

SETTLEMENT/PAYMENTS RISK

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Abstract: Settlement/ payments risk is created if one party to a deal pays money or delivers assets before receiving its own cash or assets, thereby exposing it to potential loss. Settlement risk can include credit risk if one party fails to settle, i.e. reneges on the contract, and liquidity risk - a bank may not be able to settle a transaction if it becomes illiquid.

A more specialized term for settlement risk is Herstatt risk, named after the German bank which collapsed in 1974 as a result of large foreign exchange losses. The reason settlement risk is closely linked to foreign exchange a market is because different time zones may create a gap in the timing of payments. Settlement of foreign exchange transaction requires a cash transfer from the account of one bank to that of another through the central banks of the currencies involved. Bankhaus Herstatt bought Deutschmarks from 12 US banks, with settlement due on 26th June. On the 26th, the American banks ordered their corresponding German banks to debit their German accounts and deposit the DMs in the Landesbank (the regional bank was acting as a clearing house). The American banks expected to be repaid in dollars, but Herstatt was declared bankrupt at 4 p.m. German time - after the German market was closed but before the American market had closed, because of the 6-hour time difference. The Landesbank had already paid DMs 10 Bankhaus Herstatt, but the US banks had not received their dollars. The exposed US banks were faced with a liquidity crisis, which came close to triggering a collapse of the American payments system.

Settlement risk is a problem in other markets, especially the interbank markets because the volume of interbank payments is extremely high. For example, it can take just 10 days to turn over the annual value of the GNP of a major OECD country - in the UK, it is roughly £1- £1.6 trillion. With such large volumes, banks settle amounts far in excess of their capital. Netting is one way of reducing payments risk, by allowing a bank to make a single net payment to a regulated counterparty, instead of a series of gross payments partly offset by payments in the other direction. It results in much lower volumes (because less money flow-through the payments and settlement systems), thereby reducing the absolute level of risk in the banking system. Netting is common among domestic payments systems in industrialized countries. At the end of each day, the central bank requires each bank to settle its net obligations, after canceling credits and debits due on a given day. If the interbank transaction is intraday, the exposure will not appear on a bank's balance sheet, which is an added risk.

However, settlement risk is still present because the netting is multilateral. The payments are interbank, and banks will not know the aggregate exposure of another bank. Any problem with one bank can have domino effect. If one bank fails to meet its obligations, other banks along the line are affected, even though they have an indirect connection with the failing bank, the counterparty of exchange. Given the large volume of transactions in relation to the capital set aside by each bank, the central bank will be concerned about systemic risk - the failure to meet obligations by one bank triggers system-wide failures. Most central bank/regulators deal with this problem through a variety of measures, capping multilateral exposures, requiring collateral, passing the necessary legislation to make bilateral and multilateral netting legally enforceable, or imposing penalty rates on banks which approach the central bank late in the day.

Market or price risk

The modern theory of portfolio management has been developed by Sharpe (1964), Lintner (1965), and Markowitz (1952). As such, it is of course interesting for banks, which often hold large portfolios of marketable assets. More importantly, this portfolio theory has also led to another paradigm for banking behavior, essentially developed by Pyle (1971) and Hart and Jaffee (1974).

The idea is to assimilate all assets and liabilities of the bank into securities of a particular sort, and to consider the whole bank itself as an enormous portfolio of these securities. In this approach, the only specificity of the bank's liabilities is that they correspond to short positions in the bank's portfolio.

- *General or systematic market risk* is caused by a movement in the prices of all market instruments because of, for example, a change in economic policy.
- *Unsystematic or specific market risk* arises in situations where the price of one instrument moves out of line with other similar instruments, because of an event (or events) related to the issuer of the instrument.
- A bank can be exposed to market risk (general or specific) in relation to:
 - *Equity*
 - *Commodities* (e.g. cocoa, wheat, oil)
 - *Currencies* (e.g. the price of sterling appreciates against the euro)
 - *Debt securities* (fixed and floating rate debt instruments, such as bonds)
 - *Debt derivatives* (forward rate agreements, futures and options on debt instruments, interest rate and cross-currency swaps, and forward foreign exchange positions)
 - *Equity derivatives* (equity swaps, futures and options on equity indices, options on futures, warrants)

Thus, market risk includes a very large subset of other risks. Two major types of risks are currency and interest rate risk. If exchange rates are flexible, any net short or long open position in a given currency will expose the bank to *foreign exchange* or *currency risk*, a form of market risk.

Interest rate risk

Interest rates are another form of price risk, because the interest rate is the "price" of money, or the opportunity cost of holding money in the narrow form. It arises due to interest rate mismatches. Banks engage in asset transformation, and their assets and liabilities differ in maturity and volume. The traditional focus of an asset-liability management group, within a bank is the management of interest rate risk, but this has expanded to include off-balance sheet items, as will be seen below.

Capital or gearing risk

Banks are more highly geared (leveraged) than other businesses individuals feel safe placing their deposits at a bank with a reputation for soundness. There are normally no sudden or random changes in the amount people wish to save or borrow, hence the banking system as a whole tends to be stable, unless depositors are given reason to believe the system is becoming unsound.

Thus, for banks, the gearing (or leverage) limit is more critical because their relatively high gearing means the threshold of tolerable risk is lower in relation to the balance sheet. This is where capital comes in: its principal function is to act as a buffer by supporting or absorbing losses. Banks which take on more risk should set aside more capital, and this is the principle behind the Basel risk assets ratio. Banks need to increase their gearing to improve their return to shareholders. To see the link, consider the equation below:

$$\text{ROE} = \text{ROA} \times (\text{gearing multiplier})$$

Where:

ROE: return on equity or net income/equity

ROA: return on assets or net income/assets

Gearing/leverage multiplier: assets/equity

Operational risk

The Bank for International Settlements defines operational risk as: "The risk of direct or indirect loss resulting from inadequate or failed internal processes people, and systems, or from external events." (BIS, 2001, p. 2 7)

The definition of operational risk varies considerably, and more important, measuring it can be even more difficult. The Basel Committee has conducted surveys of banks on operational risk Based on Basel (2003), the key types of operational risk are identified as follows:

(1) *Physical Capital*: the subsets of which are: damage to physical assets, business disruption system failure, problems with execution and delivery, and/or process management.

Technological failure dominates this category and here, the principal concern is with bank's computer systems. A crash in the computing system can destroy a bank. Most banks have a duplicate system which is backed up in real time, in a secret location, should anything go wrong with the main computer system. When banks and other financial institutions had their premises damaged or destroyed as a result of "9/11", they were able to return to business quite quickly (in alternative accommodation), relying on the back-up computer systems. More generally, the loss of physical assets, such as buildings owned, is a form of operational risk. However, banks take out insurance against the risk of fire or other catastrophes and to this extent; they have already hedged themselves against the risk. To the extent they are fully hedged, there should be no need to set aside capital. Problems with physical capital may interfere with process management and contribute to a break down in execution and/or delivery.

(2) *Human Capital*: this type of risk arises from human error, problems with employment practices or employees' health and safety, and internal fraud. An employee can accidentally enter too many (or too few) zeroes on a sell or buy order. Or a bank might find itself being fined for breach of health and safety rules, or brought before a employment tribunal accused of unfair dismissal. In addition, employees can defraud their bank, but this is discussed in a separate category below.

(3) *Legal*: the main legal risk is that of the bank being sued. It can arise as a result of the treatment of clients, the sale of products, or business practices. There are countless examples of banks being taken to court by disgruntled corporate customers, who claim they were misled by advice given to them or business products sold. Contracts with customers may be disputed. One of the most recent and costly examples of shoddy treatment of clients is the implicit admission, in 2003, by all the major investment banks that they failed to control the conflict of interest between research and investment banking divisions. In addition to fines summing up to hundreds of millions, these banks face civil law suits from angry clients who claim they acted on paid advice from research departments to invest in certain stocks, only to find there was no solid research to back the recommendations, but rather, pressure from corporate finance divisions to bid up the price of one or more shares.

(4) *Fraud*: the fraud may be internal or external to the bank. For example, the looting of his company's pension by Mr. Maxwell affected the banks because they were holding some of the assets he had stolen from the funds as collateral. Another illustration of this form of risk is the Hammersmith and Fulham Council case. This London borough had taken out interest rate swaps in the period December 1983 to February 1989. The swaps fell into two categories, one for hedging and one for speculation. With local taxpayers facing a bill of tens of millions of pounds, the House of Lords (in 1991) declared all the contracts null and void, overturning an earlier decision by the appeal court. Barclays, Chemical, the Midland, Mitsubishi Finance International and Security Pacific were the key banks left facing \$400 million in losses and \$15 million in legal fees. Examples of internal fraud include rogue trading. Nick Leeson brought down Barings with losses of \$1.5 billion, and John Rusnak was convicted of fraud at a US subsidiary of Allied Irish Bank, which cost it \$750 million.

As can be seen from the classification above, factors contributing to operational risk are not necessarily independent of each other. Internal fraud could be classified as a human capital risk. If an employee sues because of breaches in health and safety, it falls in both (the human capital and/or legal risk sub classifications). Certain payment risks may also fall into the operational risk category. For example, in 1985, a major US bank experienced computer problems which prevented it from making outgoing payments. It was forced to borrow \$20 billion from the Federal Reserve to meet these payments. Simultaneously, payments to this bank from other banks could not be made, so they flooded the interbank markets, forcing down the federal funds rate by 3.

Thus, an operational failure created settlement and liquidity risks. Or if a borrower is granted a loan based on a fraudulent loan application and subsequently defaults, it will be recorded as a loan loss, and therefore, a credit risk issue, even though the fraud was the original source of the problem.

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