

Effect of the Unemployment Report on Interest Rate Futures

1 Introduction

The interest rate markets, much more than equity markets, are driven by information releases. At regular intervals, various government and private agencies release a large variety of macroeconomic indicators, from Change in Nonfarm Payrolls & Unemployment Rate (Figure 1) to ISM Manufacturing Indices, FOMC statements and minutes, CPI data as well as Treasury Auctions. Macro releases impact the interest rates market similarly to how earnings impact the equities market. QB tracks 62 distinct events, and we calibrate our volume forecasts to the effect of each individual macroeconomic data release. Because the data releases are precisely scheduled, market participants can gear up in anticipation of the announcement and react to it, which results in fascinating intraday patterns in liquidity and price formation (Figure 1).

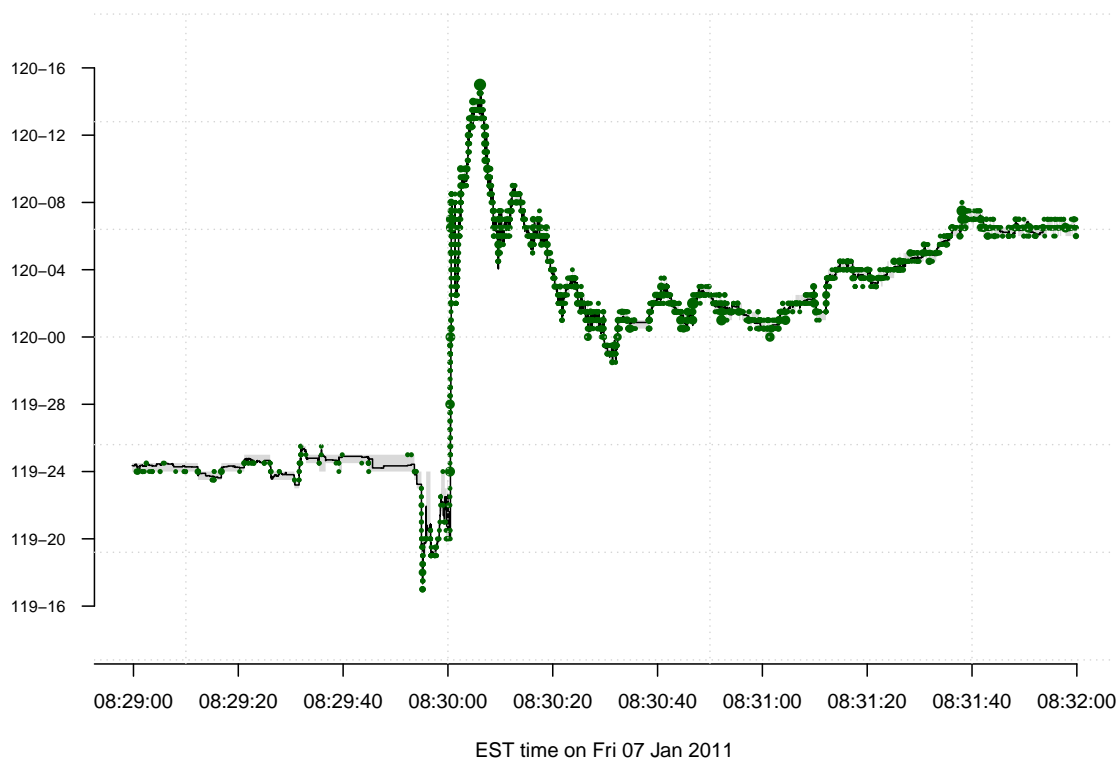


Figure 1: January 2011 Change in Nonfarm Payrolls Report - Reaction of the 10Y Treasury Future around the 08:30 ET report release. Prior to the release, there is very little posted volume and trading activity - the 10Y Treasury note moves 24 32nds within 15 seconds in response to the payroll number as liquidity gradually starts recovering

In this white-paper, we present a sample case study of the Interest Rate Futures market's



reaction to the much-anticipated monthly release of the Change in Nonfarm Payrolls Report and the Unemployment Rate by the BLS. More importantly, we analyze the importance of measuring data release specific microstructure features and why it is critical to incorporate these features into optimal execution strategies while trading through economic data releases.

2 Change in Nonfarm Payrolls & Unemployment Rate

The Bureau of Labor Statistics (BLS) publishes the report on national employment on the first Friday of each month at 08:30 ET. It is a critical report utilized by participants in various markets to determine the state of the economy - it's especially important to the interest rate market because of the Federal Reserve's dual-mandate of keeping maximum employment and price stability and the direct effects of the Fed open-market operations and rate setting on the bond market.

In order to study the market's pre- and post- reaction the release of this data, we utilized depth of market data from the CME Interest Rate Futures Complex i.e. Eurodollar, ZF (5Y), ZN (10Y), and ZB (30Y). Our data spans all Change in Nonfarm Payrolls reports from January 2009 to May 2011 - additionally, for a control group, we analyze the market activity at 08:30 ET on days where there was no scheduled economic data release to ensure that we are not drawing conclusions based on some (intra-day) seasonal pattern around the specific time window.

2.1 Gearing up & Reacting to the Event

We start off by analyzing what happens to the posted liquidity (inside bid + inside ask) pre and post the release of the employment report at 08:30 ET (Figure 2). Across instruments, the start of the (near exponential) withdrawal of liquidity from the market begins 15 minutes prior to the data release; for example, liquidity in Eurodollar futures drops from approximately 5000 contracts 15 minutes prior to the release to 750 contracts available 1 minute prior to the release - almost a 10X drop in available liquidity. Given that the contents of the data release are unknown, market participants curtail their exposure by withdrawing from the order-book. However, once the data is in the public domain and market participants have interpreted its effect, posted liquidity is gradually replenished (it takes up to a full 60 minutes (for Eurodollars) to reach the levels of 15 minutes prior the data release)

Similarly, Figure 3 displays the average bid-ask spread during actual Non-Farm report days. Given the large tick characteristic of the Rates Futures market, Eurodollar and Treasury futures contracts typically always trade at the minimum spread allowed during normal market conditions. Fifteen minutes prior to the event, the spread is 1 (as expected) but increases significantly in the run up of the data announcement - for example, the 5Y note future, on average, has a spread of 7 times wider on Change in Nonfarm Payrolls days than on regular days at 08:30 ET. The widening of the spread coupled with the withdrawal of posted liquidity prior to the event shows the extent of risk aversion exhibited by participants, and highlights the volatile and unexpected nature of the Change in Nonfarm Payrolls report. However, it must also be noted that the risk aversion in itself is also responsible for exacerbating the volatile price motion after the event since any subsequent trading will occur at wider spreads and against thinner liquidity.

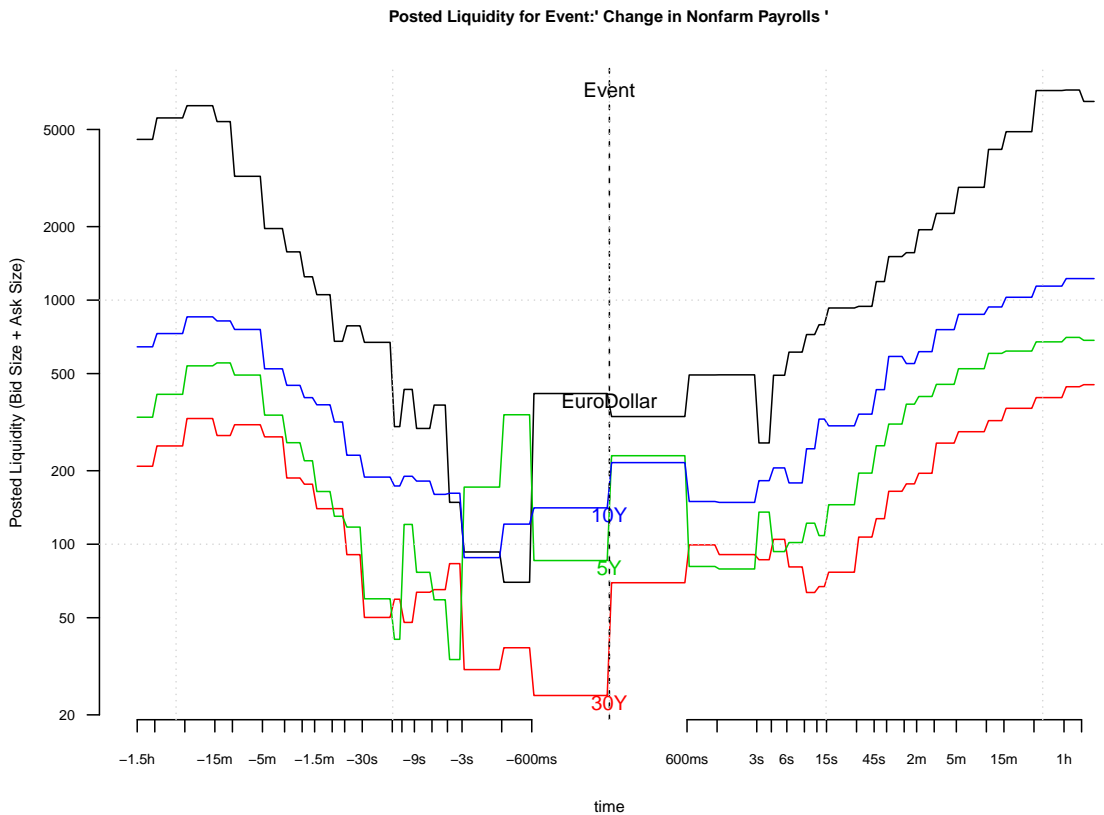


Figure 2: Average Posted Liquidity Profile. Liquidity is measured as the average bid + ask sizes at trade times (displayed on log scale).

Figure 4 displays the ratio of traded volume during Non-Farm report days vs. the control group days (non-event days). Prior to the release of data, traded volume reduces substantially as market participants focus on the event. This is natural given that liquidity is withdrawn and spreads are widened by market makers - as such, participants are less inclined to trade. However, once the data is released, the ratio of traded volume increases to approximately 4-5 times the typical traded volume within 600 ms. The traded volume ratio (which is 4-5x higher) is persistently high for the subsequent 2 minutes and slowly starts decaying towards normal levels.

3 Implications for Execution Strategies

In summary, in anticipation and in response to the monthly Change in Nonfarm Payrolls report, the interest rate futures market makes striking adjustments to the available liquidity, bid-ask spread and traded volume, and as a result, there is increased volatility just after the event as participants start trading. Without knowledge of these data release specific details, any benchmark execution strategy working in the market during an economic data release is at a clear disadvantage of excessive trading prior to the release and/or trading at extremely wide spreads just because of scheduling constraints and as result, missing its

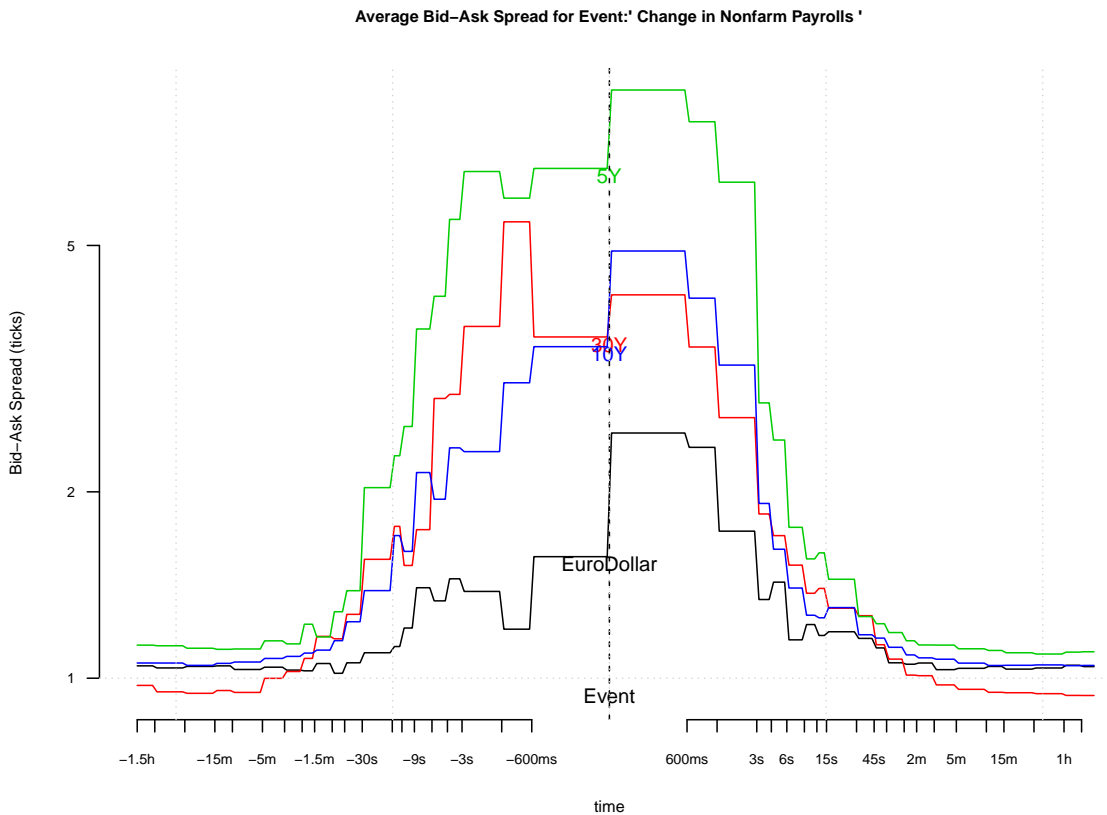


Figure 3: Bid-Ask Spread Profile. Spread is measured as the average difference between the bid and ask at trade times, excluding any cases where the market may be locked or crossed (displayed on log scale) Note: 30Y contract spread changed in August 2009 from 1/2 of 32nd to a full 32nd

benchmark because of the unexpected trading patterns and volatility.

The whole suite of QB's Execution Strategies incorporates macroeconomic data release specific features (some of which are outlined above) in such a way that the strategies are prevented from trading at unfavorable times and prices while minimizing slippage to the respective benchmarks. For instance, when trading through a Change in Nonfarm Payrolls economic data release, QB's STROBE strategy will attempt to be on the target trajectory prior to the data release, well before the spread is anticipated to widen (since there is generally very little price activity even before the spreads start to widen). In addition, Strobe will wait for the market to digest the release before re-entering the market (calibrated for each economic data release category).

In a future white-paper, we will detail the reduction in slippage achieved as a result of incorporating economic data release specific intelligence into our strategies.

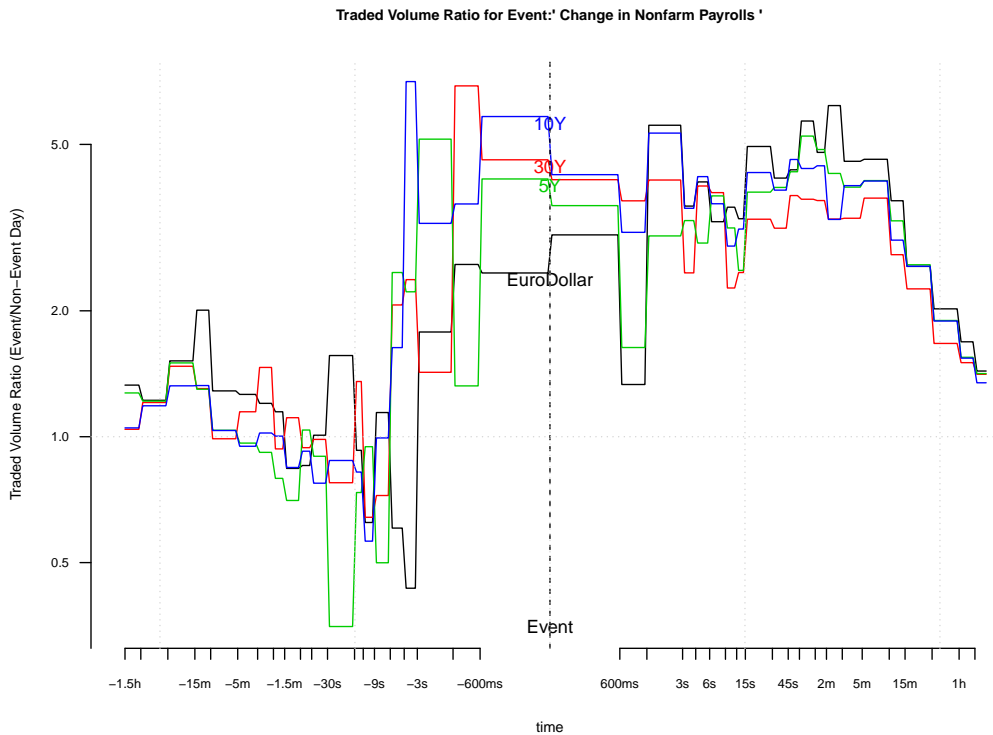


Figure 4: Traded Volume Profile. Displays Traded Volume Ratio (Event/Non Event Days) as a function of time. As the event approaches, the rate of trading picks up as market participants try to position their portfolios inline with the implications of the data release

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This document contains examples of hypothetical performance. Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program.

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