EC371 Economic Analysis of Asset Prices

Short sales – introduction and commentary

A 'short sale' refers to the sale, with re-purchase at a later date, of an asset, e.g. a company's shares, that the investor does not own. In essence the asset is borrowed from its owner; the borrower (short-seller) then sells it. At a later date, sometime before the loan of the asset expires, the short-seller purchases the asset, which is then returned to its owner. As the 'asset' is typically homogeneous, what matters is that an exactly equivalent asset is returned: in the typical case when the 'asset' is a company's shares, the same number of the same company's shares are returned – whether the returned shares happen to bear the same certificate numbers as those borrowed is irrelevant.

The short-seller must almost always provide collateral for the loan, commonly in the form of a 'good faith' deposit of cash held in a margin account. At the conclusion of the short sale, when the short-seller returns the asset to its owner, the balance of the margin account is returned to the short-seller.

In the more detailed illustration below, the shares (representing the 'asset') are in the legal possession of a 'custodian', C, (who may be the shares' owner or a trustee acting on behalf of the owner). The custodian is assumed to manage the share-holding with a broker, B, (an intermediary such as a bank) which has the authority to lend the shares. The broker may then (at its discretion) lend the shares to the short-seller, investor A – which may, for example, be a hedge-fund. Figures 1 and 2 (on page 2), below, depict the two steps in a short sale.

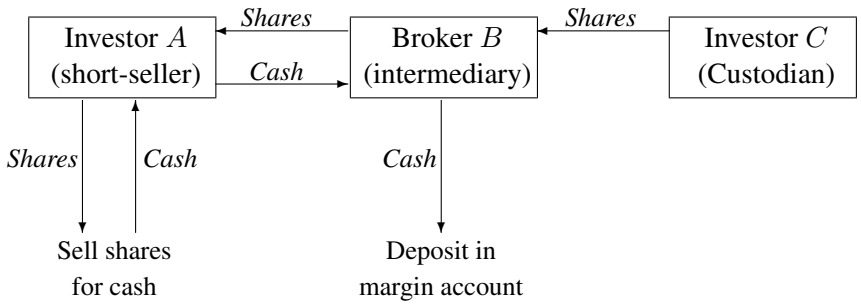

Figure 1: **The short sale commences with the sale of shares**

Investor A borrows shares from broker B (which holds them on behalf of investor C) and sells them in the open market. The proceeds from the sale, together with an additional margin, are held on deposit with the broker for the duration of the short sale.

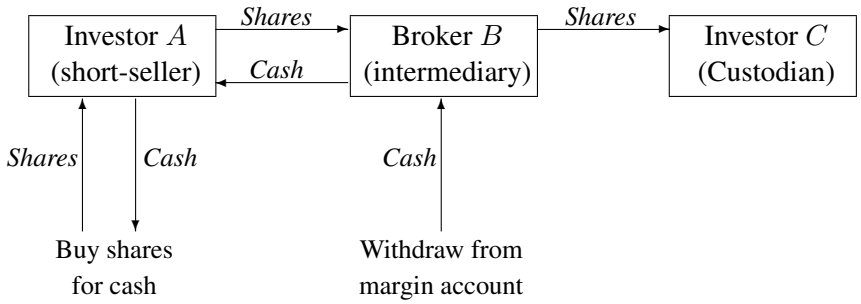

Figure 2: **The short sale is concluded with repurchase of shares**

The short-seller, investor A, repurchases the shares, which are then returned to the broker in return for the 'good faith' deposit of funds held in the margin account.

[The following passage is adapted from *Economics of Financial Markets*, pp. 14–15.]

Exchange authorities commonly place restrictions on the circumstances in which short sales are permitted. For example, the rules of an exchange might prohibit short sales at times when the asset price is falling. In the United States the Securities and Exchange Commission, SEC, permitted short sales only when the most recent recorded transaction involved a price *increase* – this is the so-called 'uptick rule', which was removed in July 2007 "in order to provide a more consistent regulatory environment . . . " (SEC ruling '17 CFR PARTS 240 and 242', 3rd July 2007).

In September 2008, the SEC, acting in concert with the UK Financial Services Authority, enacted a rule "temporarily prohibiting any person from effecting a short sale in the publicly traded securities of certain financial firms [essentially banks and other financial intermediaries], . . . " (SEC ruling 34-58592, 18th September 2008). Exchange authorities tend to justify this sort of suspension on the ground that short sales at times of falling, or stationary, prices exacerbate price volatility:

> Recent market conditions have made us concerned that short selling in the securities of a . . . range of financial institutions may be causing sudden and excessive fluctuations of the prices of such securities in such a manner so as to threaten fair and orderly markets (SEC ruling 34-58592).

The SEC lifted the prohibition in early October 2008, but further extended regulations intended to restrict naked short selling, essentially by treating the failure to deliver shares that have been short-sold as fraud.

In some circumstances short sales are permitted but only available to a restricted group of investors. For example, short sales may be allowed, as a privilege, to designated members – say, specialists or market-makers – in an exchange. Once again, the motive is probably to limit price volatility, though it also restricts freedom to compete. Also, by restricting the eligibility to undertake short sales, the scope for default or dishonesty can be restrained. At the same time, conferment of the privilege to make short sales rewards the designated exchange-members for the burdens imposed by their other responsibilities. (For example, each market-maker is normally obliged to ensure that investors can always succeed in trading shares on a list of companies for which the market-maker is responsible.)

As outlined above, even when short sales are permitted, good faith deposits are normally required to insure against performance risk. Here the potential for loss arises when the borrower purchases the asset (for return to its lender) at a price *higher* than that at which it was short sold. In this circumstance, the presence of the margin deposit serves to ensure that sufficient funds are available to enable the return of the asset to its owner, though of course the short seller incurs a loss on the transaction as a whole.

Example: Margins with Short Sales

Suppose that investor A has an agreement with broker B which allows A to make short sales of company XYZ's shares (the shares might be borrowed from B's own portfolio or from the portfolio of one of B's other clients, investor C). Now suppose that A instructs B to short sell 100 shares at a market price of \$10 each. B will hold the proceeds, \$1000 in A's margin account and will also demand an additional deposit of, say, \$400.

Sooner or later A will return the borrowed shares by instructing B to purchase 100 XYZ shares at the ruling market price. If the price has fallen below \$10, then A stands to make a profit.[1] However, if the share is purchased at a price above \$10, then A will make a loss – a loss which might be so large that an additional payment has to be made to B. Suppose that the shares are re-purchased at a price of \$16. Then A would have to pay another \$200 (plus transaction costs) to B. If A defaults, then B may incur a loss. To guard against this contingency, margin deposits are adjusted by margin calls.

With regard to short sales, the actual margin is defined by

$$\text{actual margin} = \frac{\text{collateral} - \text{loan}}{\text{loan}}$$

where now 'collateral' equals the funds held in the margin account and the 'loan' is the current market value of the shares that have been short sold.[2] In the example, the initial margin is $(1000 + 400 - 1000)/1000 = 40\%$, as required.

Consequently, in the example, if the share price rises to \$16 and the short sale remains in place, a variation margin of \$840 would restore the actual margin to its initial value, $40\% = (1400 + 840 - 1600)/1600$. (Once again, the rules for margins are prescribed by the regulatory authorities. The detailed rules differ from market to market.)

Short selling can yield high rates of return but also can be very risky. Even when short sales are permitted, the rules governing margins serve to limit the likelihood of default (performance risk) though the potential for loss (as a reflection of price risk) remains substantial.

Trigger prices for short sales are prices for which the investor (who short-sold the asset) receives a *margin call*, i.e. the range of prices for which the actual margin falls below the maintenance margin.

[1] In practice, it is necessary to allow for transaction costs such as trading commissions and possibly a fee for the loan of the shares. However, note that the funds in the margin account earn interest while on deposit: share lending is often sufficiently competitive that short-sellers are able to demand a *rebate*, i.e., a portion of the interest on the margin account deposit.

[2] More formally, let m denote the margin. Let p equal the price per share, N the number of shares short sold, and C the amount of the collateral. The value of the loan from the broker to the short-seller is equal to pN so that $m = (C - pN)/pN$, or $m = (C/pN) - 1$. Once again m varies with p. If p increases, m may fall so low that the broker demands funds from the investor to increase the collateral, C, and thus raise m.

To calculate the range of trigger prices, find the price at which the actual margin equals the maintenance margin. Then all prices *above* this level are *trigger prices* because they would trigger a margin call. In the above example, the actual margin equals

$$\text{Actual margin} = \frac{\text{Collateral} - \text{Loan}}{\text{Loan}} = \frac{1000 + 400 - 100p}{100p}$$

where p is the market price. Notice that at the transaction price, $p = 10$, so that the initial margin equals the actual margin, 40%.

Suppose that the *maintenance margin* had been set at 25% (this would be part of the contract agreed at the outset). Hence the market price, say $\widehat{p}$, at which the actual margin equals the maintenance margin is given by:

$$\text{Maintenance margin} = 0.25 = \frac{1400 - 100\widehat{p}}{100\widehat{p}} = \text{Actual margin},$$

which gives $\widehat{p} = 14/1.25 = 11.20$. Thus the range of trigger prices is $p > \$11.20$: any price above $\$11.20$, triggers a margin call for the investor to replenish funds in the margin account.

Commentary

The role of short selling in the turmoil of the 'credit crisis' has inspired widespread debate, especially from commentators outside the financial sector, many of whom blame the collapse in share prices (and subsequent demise) of some companies on the practice: short-sellers exacerbate falling share prices, driving companies into extinction. The views of the archbishops of Canterbury and York have attracted particular attention in the media.

In reflecting the debate, the *Financial Times* reported:

> The Church of England faced charges of hypocrisy yesterday over its leaders' attack on short selling and debt trading after hedge funds pointed out that it uses some of the same practices when investing its own assets.
>
> Rowan Williams, archbishop of Canterbury and head of the Anglican Church, said it was right to ban short selling, while John Sentamu, archbishop of York, called traders who cashed in on falling prices "bank robbers and asset strippers".
>
> Hedge funds pointed to the willingness of the church commissioners to lend foreign stock from their £5.5bn ($10.2bn) of investments – an essential support for short selling – and derided the pair for not understanding shorting. "They are trying to shoot the messenger and ... deflecting attention away from the dramatic incompetence of bank executives," said Hugh Hendry, of hedge fund Eclectica Asset Management. "Short selling is the pursuit of truth."
> (*Financial Times*, September 26, 2008.)

In summary: beware of inferring causation from correlation. The observation that short selling precedes a fall in an asset's price, does not necessarily mean that the short sales *caused* the price fall.

It is sometimes overlooked that short selling is not the only avenue available to investors who believe that an asset's price will fall. Certain derivatives strategies (e.g. writing call options, purchasing put options or acquiring Credit Default Swaps) are also ways that in-

vestors can seek to gain from beliefs that the price of an asset will fall.[3] But these strategies may not be open to some investors, or may be more costly to execute than short selling. As one practitioner asks rhetorically: "Should they [the authorities] not also stop the above option strategies?" (Be careful before you answer.)

The Economist comments:

> As a matter of justice, the constraints on short-sellers, who bet that share prices will fall, are cruel. Some bears played a big role in uncovering the folly that banks were engaged in. Nor does it seem likely that their trades distorted prices. In the week before AIG's rescue the net increase in its stock on loan (and thus available to be sold short) represented only 5% of trading activity, ... Even on grounds of expediency the actions are questionable. Some financial shares covered by the ban have since plummeted.
>
> In addition to their unconvincing experiment with short selling, regulators have turned on credit-default swaps (CDS), contracts which insure against default. Some intervention is certainly needed to limit the systemic risk posed by this largely unregulated, over-the-counter market. ...
>
> Yet there will also be a cost. Already absurd situations have arisen: somehow IBM, a technology company, has managed to get on the list of stocks protected from shorting. In the long run short-sellers, who improve liquidity and price discovery, will be wary of trading the shares of politically important industries. In America, one bear complains, it is now "capitalism on the way up, and socialism on the way down".
> (*The Economist*, September 27th 2008, "Shoot first", pp. 98–102.)

Some practitioners remain concerned, however, that financial markets may be open to manipulative practices that should be regulated:

> ... one gets accustomed to the rumour mill circulating different desks.
>
> It has been argued that many 'shops' [dealing rooms] that were short Bear Stearns stock deliberately and callously spread vicious rumors around trading desks in the days prior to its recovery take over. This is a significant problem and needs regulatory reform. Clearly, people did spread rumors, clearly this exacerbated the collapse and clearly this should be stopped.
>
> So my feeling is greater regulatory control of rumor spreading is the answer ... [I]f you send out an email stating that 'we're hearing rumors that...' and that same rumor is potentially harmful to a security, market sensitive and/or non-public and material in nature if it is true, you should be able to point the reader to the source and/or justify its logic.
>
> Therefore, one way to clamp down on those who spread rumors is to filter through dealers' emails and see who said what and if someone stated a rumor without a source that person should be accountable.
>
> All phone calls and all emails are recorded. So what's the difficulty? The disincentive would be clear. Generally everyone on the Street is very mindful of ethics and their own reputation so I am not convinced greater controls, enforements, and punishments would not serve as an appropriate deterrent.
>
> That said, its such a pity that increased regulations have to be the answer. The industry is already awash with regulatory restrictions ...
> (Private correspondence with an Essex graduate who has more than a decade's experience working in the New York financial sector.)

[3] Derivatives markets are studied in EC372, Economics of Bond and Derivatives Markets.

In summary: banning short sales may represent an attempt to address a problem by suppressing one of its symptoms, while neglecting deeper causes. Perhaps regulations intended to punish market manipulation are needed but these may be difficult to justify as infringements of freedom of speech and difficult to enforce even when justified (often when the damage has been done).

A squeeze of Volkswagen short sellers

The announcement by Porsche (automobile manufacturing company) in October 2008 that it controlled 74.1% of Volkswagen's stock in a bid to take over the company illustrates the hazards of short selling. Allowing for other shares that were not readily available to trade, estimates suggest that at the time there was a 'float' of only about 6% of Volkswagen stock freely available to trade. Investors who had short sold Volkswagen shares scrambled to acquire shares in order to fulfil their contractual obligations (i.e., return borrowed shares).

Figure 3 shows clearly the spike in Volkswagen share prices. Porsche's announcement was made on Sunday 26th October. After closing at €210.85 the previous Friday, Volkswagen's share price peaked at €1005.01 before closing at €945 on Tuesday 28th. Porsche's action the following day in releasing of some of its Volkswagen shares helped to mitigate the short-seller's difficulties.

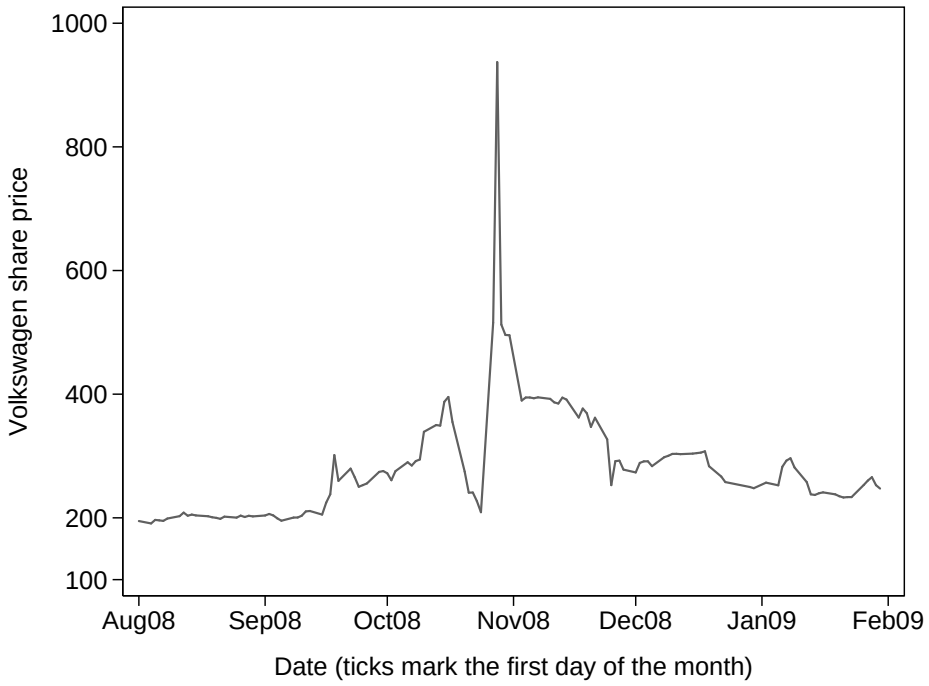

Figure 3: **Volkswagen short squeeze, October 2008**

Despite allegations of market manipulation and insider trading Porsche, a later investigation cleared Porsche of any wrongdoing. It looks as if short-sellers were caught out.[4]

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[4]Notice the dip in prices – for which short selling may have been at least partly responsible – in the week preceding the spike.