

EC372 Economics of Bond and Derivatives Markets**Bond Auctions and Bond Futures:
Anomaly or Normal Backwardation?****1. Description**

This note explores a phenomenon observed in some bond futures markets shortly before and after governments' bond auctions. In the auctions, *primary dealers* submit bids for bonds.¹ A government agency then allocates the newly issued bonds among the primary dealers, who then sell them to their clients or in the open, secondary, market or add some to their own portfolios.

Primary dealers face a variety risks, including (a) demand for the bonds among clients and in the secondary market, which affects the price at which the dealer can sell bonds obtained in the auction; (b) mismatch between the number of bonds bid for and the number allocated; (c) the actual price paid for the bonds at the auction. Inasmuch as primary dealers seek to hedge the risk of not knowing, when their auction bids are submitted, the price that the bonds they are allocated will fetch when they are sold-on, *short* hedging strategies in bond futures are appropriate.

Abstracting from inessential details, the steps are as follows:

- (i) Before an auction takes place, the primary dealer sells bond futures contracts, i.e. undertakes to deliver bonds specified in the futures contract at the date stipulated in the contract in return for the contract price.²
- (ii) The dealer receives an allocation of bonds in the auction and proceeds to sell them in the open market or to its clients.
- (iii) At much the same time as the bonds are sold, the hedge is 'lifted', i.e., the contracts that have been sold are offset by purchases of equivalent contracts.³

The hedge works in the usual way: if demand is weak in the secondary market, the bond price will be low; the futures contract price will also be low (reflecting the arbitrage principle) so that short-hedgers gain when the contracts that were previously sold are offset (purchased). Thus the gain on futures contracts mitigates, or even outweighs, losses from selling the bonds.

Conversely (as with all hedges) a loss will be made on the futures contracts if, when the hedge is lifted, the futures price is higher than when the futures contracts were sold to establish the hedge. But in this case, the high futures price reflects a high bond price in the secondary market (again, the arbitrage principle is at work) so that the bonds allocated in the auction can be sold at a high price. Thus the loss on the hedge is mitigated, or even outweighed, by a gain on the bonds acquired in the auction at a lower price than for which they are subsequently sold.

Primary brokers still bear some risks, no matter how successful their hedges. But this is not the point of this note, which is rather *that bond futures prices tend to fall before bond auctions and rise shortly afterwards*. This phenomenon is commonly attributed to actions of primary dealers: their futures sales before the auction drive prices down; subsequent lifting of the hedges drives futures prices back up.

Other investors (e.g. hedge funds and banks) seek to exploit the phenomenon by buying bond futures cheaply (before bond auctions) and selling them for a profit when the primary dealers lift their hedges, thus effectively taking the 'other side' of the futures market.

¹The institutional details are complicated but are irrelevant for this note. In most jurisdictions, only designated firms are allowed to submit bids – these are the primary brokers, in the UK formally designated as 'Gilt-Edged Market Makers' (GEMMs). In return for the privilege to make bids, the government agency (Debt Management Office in the UK) obliges primary dealers to comply with rules intended to ensure that the auction and subsequent secondary market operate in an orderly manner.

²Remember that the contract price is determined in the market for futures contracts, not the market price for the underlying bonds at the delivery date. Nor is the contract price equal to the price of the bonds at the date when the futures contracts are traded, though the arbitrage principle links the two.

³Conceivably the primary dealer could deliver bonds to fulfil the terms of the contract but this is by no means necessary and is probably rarely observed not least because the bonds allocated in the auction do match exactly bonds that it may be permissible to deliver in settlement of the futures contract. Indeed the futures contract may require 'cash settlement', so that no bonds could ever be delivered anyway.

2. Analysis

Why does the observed futures price pattern persist? That is, why don't investors' profit-seeking trades obliterate the fall, then rise, of futures prices shortly before, then shortly after, bond auctions? If they did, then futures prices would still fluctuate but randomly – the systematic pattern would vanish.

Claims have been made that the observed bond futures price pattern is an *anomaly* or represents a *market inefficiency* from which investors can benefit. What merits are there in such claims? Here are some relevant considerations in attempting an answer:

1. *Market inefficiency* (or an anomaly) in the sense that futures prices do not 'fully and correctly reflect' all available information. While this is a *possibility*, a benchmark to represent 'efficiency' is required against which to compare the observed pattern of prices.

It could be argued, as hinted above, that market efficiency implies that futures prices fluctuate randomly, with no systematic pattern. But is this benchmark plausible? Comments below suggest that it may be unwarranted to equate market efficiency with randomly fluctuating futures prices.⁴

Also, the phenomenon is hardly secret. Apparently some investment banks actively ply their clients with products claiming to profit from the observed price pattern. That you are reading about it here implies that knowledge of the phenomenon is in the public domain.

2. *Market frictions*, in the form of transaction costs or restrictions on access to the relevant markets. In the presence of such frictions it is possible that (a) net of transaction costs (e.g. commission fees) there are no profits to be made from exploiting the price pattern; and/or (b) institutional arrangements limit those who are permitted to undertake the trades needed to obtain the profits.

A practitioner in the markets comments: "What we are trading is very liquid bond futures, with few restrictions to entry and quite low transaction costs ..." While the assumption of frictionless markets is an idealisation, it is implausible to rely on frictions to account for the phenomenon.

3. *Normal backwardation*, in that the fall and subsequent rise in bond futures prices is consistent with investors' expectations. The outcome is an 'equilibrium' phenomenon in the sense that there is no incentive for investors to undertake trades that would force its disappearance. In the context of 'normal backwardation', the bond futures price observed shortly before a bond auction is below the value expected to hold after the auction.

This is not to claim that all profit opportunities have been extinguished but rather – and importantly – that strategies to profit from the phenomenon are *risky*. Again our market practitioner points out that most of the time a small positive gain can be made (by taking the opposite side of the market from primary dealers, buying futures before an auction, selling afterwards). *But* the frequency distribution of returns shows a small chance of extreme events – just occasionally (albeit rarely) the losses can be great. The profit-exploiting trades, though successful on average, are risky, potentially very risky.

Consequently – while definitive conclusions are unwarranted – the evidence is compatible with the hypothesis that the observed patterns reflect the trade-off between expected return and risk acceptable to investors in the market.

⁴Beware of claims that persistent price patterns reflect 'arbitrage opportunities' and thus market inefficiency. While arbitrage opportunities *may* exist, evidence of systematic price patterns is not sufficient to demonstrate their existence if only because strategies designed to exploit the observed patterns are *risky* – hence, do not reflect 'arbitrage' in normal understanding of the process.