38312)	-902.2535**	(7.163386)	-1060.758**	(10.81415)	-2065.034**	(39.18718)
Opposite (dummy)	-0.109809**	(0.013007)	0.026992	(0.016434)	-0.495189**	(0.024817)	-0.707893**	(0.032157)	-1.456597**	(0.06799)	-2.0731**	(0.102628)	-3.012749**	(0.371975)
Medium (dummy)	-0.787576**	(0.020927)	-0.839729**	(0.026325)	-1.201209**	(0.039659)	-1.276148**	(0.051327)	-1.103275**	(0.108419)	-0.537628**	(0.163655)	7.185387**	(0.593148)
Large (dummy)	-2.100993**	(0.073764)	-1.537375**	(0.090541)	-2.37833**	(0.136332)	-2.724542**	(0.176022)	-3.244973**	(0.370535)	-3.022801**	(0.558824)	-2.553739	(2.024849)
X-Large (dummy)	-1.595707**	(0.099241)	-0.206681	(0.122334)	-0.063533	(0.184437)	-0.206432	(0.238995)	1.173809*	(0.503296)	1.437244	(0.759877)	4.025443	(2.754081)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 44: Base model (TOBIT), EUR/USD, 10 September 2010, Buy order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.317173		3.762483		7.308781		10.61193		32.40497		57.89397		294.6523	
Constant	2.52242**	(0.232068)	2.118624**	(0.291928)	5.955973**	(0.445321)	8.257929**	(0.57729)	20.02439**	(1.258292)	31.00431**	(1.904417)	96.72506**	(6.620988)
Time zone 1 (dummy)	-1.079607**	(0.024789)	-1.230455**	(0.030799)	-1.655351**	(0.047112)	-1.713654**	(0.061244)	-0.531571**	(0.134037)	-0.198498	(0.203011)	-12.39834**	(0.708697)
Time zone 2 (dummy)	-0.895149**	(0.019394)	-0.968376**	(0.024218)	-1.168626**	(0.037214)	-1.127444**	(0.048471)	0.290036**	(0.106643)	1.48725**	(0.161671)	20.26716**	(0.56468)
Time zone 3 (dummy)	0.065389**	(0.017852)	0.154418**	(0.0224)	0.250427**	(0.034564)	0.456196**	(0.045094)	3.051507**	(0.099511)	5.628336**	(0.150942)	45.07483**	(0.527428)
Market activity	0.00129**	(0.000029)	0.001985**	(0.0000364)	0.004219**	(0.000056)	0.007254**	(0.0000729)	0.032732**	(0.00016)	0.062465**	(0.000241)	0.355369**	(0.000842)
Aggressiveness	0.191734	(0.236044)	2.503255**	(0.296909)	2.903981**	(0.452832)	2.488522**	(0.586977)	-3.667912**	(1.279393)	-9.084723**	(1.936462)	-14.92697*	(6.732379)
Market Depth	0.027394**	(0.000502)	0.043861**	(0.000632)	0.067967**	(0.000978)	0.087377**	(0.001279)	0.216045**	(0.002834)	0.392119**	(0.004304)	1.613244**	(0.01505)
Volatility	-3.08338*	(1.363504)	-5.21075**	(1.706522)	-5.195075*	(2.616267)	15.19033**	(3.393015)	77.86241**	(7.370364)	156.2577**	(11.10316)	-1274.578**	(38.70493)
Split (dummy)	0.403842**	(0.016661)	0.576631**	(0.020902)	0.894794**	(0.032317)	0.923206**	(0.042242)	0.460481**	(0.093574)	0.483734**	(0.142082)	4.111756**	(0.496752)
Bid-ask spread	-278.1958**	(1.145954)	-404.0332**	(1.4378)	-647.0721**	(2.213811)	-758.2631**	(2.882221)	-1092.359**	(6.321011)	-1431.816**	(9.564032)	-2675.866**	(33.39841)
Opposite (dummy)	-0.072201**	(0.012739)	0.122241**	(0.015921)	-0.427416**	(0.024502)	-0.639795**	(0.03194)	-1.436531**	(0.07045)	-2.026394**	(0.106896)	-4.283888**	(0.373598)
Medium (dummy)	-0.78573**	(0.019196)	-0.825687**	(0.023881)	-1.145332**	(0.03664)	-1.172587**	(0.047695)	-1.16023**	(0.105155)	-1.201087**	(0.159577)	3.278467**	(0.557839)
Large (dummy)	-1.820113**	(0.070785)	-1.460913**	(0.086117)	-2.557048**	(0.132018)	-2.933242**	(0.171183)	-3.962703**	(0.374961)	-4.785659**	(0.568507)	-7.386158**	(1.985535)
X-Large (dummy)	-1.389209**	(0.089475)	0.035083	(0.108569)	-0.092304	(0.167009)	0.127551	(0.2173)	0.367843	(0.477994)	0.934889	(0.724883)	2.004622	(2.532321)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 45: Base model (TOBIT), EUR/USD, 10 September 2010, Sell order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.243669		3.632582		7.049843		10.25431		31.28285		56.0166		285.1196	
Constant	2.697765**	(0.226644)	2.897991**	(0.28209)	6.016774**	(0.436293)	8.339476**	(0.574245)	18.93896**	(1.227304)	29.41719**	(1.85778)	100.9757**	(6.480119)
Time zone 1 (dummy)	-1.035952**	(0.024322)	-1.115212**	(0.029927)	-1.470216**	(0.046175)	-1.458036**	(0.060874)	0.137428	(0.130684)	1.11222**	(0.198015)	-10.58365**	(0.693128)
Time zone 2 (dummy)	-0.81288**	(0.018973)	-0.826398**	(0.023483)	-0.973231**	(0.036397)	-0.984409**	(0.048092)	0.559205**	(0.103913)	1.767019**	(0.157648)	20.71354**	(0.552295)
Time zone 3 (dummy)	-0.015011	(0.017492)	0.047817*	(0.02175)	-0.013605	(0.033836)	0.049435	(0.044771)	2.347415**	(0.096959)	4.279075**	(0.147199)	33.64811**	(0.515886)
Market activity	0.001196**	(0.0000283)	0.001815**	(0.0000351)	0.00393**	(0.0000545)	0.007008**	(0.000072)	0.031182**	(0.000155)	0.060116**	(0.000235)	0.344824**	(0.000825)
Aggressiveness	-0.117888	(0.230429)	1.512306**	(0.286809)	2.487163**	(0.443508)	2.009105**	(0.583668)	-3.63973**	(1.247247)	-9.210141**	(1.887923)	-22.79101**	(6.584841)
Market Depth	0.030123**	(0.000492)	0.047956**	(0.000614)	0.077784**	(0.000958)	0.100747**	(0.001269)	0.219723**	(0.002762)	0.363932**	(0.004198)	1.472104**	(0.01472)
Volatility	2.971249*	(1.318661)	5.307344**	(1.634774)	13.30414**	(2.535111)	36.44215**	(3.340344)	153.8411**	(7.159121)	302.7892**	(10.84842)	-776.1286**	(37.98943)
Split (dummy)	0.4042**	(0.016332)	0.551094**	(0.020306)	0.822722**	(0.031667)	0.845227**	(0.041969)	0.495391**	(0.091202)	0.530102**	(0.138559)	3.701037**	(0.485818)
Bid-ask spread	-276.5882**	(1.121597)	-404.0943**	(1.394841)	-654.3535**	(2.163882)	-778.3438**	(2.857576)	-1120.118**	(6.162211)	-1468.532**	(9.350017)	-2812.009**	(32.74571)
Opposite (dummy)	-0.161779**	(0.012487)	-0.031217*	(0.015465)	-0.609657**	(0.024004)	-0.866186**	(0.031729)	-1.611929**	(0.068658)	-2.211247**	(0.104246)	-4.470175**	(0.365378)
Medium (dummy)	-0.770519**	(0.018826)	-0.827072**	(0.023207)	-1.135226**	(0.035898)	-1.194471**	(0.047394)	-1.256928**	(0.102479)	-1.283463**	(0.155636)	2.531778**	(0.545554)
Large (dummy)	-1.738147**	(0.069192)	-1.403735**	(0.083624)	-2.52913**	(0.1294)	-2.975975**	(0.170189)	-3.779248**	(0.365563)	-4.168045**	(0.554378)	-4.871904*	(1.941646)
X-Large (dummy)	-1.479049**	(0.087855)	-0.152574	(0.105378)	-0.384533*	(0.163853)	-0.368741	(0.21625)	0.580117	(0.465526)	1.085277	(0.706649)	3.775497	(2.475923)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 46: Base model (TOBIT), EUR/USD, 13 September 2010, Buy order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.350088		3.814855		7.676221		11.40888		35.64559		64.40226		325.7092	
Constant	4.992411**	(0.238479)	5.193677**	(0.298247)	12.46545**	(0.474448)	15.8839**	(0.628692)	28.51238**	(1.419408)	40.35981**	(2.234529)	112.9494**	(8.642338)
Time zone 1 (dummy)	-1.050383**	(0.026393)	-0.93712**	(0.032564)	-1.148402**	(0.051552)	-1.109869**	(0.068242)	-0.242038	(0.153637)	0.841319**	(0.241685)	-7.382627**	(0.934813)
Time zone 2 (dummy)	-0.973476**	(0.020412)	-0.952927**	(0.025355)	-1.342787**	(0.040346)	-1.359537**	(0.053486)	-1.093749**	(0.121041)	-0.651885**	(0.190624)	4.576277**	(0.737865)
Time zone 3 (dummy)	-0.192582**	(0.017452)	-0.12628**	(0.021835)	-0.210207**	(0.034928)	0.005026	(0.046408)	1.462185**	(0.105411)	4.366842**	(0.166091)	60.86782**	(0.643052)
Market activity	0.00136**	(0.0000133)	0.00225**	(0.0000167)	0.005076**	(0.0000269)	0.009054**	(0.0000358)	0.039419**	(0.0000816)	0.07432**	(0.000129)	0.350265**	(0.000498)
Aggressiveness	-2.80161**	(0.242194)	-1.525489**	(0.302826)	-5.225324**	(0.481627)	-6.949702**	(0.638137)	-15.02784**	(1.44047)	-22.53206**	(2.267638)	-49.9715**	(8.770216)
Market Depth	0.027351**	(0.000579)	0.039596**	(0.000724)	0.063642**	(0.001158)	0.079879**	(0.00154)	0.210635**	(0.003503)	0.448728**	(0.005523)	2.377559**	(0.021383)
Volatility	0.092283**	(0.033291)	0.107845*	(0.043333)	0.195417**	(0.058432)	0.199039*	(0.078062)	0.072649	(0.184296)	0.030192	(0.294704)	1.220446	(0.855476)
Split (dummy)	0.243382**	(0.017938)	0.436041**	(0.022351)	0.828163**	(0.035729)	0.816523**	(0.047495)	0.493582**	(0.107997)	0.181515	(0.170213)	0.2925	(0.6591)
Bid-ask spread	-227.1521**	(1.478453)	-310.5517**	(1.837819)	-486.0076**	(2.923772)	-565.0181**	(3.876872)	-825.0664**	(8.757129)	-1237.579**	(13.78892)	-3604.034**	(53.3063)
Opposite (dummy)	-0.214703**	(0.013578)	-0.116517**	(0.016885)	-0.849603**	(0.026903)	-1.157058**	(0.035689)	-2.249392**	(0.080869)	-3.007584**	(0.127392)	-6.353853**	(0.493156)
Medium (dummy)	-0.686122**	(0.021353)	-0.665558**	(0.026439)	-0.96232**	(0.042024)	-1.112327**	(0.05571)	-1.253699**	(0.126115)	-1.27662**	(0.198656)	0.674012	(0.76892)
Large (dummy)	-1.412137**	(0.069049)	-1.041911**	(0.084465)	-1.869372**	(0.13457)	-2.168359**	(0.178042)	-2.546059**	(0.40223)	-3.328504**	(0.633352)	-6.244578*	(2.450633)
X-Large (dummy)	-0.705551**	(0.100905)	0.446931**	(0.122868)	0.314496	(0.195902)	0.186851	(0.259563)	0.676556	(0.583417)	0.281472	(0.918226)	-5.613905	(3.552453)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 47: Base model (TOBIT), EUR/USD, 13 September 2010, Sell order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.322464		3.749633		7.525732		11.19346		35.0878		63.39116		324.1757	
Constant	5.088559**	(0.160725)	6.216158**	(0.231028)	11.96713**	(0.401056)	15.06254**	(0.553924)	27.86583**	(1.334756)	39.17681**	(2.106564)	119.59**	(8.555183)
Time zone 1 (dummy)	-0.495497**	(0.017376)	-0.498796**	(0.024977)	-0.792014**	(0.043358)	-0.78482**	(0.059885)	-0.247467	(0.144301)	0.749365**	(0.227741)	-4.512674**	(0.924903)
Time zone 2 (dummy)	-0.681733**	(0.013716)	-0.813596**	(0.019716)	-1.27031**	(0.034226)	-1.46064**	(0.047272)	-1.387054**	(0.113907)	-1.082382**	(0.179773)	2.453855**	(0.730094)
Time zone 3 (dummy)	-0.183078**	(0.011954)	-0.195607**	(0.017182)	-0.25151**	(0.029828)	-0.065915	(0.041197)	1.857383**	(0.09927)	5.431598**	(0.156672)	68.90915**	(0.636276)
Market activity	0.001024**	(0.00000926)	0.001898**	(0.0000133)	0.004356**	(0.0000231)	0.008228**	(0.0000319)	0.038169**	(0.0000769)	0.072473**	(0.000121)	0.348569**	(0.000493)
Aggressiveness	-2.340953**	(0.162988)	-2.174343**	(0.23428)	-4.471782**	(0.406701)	-5.909145**	(0.56172)	-14.81023**	(1.353542)	-22.79405**	(2.136213)	-64.38803**	(8.675594)
Market Depth	0.020254**	(0.000397)	0.03169**	(0.000571)	0.055813**	(0.000992)	0.072838**	(0.00137)	0.202767**	(0.0033)	0.447052**	(0.005209)	2.393561**	(0.021153)
Volatility	0.0762**	(0.015903)	0.119505**	(0.022858)	0.204757**	(0.039681)	0.245677**	(0.054806)	0.345446**	(0.132064)	0.483973*	(0.208428)	1.100509	(0.846469)
Split (dummy)	0.021015	(0.012252)	0.137289**	(0.017611)	0.494248**	(0.030572)	0.509524**	(0.042226)	0.349754**	(0.101748)	0.128929	(0.160583)	-0.875267	(0.65216)
Bid-ask spread	-145.0533**	(0.989717)	-227.6025**	(1.422629)	-394.7863**	(2.469629)	-489.2943**	(3.410964)	-795.4625**	(8.219185)	-1188.642**	(12.97184)	-3469.705**	(52.68125)
Opposite (dummy)	0.105169**	(0.009167)	0.248517**	(0.013177)	-0.17253**	(0.022874)	-0.313419**	(0.031593)	-0.761**	(0.076129)	-1.036802**	(0.120149)	-1.248503*	(0.487951)
Medium (dummy)	-0.380447**	(0.014292)	-0.416623**	(0.020543)	-0.726066**	(0.035662)	-0.835117**	(0.049255)	-0.901041**	(0.118687)	-0.648462**	(0.187317)	2.021775**	(0.760733)
Large (dummy)	-0.887824**	(0.045544)	-0.779618**	(0.065465)	-1.441777**	(0.113645)	-1.835744**	(0.156962)	-2.589938**	(0.378222)	-3.374775**	(0.596924)	-8.904854**	(2.424229)
X-Large (dummy)	-0.19102**	(0.066031)	0.664106**	(0.094914)	0.609887**	(0.164767)	0.662781**	(0.227571)	0.419504	(0.548363)	-0.523808	(0.865448)	-8.176194*	(3.514759)
Adjusted R-squared	0.103649		0.130387		0.1653		0.216443		0.430602		0.522799		0.624273	

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 48: Base model (TOBIT), USD/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.322464		3.749633		7.525732		11.19346		35.0878		63.39116		324.1757	
Constant	6.309543**	(0.237824)	6.888029**	(0.298619)	12.25583**	(0.46393)	15.06899**	(0.606995)	27.23148**	(1.353679)	38.49749**	(2.116581)	118.708**	(8.559442)
Time zone 1 (dummy)	-0.984449**	(0.026935)	-0.836101**	(0.032537)	-1.043158**	(0.050241)	-1.00936**	(0.065736)	-0.295971*	(0.14632)	0.719742**	(0.228672)	-4.580804**	(0.924962)
Time zone 2 (dummy)	-1.017966**	(0.021679)	-1.030086**	(0.025409)	-1.370082**	(0.039395)	-1.458582**	(0.051608)	-1.164169**	(0.11532)	-0.90383**	(0.180392)	2.459908**	(0.730109)
Time zone 3 (dummy)	-0.204982**	(0.017645)	-0.168037**	(0.021857)	-0.177042**	(0.034079)	0.061762	(0.044752)	2.000622**	(0.100434)	5.532643**	(0.15718)	68.90281**	(0.63629)
Market activity	0.001495**	(0.000018)	0.002359**	(0.0000167)	0.004906**	(0.0000262)	0.008802**	(0.0000345)	0.038468**	(0.0000777)	0.072622**	(0.000122)	0.34857**	(0.000493)
Aggressiveness	-4.124831**	(0.241187)	-3.418786**	(0.302971)	-5.302042**	(0.470597)	-6.473738**	(0.615658)	-14.51612**	(1.372799)	-22.27494**	(2.146448)	-63.44803**	(8.680044)
Market Depth	0.024683**	(0.000577)	0.036141**	(0.000725)	0.062671**	(0.00113)	0.081495**	(0.001484)	0.210122**	(0.003337)	0.451774**	(0.005225)	2.394978**	(0.021155)
Volatility	-7.673813**	(1.500101)	0.039247	(0.057347)	0.037139	(0.090408)	0.14131	(0.085086)	0.171952	(0.158293)	0.164639	(0.249488)	1.107695	(0.846487)
Split (dummy)	0.19873**	(0.017912)	0.376493**	(0.0224)	0.774499**	(0.034885)	0.752024**	(0.045825)	0.438469**	(0.102899)	0.1641	(0.161079)	-0.877486	(0.652176)
Bid-ask spread	-233.9097**	(1.473415)	-313.3558**	(1.833332)	-478.6023**	(2.845559)	-566.0578**	(3.730786)	-829.559**	(8.331832)	-1209.45**	(13.02796)	-3476.783**	(52.69513)
Opposite (dummy)	-0.035672**	(0.013533)	0.126967**	(0.016897)	-0.436997**	(0.026245)	-0.556433**	(0.034409)	-0.871224**	(0.077035)	-1.088511**	(0.120542)	-1.249643*	(0.487968)
Medium (dummy)	-0.632063**	(0.021262)	-0.595621**	(0.026434)	-0.879842**	(0.040974)	-0.968566**	(0.053685)	-0.946811**	(0.12011)	-0.679282**	(0.187938)	2.004744**	(0.760765)
Large (dummy)	-1.565957**	(0.06916)	-1.224062**	(0.084764)	-1.942446**	(0.131314)	-2.332085**	(0.17184)	-2.785537**	(0.383009)	-3.522817**	(0.599161)	-9.059086**	(2.424795)
X-Large (dummy)	-0.870831**	(0.100907)	0.255344*	(0.123095)	0.020142	(0.191036)	0.064444	(0.24976)	0.131285	(0.555614)	-0.734233	(0.868868)	-8.372082*	(3.515699)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 49: Base model (TOBIT), USD/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.074868		3.282654		6.118167		8.268619		20.43948		34.38295		158.9355	
Constant	4.020765**	(0.236975)	4.330928**	(0.30055)	7.436986**	(0.449723)	9.162382**	(0.547364)	17.81723**	(0.905041)	28.96755**	(1.316153)	90.81862**	(4.138882)
Time zone 1 (dummy)	-1.09374**	(0.031615)	-0.884613**	(0.039491)	-0.67165**	(0.059315)	-0.373225**	(0.0726)	-0.622876**	(0.122444)	-0.979295**	(0.178871)	-3.445492**	(0.56536)
Time zone 2 (dummy)	-0.656338**	(0.028753)	-0.395928**	(0.036047)	0.118983*	(0.05422)	0.340444**	(0.066405)	-0.185499	(0.11189)	-1.197799**	(0.163418)	-3.434202**	(0.516613)
Time zone 3 (dummy)	0.169736**	(0.02619)	0.451872**	(0.033017)	0.951743**	(0.049789)	1.330604**	(0.060988)	2.043301**	(0.103007)	3.407246**	(0.150543)	37.68297**	(0.476165)
Market activity	0.001867**	(0.0000419)	0.002965**	(0.0000531)	0.005943**	(0.0000793)	0.009287**	(0.0000967)	0.03548**	(0.000164)	0.064829**	(0.00024)	0.302781**	(0.000761)
Aggressiveness	-1.794725**	(0.242437)	-0.61987*	(0.307433)	-0.300375	(0.459879)	-0.496863	(0.559611)	-4.17642**	(0.924712)	-10.09864**	(1.344615)	-34.56049**	(4.22781)
Market Depth	0.041318**	(0.000815)	0.059141**	(0.001029)	0.083885**	(0.001559)	0.098664**	(0.001915)	0.123334**	(0.003259)	0.12571**	(0.00477)	0.113028**	(0.015093)
Volatility	-1.270576**	(0.343849)	-2.337853**	(0.455658)	-3.018934**	(0.598775)	-2.395602**	(0.664668)	3.305183**	(1.08965)	10.92011**	(1.597786)	112.0834**	(5.06217)
Split (dummy)	0.416688**	(0.022804)	0.563162**	(0.028652)	0.898292**	(0.043267)	0.917397**	(0.053121)	0.522226**	(0.090139)	0.073846	(0.13187)	-0.746343	(0.417325)
Bid-ask spread	-171.4743**	(1.335501)	-243.8783**	(1.676022)	-381.1686**	(2.526521)	-434.3649**	(3.097832)	-516.4219**	(5.25065)	-587.2843**	(7.680111)	-838.1371**	(24.27472)
Opposite (dummy)	-0.232685**	(0.018431)	-0.11029**	(0.023084)	-0.754836**	(0.034741)	-0.944178**	(0.04256)	-1.215993**	(0.07193)	-1.406536**	(0.105159)	-3.333258**	(0.332664)
Medium (dummy)	-1.414301**	(0.029643)	-1.530441**	(0.03675)	-2.056516**	(0.054863)	-2.195824**	(0.066947)	-2.152545**	(0.112362)	-2.076764**	(0.164132)	-1.907892**	(0.519046)
Large (dummy)	-2.550653**	(0.135646)	-2.047366**	(0.161724)	-3.079319**	(0.242014)	-3.227599**	(0.293955)	-2.460063**	(0.489211)	-2.324892**	(0.713255)	1.479838	(2.252608)
X-Large (dummy)	-1.542322**	(0.175577)	-0.369285	(0.213181)	-0.092302	(0.320602)	0.080022	(0.391873)	1.240164	(0.656694)	1.291121	(0.959403)	4.897876	(3.028492)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 50: Base model (TOBIT), USD/JPY, 10 September 2010, Buy order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.079064		3.32351		6.349491		8.790904		23.49144		40.66563		193.7892	
Constant	2.558326**	(0.220911)	2.482398**	(0.275113)	4.896252**	(0.421675)	5.623297**	(0.518279)	11.55338**	(0.914778)	17.85736**	(1.343932)	63.34691**	(4.637376)
Time zone 1 (dummy)	-1.328253**	(0.029564)	-1.290217**	(0.036269)	-1.599973**	(0.055774)	-1.51464**	(0.069083)	0.30662*	(0.124396)	1.846336**	(0.183845)	6.248561**	(0.636968)
Time zone 2 (dummy)	-0.610128**	(0.02768)	-0.457518**	(0.034125)	-0.250747**	(0.052541)	0.081427	(0.065104)	2.793736**	(0.11728)	4.846764**	(0.173316)	13.0183**	(0.600605)
Time zone 3 (dummy)	0.346056**	(0.026089)	0.590655**	(0.032294)	1.171775**	(0.049854)	1.586819**	(0.061842)	4.904441**	(0.111702)	8.857722**	(0.165214)	53.22003**	(0.573327)
Market activity	0.002227**	(0.0000571)	0.003531**	(0.0000706)	0.006924**	(0.000109)	0.010695**	(0.000136)	0.039705**	(0.000246)	0.076199**	(0.000361)	0.366407**	(0.001231)
Aggressiveness	-0.334459	(0.224954)	1.374736**	(0.280126)	2.636825**	(0.429235)	3.815335**	(0.527429)	3.243634**	(0.930478)	2.07697	(1.366938)	10.14416*	(4.717187)
Market Depth	0.032291**	(0.000678)	0.042052**	(0.000837)	0.067401**	(0.001293)	0.077324**	(0.001606)	0.133901**	(0.002905)	0.218872**	(0.004299)	0.491054**	(0.014918)
Volatility	-22.43689**	(1.862829)	-37.38979**	(2.294203)	-75.19427**	(3.537649)	-102.5471**	(4.388976)	-279.706**	(7.920939)	-523.862**	(11.61439)	-2270.383**	(39.19497)
Split (dummy)	0.545713**	(0.02083)	0.746964**	(0.025775)	1.31737**	(0.039924)	1.46161**	(0.04967)	1.508774**	(0.090267)	1.657516**	(0.133735)	1.913473**	(0.464701)
Bid-ask spread	-156.3659**	(1.19259)	-217.7093**	(1.471122)	-337.031**	(2.270298)	-383.2647**	(2.818053)	-478.7095**	(5.098195)	-572.9405**	(7.543876)	-959.5938**	(26.15967)
Opposite (dummy)	-0.246357**	(0.01665)	-0.113617**	(0.020503)	-0.786557**	(0.031637)	-1.012448**	(0.039256)	-1.545549**	(0.071005)	-1.994518**	(0.105115)	-4.870911**	(0.365047)
Medium (dummy)	-1.080656**	(0.026442)	-1.117452**	(0.032339)	-1.68493**	(0.049714)	-1.763697**	(0.061485)	-1.513994**	(0.110734)	-1.29964**	(0.163847)	0.077598	(0.568948)
Large (dummy)	-2.639856**	(0.071479)	-2.585807**	(0.084424)	-3.451887**	(0.12693)	-3.507506**	(0.155638)	-3.476203**	(0.277232)	-3.926511**	(0.409893)	-4.720987**	(1.422292)
X-Large (dummy)	-2.163794**	(0.136154)	-0.729366**	(0.158558)	-0.181726	(0.242165)	-0.035129	(0.29954)	1.09753*	(0.537318)	1.968811*	(0.793666)	1.066487	(2.752044)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 51: Base model (TOBIT), USD/JPY, 10 September 2010, Sell order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.053522		3.276574		6.261114		8.681702		23.38941		40.56598		193.9386	
Constant	2.541499**	(0.22265)	2.566053**	(0.276377)	4.481695**	(0.422164)	5.165152**	(0.514411)	10.97904**	(0.899246)	15.90057**	(1.325979)	57.88839**	(4.693445)
Time zone 1 (dummy)	-1.278864**	(0.029782)	-1.2233**	(0.036497)	-1.378647**	(0.055898)	-1.272774**	(0.068624)	1.371314**	(0.122435)	3.709415**	(0.181399)	16.23763**	(0.643768)
Time zone 2 (dummy)	-0.703314**	(0.027933)	-0.554561**	(0.034353)	-0.31031**	(0.052683)	-0.163175*	(0.064706)	2.163843**	(0.115566)	3.544799**	(0.171196)	10.01773**	(0.607163)
Time zone 3 (dummy)	0.447543**	(0.026277)	0.73054**	(0.032464)	1.431299**	(0.049941)	1.737046**	(0.061416)	5.349401**	(0.110031)	9.515088**	(0.163104)	58.63914**	(0.579583)
Market activity	0.002297**	(0.0000573)	0.003577**	(0.0000708)	0.006871**	(0.000109)	0.010834**	(0.000135)	0.041737**	(0.000242)	0.080475**	(0.000359)	0.39051**	(0.001245)
Aggressiveness	-0.467626*	(0.226511)	1.035926**	(0.281134)	2.350353**	(0.429331)	3.454077**	(0.522985)	2.5521**	(0.913799)	2.318373	(1.347322)	7.624821	(4.769419)
Market Depth	0.027687**	(0.000684)	0.037905**	(0.000842)	0.059311**	(0.001296)	0.068798**	(0.001594)	0.108863**	(0.002859)	0.187905**	(0.004242)	0.476359**	(0.015078)
Volatility	-18.93924**	(1.8725)	-30.816**	(2.304845)	-59.67551**	(3.542257)	-85.45858**	(4.355202)	-282.3301**	(7.791468)	-551.8109**	(11.55186)	-2609.844**	(39.60985)
Split (dummy)	0.48991**	(0.020975)	0.680645**	(0.025895)	1.203974**	(0.039996)	1.350901**	(0.049333)	1.271584**	(0.088937)	1.400779**	(0.132048)	0.94173*	(0.469776)
Bid-ask spread	-159.735**	(1.20516)	-221.3541**	(1.477608)	-325.0739**	(2.269805)	-369.5092**	(2.794288)	-451.2105**	(5.016764)	-547.0281**	(7.443748)	-942.7041**	(26.44037)
Opposite (dummy)	-0.072037**	(0.016752)	0.063669**	(0.020605)	-0.452763**	(0.031694)	-0.5487**	(0.038993)	-0.93212**	(0.069944)	-1.063868**	(0.103772)	-1.153785**	(0.369009)
Medium (dummy)	-1.055851**	(0.026605)	-1.08741**	(0.032487)	-1.638318**	(0.049781)	-1.649666**	(0.061048)	-1.410773**	(0.109078)	-1.313043**	(0.161767)	-0.238809	(0.575159)
Large (dummy)	-2.506597**	(0.071413)	-2.466451**	(0.084557)	-3.274863**	(0.126842)	-3.263808**	(0.154154)	-3.257156**	(0.273019)	-3.469231**	(0.404454)	-4.52907**	(1.437755)
X-Large (dummy)	-1.588725**	(0.133819)	-0.353123*	(0.158357)	0.024081	(0.242435)	0.255366	(0.297552)	1.274441*	(0.529597)	2.03326**	(0.784397)	3.808122	(2.781868)

Table 52: Base model (TOBIT), USD/JPY, 13 September 2010, Buy order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.712089		2.692118		5.123314		6.933803		17.24934		28.97267		132.6353	
Constant	4.103313**	(0.257174)	4.707568**	(0.314097)	8.56891**	(0.464695)	9.837488**	(0.550697)	17.49634**	(0.913353)	25.91774**	(1.229347)	84.30247**	(3.93638)
Time zone 1 (dummy)	-1.205964**	(0.032919)	-1.056875**	(0.037658)	-1.435596**	(0.052032)	-1.616067**	(0.061353)	-3.398421**	(0.101517)	-5.463366**	(0.142485)	-27.70783**	(0.46767)
Time zone 2 (dummy)	-0.577793**	(0.029197)	-0.477824**	(0.034841)	-0.488064**	(0.050547)	-0.531014**	(0.060423)	-1.835762**	(0.10426)	-3.487241**	(0.144578)	-18.83796**	(0.445399)
Time zone 3 (dummy)	0.242272**	(0.02606)	0.481321**	(0.031607)	0.835937**	(0.04426)	0.867114**	(0.052615)	-0.040255	(0.095719)	-0.27511*	(0.137819)	1.046207*	(0.466515)
Market activity	0.001856**	(0.0000548)	0.002862**	(0.0000682)	0.005553**	(0.000098)	0.009062**	(0.000122)	0.033327**	(0.000253)	0.061682**	(0.000376)	0.298888**	(0.001275)
Aggressiveness	-2.15136**	(0.262512)	-1.332368**	(0.320896)	-1.814306**	(0.474655)	-1.543963**	(0.56246)	-3.41096**	(0.930575)	-6.545018**	(1.250903)	-18.66357**	(3.999356)
Market Depth	0.033008**	(0.001151)	0.043448**	(0.00149)	0.064847**	(0.002185)	0.082558**	(0.00265)	0.139047**	(0.004618)	0.212017**	(0.006903)	0.74724**	(0.022344)
Volatility	1.118444**	(0.142293)	1.426376**	(0.188364)	2.22652**	(0.249733)	2.414265**	(0.301061)	2.801254**	(0.421187)	3.249192**	(0.46732)	6.46614**	(0.909583)
Split (dummy)	0.354986**	(0.022908)	0.469416**	(0.027274)	0.944206**	(0.039457)	0.96164**	(0.047844)	0.976389**	(0.085417)	0.974174**	(0.121505)	2.536308**	(0.399583)
Bid-ask spread	-191.4044**	(2.119911)	-258.9419**	(2.579429)	-387.1659**	(3.847579)	-439.3973**	(4.410226)	-543.7185**	(6.517536)	-658.818**	(8.97262)	-1461.753**	(26.82619)
Opposite (dummy)	-0.222748**	(0.019487)	-0.084139**	(0.02328)	-0.803144**	(0.033301)	-0.985653**	(0.039966)	-1.343198**	(0.069159)	-1.403853**	(0.097951)	-1.035564**	(0.318029)
Medium (dummy)	-1.016033**	(0.028721)	-1.086909**	(0.03423)	-1.416991**	(0.048171)	-1.545686**	(0.057385)	-1.331559**	(0.10065)	-1.3506**	(0.143623)	1.476931**	(0.475373)
Large (dummy)	-2.292098**	(0.083331)	-2.115292**	(0.094806)	-2.75557**	(0.12299)	-2.942649**	(0.144018)	-2.709831**	(0.2469)	-2.350618**	(0.356031)	5.433258**	(1.209792)
X-Large (dummy)	-1.932312**	(0.220834)	-1.08993**	(0.25978)	-1.271615**	(0.371227)	-1.278387**	(0.412455)	-1.484635*	(0.644475)	-1.109282	(0.925636)	0.838392	(2.989764)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 53: Base model (TOBIT), USD/JPY, 13 September 2010, Sell order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.751116		2.75391		5.229516		7.066118		17.61148		29.72717		135.5574	
Constant	5.240552**	(0.271907)	5.790737**	(0.334355)	9.464193**	(0.484618)	10.85806**	(0.579718)	18.43342**	(0.968385)	26.01317**	(1.325021)	80.07495**	(4.256967)
Time zone 1 (dummy)	-0.994646**	(0.032471)	-0.808253**	(0.038295)	-0.952207**	(0.053352)	-0.903384**	(0.063378)	-1.789243**	(0.106877)	-2.698483**	(0.152484)	-16.60923**	(0.514978)
Time zone 2 (dummy)	-0.506219**	(0.02884)	-0.339575**	(0.036055)	-0.312422**	(0.05166)	-0.214915**	(0.062055)	-1.423884**	(0.106748)	-2.690772**	(0.149781)	-17.33131**	(0.479859)
Time zone 3 (dummy)	0.319913**	(0.025763)	0.576696**	(0.031918)	1.051901**	(0.04486)	1.21321**	(0.053556)	0.389795**	(0.099589)	0.074905	(0.145889)	1.491839**	(0.509481)
Market activity	0.002014**	(0.0000564)	0.003113**	(0.0000731)	0.005895**	(0.000105)	0.00976**	(0.000132)	0.036471**	(0.000287)	0.067981**	(0.000436)	0.3209**	(0.001476)
Aggressiveness	-3.442454**	(0.277361)	-2.643473**	(0.34122)	-2.957947**	(0.493687)	-2.968356**	(0.590635)	-5.090332**	(0.984119)	-7.645108**	(1.344537)	-18.22112**	(4.317712)
Market Depth	0.031392**	(0.001139)	0.045382**	(0.001585)	0.069971**	(0.002299)	0.084995**	(0.002722)	0.137757**	(0.004726)	0.211793**	(0.007014)	0.812519**	(0.024614)
Volatility	1.15364**	(0.131046)	1.507409**	(0.178181)	2.097121**	(0.279109)	2.395039**	(0.301303)	2.725278**	(0.356876)	2.776425**	(0.480782)	5.711622**	(1.106819)
Split (dummy)	0.389016**	(0.022442)	0.517624**	(0.027498)	0.961226**	(0.040006)	0.995438**	(0.048754)	0.877096**	(0.089035)	0.78334**	(0.128631)	2.238163**	(0.430552)
Bid-ask spread	-191.7819**	(1.85177)	-264.7532**	(2.35063)	-400.7101**	(3.246224)	-454.4184**	(3.777626)	-561.9643**	(6.172313)	-690.3494**	(8.852174)	-1499.664**	(28.71074)
Opposite (dummy)	0.012422	(0.019398)	0.144832**	(0.023815)	-0.518921**	(0.033971)	-0.689584**	(0.040899)	-1.286527**	(0.073058)	-1.748901**	(0.104323)	-4.425581**	(0.341874)
Medium (dummy)	-1.042724**	(0.028582)	-1.117525**	(0.034848)	-1.501387**	(0.048936)	-1.573253**	(0.058503)	-1.588759**	(0.105651)	-1.645433**	(0.15144)	0.197289	(0.502777)
Large (dummy)	-2.485438**	(0.081833)	-2.416348**	(0.0953)	-3.15157**	(0.123233)	-3.187396**	(0.143324)	-3.117259**	(0.253324)	-2.972365**	(0.371779)	3.082948*	(1.268745)
X-Large (dummy)	-1.752416**	(0.22668)	-0.906675**	(0.266877)	-1.033403**	(0.381793)	-1.050032*	(0.431404)	-1.285794	(0.689342)	-0.935616	(0.994044)	2.226897	(3.28803)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 54: Base model (TOBIT), EUR/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	8.833764**	(0.351505)	8.598309**	(0.392112)	9.940141**	(0.520987)	12.6136**	(0.650368)	25.27192**	(1.20001)	33.76547**	(1.779616)	106.309**	(6.248824)
Time zone 1 (dummy)	-0.447551**	(0.02982)	-0.386623**	(0.032022)	-0.425141**	(0.041241)	-0.476246**	(0.051361)	-1.149118**	(0.094353)	-2.323838**	(0.139742)	-13.08263**	(0.490885)
Time zone 2 (dummy)	-0.28567**	(0.021361)	-0.267969**	(0.023109)	-0.148835**	(0.029939)	-0.037383	(0.037326)	0.381403**	(0.069039)	0.761604**	(0.102518)	13.49308**	(0.361123)
Time zone 3 (dummy)	-0.099764**	(0.019223)	-0.067871**	(0.02085)	0.02748	(0.027078)	0.16194**	(0.033783)	1.214379**	(0.062571)	2.307586**	(0.092982)	24.64315**	(0.327734)
Market activity	0.002217**	(0.0000668)	0.003011**	(0.0000724)	0.005248**	(0.0000941)	0.008659**	(0.000117)	0.033399**	(0.000218)	0.064381**	(0.000324)	0.334681**	(0.001144)
Aggressiveness	-9.022048**	(0.356537)	-7.755994**	(0.397625)	-6.796454**	(0.528219)	-8.570304**	(0.659368)	-17.66882**	(1.216492)	-22.87386**	(1.804018)	-69.93046**	(6.334383)
Market Depth	0.027046**	(0.001776)	0.052765**	(0.001933)	0.098305**	(0.002528)	0.125207**	(0.003159)	0.130268**	(0.005884)	0.12781**	(0.00875)	0.226034**	(0.030839)
Volatility	-6.550321**	(1.141069)	-6.550525**	(1.234332)	-8.632487**	(1.605506)	-5.271881**	(2.003201)	22.2025**	(3.713977)	51.50875**	(5.522808)	556.9551**	(19.45399)
Split (dummy)	-0.288942**	(0.016685)	-0.1717**	(0.017943)	-0.010048	(0.023212)	0.004404	(0.028954)	-0.079377	(0.053712)	-0.253495**	(0.079838)	0.219951	(0.28138)
Bid-ask spread	-56.74301**	(0.896242)	-79.21275**	(0.968188)	-116.5464**	(1.260902)	-135.1885**	(1.575655)	-169.7506**	(2.926844)	-195.6112**	(4.348346)	-623.3252**	(15.3079)
Opposite (dummy)	0.429475**	(0.01414)	0.506209**	(0.015295)	-0.33446**	(0.019839)	-0.521964**	(0.02474)	-1.14341**	(0.045842)	-1.528692**	(0.068117)	-3.519249**	(0.240005)
Medium (dummy)	-0.231349**	(0.024864)	-0.313969**	(0.026994)	-0.364185**	(0.034967)	-0.414787**	(0.043584)	-0.644883**	(0.080779)	-0.850222**	(0.120055)	-0.347148	(0.423178)
Large (dummy)	-1.313899**	(0.140031)	-1.297603**	(0.147814)	-1.749481**	(0.189161)	-1.881077**	(0.233823)	-2.428728**	(0.424806)	-2.931081**	(0.629535)	-8.525706**	(2.207685)
X-Large (dummy)	-1.657537**	(0.241504)	-1.57103**	(0.252507)	-1.808231**	(0.320281)	-1.696109**	(0.394349)	-1.231908	(0.714538)	-1.05624	(1.059281)	-0.442572	(3.714568)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 55: Base model (TOBIT), EUR/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.992615		1.641779		3.336682		5.00787		15.91259		28.998		151.9894	
Constant	10.25383**	(0.343295)	9.74149**	(0.384353)	11.48785**	(0.515287)	13.47195**	(0.640456)	24.56978**	(1.181798)	34.70524**	(1.752878)	101.5421**	(5.911956)
Time zone 1 (dummy)	-0.663884**	(0.029436)	-0.6249**	(0.031543)	-0.725328**	(0.041105)	-0.838284**	(0.050843)	-2.178105**	(0.093262)	-3.897575**	(0.137827)	-21.94835**	(0.464642)
Time zone 2 (dummy)	-0.391076**	(0.020945)	-0.42888**	(0.022724)	-0.444907**	(0.029794)	-0.4356**	(0.036909)	-0.998702**	(0.068242)	-1.690831**	(0.101175)	-0.010898	(0.341847)
Time zone 3 (dummy)	-0.168687**	(0.018825)	-0.149933**	(0.020471)	-0.092181**	(0.026904)	0.022628	(0.033364)	0.481618**	(0.061819)	1.097994**	(0.091746)	15.78702**	(0.310243)
Market activity	0.002382**	(0.0000661)	0.003175**	(0.0000714)	0.005753**	(0.0000937)	0.009111**	(0.000116)	0.034858**	(0.000216)	0.065852**	(0.00032)	0.352241**	(0.001083)
Aggressiveness	-10.37672**	(0.348372)	-8.768063**	(0.389871)	-8.30346**	(0.52258)	-9.288232**	(0.649486)	-16.35976**	(1.198303)	-22.15778**	(1.777328)	-54.91937**	(5.994401)
Market Depth	0.022854**	(0.001753)	0.035805**	(0.001904)	0.068224**	(0.002518)	0.095233**	(0.003126)	0.127663**	(0.005815)	0.143242**	(0.008633)	0.27044**	(0.029192)
Volatility	-12.37973**	(1.138126)	-13.69612**	(1.223101)	-17.89959**	(1.599637)	-16.68285**	(1.983862)	-13.88442**	(3.684857)	-7.044662	(5.45368)	139.3657**	(18.41462)
Split (dummy)	-0.327623**	(0.016401)	-0.202635**	(0.017659)	-0.044845	(0.023112)	-0.009585	(0.028642)	0.026974	(0.053087)	-0.022738	(0.078779)	1.069578**	(0.266358)
Bid-ask spread	-50.70287**	(0.879011)	-69.82233**	(0.953072)	-103.9499**	(1.25538)	-122.5324**	(1.558252)	-149.0215**	(2.892521)	-178.3361**	(4.289731)	-548.9301**	(14.49205)
Opposite (dummy)	0.456709**	(0.013881)	0.540513**	(0.015045)	-0.2187**	(0.019742)	-0.402371**	(0.024464)	-1.050643**	(0.045308)	-1.567137**	(0.067214)	-2.949248**	(0.227193)
Medium (dummy)	-0.08876**	(0.024222)	-0.197617**	(0.026466)	-0.272906**	(0.034746)	-0.31768**	(0.043063)	-0.512675**	(0.079828)	-0.517241**	(0.118472)	0.345201	(0.400596)
Large (dummy)	-1.490041**	(0.141466)	-1.41774**	(0.146629)	-2.024853**	(0.189366)	-2.137501**	(0.231173)	-2.655985**	(0.418852)	-2.875363**	(0.619359)	-5.582484**	(2.087748)
X-Large (dummy)	-1.94019**	(0.24624)	-1.645838**	(0.248621)	-2.031051**	(0.320296)	-1.293662**	(0.387118)	-0.485072	(0.704379)	-0.595177	(1.042554)	1.135513	(3.51423)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 56: Base model (TOBIT), EUR/JPY, 10 September 2010, Buy order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.002233		1.679326		3.491534		5.279688		16.99086		31.0228		163.1273	
Constant	7.431394**	(0.335022)	7.346363**	(0.378705)	8.433894**	(0.518842)	10.16142**	(0.652133)	19.80143**	(1.227536)	27.77288**	(1.839728)	74.83312**	(6.586081)
Time zone 1 (dummy)	-0.382497**	(0.025155)	-0.364721**	(0.027379)	-0.526087**	(0.036524)	-0.613791**	(0.045905)	-0.301681**	(0.086979)	-0.191505	(0.130526)	-2.072987**	(0.468099)
Time zone 2 (dummy)	-0.399678**	(0.019996)	-0.452643**	(0.021889)	-0.575585**	(0.029255)	-0.583207**	(0.036772)	0.384449**	(0.069978)	1.310496**	(0.105218)	11.18662**	(0.377805)
Time zone 3 (dummy)	-0.041725*	(0.017564)	0.031632	(0.01931)	0.154046**	(0.025949)	0.271426**	(0.03268)	2.22548**	(0.062424)	4.335273**	(0.093936)	31.21509**	(0.337604)
Market activity	0.001812**	(0.0000534)	0.002559**	(0.0000587)	0.004905**	(0.000079)	0.008442**	(0.0000996)	0.036775**	(0.00019)	0.072616**	(0.000286)	0.41197**	(0.001021)
Aggressiveness	-7.405247**	(0.339902)	-6.12711**	(0.384127)	-4.690077**	(0.526166)	-5.040279**	(0.661266)	-10.30974**	(1.244488)	-13.47608**	(1.865041)	-21.57672**	(6.676243)
Market Depth	0.012008**	(0.001615)	0.018281**	(0.001773)	0.033131**	(0.00238)	0.047648**	(0.002995)	0.103496**	(0.005731)	0.203211**	(0.008622)	1.33891**	(0.030974)
Volatility	-1.379068	(1.213881)	-3.509588**	(1.331754)	-4.65768**	(1.782777)	-9.574523**	(2.242377)	-77.63733**	(4.244314)	-188.8468**	(6.362122)	-1379.581**	(22.59511)
Split (dummy)	-0.178296**	(0.015202)	-0.043938**	(0.016581)	0.177247**	(0.022202)	0.235906**	(0.027964)	0.321709**	(0.053458)	0.386598**	(0.080457)	1.303549**	(0.289129)
Bid-ask spread	-51.90038**	(0.808758)	-72.81894**	(0.886306)	-110.8811**	(1.186576)	-134.8203**	(1.492347)	-183.1726**	(2.813717)	-237.5528**	(4.196107)	-641.7937**	(14.98781)
Opposite (dummy)	0.397365**	(0.012777)	0.470814**	(0.014004)	-0.354062**	(0.018795)	-0.603307**	(0.023661)	-1.280969**	(0.045183)	-1.816487**	(0.067995)	-3.925453**	(0.244343)
Medium (dummy)	-0.02812	(0.02127)	-0.100179**	(0.023491)	-0.165893**	(0.031624)	-0.129005**	(0.039847)	-0.187788*	(0.076369)	-0.230442*	(0.115016)	2.40687**	(0.413469)
Large (dummy)	-0.627413**	(0.065195)	-0.467405**	(0.070471)	-0.634677**	(0.094476)	-0.575412**	(0.118648)	0.171139	(0.226849)	0.36603	(0.341762)	6.075583**	(1.228889)
X-Large (dummy)	-2.099614**	(0.223828)	-2.378048**	(0.233749)	-2.819986**	(0.293605)	-2.734886**	(0.36094)	-4.079534**	(0.672403)	-5.133055**	(1.008026)	-18.46013**	(3.610195)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 57: Base model (TOBIT), EUR/JPY, 10 September 2010, Sell order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.003728		1.667249		3.402038		5.138411		16.46182		30.00322		159.0628	
Constant	9.260744**	(0.335994)	8.388202**	(0.378887)	9.772973**	(0.513081)	11.34677**	(0.647518)	21.30302**	(1.19987)	28.05785**	(1.7557)	89.392**	(6.358637)
Time zone 1 (dummy)	-0.521773**	(0.025585)	-0.534732**	(0.027655)	-0.925457**	(0.036469)	-1.145834**	(0.045824)	-1.500267**	(0.085028)	-2.191828**	(0.124637)	-12.64092**	(0.45203)
Time zone 2 (dummy)	-0.477692**	(0.020322)	-0.529938**	(0.022085)	-0.764102**	(0.029127)	-0.856137**	(0.036638)	-0.549234**	(0.068395)	-0.525443**	(0.100477)	-0.953601**	(0.364843)
Time zone 3 (dummy)	-0.075404**	(0.017816)	-0.007465	(0.019453)	-0.078648**	(0.025818)	-0.061927	(0.032545)	0.949479**	(0.061003)	1.980237**	(0.08971)	16.6947**	(0.326043)
Market activity	0.001895**	(0.0000543)	0.002609**	(0.0000593)	0.005102**	(0.0000787)	0.008699**	(0.0000991)	0.037206**	(0.000186)	0.073564**	(0.000273)	0.412566**	(0.000985)
Aggressiveness	-9.265095**	(0.340946)	-7.321933**	(0.38433)	-6.295144**	(0.520346)	-6.532612**	(0.656675)	-11.78713**	(1.21649)	-13.67548**	(1.779929)	-31.22264**	(6.445943)
Market Depth	0.009806**	(0.001645)	0.016803**	(0.001787)	0.027478**	(0.002366)	0.032475**	(0.002981)	0.050065**	(0.005596)	0.08311**	(0.008234)	0.943038**	(0.029913)
Volatility	-4.276589**	(1.234688)	-4.385383**	(1.342441)	-6.467032**	(1.7721)	-11.59054**	(2.227269)	-94.14463**	(4.156003)	-218.2601**	(6.092938)	-1378.968**	(21.80859)
Split (dummy)	-0.2049**	(0.015446)	-0.073421**	(0.016724)	0.089669**	(0.022133)	0.133778**	(0.027891)	0.222931**	(0.052256)	0.370908**	(0.076832)	1.402135**	(0.27923)
Bid-ask spread-	49.85397**	(0.81941)	-66.97047**	(0.891772)	-98.0029**	(1.179783)	-117.3854**	(1.482998)	-145.1546**	(2.752889)	-167.887**	(4.04003)	-507.8445**	(14.48717)
Opposite (dummy)	0.440769**	(0.012989)	0.535737**	(0.014134)	-0.223258**	(0.018727)	-0.423447**	(0.023588)	-1.081797**	(0.044166)	-1.450947**	(0.064935)	-3.08942**	(0.235974)
Medium (dummy)	-0.079199**	(0.021657)	-0.133579**	(0.023718)	-0.178323**	(0.03151)	-0.177698**	(0.039724)	-0.222118**	(0.074649)	-0.053471	(0.109858)	2.92957**	(0.399314)
Large (dummy)	-0.649786**	(0.066362)	-0.447831**	(0.071169)	-0.634432**	(0.094133)	-0.565839**	(0.118173)	0.105658	(0.221682)	0.336179	(0.326408)	5.743605**	(1.18643)
X-Large (dummy)	-1.793674**	(0.220746)	-1.817331**	(0.228906)	-2.464661**	(0.295041)	-2.255698**	(0.361084)	-2.946755**	(0.657858)	-3.629762**	(0.962187)	-16.92743**	(3.488527)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 58: Base model (TOBIT), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95882		1.593369		3.359089		4.980163		15.37131		27.82783		144.0147	
Constant	8.728851**	(0.379279)	7.550264**	(0.42393)	7.997111**	(0.590224)	9.339403**	(0.73296)	16.30568**	(1.36018)	24.90766**	(2.043867)	65.45577**	(7.75313)
Time zone 1 (dummy)	-0.470111**	(0.028819)	-0.434784**	(0.030872)	-0.913346**	(0.04166)	-1.25584**	(0.051767)	-3.700163**	(0.095553)	-6.860125**	(0.143575)	-41.26299**	(0.543398)
Time zone 2 (dummy)	0.139191**	(0.019778)	0.197634**	(0.021422)	0.154568**	(0.029089)	0.156607**	(0.03626)	-0.615267**	(0.06774)	-1.905526**	(0.102183)	-9.777453**	(0.388041)
Time zone 3 (dummy)	0.132925**	(0.017309)	0.241556**	(0.018737)	0.46759**	(0.025437)	0.617722**	(0.031734)	1.253377**	(0.059412)	2.669292**	(0.089697)	25.06882**	(0.340843)
Market activity	0.007779**	(0.000199)	0.01153**	(0.000217)	0.02054**	(0.000296)	0.034287**	(0.00037)	0.129745**	(0.000696)	0.23801**	(0.001052)	1.084448**	(0.003999)
Aggressiveness	-8.891475**	(0.384427)	-6.639803**	(0.429521)	-4.670123**	(0.59789)	-4.921993**	(0.742409)	-7.754762**	(1.377533)	-11.92489**	(2.06988)	-10.57371	(7.851751)
Market Depth	0.011499**	(0.001249)	0.020943**	(0.001357)	0.034432**	(0.001859)	0.045923**	(0.002322)	0.11189**	(0.004361)	0.169627**	(0.00659)	0.667433**	(0.025054)
Volatility	2.542142**	(0.958249)	4.216716**	(1.038206)	18.5552**	(1.412652)	34.81068**	(1.764591)	163.5209**	(3.305684)	334.919**	(4.988061)	1925.499**	(18.93359)
Split (dummy)	-0.281328**	(0.015947)	-0.159503**	(0.017156)	-0.001821	(0.023293)	0.034712	(0.02908)	0.120582*	(0.054451)	0.236602**	(0.082204)	2.623781**	(0.31238)
Bid-ask spread	-53.26265**	(0.876639)	-76.28574**	(0.951203)	-117.8951**	(1.291822)	-139.9624**	(1.611055)	-203.835**	(3.005485)	-286.6911**	(4.524675)	-938.2512**	(17.1308)
Opposite (dummy)	0.279688**	(0.013365)	0.343424**	(0.01446)	-0.565505**	(0.019673)	-0.834212**	(0.024534)	-1.430641**	(0.045853)	-1.720284**	(0.069188)	-2.429554**	(0.262775)
Medium (dummy)	-0.213012**	(0.021884)	-0.33913**	(0.023763)	-0.432073**	(0.032215)	-0.40723**	(0.04014)	-0.286428**	(0.075084)	-0.041674	(0.113368)	4.668826**	(0.430811)
Large (dummy)	-0.679433**	(0.061551)	-0.56149**	(0.065367)	-0.749425**	(0.08828)	-0.640881**	(0.109559)	-0.020514	(0.20439)	0.869542**	(0.308617)	8.538381**	(1.173093)
X-Large (dummy)	-0.878099**	(0.137087)	-0.755014**	(0.145067)	-0.87677**	(0.194625)	-0.813667**	(0.241767)	0.429424	(0.450157)	2.605786**	(0.678709)	24.11911**	(2.579361)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 59: Base model (TOBIT), EUR/JPY, 13 September 2010, Sell order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95219		1.569979		3.232644		4.798213		14.80236		26.78061		139.1414	
Constant	9.712877**	(0.39255)	8.604467**	(0.436017)	9.066293**	(0.591914)	10.43659**	(0.730382)	17.50583**	(1.371228)	24.33298**	(2.038523)	67.26933**	(7.708565)
Time zone 1 (dummy)	-0.679107**	(0.030206)	-0.671816**	(0.031994)	-1.177804**	(0.042028)	-1.592559**	(0.051825)	-4.250099**	(0.096595)	-7.867106**	(0.143147)	-45.43806**	(0.54029)
Time zone 2 (dummy)	0.097847**	(0.020549)	0.140863**	(0.022093)	0.160646**	(0.029257)	0.172901**	(0.036206)	-0.557911**	(0.068399)	-2.074033**	(0.101817)	-12.05569**	(0.385779)
Time zone 3 (dummy)	0.092215**	(0.017983)	0.154353**	(0.019332)	0.261447**	(0.025601)	0.387177**	(0.031693)	0.752971**	(0.060012)	1.55811**	(0.089391)	18.02729**	(0.33888)
Market activity	0.007399**	(0.000207)	0.011132**	(0.000224)	0.019891**	(0.000298)	0.033208**	(0.00037)	0.125861**	(0.000703)	0.232135**	(0.001048)	1.051534**	(0.003976)
Aggressiveness	-9.932613**	(0.397877)	-7.712329**	(0.44178)	-5.732956**	(0.599608)	-6.051284**	(0.739812)	-8.896816**	(1.388705)	-10.46644**	(2.064473)	-8.015596	(7.806466)
Market Depth	0.004057**	(0.001326)	0.007726**	(0.001425)	0.017792**	(0.001887)	0.028692**	(0.002334)	0.078015**	(0.004408)	0.112268**	(0.006567)	0.576749**	(0.024911)
Volatility	1.921939	(1.006774)	2.461509*	(1.080139)	9.230518**	(1.429951)	21.04356**	(1.766176)	133.68**	(3.337625)	269.1669**	(4.97087)	1812.968**	(18.82192)
Split (dummy)	-0.239637**	(0.016582)	-0.10292**	(0.017709)	0.026061	(0.023466)	0.039116	(0.029058)	0.136601*	(0.055002)	0.253044**	(0.081922)	2.581346**	(0.310567)
Bid-ask spread	-52.4551**	(0.9112)	-72.84883**	(0.981313)	-108.3473**	(1.3037)	-125.4736**	(1.613796)	-178.7726**	(3.039709)	-252.9435**	(4.520429)	-939.301**	(17.08931)
Opposite (dummy)	0.338846**	(0.013917)	0.389071**	(0.014936)	-0.468103**	(0.019791)	-0.671725**	(0.024491)	-1.19853**	(0.046297)	-1.620603**	(0.068939)	-3.714737**	(0.261251)
Medium (dummy)	-0.185074**	(0.022737)	-0.29693**	(0.024517)	-0.367237**	(0.032383)	-0.330483**	(0.040047)	-0.126935	(0.075821)	0.280739*	(0.112976)	6.072161**	(0.428319)
Large (dummy)	-0.634073**	(0.063724)	-0.44728**	(0.067201)	-0.459387**	(0.088508)	-0.307283**	(0.10918)	0.50389*	(0.206218)	1.342599**	(0.307485)	10.30458**	(1.166302)
X-Large (dummy)	-0.729263**	(0.140445)	-0.583529**	(0.148278)	-0.707027**	(0.195641)	-0.649768**	(0.241746)	1.474293**	(0.454724)	4.12105**	(0.676946)	30.43567**	(2.564412)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 60: Extended model (TOBIT), EUR/USD, 9 September 2010, Buy order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.415833		3.923394		7.552876		11.09711		34.14328		61.06026		309.2231	
Constant	4.240868**	(0.239416)	4.935038**	(0.301793)	9.310295**	(0.454019)	12.9423**	(0.591996)	32.7842**	(1.293388)	48.49145**	(1.971113)	136.647**	(7.247918)
Time zone 1 (dummy)	-0.888606**	(0.028008)	-0.822417**	(0.034836)	-0.717701**	(0.052397)	-0.653496**	(0.068524)	-0.979544**	(0.149395)	-2.480398**	(0.227418)	-25.59805**	(0.838172)
Time zone 2 (dummy)	-0.60169**	(0.020193)	-0.493351**	(0.025335)	-0.10902**	(0.038343)	0.362794**	(0.05024)	2.959184**	(0.110286)	4.979471**	(0.168183)	38.20123**	(0.620632)
Time zone 3 (dummy)	-0.078877**	(0.01896)	0.101572**	(0.023861)	0.629185**	(0.036174)	1.019503**	(0.047423)	3.304352**	(0.104247)	5.853343**	(0.15903)	50.06818**	(0.58697)
Market activity	0.001074**	(0.0000177)	0.001744**	(0.0000223)	0.003713**	(0.0000338)	0.007293**	(0.0000444)	0.034658**	(0.0000978)	0.067118**	(0.000149)	0.345161**	(0.000551)
Aggressiveness	-1.893563**	(0.244288)	-1.039631**	(0.307892)	-2.127875**	(0.463117)	-4.276234**	(0.60379)	-19.10962**	(1.319003)	-29.48213**	(2.010123)	-65.62267**	(7.391093)
Market Depth	0.072782**	(0.00062)	0.106695**	(0.000785)	0.160794**	(0.001197)	0.204518**	(0.001573)	0.3732**	(0.003473)	0.507186**	(0.005302)	1.149756**	(0.019574)
Volatility	-0.089111	(0.095079)	-0.112416	(0.106204)	-0.182701	(0.147537)	-0.183034	(0.146573)	0.058963	(0.173524)	0.108385	(0.26433)	1.261988	(0.935462)
Split (dummy)	-0.126607*	(0.053997)	0.385593**	(0.067241)	0.969494**	(0.10181)	1.158938**	(0.133444)	1.709005**	(0.293981)	2.023493**	(0.448656)	4.886568**	(1.656245)
Bid-ask spread	-266.6914**	(1.415645)	-371.4201**	(1.775841)	-556.1259**	(2.688396)	-657.34**	(3.518155)	-914.0749**	(7.736465)	-1093.049**	(11.80042)	-2095.072**	(43.53709)
Opposite (dummy)	-0.177084**	(0.014201)	-0.062092**	(0.017813)	-0.541759**	(0.026975)	-0.717572**	(0.035363)	-1.549204**	(0.07773)	-1.989031**	(0.118567)	-5.091107**	(0.437592)
Medium (dummy)	-0.965716**	(0.042176)	-1.146882**	(0.052706)	-1.534095**	(0.079302)	-1.426919**	(0.10367)	-0.543825*	(0.227407)	0.946347**	(0.346909)	18.56219**	(1.280135)
Large (dummy)	-4.802793**	(0.212942)	-6.183645**	(0.255506)	-7.875959**	(0.36153)	-7.885299**	(0.45776)	-9.226354**	(0.976095)	-9.961692**	(1.483226)	-8.545761	(5.456418)
X-Large (dummy)	-5.006492**	(0.360641)	-6.197545**	(0.426985)	-6.952133**	(0.600024)	-6.563478**	(0.764776)	-3.877674*	(1.631946)	-5.110726*	(2.483923)	6.138409	(9.138375)
Opposite * Medium (dummy)	0.001004	(0.04278)	0.010133	(0.05338)	-0.13879	(0.080544)	-0.33832**	(0.105426)	-1.033122**	(0.231528)	-1.537816**	(0.353207)	-3.440522**	(1.303594)
Opposite * Large (dummy)	1.459469**	(0.152895)	2.208372**	(0.186648)	2.722314**	(0.278878)	2.783403**	(0.362922)	3.082264**	(0.792493)	3.305318**	(1.207762)	14.02731**	(4.453692)
Opposite * X-Large (dummy)	2.19183**	(0.208734)	3.09984**	(0.253065)	2.545365**	(0.377754)	1.762811**	(0.492994)	-2.907944**	(1.076234)	-5.59589**	(1.641821)	-15.16667*	(6.056953)
Split * Agg 2 (dummy)	0.171306**	(0.060576)	-0.258805**	(0.075583)	-0.725282**	(0.114539)	-1.067056**	(0.150214)	-2.232012**	(0.33103)	-3.135645**	(0.5052)	-5.977141**	(1.865052)
Split * Agg 3 (dummy)	0.079194	(0.061831)	-0.195566*	(0.077014)	-0.376041**	(0.116621)	-0.577207**	(0.152924)	-1.755813**	(0.336936)	-2.306382**	(0.51421)	-5.51867**	(1.898318)
Split * Agg 4 (dummy)	-0.707569**	(0.101626)	-0.578474**	(0.125295)	-0.949768**	(0.190194)	-1.120853**	(0.250054)	-1.851128**	(0.552416)	-2.309713**	(0.843109)	-4.644002	(3.112476)
Medium * Agg 2 (dummy)	0.355754**	(0.04818)	0.391889**	(0.060139)	0.554269**	(0.090514)	0.476193**	(0.118293)	0.069763	(0.259373)	-0.689931	(0.395644)	-11.87443**	(1.46012)
Medium * Agg 3 (dummy)	-0.033446	(0.063124)	0.132216	(0.07844)	0.295379*	(0.118017)	0.251268	(0.154238)	0.083507	(0.33821)	-1.160876*	(0.515961)	-10.64918**	(1.904293)
Medium * Agg 4 (dummy)	0.249011**	(0.073274)	0.98596**	(0.091237)	1.195115**	(0.138763)	1.000784**	(0.182382)	-0.455007	(0.40266)	-1.567829*	(0.614603)	-17.79961**	(2.268406)
Large * Agg 2 (dummy)	0.435363	(0.311792)	1.113484**	(0.369912)	0.936971	(0.53318)	0.827849	(0.677141)	2.062882	(1.443547)	3.300582	(2.195166)	-12.84944	(8.084547)
Large * Agg 3 (dummy)	0.867819**	(0.269193)	1.76064**	(0.321704)	1.98846**	(0.463427)	1.174407*	(0.594565)	2.607086*	(1.280206)	4.277468*	(1.946738)	-4.116842	(7.166246)
Large * Agg 4 (dummy)	3.402793**	(0.222939)	5.689318**	(0.269101)	7.0082**	(0.387435)	6.554663**	(0.49522)	6.327595**	(1.066421)	6.132829**	(1.62185)	-1.517259	(5.967775)
X-Large * Agg 2 (dummy)	0.260236	(0.438281)	0.59117	(0.516252)	0.82213	(0.730748)	0.780092	(0.93336)	3.222935	(1.990967)	6.327969*	(3.031441)	-3.722277	(11.15806)
X-Large * Agg 3 (dummy)	-0.352242	(0.414291)	0.726391	(0.485664)	0.633882	(0.692831)	-0.042918	(0.889586)	0.992752	(1.908237)	4.089274	(2.905957)	-9.520794	(10.69724)
X-Large * Agg 4 (dummy)	4.900278**	(0.37713)	9.38255**	(0.450401)	12.42582**	(0.643706)	12.82518**	(0.8262)	14.45568**	(1.775583)	19.23886**	(2.703691)	24.41668*	(9.947712)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 61: Extended model (TOBIT), EUR/USD, 9 September 2010, Sell order cancellations (included observations: 268928)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.354142		3.823675		7.310977		10.67749		32.7497		58.6056		297.483	
Constant	4.426582**	(0.234569)	5.274712**	(0.297601)	8.104602**	(0.448365)	10.61263**	(0.578132)	26.97278**	(1.213139)	40.09371**	(1.828475)	112.6627**	(6.602587)
Time zone 1 (dummy)	-0.90707**	(0.027338)	-0.697595**	(0.034205)	-0.46569**	(0.051358)	-0.323701**	(0.066487)	-0.537709**	(0.139796)	-2.106366**	(0.210662)	-21.38367**	(0.76261)
Time zone 2 (dummy)	-0.69194**	(0.019726)	-0.57235**	(0.024939)	-0.372984**	(0.037689)	-0.078826	(0.04886)	1.753321**	(0.103256)	2.68924**	(0.155818)	26.32756**	(0.56465)
Time zone 3 (dummy)	-0.213546**	(0.01853)	-0.059513*	(0.023501)	0.240651**	(0.035572)	0.460445**	(0.046136)	2.288546**	(0.097616)	4.058896**	(0.147342)	41.56845**	(0.534023)
Market activity	0.000996**	(0.0000176)	0.001602**	(0.000022)	0.00354**	(0.0000333)	0.006928**	(0.0000432)	0.032613**	(0.0000916)	0.063287**	(0.000138)	0.33439**	(0.000501)
Aggressiveness	-1.999599**	(0.239148)	-1.355558**	(0.303368)	-0.848236	(0.456969)	-1.853978**	(0.589158)	-12.79614**	(1.236125)	-19.73819**	(1.863099)	-42.64594**	(6.72736)
Market Depth	0.074259**	(0.000606)	0.112134**	(0.000772)	0.166451**	(0.001176)	0.208784**	(0.001528)	0.386475**	(0.003251)	0.509951**	(0.004912)	1.29389**	(0.017809)
Volatility	-0.132798	(0.232161)	-0.153836	(0.181761)	-0.219854	(0.195747)	-0.222107	(0.17006)	-0.378505	(0.281319)	-0.492856	(0.384057)	-0.688243	(1.119826)
Split (dummy)	-0.178345**	(0.052876)	0.294096**	(0.066285)	0.89405**	(0.1001)	1.175531**	(0.129848)	1.689806**	(0.275206)	2.093664**	(0.415606)	4.817707**	(1.506839)
Bid-ask spread	-267.5179**	(1.385299)	-373.8673**	(1.744852)	-553.7291**	(2.637713)	-642.7654**	(3.415789)	-898.9685**	(7.239817)	-1058.558**	(10.9305)	-2061.89**	(39.61002)
Opposite (dummy)	-0.188935**	(0.013878)	-0.083414**	(0.01753)	-0.633245**	(0.026501)	-0.844881**	(0.034372)	-1.589185**	(0.072759)	-2.223201**	(0.109837)	-3.309798**	(0.398121)
Medium (dummy)	-1.362832**	(0.044505)	-1.658287**	(0.055859)	-2.252779**	(0.083813)	-2.275445**	(0.108297)	-1.427887**	(0.228571)	-0.134415	(0.344988)	15.52614**	(1.250337)
Large (dummy)	-5.00494**	(0.214173)	-6.279923**	(0.254224)	-8.36726**	(0.365195)	-8.226743**	(0.457922)	-6.890582**	(0.937642)	-6.958743**	(1.409564)	3.462498	(5.09238)
X-Large (dummy)	-5.797838**	(0.373264)	-7.448303**	(0.440559)	-9.9675**	(0.632152)	-9.576147**	(0.789093)	-7.753317**	(1.596656)	-10.45025**	(2.401929)	-5.875568	(8.673516)
Opposite * Medium (dummy)	0.577312**	(0.041784)	0.766734**	(0.052516)	1.003518**	(0.079169)	1.034845**	(0.102524)	1.040252**	(0.216774)	1.107114**	(0.32723)	1.519531	(1.186037)
Opposite * Large (dummy)	1.458733**	(0.149873)	2.33796**	(0.18364)	3.049928**	(0.274356)	2.920588**	(0.352964)	1.234712	(0.74154)	0.993002	(1.118396)	-6.398428	(4.052178)
Opposite * X-Large (dummy)	2.380272**	(0.204857)	3.875299**	(0.251033)	4.814362**	(0.37273)	4.152324**	(0.480486)	3.687788**	(1.007301)	4.405098**	(1.520863)	8.331589	(5.511039)
Split * Agg 2 (dummy)	0.173592**	(0.059345)	-0.207561**	(0.074529)	-0.842811**	(0.112652)	-1.314968**	(0.146183)	-2.536046**	(0.309892)	-3.626874**	(0.467985)	-6.525579**	(1.696809)
Split * Agg 3 (dummy)	0.165227**	(0.060506)	-0.136501	(0.075897)	-0.318233**	(0.114639)	-0.59258**	(0.148761)	-1.795215**	(0.315415)	-2.462115**	(0.476343)	-6.850123**	(1.727082)
Split * Agg 4 (dummy)	-0.634657**	(0.099449)	-0.390369**	(0.123245)	-0.827765**	(0.18693)	-1.135207**	(0.243116)	-1.96999**	(0.517049)	-2.666933**	(0.781075)	-5.190041	(2.831708)
Medium * Agg 2 (dummy)	0.597261**	(0.047127)	0.660348**	(0.059246)	0.76529**	(0.08905)	0.63746**	(0.115111)	-0.375414	(0.24286)	-1.418267**	(0.366548)	-13.09316**	(1.328467)
Medium * Agg 3 (dummy)	0.048662	(0.061773)	0.188708*	(0.077237)	0.571111**	(0.115943)	0.583433**	(0.149899)	0.161679	(0.316626)	-1.04591*	(0.477983)	-10.69892**	(1.732562)
Medium * Agg 4 (dummy)	0.228105**	(0.07183)	1.140132**	(0.089836)	1.304418**	(0.136497)	1.205922**	(0.177442)	-0.396396	(0.37702)	-1.361757*	(0.569399)	-15.26012**	(2.063803)
Large * Agg 2 (dummy)	0.629438*	(0.305415)	0.697921	(0.365715)	1.220927*	(0.524374)	1.138275	(0.659657)	1.312108	(1.351999)	2.929311	(2.032088)	-11.00568	(7.357493)
Large * Agg 3 (dummy)	1.035137**	(0.265507)	1.913154**	(0.314752)	2.345946**	(0.45721)	1.680188**	(0.579009)	1.647017	(1.197008)	3.08937	(1.801988)	-5.860766	(6.520466)
Large * Agg 4 (dummy)	3.485809**	(0.220698)	5.80813**	(0.263835)	7.451676**	(0.383196)	7.046767**	(0.484102)	5.123582**	(0.998143)	4.996114**	(1.501501)	-0.853569	(5.430176)
X-Large * Agg 2 (dummy)	0.862319*	(0.43755)	1.252756*	(0.515)	2.743693**	(0.735096)	2.285278*	(0.92153)	2.96116	(1.866134)	5.669298*	(2.80862)	-3.583083	(10.15467)
X-Large * Agg 3 (dummy)	0.543136	(0.409766)	1.335017**	(0.482343)	2.432478**	(0.697171)	1.774439*	(0.877096)	1.04971	(1.788674)	2.239654	(2.692697)	-13.44967	(9.736531)
X-Large * Agg 4 (dummy)	5.315983**	(0.377172)	9.724983**	(0.449044)	13.71069**	(0.651378)	14.05776**	(0.81739)	14.10482**	(1.664768)	18.13111**	(2.505021)	22.03974*	(9.053823)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 62: Extended model (TOBIT), EUR/USD, 10 September 2010, Buy order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.317173		3.762483		7.308781		10.61193		32.40497		57.89397		294.6523	
Constant	2.739446**	(0.232516)	2.492792**	(0.292174)	6.437619**	(0.446045)	8.679819**	(0.578587)	20.20062**	(1.262113)	31.29276**	(1.910322)	98.28069**	(6.642058)
Time zone 1 (dummy)	-1.056624**	(0.024787)	-1.204944**	(0.030779)	-1.617578**	(0.047105)	-1.674493**	(0.061264)	-0.481733**	(0.13417)	-0.129224	(0.203225)	-12.22243**	(0.709485)
Time zone 2 (dummy)	-0.883833**	(0.019397)	-0.960639**	(0.024206)	-1.15305**	(0.037215)	-1.110971**	(0.048495)	0.321247**	(0.10677)	1.540035**	(0.161871)	20.42443**	(0.565412)
Time zone 3 (dummy)	0.070809**	(0.01784)	0.163103**	(0.022371)	0.264198**	(0.034538)	0.469753**	(0.045085)	3.066**	(0.099564)	5.645817**	(0.151032)	45.07595**	(0.527775)
Market activity	0.001296**	(0.000029)	0.002006**	(0.0000364)	0.004245**	(0.000056)	0.00728**	(0.0000729)	0.032739**	(0.00016)	0.062455**	(0.000241)	0.355277**	(0.000842)
Aggressiveness	-0.027264	(0.236517)	2.108902**	(0.297179)	2.393395**	(0.453596)	2.035483**	(0.588333)	-3.827543**	(1.28336)	-9.352218**	(1.942586)	-16.38665*	(6.75421)
Market Depth	0.027513**	(0.000503)	0.044006**	(0.000633)	0.067802**	(0.00098)	0.087115**	(0.001281)	0.214913**	(0.002842)	0.39042**	(0.004317)	1.612001**	(0.015099)
Volatility	-3.075708*	(1.362064)	-5.633509**	(1.703428)	-5.726101*	(2.613014)	14.5968**	(3.390495)	77.71394**	(7.370664)	156.587**	(11.10455)	-1271.996**	(38.71201)
Split (dummy)	-0.628303**	(0.063685)	-0.394009**	(0.078641)	-0.277075*	(0.120331)	0.047994	(0.15651)	0.379838	(0.345125)	-0.034143	(0.524006)	-0.728967	(1.832501)
Bid-ask spread	-275.7878**	(1.157242)	-399.0359**	(1.451418)	-641.3885**	(2.236543)	-752.394**	(2.913424)	-1091.075**	(6.393527)	-1434.263**	(9.673758)	-2690.628**	(33.78259)
Opposite (dummy)	-0.141907**	(0.013737)	0.038034*	(0.017179)	-0.513603**	(0.026473)	-0.720293**	(0.034539)	-1.50217**	(0.076259)	-2.043866**	(0.115715)	-4.418962**	(0.40443)
Medium (dummy)	-1.2124**	(0.035467)	-1.479751**	(0.044109)	-1.864426**	(0.067225)	-1.804899**	(0.087434)	-1.433284**	(0.192773)	-1.104466**	(0.292549)	4.651681**	(1.022817)
Large (dummy)	-4.786708**	(0.209604)	-5.486028**	(0.240895)	-7.424568**	(0.345752)	-7.666163**	(0.431002)	-8.311658**	(0.911505)	-8.610294**	(1.377731)	-12.12262*	(4.799361)
X-Large (dummy)	-4.755368**	(0.287439)	-5.795072**	(0.336966)	-7.622461**	(0.485321)	-7.311589**	(0.606947)	-7.193626**	(1.284071)	-7.303102**	(1.934829)	1.621312	(6.724786)
Opposite * Medium (dummy)	0.378784**	(0.037935)	0.418842**	(0.047176)	0.403217**	(0.072403)	0.360095**	(0.094295)	0.23234	(0.208053)	-0.046237	(0.315761)	1.067787	(1.103891)
Opposite * Large (dummy)	1.312573**	(0.144865)	1.674618**	(0.175386)	1.840149**	(0.266826)	1.882986**	(0.344717)	2.140663**	(0.753673)	0.930466	(1.142682)	1.115208	(3.991536)
Opposite * X-Large (dummy)	1.999882**	(0.184574)	2.751003**	(0.222236)	2.669749**	(0.337345)	2.35882**	(0.436444)	1.714724	(0.955948)	1.114645	(1.449543)	-7.18175	(5.064248)
Split * Agg 2 (dummy)	1.176923**	(0.067739)	1.049346**	(0.083864)	1.153103**	(0.128572)	0.793969**	(0.167382)	-0.361145	(0.369446)	-0.290118	(0.560954)	2.448074	(1.961716)
Split * Agg 3 (dummy)	1.059105**	(0.066752)	0.997325**	(0.082528)	1.254689**	(0.126411)	0.960497**	(0.164512)	0.317008	(0.362968)	1.060361	(0.551112)	7.093119**	(1.927312)
Split * Agg 4 (dummy)	0.714586**	(0.113361)	1.329219**	(0.140375)	2.089285**	(0.216962)	2.141893**	(0.283865)	1.664525**	(0.630288)	2.341134*	(0.957237)	8.563608*	(3.347448)
Medium * Agg 2 (dummy)	0.630162**	(0.041055)	0.806985**	(0.051125)	0.946113**	(0.078286)	0.862276**	(0.101847)	0.625565**	(0.224528)	0.352414	(0.340755)	-2.784574*	(1.191282)
Medium * Agg 3 (dummy)	0.00232	(0.052492)	0.386057**	(0.064904)	0.619364**	(0.099375)	0.4946**	(0.129318)	0.186384	(0.284989)	-0.056154	(0.432506)	-2.323556	(1.512095)
Medium * Agg 4 (dummy)	0.111584	(0.067717)	0.988803**	(0.083749)	0.843727**	(0.129788)	0.681741**	(0.169847)	-1.186857**	(0.376754)	-2.197707**	(0.57207)	-5.458159**	(2.00034)
Large * Agg 2 (dummy)	0.188282	(0.313581)	-0.039095	(0.366243)	0.093345	(0.526061)	0.459892	(0.657956)	0.633461	(1.393056)	0.318621	(2.105264)	-4.468682	(7.339396)
Large * Agg 3 (dummy)	1.152453**	(0.267448)	1.996965**	(0.309449)	2.808786**	(0.453835)	2.528113**	(0.574997)	3.927874**	(1.230932)	5.77201**	(1.862356)	0.478226	(6.497183)
Large * Agg 4 (dummy)	3.536704**	(0.220955)	4.97053**	(0.257072)	6.281291**	(0.37595)	6.180911**	(0.473889)	4.843308**	(1.014892)	4.368939**	(1.535925)	8.864394	(5.357073)
X-Large * Agg 2 (dummy)	0.213726	(0.371494)	0.663705	(0.432357)	1.145001	(0.629193)	0.771696	(0.790837)	2.803126	(1.677318)	3.623677	(2.532024)	-1.245028	(8.828101)
X-Large * Agg 3 (dummy)	0.634975	(0.335798)	1.992348**	(0.39232)	3.524225**	(0.574538)	3.544363**	(0.728025)	4.632146**	(1.564597)	5.147148*	(2.366101)	-6.159198	(8.241283)
X-Large * Agg 4 (dummy)	4.035277**	(0.298074)	7.703492**	(0.353617)	10.83147**	(0.519228)	11.3698**	(0.655583)	11.41629**	(1.403746)	13.07838**	(2.12061)	12.7164	(7.382992)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 63: Extended model (TOBIT), EUR/USD, 10 September 2010, Sell order cancellations (included observations: 453661)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.243669		3.632582		7.049843		10.25431		31.28285		56.0166		285.1196	
Constant	2.862583**	(0.227176)	3.206694**	(0.282504)	6.404939**	(0.437087)	8.672129**	(0.575617)	18.928**	(1.231067)	29.43128**	(1.86355)	101.6444**	(6.500882)
Time zone 1 (dummy)	-1.020542**	(0.024314)	-1.100779**	(0.029903)	-1.445424**	(0.046167)	-1.432232**	(0.060896)	0.16726	(0.130821)	1.156251**	(0.19823)	-10.47047**	(0.69392)
Time zone 2 (dummy)	-0.805859**	(0.018972)	-0.823654**	(0.02347)	-0.962705**	(0.036398)	-0.971946**	(0.04812)	0.580219**	(0.104043)	1.803931**	(0.157849)	20.82142**	(0.553028)
Time zone 3 (dummy)	-0.00917	(0.017478)	0.056796**	(0.02172)	0.002017	(0.033811)	0.063519	(0.044765)	2.357457**	(0.097016)	4.290737**	(0.147292)	33.62551**	(0.51624)
Market activity	0.001201**	(0.0000282)	0.001836**	(0.000035)	0.003957**	(0.0000545)	0.007035**	(0.000072)	0.031192**	(0.000155)	0.06011**	(0.000236)	0.344747**	(0.000825)
Aggressiveness	-0.28584	(0.230994)	1.195478**	(0.287257)	2.09043**	(0.444352)	1.670402**	(0.585109)	-3.586773**	(1.251158)	-9.129956**	(1.893913)	-23.38561**	(6.606379)
Market Depth	0.030344**	(0.000493)	0.048271**	(0.000614)	0.077865**	(0.00096)	0.100662**	(0.001272)	0.21853**	(0.00277)	0.361973**	(0.004211)	1.470496**	(0.014767)
Volatility	2.972484*	(1.316919)	4.840584**	(1.631733)	12.647**	(2.532083)	35.69988**	(3.338274)	153.5311**	(7.15986)	302.9212**	(10.85015)	-774.1476**	(37.99739)
Split (dummy)	-0.568798**	(0.062184)	-0.25793**	(0.076227)	0.00619	(0.117736)	0.274225	(0.15539)	1.061994**	(0.336622)	1.048334*	(0.511125)	0.153859	(1.792188)
Bid-ask spread-	273.8258**	(1.132405)	-398.9352**	(1.407973)	-648.6437**	(2.185978)	-772.7549**	(2.888465)	-1119.253**	(6.233304)	-1472.045**	(9.458031)	-2823.769**	(33.12492)
Opposite (dummy)	-0.227544**	(0.013463)	-0.133305**	(0.016686)	-0.728105**	(0.025934)	-0.980463**	(0.034313)	-1.691429**	(0.074323)	-2.308513**	(0.112849)	-4.498553**	(0.395546)
Medium (dummy)	-1.173948**	(0.034616)	-1.499958**	(0.042691)	-1.942422**	(0.065624)	-1.88934**	(0.086534)	-1.562805**	(0.187131)	-1.447729**	(0.284313)	4.782458**	(0.996769)
Large (dummy)	-4.976358**	(0.214784)	-6.222202**	(0.249223)	-8.414038**	(0.360786)	-8.946455**	(0.460238)	-7.981261**	(0.959045)	-8.46801**	(1.45106)	-8.780286	(5.072855)
X-Large (dummy)	-4.943143**	(0.285889)	-5.929567**	(0.328241)	-7.895597**	(0.483969)	-7.832523**	(0.617891)	-4.936709**	(1.279492)	-4.438033*	(1.935812)	-0.954169	(6.7581)
Opposite * Medium (dummy)	0.339659**	(0.037207)	0.532002**	(0.04585)	0.575517**	(0.070945)	0.556817**	(0.09371)	0.52603**	(0.202774)	0.675316*	(0.307968)	-0.012198	(1.079611)
Opposite * Large (dummy)	1.51071**	(0.141815)	2.265155**	(0.17082)	3.143167**	(0.261645)	3.223533**	(0.342682)	2.072546**	(0.734611)	2.720515*	(1.114182)	4.516777	(3.903537)
Opposite * X-Large (dummy)	2.155417**	(0.179688)	3.129598**	(0.214586)	3.715922**	(0.330571)	3.176875**	(0.434296)	-0.478873	(0.93113)	-1.487601	(1.413164)	1.023642	(4.951621)
Split * Agg 2 (dummy)	1.20202**	(0.066161)	0.954414**	(0.081308)	0.836122**	(0.125822)	0.52509**	(0.166199)	-0.963609**	(0.360309)	-1.273364*	(0.547144)	2.134381	(1.91856)
Split * Agg 3 (dummy)	0.931041**	(0.0652)	0.772699**	(0.08001)	0.835594**	(0.123699)	0.610849**	(0.163343)	-0.407569	(0.354003)	-0.094362	(0.537557)	5.187396**	(1.884921)
Split * Agg 4 (dummy)	0.665077**	(0.111147)	1.158831**	(0.136305)	1.684192**	(0.212703)	1.593939**	(0.282203)	0.469043	(0.614372)	0.268217	(0.933655)	3.109233	(3.27399)
Medium * Agg 2 (dummy)	0.641054**	(0.040234)	0.761065**	(0.049656)	0.97854**	(0.076683)	0.830143**	(0.101196)	0.360718	(0.218814)	0.039181	(0.332342)	-3.382887**	(1.165065)
Medium * Agg 3 (dummy)	-0.054821	(0.051615)	0.246876**	(0.063195)	0.50834**	(0.097457)	0.340727**	(0.128573)	0.021216	(0.277789)	-0.010688	(0.42186)	-3.270351*	(1.478822)
Medium * Agg 4 (dummy)	0.088978	(0.066446)	0.972505**	(0.08137)	0.900289**	(0.127173)	0.673328**	(0.168791)	-1.099071**	(0.367239)	-2.158061**	(0.558001)	-5.005503*	(1.956502)
Large * Agg 2 (dummy)	0.802785**	(0.299202)	0.972589**	(0.350865)	0.643416	(0.514632)	1.120359	(0.655367)	1.650636	(1.358075)	1.087873	(2.053014)	-1.916681	(7.176746)
Large * Agg 3 (dummy)	1.437295**	(0.260162)	2.435903**	(0.301778)	3.131522**	(0.444541)	3.417641**	(0.571951)	4.006773**	(1.200828)	5.990255**	(1.816528)	1.253816	(6.352957)
Large * Agg 4 (dummy)	3.636583**	(0.214919)	5.485213**	(0.25122)	6.641358**	(0.368175)	6.684963**	(0.472581)	4.259511**	(0.990085)	3.2146*	(1.498528)	3.041098	(5.237693)
X-Large * Agg 2 (dummy)	0.588628	(0.364519)	1.025681*	(0.416376)	1.43222*	(0.614583)	1.286261	(0.787679)	1.811068	(1.633667)	2.882063	(2.470501)	-0.947517	(8.632115)
X-Large * Agg 3 (dummy)	1.040065**	(0.330478)	2.438842**	(0.377808)	3.425079**	(0.563336)	3.659162**	(0.726424)	5.266755**	(1.522926)	5.957406**	(2.305945)	-3.101279	(8.058104)
X-Large * Agg 4 (dummy)	4.045373**	(0.293281)	7.244106**	(0.340263)	9.990783**	(0.507625)	10.59581**	(0.653355)	9.427268**	(1.366242)	9.770948**	(2.06746)	11.40271	(7.217554)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 64: Extended model (TOBIT), EUR/USD, 13 September 2010, Buy order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.350088		3.814855		7.676221		11.40888		35.64559		64.40226		325.7092	
Constant	4.791555**	(0.238945)	4.917539**	(0.298628)	12.08021**	(0.475163)	15.41038**	(0.629752)	27.75489**	(1.422458)	39.14465**	(2.239378)	111.0491**	(8.66102)
Time zone 1 (dummy)	-1.064383**	(0.026407)	-0.97156**	(0.032561)	-1.206247**	(0.051579)	-1.180636**	(0.06831)	-0.351225*	(0.153901)	0.694721**	(0.242121)	-7.548091**	(0.93659)
Time zone 2 (dummy)	-0.976893**	(0.020428)	-0.972857**	(0.02536)	-1.378668**	(0.040382)	-1.405214**	(0.053559)	-1.162319**	(0.121298)	-0.726663**	(0.191046)	4.632744**	(0.739572)
Time zone 3 (dummy)	-0.186552**	(0.017446)	-0.124506**	(0.021814)	-0.21656**	(0.034918)	-0.007142	(0.04642)	1.432636**	(0.105523)	4.340659**	(0.166285)	60.87768**	(0.643871)
Market activity	0.001359**	(0.0000133)	0.002253**	(0.0000167)	0.005081**	(0.0000268)	0.009059**	(0.0000358)	0.039414**	(0.0000816)	0.074298**	(0.000129)	0.350122**	(0.000498)
Aggressiveness	-2.591134**	(0.242663)	-1.238813**	(0.303206)	-4.859976**	(0.482336)	-6.50971**	(0.639184)	-14.42738**	(1.443483)	-21.61739**	(2.272422)	-49.24854**	(8.788619)
Market Depth	0.027299**	(0.000579)	0.039248**	(0.000723)	0.062817**	(0.001158)	0.078823**	(0.00154)	0.209635**	(0.003508)	0.448152**	(0.00553)	2.381884**	(0.021412)
Volatility	0.083661*	(0.033371)	0.094493*	(0.043486)	0.181139**	(0.058428)	0.185154*	(0.078017)	0.062887	(0.184125)	0.020707	(0.294574)	1.212374	(0.855347)
Split (dummy)	0.900426**	(0.067306)	1.662162**	(0.083545)	2.674175**	(0.133642)	3.152596**	(0.177666)	3.881142**	(0.40419)	4.327302**	(0.637178)	0.187728	(2.468076)
Bid-ask spread	-223.1258**	(1.488013)	-304.273**	(1.848754)	-478.0359**	(2.943292)	-557.0513**	(3.904689)	-817.6281**	(8.826483)	-1225.831**	(13.89932)	-3575.711**	(53.73808)
Opposite (dummy)	-0.286333**	(0.014955)	-0.201009**	(0.018604)	-0.864842**	(0.029674)	-1.123669**	(0.039389)	-1.911691**	(0.089332)	-2.429685**	(0.140736)	-4.438882**	(0.544875)
Medium (dummy)	-0.698483**	(0.046101)	-0.882758**	(0.057279)	-1.036625**	(0.090892)	-0.972388**	(0.120475)	-0.180205	(0.272877)	0.946732*	(0.429908)	9.202907**	(1.664278)
Large (dummy)	-5.725231**	(0.227763)	-7.084742**	(0.26772)	-9.554099**	(0.39859)	-9.846751**	(0.507462)	-10.63484**	(1.100796)	-12.24812**	(1.727419)	-26.49287**	(6.667894)
X-Large (dummy)	-6.063703**	(0.331124)	-7.530805**	(0.388259)	-10.28**	(0.583888)	-11.06253**	(0.749135)	-6.326573**	(1.606883)	-4.912636	(2.51886)	6.789292	(9.721634)
Opposite * Medium (dummy)	0.347347**	(0.044164)	0.472761**	(0.054713)	0.37907**	(0.087065)	0.256458*	(0.115504)	-0.708453**	(0.261848)	-1.52659**	(0.412504)	-5.771016**	(1.59687)
Opposite * Large (dummy)	2.183314**	(0.148762)	2.91254**	(0.181884)	3.396976**	(0.2875)	3.215055**	(0.378399)	1.8539*	(0.852038)	0.498809	(1.341759)	0.408712	(5.191777)
Opposite * X-Large (dummy)	2.767633**	(0.219912)	3.722882**	(0.267774)	3.869477**	(0.421287)	3.27002**	(0.554425)	-0.286998	(1.237301)	-5.195477**	(1.947177)	-18.94911*	(7.533456)
Split * Agg 2 (dummy)	-0.503873**	(0.071576)	-1.10034**	(0.088925)	-1.791914**	(0.142312)	-2.373086**	(0.189233)	-3.487718**	(0.430606)	-3.721097**	(0.678812)	3.596834	(2.629278)
Split * Agg 3 (dummy)	-0.733904**	(0.073724)	-1.355052**	(0.091498)	-2.338578**	(0.146358)	-2.972027**	(0.194555)	-5.054381**	(0.442532)	-6.859807**	(0.697579)	-8.844903**	(2.701908)
Split * Agg 4 (dummy)	-0.974755**	(0.075455)	-1.598112**	(0.093705)	-1.762745**	(0.149838)	-2.002135**	(0.199278)	-1.783198**	(0.453669)	-2.19887**	(0.715245)	6.570442*	(2.770406)
Medium * Agg 2 (dummy)	-0.120856*	(0.049078)	-0.093816	(0.060903)	-0.250138**	(0.096702)	-0.426589**	(0.128116)	-1.047865**	(0.289942)	-2.00374**	(0.456712)	-6.963178**	(1.767875)
Medium * Agg 3 (dummy)	-0.536768**	(0.073477)	-0.32126**	(0.090438)	-0.385195**	(0.143711)	-0.638768**	(0.190339)	-1.299713**	(0.430204)	-2.84461**	(0.677597)	-12.49823**	(2.622611)
Medium * Agg 4 (dummy)	-0.277118**	(0.062411)	0.31424**	(0.077011)	0.20812	(0.122672)	-0.045449	(0.16289)	-0.622909	(0.369727)	-1.468*	(0.582606)	-6.804716**	(2.255219)
Large * Agg 2 (dummy)	1.981497**	(0.294512)	2.524894**	(0.350052)	3.317458**	(0.530895)	3.84498**	(0.681408)	8.088392**	(1.492807)	12.32899**	(2.345353)	43.67102**	(9.058676)
Large * Agg 3 (dummy)	2.058751**	(0.272032)	3.114376**	(0.323021)	4.324677**	(0.496155)	4.157294**	(0.643003)	5.965113**	(1.422622)	8.747304**	(2.234848)	33.80277**	(8.637758)
Large * Agg 4 (dummy)	4.447806**	(0.230109)	6.447358**	(0.271425)	8.538713**	(0.408785)	8.773658**	(0.523947)	9.390531**	(1.14521)	10.38137**	(1.79816)	16.17961*	(6.943789)
X-Large * Agg 2 (dummy)	1.159154**	(0.398759)	1.492102**	(0.468043)	2.352387**	(0.709177)	3.06632**	(0.910232)	3.141403	(1.950919)	6.778075*	(3.059121)	19.34128	(11.82225)
X-Large * Agg 3 (dummy)	0.642334	(0.413094)	2.199321**	(0.476883)	3.908083**	(0.732489)	5.058242**	(0.95238)	2.283865	(2.084257)	2.538503	(3.27384)	-28.03356*	(12.65026)
X-Large * Agg 4 (dummy)	6.248585**	(0.324867)	9.838122**	(0.383204)	14.22951**	(0.583846)	15.8497**	(0.753369)	12.58436**	(1.62894)	13.01945**	(2.555842)	-3.251136	(9.867944)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 65: Extended model (TOBIT), EUR/USD, 13 September 2010, Sell order cancellations (included observations: 483670)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.322464		3.749633		7.525732		11.19346		35.0878		63.39116		324.1757	
Constant	6.247706**	(0.238296)	6.863329**	(0.299038)	12.11096**	(0.46468)	14.86663**	(0.608086)	26.69187**	(1.356786)	37.63149**	(2.121435)	118.0096**	(8.578836)
Time zone 1 (dummy)	-0.98957**	(0.026956)	-0.856782**	(0.032553)	-1.075115**	(0.050284)	-1.049028**	(0.065816)	-0.367387*	(0.146591)	0.623851**	(0.229108)	-4.666828**	(0.926791)
Time zone 2 (dummy)	-1.011025**	(0.021701)	-1.034884**	(0.025429)	-1.384393**	(0.03944)	-1.48074**	(0.051689)	-1.208641**	(0.11558)	-0.94805**	(0.18081)	2.56406**	(0.731852)
Time zone 3 (dummy)	-0.196648**	(0.017649)	-0.164694**	(0.021851)	-0.175746**	(0.034081)	0.059	(0.044773)	1.991552**	(0.100555)	5.532815**	(0.15738)	68.96197**	(0.637148)
Market activity	0.001496**	(0.000018)	0.002363**	(0.0000167)	0.004913**	(0.0000262)	0.008809**	(0.0000345)	0.038465**	(0.0000778)	0.072606**	(0.000122)	0.348436**	(0.000493)
Aggressiveness	-4.0554**	(0.241644)	-3.372927**	(0.30337)	-5.152779**	(0.471315)	-6.263207**	(0.616706)	-13.92317**	(1.375816)	-21.36246**	(2.151158)	-62.47245**	(8.698845)
Market Depth	0.024457**	(0.000577)	0.035618**	(0.000725)	0.061747**	(0.00113)	0.080386**	(0.001485)	0.209164**	(0.003341)	0.451405**	(0.005232)	2.400022**	(0.021186)
Volatility	-7.82339**	(1.498543)	0.027499	(0.058332)	0.020875	(0.091902)	0.129818	(0.085612)	0.164342	(0.158378)	0.157324	(0.249445)	1.10347	(0.846421)
Split (dummy)	0.283309**	(0.068563)	0.664693**	(0.084954)	1.515132**	(0.13159)	1.844501**	(0.172403)	2.793888**	(0.385561)	2.98264**	(0.603219)	-2.780651	(2.442325)
Bid-ask spread	-229.9215**	(1.483587)	-307.3231**	(1.845168)	-471.1045**	(2.865204)	-558.6028**	(3.758151)	-821.7872**	(8.398682)	-1197.12**	(13.13334)	-3446.537**	(53.12485)
Opposite (dummy)	-0.108626**	(0.014915)	0.008222	(0.018634)	-0.524872**	(0.028962)	-0.635656**	(0.03799)	-1.001996**	(0.085113)	-1.277948**	(0.133186)	-2.382732**	(0.539187)
Medium (dummy)	-0.666393**	(0.044497)	-0.747802**	(0.055386)	-1.016455**	(0.085739)	-0.946558**	(0.112273)	-0.593604*	(0.251178)	0.219132	(0.393039)	5.167534**	(1.591051)
Large (dummy)	-4.634401**	(0.219749)	-5.703092**	(0.259342)	-7.83672**	(0.377811)	-8.592835**	(0.480038)	-9.836676**	(1.024789)	-11.86864**	(1.597436)	-30.0587**	(6.453914)
X-Large (dummy)	-4.927681**	(0.302744)	-5.99075**	(0.353433)	-9.036154**	(0.519056)	-9.847793**	(0.648542)	-9.666678**	(1.370997)	-13.49288**	(2.133328)	-15.0395	(8.594726)
Opposite * Medium (dummy)	0.32334**	(0.043966)	0.391276**	(0.054723)	0.418263**	(0.084929)	0.396693**	(0.111351)	0.857022**	(0.249398)	1.242769**	(0.390297)	5.492592**	(1.58006)
Opposite * Large (dummy)	0.391832**	(0.148402)	0.756252**	(0.18159)	0.949446**	(0.279859)	0.860242*	(0.365154)	1.191924	(0.811604)	2.267265	(1.269424)	6.260874	(5.137471)
Opposite * X-Large (dummy)	1.466326**	(0.217875)	2.031721**	(0.265424)	2.757403**	(0.409584)	3.07995**	(0.532702)	4.408686**	(1.179131)	7.244873**	(1.842982)	15.72774*	(7.457179)
Split * Agg 2 (dummy)	0.111184	(0.072734)	-0.114219	(0.090272)	-0.594331**	(0.139983)	-1.005747**	(0.183503)	-2.115057**	(0.4107)	-1.980296**	(0.64261)	6.30232*	(2.601838)
Split * Agg 3 (dummy)	-0.312075**	(0.074792)	-0.62865**	(0.092778)	-0.855244**	(0.143784)	-1.156138**	(0.188499)	-2.687441**	(0.422015)	-3.510273**	(0.660348)	-3.129785	(2.673719)
Split * Agg 4 (dummy)	-0.133846	(0.076692)	-0.208071*	(0.095075)	-1.041957**	(0.147489)	-1.43377**	(0.193324)	-2.932063**	(0.432749)	-4.042562**	(0.677121)	1.799719	(2.741501)
Medium * Agg 2 (dummy)	-0.065178	(0.04894)	-0.1355*	(0.060933)	-0.218985*	(0.09435)	-0.414853**	(0.123539)	-1.236561**	(0.276181)	-2.277748**	(0.432122)	-7.823878**	(1.749227)
Medium * Agg 3 (dummy)	-0.56492**	(0.073531)	-0.423091**	(0.090843)	-0.259066	(0.139936)	-0.364062*	(0.183143)	-0.488042	(0.409586)	-1.809052**	(0.640939)	-9.938226**	(2.594877)
Medium * Agg 4 (dummy)	-0.208948**	(0.06208)	0.345305**	(0.076855)	0.32034**	(0.119629)	0.056194	(0.156983)	-0.966938**	(0.352156)	-1.708551**	(0.55119)	-7.638066**	(2.231338)
Large * Agg 2 (dummy)	1.461964**	(0.294292)	1.982204**	(0.349326)	2.692549**	(0.516344)	3.705437**	(0.658583)	7.507269**	(1.421765)	10.3007**	(2.217834)	39.52757**	(8.964117)
Large * Agg 3 (dummy)	2.576821**	(0.272023)	3.400419**	(0.325508)	4.690948**	(0.484219)	4.970875**	(0.622413)	5.850973**	(1.353909)	7.448924**	(2.113877)	31.29906**	(8.547584)
Large * Agg 4 (dummy)	3.862219**	(0.228155)	5.689232**	(0.270144)	7.648103**	(0.397426)	8.187478**	(0.506991)	8.394347**	(1.090507)	8.744423**	(1.7009)	14.30109*	(6.871194)
X-Large * Agg 2 (dummy)	0.284936	(0.404732)	0.936093*	(0.468782)	1.728306*	(0.692796)	2.292365**	(0.872959)	4.325392*	(1.861528)	9.05391**	(2.89882)	23.60572*	(11.70494)
X-Large * Agg 3 (dummy)	1.507413**	(0.418182)	2.855292**	(0.485983)	4.458357**	(0.720195)	5.411299**	(0.916861)	4.41194*	(1.984705)	4.426871	(3.099019)	-27.30395*	(12.52178)
X-Large * Agg 4 (dummy)	5.421837**	(0.32412)	8.653186**	(0.383543)	12.98118**	(0.571876)	14.24601**	(0.724164)	12.90436**	(1.554791)	14.63394**	(2.422068)	-1.689347	(9.772393)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 66: Extended model (TOBIT), USD/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.074868		3.282654		6.118167		8.268619		20.43948		34.38295		158.9355	
Constant	4.180651**	(0.23851)	4.539561**	(0.30235)	7.778492**	(0.451821)	9.47617**	(0.549585)	17.64256**	(0.908702)	28.36437**	(1.321411)	89.78724**	(4.154945)
Time zone 1 (dummy)	-1.09131**	(0.031686)	-0.904346**	(0.039548)	-0.688194**	(0.059392)	-0.383726**	(0.07271)	-0.650827**	(0.122701)	-1.034609**	(0.179271)	-3.512282**	(0.5667)
Time zone 2 (dummy)	-0.651103**	(0.028786)	-0.403404**	(0.036054)	0.11253*	(0.054225)	0.333449**	(0.066425)	-0.217474	(0.111992)	-1.260511**	(0.163592)	-3.580228**	(0.517236)
Time zone 3 (dummy)	0.170831**	(0.026185)	0.4496**	(0.03298)	0.948878**	(0.049725)	1.327498**	(0.060924)	2.032086**	(0.102963)	3.386286**	(0.150501)	37.63351**	(0.476097)
Market activity	0.001874**	(0.0000419)	0.00297**	(0.000053)	0.00595**	(0.0000792)	0.00929**	(0.0000966)	0.035456**	(0.000164)	0.064781**	(0.00024)	0.302648**	(0.00076)
Aggressiveness	-1.961702**	(0.244032)	-0.860572**	(0.309307)	-0.679039	(0.462061)	-0.844198	(0.561914)	-4.018409**	(0.928487)	-9.522104**	(1.350026)	-33.58911**	(4.244333)
Market Depth	0.040889**	(0.000817)	0.058503**	(0.001031)	0.08253**	(0.001561)	0.097078**	(0.001918)	0.121589**	(0.003266)	0.123692**	(0.004781)	0.109656**	(0.015134)
Volatility	-1.281366**	(0.343582)	-2.392168**	(0.454405)	-3.078216**	(0.596569)	-2.479954**	(0.664697)	3.249211**	(1.088984)	10.85715**	(1.597072)	111.9004**	(5.060597)
Split (dummy)	0.255429**	(0.082391)	0.830636**	(0.102524)	1.159838**	(0.154083)	1.336168**	(0.188313)	2.437342**	(0.315986)	3.399196**	(0.46207)	4.884937**	(1.462499)
Bid-ask spread	-170.3554**	(1.356842)	-240.5511**	(1.701271)	-377.733**	(2.564466)	-431.7455**	(3.145269)	-513.8951**	(5.334754)	-583.8747**	(7.803987)	-844.9182**	(24.6691)
Opposite (dummy)	-0.253343**	(0.019621)	-0.117952**	(0.024597)	-0.746588**	(0.037063)	-0.91304**	(0.045454)	-1.125716**	(0.07698)	-1.227163**	(0.112579)	-2.64274**	(0.356213)
Medium (dummy)	-1.795538**	(0.059845)	-1.972156**	(0.074054)	-2.541266**	(0.110094)	-2.374448**	(0.134003)	-1.692458**	(0.224346)	-0.788504*	(0.327597)	6.53942**	(1.03621)
Large (dummy)	-6.518363**	(0.409478)	-8.070516**	(0.475542)	-11.26761**	(0.648518)	-10.81673**	(0.725166)	-9.571498**	(1.11747)	-9.236805**	(1.608602)	-9.43062	(5.051038)
X-Large (dummy)	-6.331448**	(0.520806)	-8.039731**	(0.610596)	-11.22645**	(0.838199)	-11.35513**	(0.959647)	-9.716257**	(1.462352)	-11.77752**	(2.118443)	-16.47946*	(6.64359)
Opposite * Medium (dummy)	0.079523	(0.058538)	-0.061597	(0.072552)	-0.278266*	(0.108266)	-0.476827**	(0.132122)	-0.940886**	(0.22185)	-1.633573**	(0.324111)	-5.826158**	(1.025104)
Opposite * Large (dummy)	1.220802**	(0.281824)	1.439168**	(0.336596)	2.022987**	(0.497062)	1.966117**	(0.59552)	2.201536*	(0.979148)	1.353764	(1.426492)	-6.231004	(4.503781)
Opposite * X-Large (dummy)	2.030017**	(0.372106)	2.961498**	(0.447677)	4.339958**	(0.661967)	3.819162**	(0.799646)	3.454109**	(1.31884)	4.289838*	(1.924806)	10.37801	(6.071808)
Split * Agg 2 (dummy)	0.088815	(0.088812)	-0.42862**	(0.110721)	-0.642658**	(0.166605)	-0.954767**	(0.203807)	-2.420736**	(0.342775)	-3.793525**	(0.501303)	-7.848157**	(1.586744)
Split * Agg 3 (dummy)	0.233087**	(0.086646)	-0.195922	(0.107932)	-0.050276	(0.162293)	-0.129857	(0.198447)	-1.855916**	(0.333407)	-3.461081**	(0.487582)	-5.005213**	(1.543218)
Split * Agg 4 (dummy)	0.029568	(0.186612)	0.302356	(0.231588)	0.361433	(0.351625)	0.407367	(0.433053)	-0.938309	(0.739292)	-2.840863**	(1.082954)	0.439217	(3.428169)
Medium * Agg 2 (dummy)	0.520956**	(0.065153)	0.530671**	(0.080608)	0.77023**	(0.119802)	0.50863**	(0.145714)	-0.0804	(0.243482)	-0.902081*	(0.3555)	-8.707173**	(1.124151)
Medium * Agg 3 (dummy)	0.397878**	(0.087982)	0.535961**	(0.108687)	0.799064**	(0.161633)	0.503954*	(0.196942)	0.227554	(0.329551)	-0.199164	(0.481204)	-6.068328**	(1.521328)
Medium * Agg 4 (dummy)	0.618571**	(0.114352)	1.885762**	(0.139616)	2.136406**	(0.210883)	1.732684**	(0.259159)	-0.18321	(0.44166)	-1.307039*	(0.646634)	-7.935127**	(2.047084)
Large * Agg 2 (dummy)	1.845978**	(0.609452)	2.405034**	(0.719077)	2.93238**	(1.008312)	2.607326*	(1.157679)	6.332106**	(1.809014)	7.657075**	(2.615091)	27.16764**	(8.249547)
Large * Agg 3 (dummy)	1.721686**	(0.525562)	3.016208**	(0.605471)	3.979332**	(0.849876)	3.766443**	(0.979697)	5.338285**	(1.545907)	7.129342**	(2.244478)	22.72003**	(7.062742)
Large * Agg 4 (dummy)	4.948937**	(0.422058)	8.007238**	(0.493755)	11.39163**	(0.686103)	10.93268**	(0.781547)	9.121051**	(1.228399)	8.750264**	(1.777509)	14.83781**	(5.590509)
X-Large * Agg 2 (dummy)	1.255214	(0.75478)	1.094492	(0.905496)	1.277271	(1.269802)	1.869635	(1.476453)	1.757846	(2.326888)	2.159148	(3.381424)	4.776171	(10.61864)
X-Large * Agg 3 (dummy)	0.610814	(0.650766)	2.619145**	(0.739795)	3.787326**	(1.044016)	3.702163**	(1.226832)	1.377389	(1.939217)	2.055427	(2.818728)	-3.760361	(8.87014)
X-Large * Agg 4 (dummy)	6.765321**	(0.549268)	11.309**	(0.651436)	17.36363**	(0.918127)	19.12759**	(1.076725)	21.02635**	(1.69688)	24.87638**	(2.468278)	40.531**	(7.760986)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 67: Extended model (TOBIT), USD/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.12024		3.326846		6.256875		8.444012		20.95471		35.36334		163.9378	
Constant	4.838755**	(0.23463)	5.061454**	(0.290785)	8.292839**	(0.447322)	9.365898**	(0.539299)	16.10777**	(0.903378)	26.37551**	(1.317424)	90.92834**	(4.266733)
Time zone 1 (dummy)	-1.03184**	(0.031417)	-0.954631**	(0.038165)	-0.785679**	(0.058756)	-0.462903**	(0.071259)	-0.499702**	(0.121686)	-0.79393**	(0.178546)	-2.863345**	(0.581858)
Time zone 2 (dummy)	-0.678011**	(0.028432)	-0.514485**	(0.034811)	-0.08708	(0.053659)	0.197705**	(0.065083)	-0.628582**	(0.111105)	-2.067371**	(0.162977)	-6.63188**	(0.531102)
Time zone 3 (dummy)	0.196222**	(0.025864)	0.452208**	(0.031807)	1.067151**	(0.04916)	1.412307**	(0.059663)	1.921737**	(0.102103)	3.281819**	(0.149916)	36.33414**	(0.488859)
Market activity	0.003107**	(0.0000637)	0.003237**	(0.0000524)	0.006184**	(0.0000796)	0.009647**	(0.0000968)	0.037165**	(0.000164)	0.067413**	(0.00024)	0.308635**	(0.000781)
Aggressiveness	-2.364494**	(0.239651)	-1.20779**	(0.297206)	-0.934041*	(0.457058)	-0.471484	(0.550911)	-2.334469*	(0.922319)	-7.204337**	(1.344865)	-32.28822**	(4.354901)
Market Depth	0.038327**	(0.000807)	0.053178**	(0.000995)	0.080896**	(0.001545)	0.09583**	(0.00188)	0.134232**	(0.003239)	0.149736**	(0.004762)	0.187737**	(0.015539)
Volatility	-32.24586**	(1.374822)	-4.63824**	(0.5385)	-5.681829**	(0.703614)	-5.868543**	(0.857495)	1.086579	(1.165717)	8.446731**	(1.627186)	125.34**	(5.196296)
Split (dummy)	-0.079387	(0.082148)	0.377304**	(0.099578)	0.746993**	(0.153079)	0.961258**	(0.184943)	2.126653**	(0.313709)	2.92737**	(0.460425)	2.491558	(1.501712)
Bid-ask spread	-172.1799**	(1.340955)	-241.4029**	(1.644722)	-386.7362**	(2.537799)	-441.4038**	(3.083284)	-530.2843**	(5.289877)	-602.5674**	(7.769518)	-869.6543**	(25.32922)
Opposite (dummy)	-0.201464**	(0.019352)	-0.061674**	(0.023743)	-0.630219**	(0.036688)	-0.727066**	(0.044553)	-1.103954**	(0.076355)	-1.436853**	(0.112133)	-1.51165**	(0.365755)
Medium (dummy)	-1.906856**	(0.058906)	-2.151893**	(0.071209)	-2.938191**	(0.108508)	-2.912379**	(0.1307)	-1.750121**	(0.22099)	-0.607398	(0.324021)	8.379915**	(1.056267)
Large (dummy)	-7.110348**	(0.428269)	-8.381267**	(0.47147)	-11.87645**	(0.657161)	-11.52055**	(0.732343)	-10.08547**	(1.122955)	-10.00035**	(1.624487)	-16.08943**	(5.240164)
X-Large (dummy)	-7.412761**	(0.570917)	-8.491573**	(0.637255)	-10.04367**	(0.863729)	-10.58519**	(0.997884)	-7.858411**	(1.54705)	-8.949251**	(2.255188)	-10.54583	(7.296406)
Opposite * Medium (dummy)	0.314701**	(0.057688)	0.343898**	(0.069933)	0.287221**	(0.107145)	0.200767	(0.129501)	-0.736388**	(0.220097)	-1.557162**	(0.322855)	-6.682225**	(1.05258)
Opposite * Large (dummy)	1.475104**	(0.281529)	1.967502**	(0.327365)	2.8995**	(0.493701)	2.439797**	(0.585482)	1.875052	(0.971833)	1.719983	(1.421763)	8.15808	(4.622807)
Opposite * X-Large (dummy)	2.857682**	(0.379852)	2.671093**	(0.44114)	1.90062**	(0.656178)	1.919325*	(0.783039)	-0.349234	(1.307695)	-2.077476	(1.915413)	-7.752382	(6.23073)
Split * Agg 2 (dummy)	0.371058**	(0.088418)	-0.065071	(0.107446)	-0.33308*	(0.16543)	-0.725724**	(0.200111)	-2.185727**	(0.340242)	-3.573763**	(0.499501)	-6.475936**	(1.629289)
Split * Agg 3 (dummy)	0.544037**	(0.086301)	0.195062	(0.104765)	0.37971*	(0.161161)	0.329952	(0.194837)	-1.298101**	(0.330966)	-2.618328**	(0.485809)	-1.755429	(1.584591)
Split * Agg 4 (dummy)	0.230806	(0.18523)	0.718727**	(0.224208)	0.891474*	(0.348388)	0.794702	(0.425)	-0.492071	(0.733759)	-1.937989	(1.079372)	3.648963	(3.519577)
Medium * Agg 2 (dummy)	0.605578**	(0.064131)	0.6632**	(0.077672)	1.018787**	(0.118538)	0.840274**	(0.142834)	-0.009735	(0.241586)	-1.04465**	(0.354133)	-10.71805**	(1.154295)
Medium * Agg 3 (dummy)	0.237427**	(0.087057)	0.486453**	(0.104924)	0.768683**	(0.160085)	0.699794**	(0.193004)	-0.042173	(0.326853)	-0.749297	(0.47932)	-8.911573**	(1.562107)
Medium * Agg 4 (dummy)	0.517636**	(0.112948)	1.740049**	(0.134838)	2.088732**	(0.208882)	1.713421**	(0.254338)	-0.386915	(0.438205)	-1.988254**	(0.644278)	-10.01458**	(2.101878)
Large * Agg 2 (dummy)	2.149703**	(0.623463)	2.184964**	(0.708296)	2.873695**	(1.006154)	3.08127**	(1.137249)	6.519701**	(1.790932)	6.362662*	(2.610209)	29.22528**	(8.467599)
Large * Agg 3 (dummy)	2.680504**	(0.527097)	3.197182**	(0.588047)	4.38279**	(0.842978)	4.595637**	(0.965181)	6.239659**	(1.536996)	9.043981**	(2.236908)	28.53769**	(7.248755)
Large * Agg 4 (dummy)	4.956247**	(0.432943)	7.557578**	(0.478832)	10.87115**	(0.680133)	10.69017**	(0.772075)	9.140604**	(1.219173)	8.593858**	(1.773072)	14.67442*	(5.735468)
X-Large * Agg 2 (dummy)	1.471334	(0.775887)	1.271537	(0.90068)	1.04408	(1.253118)	2.461712	(1.432004)	1.478436	(2.309261)	2.495114	(3.363188)	12.18123	(10.89458)
X-Large * Agg 3 (dummy)	0.981422	(0.659601)	2.62743**	(0.732111)	3.515107**	(1.027234)	3.661256**	(1.198183)	1.679389	(1.923529)	3.190426	(2.80708)	2.199249	(9.097903)
X-Large * Agg 4 (dummy)	7.198236**	(0.563733)	12.36454**	(0.644861)	17.33138**	(0.902684)	19.15174**	(1.05212)	20.32954**	(1.679808)	24.94447**	(2.456018)	44.1086**	(7.957353)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 68: Extended model (TOBIT), USD/JPY, 10 September 2010, Buy order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.079064		3.32351		6.349491		8.790904		23.49144		40.66563		193.7892	
Constant	2.676272**	(0.221693)	2.66048**	(0.275773)	5.125724**	(0.422521)	5.763828**	(0.519631)	11.19546**	(0.917967)	16.74914**	(1.348602)	62.20643**	(4.655184)
Time zone 1 (dummy)	-1.330504**	(0.029599)	-1.317301**	(0.036265)	-1.635749**	(0.05576)	-1.551032**	(0.069099)	0.265173*	(0.124556)	1.765433**	(0.184108)	6.314555**	(0.638224)
Time zone 2 (dummy)	-0.606977**	(0.027715)	-0.470773**	(0.034118)	-0.269269**	(0.052516)	0.05611	(0.065103)	2.741007**	(0.117404)	4.74132**	(0.173525)	12.99979**	(0.601651)
Time zone 3 (dummy)	0.350533**	(0.026087)	0.593752**	(0.032242)	1.177333**	(0.049758)	1.591966**	(0.061752)	4.899894**	(0.111656)	8.833285**	(0.165171)	53.23759**	(0.573484)
Market activity	0.002238**	(0.0000571)	0.003565**	(0.0000704)	0.006969**	(0.000109)	0.010736**	(0.000135)	0.039731**	(0.000246)	0.076228**	(0.000361)	0.366373**	(0.001232)
Aggressiveness	-0.474578*	(0.225818)	1.157348**	(0.280888)	2.356761**	(0.430223)	3.632508**	(0.528955)	3.541969**	(0.933956)	3.095109*	(1.372023)	11.07756*	(4.73642)
Market Depth	0.032129**	(0.00068)	0.041698**	(0.000838)	0.066752**	(0.001295)	0.076521**	(0.001608)	0.132977**	(0.002912)	0.218595**	(0.00431)	0.49101**	(0.014966)
Volatility	-23.07583**	(1.862227)	-38.96535**	(2.289938)	-77.44152**	(3.530343)	-104.7479**	(4.382019)	-281.6089**	(7.916973)	-526.1411**	(11.6103)	-2270.045**	(39.20196)
Split (dummy)	0.459165**	(0.071163)	1.073686**	(0.087172)	2.096105**	(0.134342)	2.822128**	(0.166354)	4.313737**	(0.301014)	7.000557**	(0.445552)	8.049338**	(1.548956)
Bid-ask spread	-154.0362**	(1.212068)	-212.3533**	(1.493056)	-330.1871**	(2.304258)	-377.3299**	(2.86186)	-473.1621**	(5.183025)	-564.2739**	(7.670141)	-966.7169**	(26.61089)
Opposite (dummy)	-0.249173**	(0.017857)	-0.115326**	(0.022)	-0.777252**	(0.033985)	-0.979518**	(0.042229)	-1.403096**	(0.076558)	-1.759937**	(0.113369)	-4.221156**	(0.393939)
Medium (dummy)	-1.478856**	(0.050682)	-1.775062**	(0.062006)	-2.583171**	(0.094649)	-2.592269**	(0.116756)	-1.613336**	(0.209687)	-0.978959**	(0.310175)	1.697091	(1.077558)
Large (dummy)	-3.748948**	(0.125375)	-4.369231**	(0.147734)	-5.475232**	(0.214279)	-5.50765**	(0.260693)	-5.66466**	(0.464068)	-6.278913**	(0.686994)	-4.339627	(2.38612)
X-Large (dummy)	-6.330224**	(0.414048)	-7.518066**	(0.461425)	-9.470935**	(0.637785)	-8.866192**	(0.742837)	-7.66065**	(1.259239)	-5.505261**	(1.843821)	-0.16863	(6.369216)
Opposite * Medium (dummy)	-0.088536	(0.052228)	-0.105861	(0.06381)	-0.187506	(0.098044)	-0.376652**	(0.121301)	-1.310917**	(0.218695)	-2.109561**	(0.323646)	-5.093352**	(1.12445)
Opposite * Large (dummy)	0.609748**	(0.144433)	0.661271**	(0.170852)	0.486337	(0.254481)	0.544211	(0.311034)	1.19476*	(0.553087)	1.440437	(0.817883)	0.336081	(2.839619)
Opposite * X-Large (dummy)	1.704543**	(0.289016)	2.224811**	(0.337281)	2.737605**	(0.50349)	2.047019**	(0.614545)	-0.90601	(1.089382)	-3.059008	(1.606913)	-10.61722	(5.571993)
Split * Agg 2 (dummy)	0.086024	(0.076776)	-0.373717**	(0.094233)	-1.014709**	(0.145425)	-1.797415**	(0.18028)	-3.290172**	(0.326611)	-5.672867**	(0.483548)	-8.264156**	(1.681107)
Split * Agg 3 (dummy)	0.086483	(0.075606)	-0.363085**	(0.092729)	-0.747672**	(0.142986)	-1.27003**	(0.177172)	-2.890151**	(0.320825)	-5.889887**	(0.474941)	-5.289065**	(1.651104)
Split * Agg 4 (dummy)	0.237949	(0.170712)	0.357828	(0.209548)	0.327283	(0.326132)	0.007903	(0.407089)	-1.518838*	(0.744915)	-4.878484**	(1.104491)	-8.13345*	(3.839803)
Medium * Agg 2 (dummy)	0.755475**	(0.056442)	0.933548**	(0.069026)	1.31619**	(0.10567)	1.362726**	(0.130396)	1.106536**	(0.234225)	0.982115**	(0.346465)	2.690133*	(1.20347)
Medium * Agg 3 (dummy)	0.41468**	(0.079172)	0.980157**	(0.095946)	1.384734**	(0.147081)	1.464537**	(0.181671)	0.885115**	(0.326443)	0.50416	(0.482832)	-1.935529	(1.677458)
Medium * Agg 4 (dummy)	0.718102**	(0.096832)	1.945221**	(0.116749)	2.731974**	(0.180915)	2.672653**	(0.225386)	1.490951**	(0.411115)	1.651377**	(0.609384)	0.991125	(2.118468)
Large * Agg 2 (dummy)	0.374263	(0.245579)	0.354632	(0.290309)	0.021651	(0.428157)	-0.027648	(0.517577)	1.124799	(0.906241)	0.879721	(1.339519)	-2.962075	(4.642676)
Large * Agg 3 (dummy)	0.004601	(0.270191)	0.450898	(0.311304)	0.121009	(0.462804)	0.061954	(0.563947)	1.592627	(0.997518)	2.267916	(1.474207)	-5.53339	(5.117554)
Large * Agg 4 (dummy)	2.661935**	(0.16551)	4.917434**	(0.197476)	6.863645**	(0.301348)	6.96917**	(0.373435)	5.553481**	(0.677114)	5.496972**	(1.003273)	0.876061	(3.48782)
X-Large * Agg 2 (dummy)	0.354765	(0.640445)	0.384083	(0.710352)	0.649873	(0.971293)	0.044756	(1.143246)	2.139363	(1.92482)	0.724927	(2.820583)	-8.729985	(9.750754)
X-Large * Agg 3 (dummy)	1.244065*	(0.501259)	2.561079**	(0.553987)	3.148095**	(0.784542)	2.499014**	(0.935645)	2.627844	(1.619344)	-0.102613	(2.379254)	-11.42321	(8.231326)
X-Large * Agg 4 (dummy)	5.689918**	(0.420562)	10.17102**	(0.473352)	15.34514**	(0.670149)	16.00279**	(0.794965)	19.24442**	(1.372238)	20.48755**	(2.014592)	21.96825**	(6.966821)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 69: Extended model (TOBIT), USD/JPY, 10 September 2010, Sell order cancellations (included observations: 302603)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	2.053522		3.276574		6.261114		8.681702		23.38941		40.56598		193.9386	
Constant	2.614946**	(0.223469)	2.709544**	(0.277059)	4.596765**	(0.42325)	5.193107**	(0.515969)	10.44998**	(0.902545)	14.69605**	(1.330852)	56.32472**	(4.712369)
Time zone 1 (dummy)	-1.287086**	(0.029811)	-1.253204**	(0.036489)	-1.419683**	(0.055877)	-1.311365**	(0.068629)	1.320019**	(0.122588)	3.621519**	(0.181661)	16.21943**	(0.645032)
Time zone 2 (dummy)	-0.70378**	(0.02796)	-0.568215**	(0.03434)	-0.334634**	(0.052652)	-0.191396**	(0.064695)	2.103884**	(0.115684)	3.438481**	(0.171404)	9.958952**	(0.608214)
Time zone 3 (dummy)	0.449945**	(0.026269)	0.732143**	(0.032407)	1.434122**	(0.049839)	1.738546**	(0.061317)	5.3352**	(0.109982)	9.478325**	(0.163063)	58.60906**	(0.579736)
Market activity	0.002309**	(0.0000573)	0.003611**	(0.0000707)	0.006913**	(0.000109)	0.01087**	(0.000134)	0.041747**	(0.000242)	0.080478**	(0.000359)	0.390408**	(0.001245)
Aggressiveness	-0.556191*	(0.227365)	0.868951**	(0.281854)	2.211009**	(0.430472)	3.412437**	(0.524608)	3.076129**	(0.917201)	3.508136**	(1.352332)	9.028736	(4.788824)
Market Depth	0.027699**	(0.000685)	0.037781**	(0.000843)	0.058924**	(0.001297)	0.0683**	(0.001596)	0.108214**	(0.002866)	0.18781**	(0.004253)	0.476745**	(0.015126)
Volatility	-19.68542**	(1.871802)	-32.46154**	(2.300569)	-61.98555**	(3.534677)	-87.70436**	(4.347852)	-284.2401**	(7.787352)	-554.0307**	(11.54815)	-2610.417**	(39.61652)
Split (dummy)	0.535876**	(0.071387)	1.123564**	(0.087481)	2.387746**	(0.134223)	3.046249**	(0.164979)	4.538015**	(0.296334)	6.867385**	(0.439833)	8.308996**	(1.56586)
Bid-ask spread	-156.6721**	(1.224462)	-215.6887**	(1.499422)	-317.8546**	(2.303422)	-363.0268**	(2.837173)	-444.2098**	(5.099861)	-536.9917**	(7.568241)	-942.6063**	(26.89622)
Opposite (dummy)	-0.097459**	(0.017968)	0.025167	(0.022112)	-0.48911**	(0.034048)	-0.573671**	(0.041947)	-0.896098**	(0.075414)	-0.976166**	(0.111921)	-0.577003	(0.398208)
Medium (dummy)	-1.586305**	(0.050573)	-1.860298**	(0.061625)	-2.719013**	(0.09385)	-2.686318**	(0.114777)	-2.084527**	(0.20464)	-1.761189**	(0.303422)	0.752761	(1.079229)
Large (dummy)	-3.705786**	(0.122741)	-4.395569**	(0.14455)	-5.353578**	(0.208087)	-5.215345**	(0.250798)	-4.963548**	(0.442027)	-5.334439**	(0.654545)	-6.989**	(2.328227)
X-Large (dummy)	-5.761691**	(0.381519)	-6.808025**	(0.429212)	-9.490021**	(0.608485)	-9.650517**	(0.709089)	-9.635473**	(1.172199)	-10.5659**	(1.719324)	-11.87581*	(6.044048)
Opposite * Medium (dummy)	0.093403	(0.052574)	0.11678	(0.064123)	0.089282	(0.098229)	-0.029376	(0.120479)	-0.446112*	(0.215426)	-0.892981**	(0.31954)	-5.627905**	(1.136704)
Opposite * Large (dummy)	0.565527**	(0.144355)	0.950883**	(0.170977)	0.71837**	(0.254483)	0.802192**	(0.308233)	0.511615	(0.544823)	0.689416	(0.80712)	3.75594	(2.870471)
Opposite * X-Large (dummy)	2.021465**	(0.286907)	2.301291**	(0.335964)	2.652903**	(0.505023)	2.745286**	(0.612005)	2.454207*	(1.072897)	4.075245*	(1.587527)	9.932725	(5.632424)
Split * Agg 2 (dummy)	0.018035	(0.077018)	-0.451532**	(0.094552)	-1.389224**	(0.145341)	-2.071683**	(0.178815)	-3.577546**	(0.321576)	-5.602716**	(0.477355)	-8.95802**	(1.699459)
Split * Agg 3 (dummy)	-0.123396	(0.075907)	-0.532398**	(0.093087)	-1.247647**	(0.142915)	-1.714958**	(0.175747)	-3.579216**	(0.315868)	-6.212285**	(0.468857)	-7.200252**	(1.669124)
Split * Agg 4 (dummy)	0.222618	(0.17139)	0.381235	(0.21036)	0.193692	(0.326021)	0.095112	(0.403715)	-1.63505*	(0.733411)	-4.516395**	(1.09009)	-8.087749*	(3.881708)
Medium * Agg 2 (dummy)	0.793824**	(0.056781)	0.939174**	(0.069287)	1.360345**	(0.105788)	1.420963**	(0.129409)	1.255348**	(0.230678)	1.130715**	(0.342011)	3.317852**	(1.216588)
Medium * Agg 3 (dummy)	0.519183**	(0.079679)	0.97778**	(0.096493)	1.477008**	(0.147325)	1.449187**	(0.180489)	1.222753**	(0.321525)	0.929329	(0.476843)	-0.280261	(1.695761)
Medium * Agg 4 (dummy)	0.737488**	(0.097351)	1.894616**	(0.117324)	2.685576**	(0.181223)	2.585487**	(0.223845)	1.30031**	(0.405076)	1.454519*	(0.601792)	3.440279	(2.141656)
Large * Agg 2 (dummy)	0.874243**	(0.240427)	0.543896	(0.288526)	0.226858	(0.424581)	-0.014986	(0.511502)	0.92714	(0.891485)	1.651837	(1.320479)	2.513139	(4.692413)
Large * Agg 3 (dummy)	0.013229	(0.272424)	0.417762	(0.312333)	-0.218101	(0.46547)	-0.470128	(0.56092)	0.841028	(0.983143)	1.101449	(1.455891)	-2.944485	(5.173376)
Large * Agg 4 (dummy)	2.917005**	(0.165465)	4.954143**	(0.197865)	6.77462**	(0.301377)	6.570181**	(0.370175)	5.496309**	(0.667096)	5.350502**	(0.990521)	2.77243	(3.525842)
X-Large * Agg 2 (dummy)	0.980053	(0.579922)	0.9509	(0.669788)	1.7456	(0.958482)	1.127725	(1.130092)	2.987035	(1.896655)	3.978856	(2.787754)	2.243075	(9.856168)
X-Large * Agg 3 (dummy)	0.632952	(0.485312)	1.800027**	(0.546124)	2.999783**	(0.790615)	2.900946**	(0.937093)	3.264435*	(1.595254)	1.682681	(2.352069)	-6.387757	(8.320013)
X-Large * Agg 4 (dummy)	5.231259**	(0.402565)	9.311055**	(0.462786)	15.13407**	(0.673637)	16.54603**	(0.795902)	19.62643**	(1.353166)	22.20753**	(1.993151)	26.29288**	(7.041449)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 70: Extended model (TOBIT), USD/JPY, 13 September 2010, Buy order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.712089		2.692118		5.123314		6.933803		17.24934		28.97267		132.6353	
Constant	4.190422**	(0.259273)	4.849136**	(0.316692)	8.903887**	(0.4693)	10.16081**	(0.554939)	17.58414**	(0.916974)	25.83175**	(1.232513)	85.2515**	(3.956529)
Time zone 1 (dummy)	-1.205894**	(0.032907)	-1.076794**	(0.037595)	-1.454489**	(0.051913)	-1.631377**	(0.061299)	-3.404374**	(0.101665)	-5.464017**	(0.142818)	-27.5122**	(0.468768)
Time zone 2 (dummy)	-0.566965**	(0.02921)	-0.467195**	(0.034796)	-0.464073**	(0.05046)	-0.507339**	(0.060359)	-1.839085**	(0.104182)	-3.499774**	(0.144511)	-18.78961**	(0.446286)
Time zone 3 (dummy)	0.252801**	(0.026052)	0.503091**	(0.031584)	0.860993**	(0.044237)	0.890091**	(0.052617)	-0.033165	(0.09581)	-0.275528*	(0.137914)	0.95551*	(0.466858)
Market activity	0.001874**	(0.0000547)	0.002899**	(0.0000681)	0.005591**	(0.0000979)	0.009095**	(0.000122)	0.033337**	(0.000253)	0.061673**	(0.000376)	0.298544**	(0.001275)
Aggressiveness	-2.295652**	(0.264678)	-1.584723**	(0.323523)	-2.267088**	(0.479264)	-1.96393**	(0.566656)	-3.552162**	(0.933958)	-6.496559**	(1.253576)	-19.21749**	(4.020769)
Market Depth	0.032756**	(0.001154)	0.043027**	(0.001494)	0.064006**	(0.002188)	0.081625**	(0.002657)	0.13841**	(0.004641)	0.211821**	(0.006941)	0.749817**	(0.022452)
Volatility	1.091616**	(0.140848)	1.372991**	(0.185546)	2.170033**	(0.246323)	2.365233**	(0.2984)	2.765572**	(0.418435)	3.226616**	(0.464873)	6.789298**	(0.91376)
Split (dummy)	-0.602664**	(0.113805)	-0.631713**	(0.143337)	-0.855555**	(0.201736)	-0.555244*	(0.23372)	0.434637	(0.373476)	0.996671	(0.531348)	-0.63738	(1.626296)
Bid-ask spread	-187.3778**	(2.160332)	-251.008**	(2.619636)	-379.0372**	(3.929689)	-432.3961**	(4.515103)	-539.6281**	(6.670642)	-656.834**	(9.168062)	-1510.553**	(27.44716)
Opposite (dummy)	-0.23523**	(0.021238)	-0.099377**	(0.025373)	-0.828356**	(0.036447)	-1.018436**	(0.043869)	-1.350117**	(0.075882)	-1.374667**	(0.107196)	-0.643216	(0.345542)
Medium (dummy)	-0.882697**	(0.057141)	-0.997038**	(0.069978)	-1.325478**	(0.09766)	-1.516873**	(0.11617)	-0.656736**	(0.203072)	-0.386871	(0.290279)	5.622834**	(0.925663)
Large (dummy)	-3.392929**	(0.173433)	-4.123924**	(0.197961)	-4.775573**	(0.230103)	-4.701401**	(0.273079)	-4.275691**	(0.446158)	-3.715115**	(0.655513)	11.13414**	(2.192449)
X-Large (dummy)	-5.661822**	(0.486751)	-7.029409**	(0.532646)	-9.237615**	(0.636914)	-9.00104**	(0.654306)	-7.770628**	(1.080516)	-6.154413**	(1.711704)	6.519473	(6.308222)
Opposite * Medium (dummy)	-0.016977	(0.055682)	-0.090058	(0.066342)	-0.055181	(0.093798)	-0.01994	(0.111601)	-0.271545	(0.195471)	-0.487903	(0.27913)	-2.966697**	(0.927023)
Opposite * Large (dummy)	0.706476**	(0.166944)	1.244879**	(0.18733)	1.129701**	(0.238079)	1.180258**	(0.28061)	2.144002**	(0.484881)	2.032869**	(0.703421)	-0.786926	(2.408713)
Opposite * X-Large (dummy)	1.354691**	(0.453903)	1.836191**	(0.502754)	1.962835**	(0.684896)	1.588017*	(0.753232)	0.590999	(1.232219)	0.846114	(1.791889)	16.49671**	(5.874528)
Split * Agg 2 (dummy)	1.153135**	(0.118914)	1.35003**	(0.149202)	1.877441**	(0.210442)	1.453313**	(0.244596)	0.347155	(0.394364)	-0.328083	(0.560672)	-1.204506	(1.724259)
Split * Agg 3 (dummy)	0.927433**	(0.116581)	1.042748**	(0.146544)	1.89872**	(0.206709)	1.675004**	(0.24023)	0.695037	(0.386832)	0.177331	(0.550782)	6.098428**	(1.696602)
Split * Agg 4 (dummy)	0.940048**	(0.186839)	1.554394**	(0.215281)	2.662076**	(0.308237)	2.492081**	(0.368937)	1.888286**	(0.706488)	0.392356	(0.995931)	3.628729	(3.337961)
Medium * Agg 2 (dummy)	-0.168017**	(0.062115)	-0.234361**	(0.075626)	-0.26882*	(0.106191)	-0.187468	(0.125377)	-0.879787**	(0.217043)	-1.120657**	(0.308663)	-3.028337**	(1.010861)
Medium * Agg 3 (dummy)	-0.212685**	(0.080892)	-0.001812	(0.097031)	0.061665	(0.139509)	0.140712	(0.1666)	-0.503399	(0.290036)	-0.720662	(0.416018)	-2.740526*	(1.370938)
Medium * Agg 4 (dummy)	-0.019731	(0.095726)	0.955345**	(0.107401)	1.175681**	(0.154172)	1.145402**	(0.191097)	-0.425244	(0.350203)	-0.98921	(0.514789)	-6.803271**	(1.747806)
Large * Agg 2 (dummy)	0.250986	(0.21407)	0.346939	(0.246477)	0.373524	(0.299619)	0.048971	(0.344889)	-0.762228	(0.587466)	-0.65048	(0.853592)	-5.959858*	(2.909935)
Large * Agg 3 (dummy)	-0.092654	(0.3247)	0.439539	(0.352592)	0.058272	(0.448388)	-0.684927	(0.509728)	-0.472738	(0.933502)	-0.72004	(1.360887)	-16.02094**	(4.438055)
Large * Agg 4 (dummy)	2.430024**	(0.203126)	4.489395**	(0.222316)	5.419687**	(0.295225)	5.044545**	(0.35603)	3.107403**	(0.639096)	2.437029**	(0.920064)	-10.55473**	(3.221898)
X-Large * Agg 2 (dummy)	0.477207	(0.672682)	0.933647	(0.72068)	1.933996*	(0.912402)	2.181164*	(0.957955)	1.919045	(1.565562)	1.498737	(2.252839)	-12.57763	(9.433869)
X-Large * Agg 3 (dummy)	0.954688	(0.60154)	2.561814**	(0.618462)	3.219227**	(0.788172)	2.858646**	(0.840794)	0.650548	(1.451812)	-4.349414	(2.226354)	-40.49365**	(7.780925)
X-Large * Agg 4 (dummy)	5.957512**	(0.571933)	9.817903**	(0.659406)	14.67039**	(0.886152)	15.4203**	(0.982061)	15.47801**	(1.63452)	15.41628**	(2.437028)	-5.070208	(7.874147)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 71: Extended model (TOBIT), USD/JPY, 13 September 2010, Sell order cancellations (included observations: 215872)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.751116		2.75391		5.229516		7.066118		17.61148		29.72717		135.5574	
Constant	5.35186**	(0.274898)	5.96443**	(0.337778)	9.824265**	(0.49015)	11.19909**	(0.585185)	18.43765**	(0.973291)	25.79639**	(1.328706)	80.97332**	(4.279324)
Time zone 1 (dummy)	-0.993387**	(0.032447)	-0.827886**	(0.038198)	-0.967053**	(0.053206)	-0.913196**	(0.063295)	-1.796091**	(0.106987)	-2.700053**	(0.152815)	-16.41311**	(0.51613)
Time zone 2 (dummy)	-0.493438**	(0.028803)	-0.325729**	(0.035953)	-0.282901**	(0.051494)	-0.186877**	(0.061934)	-1.426868**	(0.106639)	-2.703543**	(0.149815)	-17.28184**	(0.48094)
Time zone 3 (dummy)	0.328165**	(0.025734)	0.595811**	(0.031883)	1.071321**	(0.044817)	1.229184**	(0.053538)	0.392254**	(0.099624)	0.075024	(0.145944)	1.400611**	(0.509839)
Market activity	0.002032**	(0.0000564)	0.003152**	(0.0000731)	0.005933**	(0.000105)	0.00979**	(0.000132)	0.036484**	(0.000288)	0.067979**	(0.000436)	0.320557**	(0.001475)
Aggressiveness	-3.610179**	(0.280349)	-2.922512**	(0.344549)	-3.432802**	(0.499006)	-3.417782**	(0.595829)	-5.203499**	(0.988155)	-7.549862**	(1.347333)	-18.6992**	(4.339348)
Market Depth	0.031115**	(0.001144)	0.044895**	(0.001593)	0.068879**	(0.002303)	0.083884**	(0.002731)	0.136719**	(0.004751)	0.211194**	(0.007052)	0.81563**	(0.024741)
Volatility	1.131898**	(0.129153)	1.453512**	(0.173115)	2.046766**	(0.274346)	2.356944**	(0.297776)	2.712869**	(0.355417)	2.778259**	(0.480078)	6.082282**	(1.108002)
Split (dummy)	-0.691968**	(0.11384)	-0.633197**	(0.142919)	-0.965143**	(0.212333)	-0.643216**	(0.24497)	0.587324	(0.410841)	1.15604*	(0.553602)	-0.685976	(1.725854)
Bid-ask spread	-188.6044**	(1.880609)	-257.84**	(2.376295)	-394.4502**	(3.302582)	-449.4668**	(3.851645)	-559.1421**	(6.316216)	-688.7775**	(9.032445)	-1549.906**	(29.35365)
Opposite (dummy)	0.019443	(0.021136)	0.144293**	(0.026022)	-0.494276**	(0.03726)	-0.638806**	(0.044989)	-1.125681**	(0.080314)	-1.519029**	(0.114453)	-4.055599**	(0.373104)
Medium (dummy)	-0.861655**	(0.05874)	-1.031585**	(0.073033)	-1.305201**	(0.102997)	-1.290504**	(0.122019)	-0.536206*	(0.219811)	-0.228476	(0.306511)	4.237486**	(0.985473)
Large (dummy)	-3.264285**	(0.157045)	-4.195725**	(0.185724)	-4.999649**	(0.22253)	-4.67325**	(0.252546)	-3.954008**	(0.434754)	-4.037889**	(0.635514)	5.371756*	(2.164313)
X-Large (dummy)	-7.385493**	(0.65992)	-8.92191**	(0.696634)	-11.33623**	(0.835025)	-10.76346**	(0.889905)	-9.815692**	(1.3455)	-6.869121**	(2.078144)	25.61292**	(7.917698)
Opposite * Medium (dummy)	-0.151854**	(0.055524)	-0.170916*	(0.067452)	-0.326592**	(0.095042)	-0.480014**	(0.113587)	-1.126922**	(0.204822)	-1.66489**	(0.29391)	-2.59232**	(0.978374)
Opposite * Large (dummy)	0.510734**	(0.163713)	1.097329**	(0.18797)	1.019299**	(0.24101)	0.94968**	(0.281728)	0.34472	(0.497689)	1.209764	(0.733868)	4.045603	(2.518058)
Opposite * X-Large (dummy)	2.961194**	(0.499145)	3.741461**	(0.534627)	4.221515**	(0.702269)	3.6944**	(0.785325)	2.710184*	(1.27946)	1.016312	(1.881093)	-13.69185*	(6.376802)
Split * Agg 2 (dummy)	1.196805**	(0.118516)	1.278533**	(0.148786)	1.823028**	(0.220472)	1.38659**	(0.255204)	-0.153362	(0.430359)	-0.871832	(0.585185)	-1.765206	(1.834113)
Split * Agg 3 (dummy)	1.10271**	(0.116543)	1.158924**	(0.14616)	2.127268**	(0.216991)	1.898358**	(0.251098)	0.523959	(0.423729)	-0.142564	(0.573877)	5.963238**	(1.803647)
Split * Agg 4 (dummy)	1.189343**	(0.176199)	1.827849**	(0.20885)	2.99469**	(0.323897)	3.065809**	(0.39603)	2.657452**	(0.773632)	1.399606	(1.076677)	5.158122	(3.622447)
Medium * Agg 2 (dummy)	-0.14882*	(0.062142)	-0.184743*	(0.076658)	-0.242208*	(0.107855)	-0.229932	(0.127575)	-0.850449**	(0.229297)	-0.907737**	(0.32433)	-3.147419**	(1.064216)
Medium * Agg 3 (dummy)	-0.096399	(0.081807)	0.172664	(0.100204)	0.334825*	(0.142342)	0.324926	(0.170364)	-0.109536	(0.304475)	-0.376952	(0.4374)	-2.837666*	(1.435725)
Medium * Agg 4 (dummy)	-0.007679	(0.098621)	0.996152**	(0.111784)	1.035036**	(0.157023)	0.877048**	(0.193364)	-0.675337	(0.368782)	-1.217822*	(0.545485)	-6.698856**	(1.836492)
Large * Agg 2 (dummy)	0.045949	(0.207882)	0.278316	(0.243414)	0.606735*	(0.29853)	0.294416	(0.342073)	-0.303456	(0.587308)	-0.619724	(0.862795)	-4.148723	(3.011823)
Large * Agg 3 (dummy)	-0.281591	(0.321005)	0.194676	(0.369538)	-0.334626	(0.466808)	-0.883282	(0.52938)	0.235861	(1.07281)	0.7416	(1.494963)	-12.48337*	(4.863931)
Large * Agg 4 (dummy)	2.008351**	(0.199842)	4.278388**	(0.224787)	5.059275**	(0.294602)	4.452107**	(0.355049)	3.381194**	(0.656724)	2.784659**	(0.987871)	-9.066204**	(3.383751)
X-Large * Agg 2 (dummy)	0.57324	(0.790381)	0.89899	(0.839556)	1.874054*	(0.937655)	1.930517	(1.000283)	1.35207	(1.628451)	0.035961	(2.567663)	-14.87173	(10.6818)
X-Large * Agg 3 (dummy)	1.483927*	(0.625797)	3.361179**	(0.64629)	4.396774**	(0.791061)	3.488458**	(0.872619)	1.044696	(1.454804)	-3.894194	(2.328643)	-47.16434**	(8.503984)
X-Large * Agg 4 (dummy)	7.494951**	(0.672725)	11.47103**	(0.741685)	16.47985**	(0.951083)	16.99587**	(1.059339)	18.21647**	(1.725493)	17.66813**	(2.551918)	-7.465764	(8.862803)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 72: Extended model (TOBIT), EUR/JPY, 9 September 2010, Buy order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.987587		1.633395		3.347843		5.031015		15.97773		29.00966		152.0572	
Constant	9.349121**	(0.352918)	9.142611**	(0.39403)	10.87002**	(0.523441)	13.53628**	(0.654012)	26.07016**	(1.208224)	34.51781**	(1.792108)	106.6144**	(6.293667)
Time zone 1 (dummy)	-0.445637**	(0.02985)	-0.387904**	(0.032061)	-0.429501**	(0.041288)	-0.482266**	(0.051428)	-1.157228**	(0.094513)	-2.337746**	(0.139992)	-13.00204**	(0.491814)
Time zone 2 (dummy)	-0.275942**	(0.021397)	-0.262629**	(0.023151)	-0.141148**	(0.029993)	-0.03058	(0.037398)	0.391477**	(0.069195)	0.767073**	(0.102759)	13.60424**	(0.362)
Time zone 3 (dummy)	-0.094904**	(0.019215)	-0.064985**	(0.020843)	0.031026	(0.027064)	0.164557**	(0.033771)	1.214959**	(0.062574)	2.306614**	(0.092995)	24.66756**	(0.327814)
Market activity	0.002205**	(0.0000668)	0.003006**	(0.0000724)	0.005238**	(0.0000941)	0.008652**	(0.000118)	0.033393**	(0.000218)	0.064394**	(0.000325)	0.33452**	(0.001145)
Aggressiveness	-9.515248**	(0.35777)	-8.293783**	(0.399337)	-7.686503**	(0.530379)	-9.454574**	(0.662647)	-18.40618**	(1.224042)	-23.56675**	(1.815525)	-70.07569**	(6.37576)
Market Depth	0.024394**	(0.001804)	0.050772**	(0.001964)	0.094962**	(0.002569)	0.121568**	(0.003212)	0.126294**	(0.005985)	0.122498**	(0.0089)	0.227341**	(0.031376)
Volatility	-6.464926**	(1.140822)	-6.572098**	(1.234126)	-8.642225**	(1.604911)	-5.334591**	(2.002781)	22.08599**	(3.715046)	51.17252**	(5.524912)	558.5557**	(19.4634)
Split (dummy)	-0.84051**	(0.053841)	-0.679787**	(0.057241)	-0.805893**	(0.074101)	-0.650547**	(0.092013)	-0.243384	(0.170263)	-0.031883	(0.253151)	0.777399	(0.892272)
Bid-ask spread	-58.7843**	(0.915769)	-80.20718**	(0.988793)	-118.3465**	(1.286922)	-136.6087**	(1.608091)	-170.6417**	(2.987027)	-195.3574**	(4.437601)	-631.0396**	(15.62298)
Opposite (dummy)	0.475562**	(0.014888)	0.535669**	(0.016099)	-0.33584**	(0.020885)	-0.530769**	(0.026052)	-1.208744**	(0.048299)	-1.616031**	(0.071773)	-3.626941**	(0.252908)
Medium (dummy)	0.06219	(0.046506)	-0.078711	(0.050811)	-0.333713**	(0.065956)	-0.407763**	(0.082375)	-0.90293**	(0.153128)	-1.213413**	(0.227677)	0.190322	(0.802677)
Large (dummy)	-2.945995**	(0.337768)	-3.788935**	(0.349319)	-5.178056**	(0.416902)	-5.728202**	(0.497603)	-6.196346**	(0.848885)	-7.737362**	(1.249738)	-16.39703**	(4.366506)
X-Large (dummy)	-3.703655**	(0.567409)	-4.939878**	(0.596546)	-6.164071**	(0.657271)	-6.406474**	(0.756576)	-6.267033**	(1.277489)	-6.274097**	(1.874562)	-0.62011	(6.516714)
Opposite * Medium (dummy)	-0.421968**	(0.048327)	-0.292341**	(0.052473)	0.047469	(0.067947)	0.095915	(0.084699)	0.655737**	(0.157046)	0.878774**	(0.233429)	1.067796	(0.822908)
Opposite * Large (dummy)	0.450361	(0.297416)	0.935951**	(0.315083)	1.6351**	(0.394504)	2.178023**	(0.483402)	2.634053**	(0.864233)	2.710753*	(1.28025)	10.20564*	(4.487699)
Opposite * X-Large (dummy)	0.765425	(0.522415)	1.822133**	(0.553305)	3.089811**	(0.671922)	3.483488**	(0.813635)	3.243924*	(1.452053)	1.695665	(2.151349)	-6.127588	(7.546917)
Split * Agg 2 (dummy)	0.405709**	(0.057788)	0.404771**	(0.061468)	0.634977**	(0.079552)	0.456686**	(0.098819)	-0.132949	(0.182905)	-0.615546*	(0.271944)	-1.109416	(0.958534)
Split * Agg 3 (dummy)	0.7642**	(0.057145)	0.664784**	(0.060833)	1.046538**	(0.078712)	0.912985**	(0.097801)	0.421131*	(0.181033)	0.031481	(0.269152)	-0.142557	(0.948659)
Split * Agg 4 (dummy)	0.465347**	(0.087983)	0.609734**	(0.093196)	0.870322**	(0.120527)	0.764343**	(0.150309)	0.406082	(0.279054)	0.252456	(0.415004)	-0.450358	(1.462246)
Medium * Agg 2 (dummy)	-0.036793	(0.049423)	-0.088483	(0.053803)	0.000177	(0.069757)	-0.00632	(0.086962)	0.0052	(0.161208)	-0.033099	(0.239605)	-0.803265	(0.844726)
Medium * Agg 3 (dummy)	-0.393048**	(0.129272)	-0.331007*	(0.138449)	-0.444807*	(0.179243)	-0.452822*	(0.223208)	-1.161648**	(0.412275)	-0.751969	(0.610931)	-6.127105**	(2.148667)
Medium * Agg 4 (dummy)	-0.480308**	(0.094332)	-0.265445**	(0.10114)	-0.35947**	(0.131966)	-0.329467*	(0.16513)	-0.336377	(0.308332)	-0.408664	(0.458824)	-5.607191**	(1.617436)
Large * Agg 2 (dummy)	0.431712	(0.692452)	-0.11556	(0.758525)	0.434822	(0.891298)	-0.17011	(1.090816)	0.627335	(1.88064)	0.465927	(2.794569)	8.77171	(9.734172)
Large * Agg 3 (dummy)	0.149623	(0.618873)	0.038259	(0.642906)	0.085769	(0.764048)	-0.740506	(0.932305)	-0.537339	(1.583506)	-0.830664	(2.343834)	-4.908979	(8.196253)
Large * Agg 4 (dummy)	2.140279**	(0.344624)	3.203472**	(0.360503)	4.294342**	(0.444211)	4.810998**	(0.535407)	4.454029**	(0.944761)	6.546723**	(1.395833)	3.749357	(4.883405)
X-Large * Agg 2 (dummy)	0.44386	(1.170114)	0.794365	(1.198503)	0.532437	(1.458203)	2.499464	(1.665203)	6.233265*	(2.920155)	9.399698*	(4.331154)	29.13298	(15.00727)
X-Large * Agg 3 (dummy)	0.115857	(0.844785)	-1.069028	(0.90282)	-1.941368	(1.016678)	-2.850245*	(1.215427)	-3.254713	(2.136746)	-1.566215	(3.153697)	-17.24545	(11.08999)
X-Large * Agg 4 (dummy)	3.107877**	(0.621036)	4.957061**	(0.65214)	6.840159**	(0.775407)	7.759864**	(0.932993)	9.172652**	(1.655784)	10.65463**	(2.453956)	10.37936	(8.610547)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 73: Extended model (TOBIT), EUR/JPY, 9 September 2010, Sell order cancellations (included observations: 249170)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.992615		1.641779		3.336682		5.00787		15.91259		28.998		151.9894	
Constant	10.93365**	(0.344449)	10.64612**	(0.385803)	12.71455**	(0.517581)	14.79441**	(0.643775)	25.51521**	(1.189973)	35.85341**	(1.765199)	103.0715**	(5.954513)
Time zone 1 (dummy)	-0.668391**	(0.029449)	-0.634581**	(0.031568)	-0.729285**	(0.041138)	-0.843244**	(0.050894)	-2.167203**	(0.093417)	-3.883171**	(0.138065)	-21.81102**	(0.465493)
Time zone 2 (dummy)	-0.382049**	(0.020971)	-0.423037**	(0.022757)	-0.431908**	(0.029834)	-0.422578**	(0.036966)	-0.980108**	(0.068393)	-1.668018**	(0.101405)	0.136644	(0.342658)
Time zone 3 (dummy)	-0.164137**	(0.01881)	-0.146034**	(0.020457)	-0.084684**	(0.026882)	0.030129	(0.033343)	0.490378**	(0.061822)	1.109839**	(0.091754)	15.83382**	(0.310301)
Market activity	0.002377**	(0.000066)	0.00318**	(0.0000714)	0.005746**	(0.0000937)	0.009104**	(0.000116)	0.034839**	(0.000216)	0.06583**	(0.000321)	0.351992**	(0.001083)
Aggressiveness	-11.0101**	(0.349334)	-9.622902**	(0.391088)	-9.437582**	(0.524537)	-10.51334**	(0.652388)	-17.20497**	(1.205721)	-23.16854**	(1.788525)	-56.1545**	(6.033164)
Market Depth	0.018902**	(0.001779)	0.031648**	(0.001933)	0.062752**	(0.002558)	0.089367**	(0.003177)	0.124459**	(0.005915)	0.139291**	(0.008781)	0.279634**	(0.029699)
Volatility	-12.36811**	(1.137401)	-13.84264**	(1.222591)	-17.93093**	(1.598713)	-16.74554**	(1.983048)	-13.80886**	(3.685834)	-6.948348	(5.455525)	141.8426**	(18.42267)
Split (dummy)	-0.821517**	(0.052806)	-0.820381**	(0.056588)	-0.939264**	(0.073642)	-0.955235**	(0.090862)	-0.827107**	(0.168292)	-1.058965**	(0.249814)	-1.591667	(0.844551)
Bid-ask spread	-52.99564**	(0.897171)	-71.96311**	(0.972745)	-107.4614**	(1.281098)	-126.0285**	(1.590006)	-152.0601**	(2.951984)	-182.0049**	(4.37764)	-563.4431**	(14.78981)
Opposite (dummy)	0.477139**	(0.014621)	0.545258**	(0.015836)	-0.245621**	(0.020778)	-0.43719**	(0.025755)	-1.134576**	(0.047736)	-1.700846**	(0.070818)	-3.226012**	(0.239393)
Medium (dummy)	0.157927**	(0.043447)	-0.043185	(0.047836)	-0.266479**	(0.062757)	-0.360761**	(0.077959)	-0.71627**	(0.145069)	-0.867547**	(0.215393)	0.233182	(0.728575)
Large (dummy)	-2.932063**	(0.338143)	-3.483319**	(0.341667)	-5.427619**	(0.424913)	-5.572569**	(0.490277)	-5.746291**	(0.836214)	-6.346583**	(1.228536)	-6.160015	(4.112492)
X-Large (dummy)	-3.259777**	(0.570461)	-3.774128**	(0.573904)	-4.992865**	(0.69383)	-3.85888**	(0.804755)	-2.434129	(1.413865)	-3.375221	(2.096159)	1.574487	(7.079447)
Opposite * Medium (dummy)	-0.321163**	(0.047157)	-0.179807**	(0.051493)	0.076342	(0.067529)	0.166144*	(0.083696)	0.701078**	(0.15521)	1.201219**	(0.23035)	2.673332**	(0.778953)
Opposite * Large (dummy)	0.079845	(0.296117)	0.596839	(0.305645)	1.680372**	(0.39344)	1.388108**	(0.476199)	2.11447*	(0.852577)	1.797944	(1.260184)	-5.640765	(4.243807)
Opposite * X-Large (dummy)	0.366947	(0.51897)	0.462742	(0.52268)	1.198945	(0.666875)	0.191962	(0.794857)	-0.383753	(1.431117)	0.775311	(2.115823)	5.601967	(7.136581)
Split * Agg 2 (dummy)	0.222158**	(0.056774)	0.334834**	(0.060792)	0.566347**	(0.079095)	0.602453**	(0.097616)	0.671336**	(0.180781)	0.804142**	(0.268354)	2.682384**	(0.907271)
Split * Agg 3 (dummy)	0.785772**	(0.056034)	0.918746**	(0.060079)	1.292357**	(0.078232)	1.364553**	(0.096587)	1.14769**	(0.178936)	1.390556**	(0.265598)	3.152086**	(0.897928)
Split * Agg 4 (dummy)	0.525198**	(0.085908)	0.866429**	(0.091365)	1.010886**	(0.119756)	1.084672**	(0.14842)	0.828303**	(0.275737)	1.072266**	(0.409381)	2.410726	(1.3841)
Medium * Agg 2 (dummy)	-0.05452	(0.048196)	-0.037649	(0.052806)	0.08707	(0.069249)	0.098026	(0.085852)	-0.032234	(0.159277)	-0.159575	(0.236426)	-0.797039	(0.799586)
Medium * Agg 3 (dummy)	-0.311658*	(0.125347)	-0.221827	(0.135517)	-0.587486**	(0.178573)	-0.578354**	(0.220727)	-0.877847*	(0.406981)	-0.563657	(0.60241)	-7.61046**	(2.034046)
Medium * Agg 4 (dummy)	-0.505748**	(0.09219)	-0.353589**	(0.099739)	-0.712286**	(0.131728)	-0.712008**	(0.163703)	-1.071787**	(0.305185)	-1.642673**	(0.452817)	-6.353617**	(1.531275)
Large * Agg 2 (dummy)	0.322152	(0.740085)	0.324062	(0.750538)	1.112173	(0.900435)	1.13162	(1.070947)	-0.181331	(1.863191)	-1.464792	(2.748341)	10.98246	(9.208325)
Large * Agg 3 (dummy)	0.014287	(0.656054)	0.462481	(0.626833)	0.802775	(0.776796)	1.180942	(0.901057)	-0.578396	(1.563036)	-1.136302	(2.300734)	-0.817583	(7.75243)
Large * Agg 4 (dummy)	2.227538**	(0.351147)	2.908046**	(0.356923)	4.408462**	(0.450024)	4.84283**	(0.531442)	4.36952**	(0.930351)	5.675554**	(1.371814)	4.470756	(4.613566)
X-Large * Agg 2 (dummy)	-1.609838	(1.580571)	0.860913	(1.140449)	0.706627	(1.426934)	1.642875	(1.641164)	4.590347	(2.863009)	6.661489	(4.248787)	10.64977	(14.20065)
X-Large * Agg 3 (dummy)	0.012954	(0.831741)	0.165609	(0.822702)	-1.767272	(1.037599)	-2.472848*	(1.193303)	-4.745935*	(2.118108)	-5.630551	(3.112694)	-31.57188**	(10.49103)
X-Large * Agg 4 (dummy)	2.531161**	(0.592452)	4.002579**	(0.606724)	6.074816**	(0.757247)	6.914336**	(0.902027)	6.835054**	(1.627687)	7.614923**	(2.41099)	2.275106	(8.141713)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 74: Extended model (TOBIT), EUR/JPY, 10 September 2010, Buy order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.002233		1.679326		3.491534		5.279688		16.99086		31.0228		163.1273	
Constant	8.066066**	(0.335661)	8.035938**	(0.38)	9.611553**	(0.52055)	11.40967**	(0.655147)	21.00397**	(1.235734)	28.95557**	(1.852466)	77.54074**	(6.631922)
Time zone 1 (dummy)	-0.403132**	(0.025175)	-0.387515**	(0.027423)	-0.564892**	(0.036589)	-0.657714**	(0.046)	-0.339329**	(0.087208)	-0.223747	(0.130885)	-2.012589**	(0.469396)
Time zone 2 (dummy)	-0.410455**	(0.019997)	-0.464612**	(0.021904)	-0.595294**	(0.029274)	-0.605565**	(0.036805)	0.366392**	(0.070068)	1.297117**	(0.105361)	11.25432**	(0.378316)
Time zone 3 (dummy)	-0.042231*	(0.017546)	0.030897	(0.019301)	0.15176**	(0.025934)	0.268567**	(0.032668)	2.220545**	(0.062425)	4.330067**	(0.093944)	31.23569**	(0.337629)
Market activity	0.001797**	(0.0000534)	0.002547**	(0.0000588)	0.004879**	(0.0000791)	0.008416**	(0.0000997)	0.03671**	(0.00019)	0.072512**	(0.000286)	0.411391**	(0.001023)
Aggressiveness	-7.99466**	(0.340352)	-6.772065**	(0.385206)	-5.760064**	(0.527557)	-6.16513**	(0.663897)	-11.3515**	(1.252001)	-14.46247**	(1.876762)	-23.85801**	(6.718455)
Market Depth	0.00806**	(0.001644)	0.014362**	(0.001807)	0.027035**	(0.002428)	0.040767**	(0.003058)	0.098881**	(0.005853)	0.200119**	(0.008807)	1.362669**	(0.031643)
Volatility	-1.3928	(1.213722)	-3.574479**	(1.332031)	-4.661819**	(1.783039)	-9.613423**	(2.242963)	-76.98074**	(4.247202)	-187.4801**	(6.3673)	-1371.655**	(22.61625)
Split (dummy)	-0.845477**	(0.055271)	-0.68997**	(0.059522)	-0.897549**	(0.079604)	-0.874119**	(0.099743)	-0.882796**	(0.188982)	-0.834484**	(0.284032)	-2.372282*	(1.019515)
Bid-ask spread	-54.46845**	(0.824463)	-75.0322**	(0.90369)	-114.3762**	(1.20909)	-138.3615**	(1.520126)	-187.4925**	(2.862788)	-242.985**	(4.265306)	-664.5832**	(15.2279)
Opposite (dummy)	0.467802**	(0.013598)	0.523911**	(0.0149)	-0.347709**	(0.01999)	-0.615175**	(0.02517)	-1.370862**	(0.048062)	-1.958619**	(0.072324)	-4.29178**	(0.259884)
Medium (dummy)	0.125182**	(0.040088)	-0.003145	(0.044451)	-0.349239**	(0.059833)	-0.454806**	(0.07551)	-0.701422**	(0.144973)	-0.881543**	(0.218459)	1.134194	(0.785591)
Large (dummy)	-0.653292**	(0.113375)	-0.584608**	(0.122752)	-1.193128**	(0.163735)	-1.141784**	(0.205317)	-1.033105**	(0.392547)	-1.059904	(0.591369)	3.672668	(2.126924)
X-Large (dummy)	-2.404883**	(0.466894)	-3.278099**	(0.501088)	-4.189264**	(0.60463)	-4.979589**	(0.737421)	-6.116809**	(1.304933)	-6.717821**	(1.935485)	-3.43242	(6.904061)
Opposite * Medium (dummy)	-0.532969**	(0.041252)	-0.398494**	(0.045593)	0.021611	(0.061386)	0.190207*	(0.077376)	0.810606**	(0.148353)	1.276057**	(0.223458)	3.043617**	(0.80334)
Opposite * Large (dummy)	-0.303811*	(0.130152)	-0.167988	(0.140783)	0.57818**	(0.188695)	0.652028**	(0.23699)	1.65511**	(0.453351)	1.874041**	(0.683091)	7.165587**	(2.456269)
Opposite * X-Large (dummy)	-0.117483	(0.459483)	0.30956	(0.483215)	0.917042	(0.603692)	2.092293**	(0.74225)	2.922644*	(1.367385)	4.081652*	(2.046692)	-0.528083	(7.329753)
Split * Agg 2 (dummy)	0.418284**	(0.058804)	0.415345**	(0.063364)	0.739622**	(0.084729)	0.757526**	(0.106213)	0.914018**	(0.201424)	0.921282**	(0.302787)	3.294677**	(1.086991)
Split * Agg 3 (dummy)	0.936135**	(0.057803)	0.897422**	(0.062329)	1.464486**	(0.083364)	1.525639**	(0.104511)	1.58915**	(0.198182)	1.629718**	(0.297878)	4.492451**	(1.069272)
Split * Agg 4 (dummy)	0.488136**	(0.078395)	0.520681**	(0.084313)	0.831461**	(0.112719)	0.793292**	(0.14168)	0.945768**	(0.269759)	0.862349*	(0.405785)	3.793687**	(1.45691)
Medium * Agg 2 (dummy)	0.236971**	(0.041569)	0.211049**	(0.045967)	0.361445**	(0.061909)	0.449193**	(0.078033)	0.325869*	(0.149617)	0.239013	(0.225405)	0.817504	(0.810413)
Medium * Agg 3 (dummy)	0.027872	(0.108542)	-0.00259	(0.120247)	0.010951	(0.161913)	0.084264	(0.204149)	-0.110039	(0.391289)	-0.465204	(0.588541)	-10.38307**	(2.113705)
Medium * Agg 4 (dummy)	-0.09836	(0.094676)	-0.011119	(0.104072)	-0.142113	(0.141145)	0.043487	(0.178072)	-0.973533**	(0.342744)	-1.680156**	(0.515446)	-5.422987**	(1.850999)
Large * Agg 2 (dummy)	0.630681**	(0.142042)	0.64596**	(0.154436)	0.843546**	(0.207144)	0.834699**	(0.260595)	1.065567*	(0.49874)	1.549799*	(0.751855)	-0.161575	(2.704154)
Large * Agg 3 (dummy)	0.540777	(0.421042)	-0.058368	(0.465656)	-0.911008	(0.631017)	-1.024854	(0.782463)	1.6606	(1.469144)	4.850486*	(2.200654)	9.426321	(7.897746)
Large * Agg 4 (dummy)	-0.235612	(0.227636)	0.089571	(0.241561)	0.270613	(0.327397)	0.05065	(0.413023)	-0.189738	(0.797728)	-1.509481	(1.202655)	-15.55371**	(4.319247)
X-Large * Agg 2 (dummy)	0.022883	(0.932294)	0.923737	(0.929971)	0.825129	(1.139291)	2.00998	(1.364835)	5.923884*	(2.488382)	7.347969*	(3.741651)	7.42586	(13.43862)
X-Large * Agg 3 (dummy)	-0.229533	(0.676697)	0.463102	(0.680345)	0.680664	(0.842542)	1.3265	(1.032551)	-1.648256	(1.920548)	-5.670018*	(2.882907)	-51.51025**	(10.34295)
X-Large * Agg 4 (dummy)	1.207213*	(0.521321)	1.781132**	(0.557631)	2.404943**	(0.698707)	2.7559**	(0.862333)	1.405386	(1.600254)	-0.132103	(2.397554)	-23.58894**	(8.591075)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 75: Extended model (TOBIT), EUR/JPY, 10 September 2010, Sell order cancellations (included observations: 264234)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	1.003728		1.667249		3.402038		5.138411		16.46182		30.00322		159.0628	
Constant	10.08168**	(0.336623)	9.378155**	(0.379788)	11.12828**	(0.514764)	12.65289**	(0.650606)	22.26778**	(1.208272)	28.75081**	(1.768332)	91.43385**	(6.40395)
Time zone 1 (dummy)	-0.55489**	(0.025599)	-0.574804**	(0.02769)	-0.97442**	(0.036526)	-1.196529**	(0.04592)	-1.532099**	(0.08526)	-2.201334**	(0.124994)	-12.56841**	(0.453316)
Time zone 2 (dummy)	-0.492977**	(0.020315)	-0.54872**	(0.022087)	-0.788643**	(0.029137)	-0.882273**	(0.036668)	-0.565472**	(0.068489)	-0.528106**	(0.100623)	-0.884273*	(0.365364)
Time zone 3 (dummy)	-0.076767**	(0.017793)	-0.008012	(0.019435)	-0.0799**	(0.025797)	-0.063828*	(0.032532)	0.947556**	(0.061009)	1.980166**	(0.089725)	16.72054**	(0.32609)
Market activity	0.001876**	(0.0000543)	0.002607**	(0.0000593)	0.005089**	(0.0000787)	0.008694**	(0.0000992)	0.03718**	(0.000186)	0.073502**	(0.000274)	0.412135**	(0.000987)
Aggressiveness	-10.01879**	(0.341357)	-8.251176**	(0.384978)	-7.530835**	(0.521678)	-7.72004**	(0.659335)	-12.60951**	(1.224133)	-14.20911**	(1.791448)	-32.9046**	(6.487266)
Market Depth	0.005062**	(0.001675)	0.011785**	(0.001821)	0.020266**	(0.002413)	0.024737**	(0.003043)	0.043136**	(0.005716)	0.07829**	(0.008412)	0.950914**	(0.03056)
Volatility	-4.284627**	(1.234374)	-4.652564**	(1.342135)	-6.697751**	(1.771974)	-11.9094**	(2.227892)	-94.07772**	(4.158979)	-217.6634**	(6.097638)	-1373.656**	(21.83015)
Split (dummy)	-0.852374**	(0.056036)	-0.6353**	(0.059674)	-0.860225**	(0.078963)	-0.77603**	(0.098855)	-0.55357**	(0.184374)	-0.382772	(0.270968)	-1.356554	(0.984681)
Bid-ask spread	-52.34356**	(0.834818)	-68.87336**	(0.908322)	-101.0048**	(1.20112)	-120.015**	(1.509554)	-148.0058**	(2.80059)	-171.5716**	(4.109532)	-526.926**	(14.71649)
Opposite (dummy)	0.473273**	(0.013817)	0.555602**	(0.015031)	-0.2482**	(0.019911)	-0.452469**	(0.025092)	-1.158187**	(0.046984)	-1.557339**	(0.069074)	-3.225659**	(0.251001)
Medium (dummy)	0.093582*	(0.037991)	-0.039343	(0.041781)	-0.340411**	(0.055451)	-0.422325**	(0.07)	-0.512177**	(0.131913)	-0.360855	(0.194273)	1.980164**	(0.70648)
Large (dummy)	-0.656443**	(0.106875)	-0.539536**	(0.114667)	-1.090282**	(0.150722)	-0.993148**	(0.188606)	-0.783751*	(0.353863)	-0.805832	(0.520991)	8.270384**	(1.893396)
X-Large (dummy)	-2.796274**	(0.425491)	-3.191609**	(0.440387)	-4.623567**	(0.543165)	-4.218502**	(0.637776)	-5.709199**	(1.129415)	-5.750742**	(1.642605)	-15.07535*	(5.936694)
Opposite * Medium (dummy)	-0.394601**	(0.042122)	-0.297834**	(0.046101)	0.028047	(0.061198)	0.068674	(0.077173)	0.484286**	(0.14504)	0.73902**	(0.213448)	0.955178	(0.775885)
Opposite * Large (dummy)	-0.200949	(0.132442)	0.013611	(0.142028)	0.598275**	(0.187975)	0.558203*	(0.236106)	1.289382**	(0.443059)	2.050173**	(0.652452)	0.131462	(2.371518)
Opposite * X-Large (dummy)	0.869775	(0.470251)	0.901783	(0.478671)	0.800102	(0.605635)	0.297157	(0.736726)	0.303332	(1.337966)	-0.939436	(1.954799)	2.801618	(7.085151)
Split * Agg 2 (dummy)	0.288165**	(0.059692)	0.163782**	(0.063624)	0.505557**	(0.0841)	0.489247**	(0.105353)	0.469552*	(0.196556)	0.564436	(0.288889)	2.42052*	(1.049853)
Split * Agg 3 (dummy)	0.97376**	(0.058604)	0.8862**	(0.062507)	1.37372**	(0.082728)	1.321756**	(0.10364)	1.127509**	(0.193384)	1.053225**	(0.28421)	3.53517**	(1.032738)
Split * Agg 4 (dummy)	0.634053**	(0.079129)	0.739997**	(0.084388)	0.971246**	(0.111995)	0.834983**	(0.140824)	0.465786	(0.263515)	0.222425	(0.387328)	2.023816	(1.407114)
Medium * Agg 2 (dummy)	0.101768*	(0.042375)	0.114066*	(0.046468)	0.303431**	(0.061681)	0.372628**	(0.077789)	0.200772	(0.146263)	0.124179	(0.215303)	2.049285**	(0.782751)
Medium * Agg 3 (dummy)	0.070102	(0.110368)	0.084777	(0.121471)	0.024861	(0.162198)	0.226387	(0.204486)	-0.576173	(0.3832)	-1.621458**	(0.562705)	-11.4167**	(2.041484)
Medium * Agg 4 (dummy)	-0.421101**	(0.097692)	0.018107	(0.104913)	-0.02743	(0.14058)	0.318647	(0.177523)	-0.500385	(0.334774)	-1.098707*	(0.492825)	-3.417556	(1.787497)
Large * Agg 2 (dummy)	0.304095*	(0.145375)	0.217111	(0.156353)	0.492577*	(0.206653)	0.56822*	(0.259608)	0.881643	(0.487529)	0.907691	(0.718163)	-4.172361	(2.611738)
Large * Agg 3 (dummy)	0.057327	(0.438114)	-0.237291	(0.472791)	-0.536485	(0.621817)	-0.298495	(0.771014)	1.375839	(1.433411)	1.505973	(2.099622)	3.750978	(7.627818)
Large * Agg 4 (dummy)	0.21376	(0.228064)	0.355277	(0.244415)	0.452115	(0.326081)	0.045645	(0.41283)	-0.250143	(0.779102)	-1.546439	(1.148089)	-13.68524**	(4.16337)
X-Large * Agg 2 (dummy)	-1.727054	(1.126574)	-1.568917	(1.070712)	-0.065138	(1.195609)	-0.412352	(1.420371)	3.029093	(2.459793)	4.546767	(3.584419)	8.607092	(12.98437)
X-Large * Agg 3 (dummy)	-0.40495	(0.690683)	-0.142924	(0.682186)	1.134064	(0.847507)	1.583096	(1.027679)	2.005845	(1.879242)	0.727207	(2.753364)	-23.29317*	(9.994568)
X-Large * Agg 4 (dummy)	1.941668**	(0.513215)	2.921881**	(0.537686)	4.780826**	(0.703183)	5.147841**	(0.856111)	6.865235**	(1.565094)	7.164519**	(2.289598)	-0.693135	(8.302978)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 76: Extended model (TOBIT), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95882		1.593369		3.359089		4.980163		15.37131		27.82783		144.0147	
Constant	9.108804**	(0.380969)	8.088315**	(0.426016)	9.031599**	(0.592919)	10.38519**	(0.737402)	17.57519**	(1.370096)	26.15733**	(2.059055)	68.86384**	(7.808077)
Time zone 1 (dummy)	-0.465408**	(0.028861)	-0.435424**	(0.030936)	-0.921624**	(0.041747)	-1.260997**	(0.05189)	-3.671884**	(0.095812)	-6.781489**	(0.143972)	-40.62986**	(0.544733)
Time zone 2 (dummy)	0.143751**	(0.019804)	0.200498**	(0.021457)	0.157081**	(0.029136)	0.162168**	(0.036327)	-0.591132**	(0.067884)	-1.85853**	(0.102401)	-9.439216**	(0.388734)
Time zone 3 (dummy)	0.140947**	(0.017326)	0.252059**	(0.018762)	0.487127**	(0.025466)	0.639195**	(0.031777)	1.283899**	(0.05951)	2.697687**	(0.089847)	25.15278**	(0.341298)
Market activity	0.007747**	(0.000199)	0.011508**	(0.000216)	0.020555**	(0.000296)	0.034311**	(0.00037)	0.129734**	(0.000697)	0.237903**	(0.001052)	1.083186**	(0.003998)
Aggressiveness	-9.262034**	(0.386035)	-7.170531**	(0.431512)	-5.662616**	(0.60043)	-5.904686**	(0.746671)	-8.897048**	(1.387126)	-12.97626**	(2.084583)	-13.01256	(7.904835)
Market Depth	0.009712**	(0.001259)	0.019084**	(0.001369)	0.030948**	(0.001874)	0.042139**	(0.002341)	0.108517**	(0.004397)	0.167442**	(0.006646)	0.668959**	(0.025255)
Volatility	2.480215**	(0.957749)	4.142493**	(1.037768)	18.29424**	(1.411842)	34.49522**	(1.764009)	163.0426**	(3.30553)	334.3225**	(4.987893)	1923.775**	(18.92608)
Split (dummy)	-0.511215**	(0.061034)	-0.347653**	(0.06556)	-0.5462**	(0.089256)	-0.523584**	(0.111377)	-1.031337**	(0.207765)	-1.814086**	(0.313617)	-7.188027**	(1.191032)
Bid-ask spread	-54.65177**	(0.892497)	-77.49929**	(0.968606)	-119.5983**	(1.314644)	-141.9928**	(1.639442)	-208.1998**	(3.057105)	-294.2352**	(4.601221)	-987.0225**	(17.41)
Opposite (dummy)	0.323064**	(0.014284)	0.37706**	(0.015457)	-0.581335**	(0.021043)	-0.87846**	(0.026258)	-1.540021**	(0.049089)	-1.869041**	(0.074065)	-2.787939**	(0.281173)
Medium (dummy)	0.075192*	(0.038036)	-0.108501**	(0.041581)	-0.425429**	(0.056347)	-0.549211**	(0.070428)	-0.647004**	(0.13232)	-0.39069	(0.199929)	4.329644**	(0.759751)
Large (dummy)	-0.797199**	(0.107494)	-0.726278**	(0.11359)	-1.230896**	(0.152689)	-1.194673**	(0.189314)	-0.700049*	(0.35318)	-0.06297	(0.533256)	4.570554*	(2.026178)
X-Large (dummy)	-1.420726**	(0.21868)	-1.4354**	(0.229879)	-2.126926**	(0.303955)	-2.001716**	(0.374485)	0.004652	(0.690749)	1.838382	(1.041551)	25.54816**	(3.95496)
Opposite * Medium (dummy)	-0.415478**	(0.042408)	-0.35086**	(0.046034)	-0.007378	(0.062347)	0.222133**	(0.077687)	0.72366**	(0.145322)	0.986695**	(0.21942)	2.048799*	(0.833497)
Opposite * Large (dummy)	-0.049502	(0.123016)	0.076796	(0.13068)	0.695174**	(0.176674)	0.842086**	(0.219318)	1.521573**	(0.40916)	2.252441**	(0.617805)	7.21373**	(2.34754)
Opposite * X-Large (dummy)	0.367031	(0.27802)	0.36979	(0.294331)	1.132314**	(0.39411)	1.293551**	(0.488726)	0.83155	(0.90958)	1.103832	(1.370853)	5.432898	(5.208483)
Split * Agg 2 (dummy)	0.019043	(0.064222)	-0.061267	(0.068939)	0.196272*	(0.093778)	0.204878	(0.117012)	0.840194**	(0.218301)	1.925911**	(0.329524)	9.960761**	(1.251511)
Split * Agg 3 (dummy)	0.439927**	(0.063603)	0.405237**	(0.06832)	0.885457**	(0.092989)	0.91699**	(0.11604)	1.566456**	(0.21653)	2.468812**	(0.326843)	11.37491**	(1.241261)
Split * Agg 4 (dummy)	0.019038	(0.084692)	0.140727	(0.090092)	0.337445**	(0.122406)	0.240198	(0.152824)	0.696543*	(0.28593)	1.263857**	(0.431647)	6.056002**	(1.639521)
Medium * Agg 2 (dummy)	-0.111502**	(0.041794)	-0.080222	(0.045422)	-0.01236	(0.06147)	0.062534	(0.076563)	0.129123	(0.14317)	0.073323	(0.216192)	1.5039	(0.82133)
Medium * Agg 3 (dummy)	0.142899	(0.120474)	0.220745	(0.131404)	0.562175**	(0.180177)	0.572238*	(0.22521)	-0.130329	(0.422603)	-1.407923*	(0.63714)	-13.67774**	(2.419454)
Medium * Agg 4 (dummy)	-0.435804**	(0.095455)	-0.29498**	(0.10256)	-0.115514	(0.139418)	-0.183438	(0.174482)	-1.06114**	(0.328396)	-2.479786**	(0.4958)	-18.20033**	(1.882332)
Large * Agg 2 (dummy)	0.233345	(0.129548)	0.193355	(0.137437)	0.139576	(0.185372)	0.1193	(0.230008)	-0.18726	(0.428965)	0.042688	(0.647879)	4.868809*	(2.462253)
Large * Agg 3 (dummy)	0.633755	(0.348656)	0.276346	(0.379117)	0.437892	(0.514579)	0.629058	(0.638386)	1.035329	(1.187582)	1.455846	(1.785634)	2.851285	(6.769544)
Large * Agg 4 (dummy)	0.462397	(0.240444)	0.679301**	(0.25726)	1.41922**	(0.350554)	1.533219**	(0.437748)	0.472621	(0.826692)	-2.2803	(1.250717)	-19.52724**	(4.749923)
X-Large * Agg 2 (dummy)	1.157917**	(0.312953)	1.607599**	(0.332732)	1.735537**	(0.452337)	1.366355*	(0.564182)	0.569741	(1.055707)	2.195135	(1.591953)	5.727321	(6.049204)
X-Large * Agg 3 (dummy)	-1.65036*	(0.836844)	-2.676158**	(0.892281)	-1.350654	(0.947805)	-1.858595	(1.152804)	-2.588605	(2.164184)	-2.964717	(3.248637)	-34.04845**	(12.35249)
X-Large * Agg 4 (dummy)	1.053732*	(0.464213)	1.535398**	(0.492756)	3.673119**	(0.669779)	3.791951**	(0.841043)	0.694372	(1.591282)	-1.095913	(2.39987)	-37.60989**	(9.124529)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.

Table 77: Extended model (TOBIT), EUR/JPY, 13 September 2010, Buy order cancellations (included observations: 237835)

Time window (seconds)	0.1		0.2		0.5		1		5		10		60	
Order cancellations (mean)	0.95219		1.569979		3.232644		4.798213		14.80236		26.78061		139.1414	
Constant	10.15511**	(0.394297)	9.129911**	(0.438217)	9.969166**	(0.594731)	11.38198**	(0.734767)	18.27065**	(1.381295)	25.29339**	(2.053484)	69.62722**	(7.762127)
Time zone 1 (dummy)	-0.677955**	(0.030257)	-0.675138**	(0.032062)	-1.180387**	(0.042124)	-1.592058**	(0.051954)	-4.218096**	(0.09687)	-7.790585**	(0.143553)	-44.80799**	(0.541632)
Time zone 2 (dummy)	0.102921**	(0.020581)	0.14402**	(0.022134)	0.164477**	(0.029312)	0.178547**	(0.036278)	-0.541759**	(0.068553)	-2.039985**	(0.102041)	-11.74852**	(0.386474)
Time zone 3 (dummy)	0.104626**	(0.018)	0.167029**	(0.019359)	0.27937**	(0.025636)	0.406664**	(0.03174)	0.768219**	(0.060119)	1.57478**	(0.089546)	18.08571**	(0.339335)
Market activity	0.007411**	(0.000207)	0.011147**	(0.000224)	0.019897**	(0.000298)	0.033212**	(0.00037)	0.125786**	(0.000703)	0.231934**	(0.001049)	1.049998**	(0.003975)
Aggressiveness	-10.37598**	(0.399601)	-8.237685**	(0.443953)	-6.606605**	(0.602368)	-6.952157**	(0.744139)	-9.554047**	(1.39867)	-11.24534**	(2.079275)	-9.486789	(7.85938)
Market Depth	0.002281	(0.001338)	0.00586**	(0.001438)	0.015006**	(0.001903)	0.025351**	(0.002353)	0.075214**	(0.004445)	0.110443**	(0.006623)	0.581544**	(0.025112)
Volatility	1.793703	(1.0064)	2.355274*	(1.079854)	9.043658**	(1.429449)	20.84834**	(1.765744)	133.5231**	(3.33784)	268.9682**	(4.971018)	1812.323**	(18.81435)
Split (dummy)	-0.471378**	(0.063208)	-0.267734**	(0.067231)	-0.489556**	(0.089733)	-0.416618**	(0.110873)	-0.531746*	(0.209674)	-1.195404**	(0.312651)	-6.121314**	(1.184159)
Bid-ask spread	-53.50538**	(0.927939)	-73.67938**	(0.999441)	-109.9104**	(1.32735)	-127.5137**	(1.642872)	-182.6619**	(3.092931)	-260.0561**	(4.598647)	-985.9097**	(17.37189)
Opposite (dummy)	0.380616**	(0.014886)	0.41765**	(0.015974)	-0.471213**	(0.021176)	-0.682968**	(0.026214)	-1.265217**	(0.049568)	-1.733576**	(0.0738)	-3.972178**	(0.279547)
Medium (dummy)	0.052418	(0.039134)	-0.133166**	(0.042445)	-0.338336**	(0.056004)	-0.378536**	(0.069425)	-0.308864*	(0.132042)	0.039563	(0.196908)	6.269326**	(0.746604)
Large (dummy)	-0.694413**	(0.112323)	-0.632037**	(0.11838)	-0.783694**	(0.154134)	-0.64827**	(0.189857)	0.368029	(0.358124)	1.410898**	(0.533928)	10.98952**	(2.024718)
X-Large (dummy)	-0.773969**	(0.245986)	-0.881612**	(0.261999)	-1.135336**	(0.343194)	-1.009794*	(0.423112)	0.973702	(0.798008)	4.102268**	(1.187414)	39.74606**	(4.494723)
Opposite * Medium (dummy)	-0.339905**	(0.044077)	-0.239857**	(0.047501)	0.031216	(0.062711)	0.100533	(0.077537)	0.554266**	(0.146773)	0.981194**	(0.218674)	2.550915**	(0.828679)
Opposite * Large (dummy)	-0.06236	(0.127665)	0.034027	(0.134661)	0.248684	(0.177008)	0.368398	(0.218444)	0.637381	(0.412845)	0.645873	(0.61558)	0.501598	(2.333976)
Opposite * X-Large (dummy)	-0.188924	(0.284534)	0.107564	(0.301221)	0.357977	(0.395922)	0.17239	(0.488766)	0.62184	(0.918979)	0.501537	(1.367409)	-4.469614	(5.178383)
Split * Agg 2 (dummy)	0.02237	(0.06652)	-0.069072	(0.070731)	0.200555*	(0.094305)	0.093671	(0.116526)	0.388197	(0.220332)	1.218479**	(0.3285)	8.774788**	(1.244282)
Split * Agg 3 (dummy)	0.424111**	(0.065896)	0.360904**	(0.070103)	0.821196**	(0.093508)	0.802952**	(0.115556)	1.025884**	(0.21854)	1.879667**	(0.325834)	10.22815**	(1.234112)
Split * Agg 4 (dummy)	0.126391	(0.087369)	0.140747	(0.092529)	0.397538**	(0.123053)	0.26806	(0.152363)	0.195796	(0.288776)	0.872206*	(0.430295)	5.139374**	(1.630048)
Medium * Agg 2 (dummy)	-0.130822**	(0.043447)	-0.10327*	(0.046873)	-0.092848	(0.061764)	0.013919	(0.07635)	0.003324	(0.144569)	-0.076033	(0.215444)	0.15822	(0.816588)
Medium * Agg 3 (dummy)	0.287596*	(0.124604)	0.299727*	(0.135605)	0.451576*	(0.181602)	0.306396	(0.225187)	-0.842445*	(0.427446)	-1.779563**	(0.635807)	-14.60919**	(2.407299)
Medium * Agg 4 (dummy)	-0.210752*	(0.097968)	-0.012481	(0.105)	-0.088087	(0.140402)	-0.176949	(0.174481)	-1.077526**	(0.331953)	-2.563826**	(0.49439)	-19.26435**	(1.870991)
Large * Agg 2 (dummy)	0.175844	(0.13376)	0.380784**	(0.140798)	0.418693*	(0.185538)	0.314283	(0.229008)	-0.269257	(0.432864)	-0.38832	(0.645487)	1.12944	(2.448021)
Large * Agg 3 (dummy)	0.920559*	(0.359334)	0.533331	(0.38976)	0.30538	(0.518925)	0.302646	(0.637455)	1.066505	(1.19453)	1.071894	(1.779916)	5.097335	(6.730422)
Large * Agg 4 (dummy)	-0.043837	(0.255982)	-0.059688	(0.271792)	0.298137	(0.355788)	0.263378	(0.439943)	-1.636557	(0.835941)	-3.852358**	(1.247102)	-21.12775**	(4.722671)
X-Large * Agg 2 (dummy)	0.198859	(0.32913)	0.371075	(0.345468)	0.319942	(0.455068)	0.233904	(0.564515)	0.449402	(1.064339)	0.686064	(1.586435)	-0.119556	(6.014247)
X-Large * Agg 3 (dummy)	-1.388787	(0.794187)	-2.403557**	(0.854008)	-3.739019**	(1.062055)	-3.726731**	(1.237922)	-2.120434	(2.202806)	-4.975785	(3.237187)	-47.29048**	(12.28111)
X-Large * Agg 4 (dummy)	1.556429**	(0.467948)	2.341272**	(0.502324)	3.283631**	(0.678489)	4.02803**	(0.839863)	1.825522	(1.605783)	-1.628714	(2.395533)	-46.71013**	(9.071833)

Sources: EBS and authors' calculations. Notes: */** denotes statistical significance at 95%/99% level.