Note on Construction of Debt Supply High Frequency Surprises

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Abstract

This note presents the methodology to construct the high frequency surprises on the future markets at the announcements of the UK Debt Management Office.

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KEY WORDS: public debt supply, high-frequency identification, primary markets segmentation.

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1 Institutional Details

The UK Debt Management Office is an executive agency dependent of the UK Treasury and it is in charge of managing the public debt of the United Kingdom given the fiscal stance chosen by the Treasury. The DMO was established on April 1, 1998, obtaining the debt management responsibilities from the Bank of England. This happened in concomitance with the Bank of England becoming independent and being granted authority over monetary policy. In this study I exploit the DMO institutional structure and documents provided by the DMO.

The UK DMO publishes a series of documents during the fiscal year[1] in which it can alter the supply of marketable public debt for the current or next fiscal year. These are called the remit and the update to the remit. There are at least three of these documents each year: the first one is published in March just before the start of the fiscal year, the second one in April after the outrun of the past fiscal year is published, and the third one in the fall with the update of the fiscal stance. Two of these documents, usually the March one and the Fall one, are published after the budget speech in Parliament of the Chancellor of the Exchequer (the UK finance minister)[2]. In addition to these three remits the DMO published additional ones when there are additional budget speeches following general elections[3] and following sizable events[4].

The institutional structure of the Treasury and the DMO is such that the DMO publishes the remit just after the Chancellor ends his speech. The budget speech is a politically infused presentation of the fiscal policy stance and the fiscal forecasts[5]. What is relevant for the purpose of this paper is that the Chancellor always discusses new factual information relevant to assess the fiscal stance of the government and the debt sustainability of the government, but never discusses the exact amount of marketable debt supply that the government is going to issue during the current year. To illustrate this point, take the budget speech by Chancellor

[1] In the UK the fiscal year starts on April 1st.

[2] This was the case in all years from 1998 to 2021 except in 2002/03, 2003/04, 2009/10 when the first budget speech was in April and not in March.

[3] These were on 08 July 2015 and 22 June 2010.

[4] There are two of these events, one that reduced borrowing following an unexpectedly profitable auction for the 3G spectrum in 12 June 2000 and one that increased borrowing on 13 October 2008 to fund the recapitalization of the UK banks during the financial crisis.

[5] Since the Office for Budget Responsibility, the independent fiscal watchdog in the UK, was constituted in 2010 the Chancellor discusses these independent forecasts during the speech as well.

Philip Hammond on 29 October 2018; the Chancellor discusses the deficit projections: *Today's forecast, taking into account all announcements since the Spring Statement [...] shows the deficit down [...] to less than 1.4% next year [...] and falling to just 0.8% by 2023-24.* He discussed OBR debt projections: *The OBR confirm that our national debt [...] falls in every year of the forecast from 83.7% this year; to 74.1% in 23-24*[6]. This implies that all information pertaining to the fiscal policy of the government is already out in the market when the DMO publishes its remit, therefore the only new information released at that point is a news on the exact supply of marketable public debt. From the same budget, we can see in Figure 1 that the market is avidly waiting for the DMO announcement even after the previous discussion by the Chancellor. Therefore, by taking the change in the price of futures around the DMO announcement one can measure the impact of the news on public debt supply, independent of fiscal policy. The mapping from the information relevant for debt sustainability as the deficit and debt over GDP to marketable public debt supply is not one to one as the government has access to non-marketable public debt and the debt supply needs can reflect cash needs of the government which do not affect debt sustainability.

Both the news released during the budget speech and the DMO announcement seem to move the market for long Gilts futures. We can take four examples in Figures 2, 3, 4, and 5. In these figures, the first line is the start of the budget speech and the shaded areas is where I compute the change in price around when the budget speech ends and the DMO publishes its remit. In Figure 2, we can see large price movements and high trading values both during the Chancellor speech seems to have moved the market with price changes and at the DMO announcement. However, we can also cases when the DMO announcement had stronger price effects (Figure 3), when neither had effects (Figure 4), and when the budget speech had stronger effects (Figure 5).

2 Data

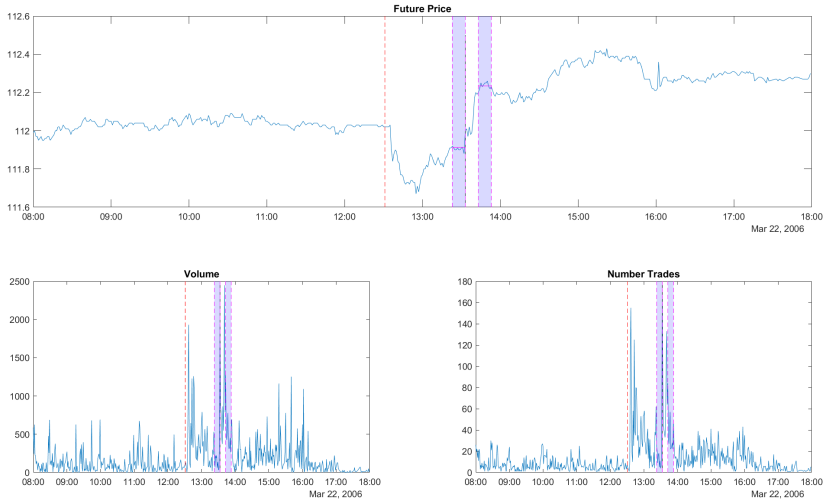
I collect the data on the DMO remit from the DMO website. For each event, I collect the day of publishing, the type of event, and the revised amount of public debt supply for the

[6]The full text can be found at https://www.gov.uk/government/speeches/budget-2018-philip-hammonds-speech.

Figure 1: Live News Coverage of the 29 October 2018 Budget

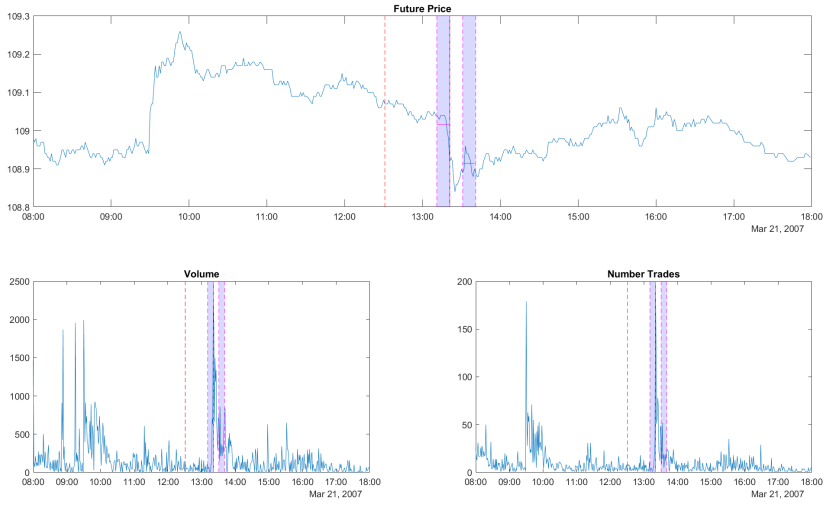
Notes: Screenshot of the Bloomberg live news coverage of the 29 October 2018 Budget. News at the top of the screen are the most recent ones. The DMO publishes the update of the Gilt remit immediately after the Chancellor ends the budget speech and sits at the bench.

Figure 2: Long Gilt Future Price during 22 March 2006 Budget.



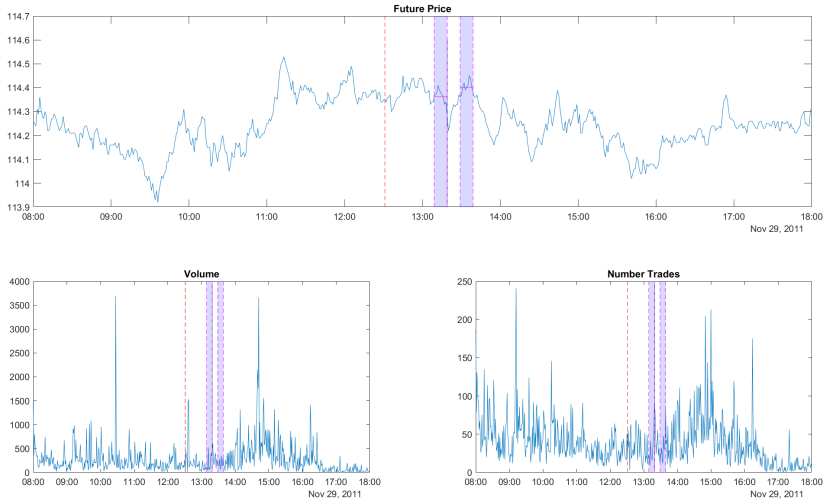
Notes: The upper panel plots the future price, the lower left panel plots the volume of trading, and the lower right panel plots the number of trades. The data is at minute frequency. The earliest red line displays the start of the budget speech. The earliest purple shaded area displays the 10 minutes before the DMO announcement and the second purple shaded area displays a 10 minutes window starting 10 minutes after the DMO announcement.

Figure 3: Long Gilt Future Price during 21 March 2007 Budget.



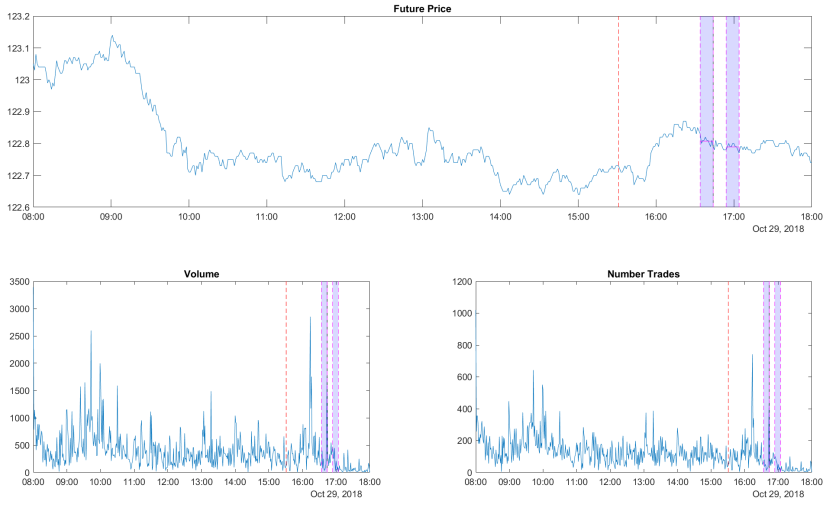
Notes: The upper panel plots the future price, the lower left panel plots the volume of trading, and the lower right panel plots the number of trades. The data is at minute frequency. The earliest red line displays the start of the budget speech. The earliest purple shaded area displays the 10 minutes before the DMO announcement and the second purple shaded area displays a 10 minutes window starting 10 minutes after the DMO announcement.

Figure 4: Long Gilt Future Price during 29 November 2011 Budget.



Notes: The upper panel plots the future price, the lower left panel plots the volume of trading, and the lower right panel plots the number of trades. The data is at minute frequency. The earliest red line displays the start of the budget speech. The earliest purple shaded area displays the 10 minutes before the DMO announcement and the second purple shaded area displays a 10 minutes window starting 10 minutes after the DMO announcement.

Figure 5: Long Gilt Future Price during 29 October 2018 Budget.



Notes: The upper panel plots the future price, the lower left panel plots the volume of trading, and the lower right panel plots the number of trades. The data is at minute frequency. The earliest red line displays the start of the budget speech. The earliest purple shaded area displays the 10 minutes before the DMO announcement and the second purple shaded area displays a 10 minutes window starting 10 minutes after the DMO announcement.

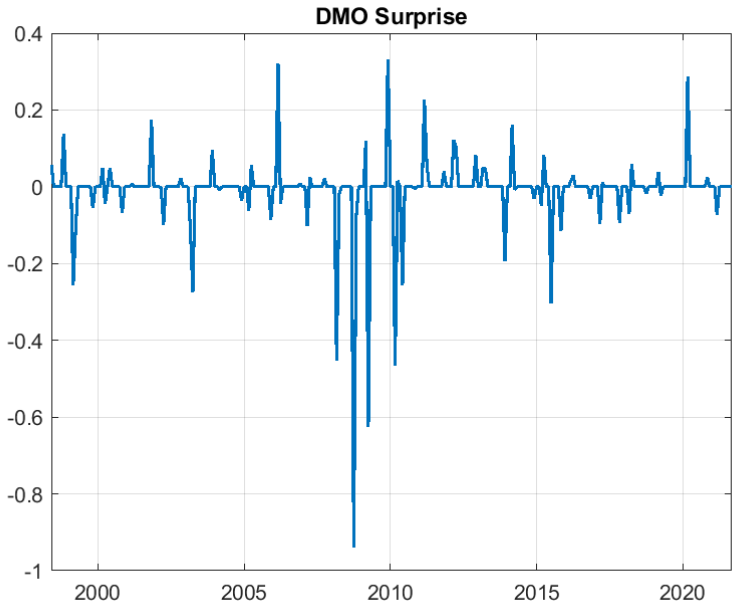
current fiscal year, with the March document having data both on the current and next fiscal year, and the April document having data on the last and current fiscal year. The DMO publishes also a split of supply by type of instrument: Gilts and T-bills, and among Gilts the supply of short (1 to 7 years), medium (7 to 15 years), and long (more than 15 years) nominal bonds and the supply of inflation linked bonds. The DMO reports only the day of the document publications, but does not report the exact minute. For this reason, I gathered this data from Factiva, Bloomberg, and Hansard for budget events: on each I check the news on the DMO remit in either of these news providers and I took the first available one.

The intra-day future data comes from the Tick History database from Refinitiv on the Long Gilt Future, traded on the Intercontinental Exchange (ICE). The data is minute by minute and I use the last price. The definition of long Gilt differs from the DMO one: this contract has as underlying assets Gilts with maturities between 8 years and 9 months and 13 years. Each year there are usually four delivery months, when the future can be exchanged with the underlying asset at any point during the month: March, June, September, and December. This future, differently from futures on oil or Fed Funds, is usually liquid only on the closest contract, besides a few days before the start of the delivery month. As an example the September contact will be liquid from the second half of May to the second half of August. Given this structure, for each event day I pick the most traded future contract, which is always close to the delivery date. Additionally, I employ the Short Sterling Future, and the FTSE100 Future constructed with the same methodology.

For the identification strategy employed in this paper it is crucial to use a short window, to capture only information contained in the DMO announcement, and not on the budget speech. For this reason I use a 30 minutes window. In my main specification, I compute the measure as the change in price between the average price 10 minutes preceding the DMO announcement and the average price for 10 minutes after 10 minutes from the announcement. This can be seen graphically in Figure 2, 3, 4, and 5. I experimented with other window measures but the results are not sensitive to the window specification.

A positive surprise corresponds to an unexpected increase in the price of the future, so to a decrease in the yield of the underlying bonds. For the daily regressions I take the value of the surprise on that day and for monthly regressions I sum all surprises in each month, as shown in Figure 6.

Figure 6: Monthly DMO Surprises.



Notes: The figure plots the monthly surprise for the Long Gilt Future. It sums over all the surprises in a month. A negative value is associated with an increase in interest rates.

Notice the future price change can be used as an instrument for the change in Gilts supply from the last remit, as the first is independent of fiscal policy news. This second measure cannot be used in the identification of the debt supply shocks as it does not incorporate changes in the fiscal stance and in expectations: if the government announces a debt-financed fiscal expansion during the budget the remit will have an increase in the supply of Gilts, but the future price should react during the speech, not after when the DMO publishes its report. On average increases in the remit Gilts supply are negatively correlated with the changes in the future price, the coefficient is $-.0082227$, meaning that a 100 billions increase in public debt decreases the price of the future by 0.8[7]. The correlation is statistically significant, with a robust t-statistic of this regression in 2.87. Notice that the R^2 is equal to 0.22, if it had been too high, it would have been worrying about the identification as substantial information to predict the changes in public debt is already present in the market, from the Chancellor speech and current macroeconomic forecasts.

[7]The future price is not interpretable per se as it is based on a notional bond whose coupon can vary in time, but it has been on average around 115 from 1998 to 2015 and it has swung from 105 to 130.