



EUROPEAN CENTRAL BANK

EUROSYSTEM

SETTLEMENT FAILS – REPORT ON SECURITIES SETTLEMENT SYSTEMS (SSS) MEASURES TO ENSURE TIMELY SETTLEMENT

INTRODUCTION

Understanding settlement fails serves the interest of central banks with respect to their oversight competence for payment systems, securities settlement systems (SSSs) and central counterparties (CCPs).

This publication draws on Eurosystem expertise on the topic, and on a survey about measures to enhance settlement efficiency (already) adopted by SSSs in the European Union. This publication is meant as an informative brochure:

- i) to provide background information about fails, their possible causes and what the consequences are for the parties involved (Section 1), and
- ii) to describe the main measures actually in place to prevent, discourage and mitigate the effect of fails (Sections 3, 4 and 5).

Section 2 addresses various aspects related to the level and duration of settlement fails. In this respect, it is emphasised that currently no uniform methodology and data availability for the experience of EU SSSs with respect to settlement fails exists, which makes it difficult to draw meaningful conclusions that are comparable amongst the European SSSs.

I BACKGROUND INFORMATION

I.1 DEFINITION OF FAILS

A trade is said to fail if on the settlement date either the seller does not deliver the securities in due time or the buyer does not deliver funds in the appropriate form. In the

context of securities settlement, the term fail is often employed to refer to the non-delivery of securities (in both free-of-payment (FOP) and delivery-versus-payment (DVP) cases), although with the adoption of DVP settlement mechanisms, fails can also derive from the non-settlement of the cash leg of the transaction. One reason why securities fails may be more difficult to resolve than cash fails is that, by nature, cash is fungible, and the party failing to deliver the cash leg may rely on credit facilities (including central bank credit), while securities need to be delivered in the specific agreed type (ISIN code), which in some cases may not be easily available in the market for purchase or borrowing. Cash fails, however, are outside the scope of this note.

A fail becomes “aged” when its settlement exceeds the agreed time period following the original settlement date (the length of this period usually varies across SSSs). Aged fails are often subject to specific measures aimed at protecting the settlement process (see Box 3 – Measures to mitigate the effects of failed settlement).

I.2 CONSEQUENCES

Settlement fails may imply three main consequences:

First, the parties involved continue to be exposed to credit risk (in FOP transactions)¹ or replacement cost risk (in DVP transactions).

¹ It should be noted, however, that FOP transactions are often used for re-alignment movements, coupon presentations, or simply for account-to-account transfers of the same entity, in which case there is no credit risk.

Second, both parties are exposed to liquidity risk on the settlement date; the seller because of lack of the expected cash and the buyer because of the inability to use the expected incoming assets to settle back-to-back transactions due on the same day. If the fail is not promptly resolved, settlement problems may propagate to other transactions, and potentially trigger a disturbance of the smooth settlement process. This is particularly relevant, for example, to positions of CCPs.

While a relatively low rate of fails can be considered “physiological”, high settlement fail rates may result in “daisy chains” (a cascading chain of fails), which may degenerate into a “round robin” (where the last participant in the chain is itself failing to the first participant), leading to gridlock situations. Under extreme circumstances, the whole settlement process may be seriously affected or impaired, unless corrective measures are taken to break the chain of fails.

In this regard, it should be noted that the consequences of fails may vary depending on the securities settlement model adopted, in particular the kind of DVP model.² For instance, in DVP model 1 – in which both legs are settled on a gross basis – a delivery fail blocks only the trade legs involved (although this may in turn cause consequential fails if the trading parties have made commitments to re-deliver the incoming assets). There would be no impact on the settlement of trades in which none of the parties to the original failed trade were involved. By contrast, in DVP model 3 – in which both legs are settled on a net basis – a securities fail may impede the settlement of a whole settlement batch, so parties with no direct involvement in the failed trade could also be adversely affected.

Third, the securities lending markets for the securities subject to the significant volume of fails could also be negatively affected, as lenders may withhold securities in the fear that the high fails in that security might diminish the likelihood of the assets being returned to

them, and this could negatively affect collateral markets. This withholding of scarce securities could in turn contribute to increasing the fail rate and prolonging the fail duration, and so the behaviour may become self-fulfilling.

1.3 DETERMINANTS OF FAILS

Fails may be determined by various circumstances:

- 1) **Operational risk:** This usually arises due to un-matched instructions sent by participants (e.g. miscommunication between traders or mistakes in processing by back offices), whereby automated systems will reject the instructions, hence impeding settlement completion on the settlement date. More serious computer problems which impede the accurate or timely processing of instructions also give rise to operational risk, the effects of which range from very limited (occasional, short-lived fails) to more serious, systemic disruptions (e.g. the Bank of New York computer breakdown in 1985, which forced the bank to borrow more than USD 20 billion from the Federal Reserve Bank of New York, or the terrorist attacks in the United States on 11 September 2001, which caused massive disruptions).
- 2) **Liquidity problems:** unavailability of the assets due for delivery. This may be the result of:
 - Cascading fails (daisy chains).
 - Technical conditions in other market segments. For instance, in correspondence with the deadlines for delivery in derivatives (particularly futures) markets, particularly in cases where many players opt for physical delivery, there could be shortage of underlying securities in the cash securities market.

² For a description of the various DVP models, see BIS, *Delivery versus payment in securities settlement systems*, September 1992.

- Short selling where the short-seller has not managed to buy or borrow the securities in time for delivery to the buyer (this is sometimes referred to as “naked short selling”). Short selling *per se* is not necessarily an illegitimate trading practice. For instance, *bona fide* short sales by broker/dealers that are market makers in a certain security help to provide liquidity quickly in fast moving market conditions. However, abusive short selling practices are normally illegal (for example, a series of short sales in order to create actual or apparent active trading in a security, or to manipulate its price).

The parties failing to deliver due to a liquidity problem normally try to get credit (for the cash side), or to borrow the securities due for delivery. In some cases the specific securities due for delivery may be difficult or very expensive to borrow (e.g. thin market, illiquid stocks).

3) **Lack of incentive to avoid fails:** The cost of failing to deliver is, typically, by market practice, “use of funds” compensation, which is paid by the seller to the buyer and corresponds to the interest rate on overnight deposits for each day of delayed delivery. When the cost of borrowing the assets is equal to or higher than the cost of failing to deliver, market participants may lack the incentive to take corrective measures to avoid fails, and may even find it preferable to fail. For instance:

- For the US government bond market, it has been shown that periods when security borrowing costs are persistently near the general collateral rate (which is closely related to the overnight funds market rate) tend to be characterised by persistently high fails.³
- The interests of back offices (to ensure early and smooth settlement) may diverge from those of the dealers (to save

liquidity), and this may also be affected by banks’ internal budget/cost allocation policies to the various departments.

- Fails may also result from arbitrage strategies implemented in equity markets where the same securities are traded but settled with different settlement cycles. In this case, the securities delivery may fail, but, as long as only retail business is involved, banks may not have strong incentives to adopt corrective measures owing to the low absolute value of the fail costs involved.

2 TIMELY SETTLEMENT IN EU SSSs

2.1 THE GENERAL CONTEXT OF SECURITIES SETTLEMENT

Settlement procedures, rules and/or systems may vary depending on the securities market segment served and on whether a CCP intervenes in the clearing process (in which case instructions are sent by the CCP). For instance, on-exchange transaction instructions are normally submitted automatically to the SSS for clearing and settlement, are often already (pre)matched and are often submitted for batch (net) settlement (DVP model 3 or sometimes DVP model 2, although some systems settle using DVP model 1). By contrast, OTC transactions tend to be matched in the SSS environment and submitted for settlement in gross settlement procedures (DVP model 1), or the parties can choose the settlement modality.

Settlement cycles tend to be shorter for bonds (between T+0 and T+2) than for equities (normally T+3), and tend to be fixed for on-exchange transactions and more flexible for OTC trades (where the parties are free to choose the settlement date).

³ See Fleming, M.J. and Garbade, K.D., “Explaining settlement fails”, *Current issues in Economics and Finance*, Vol. 11, No 9, Federal Reserve Bank of New York, 2005.

2.2 THE LEVEL AND DURATION OF FAILS

2.2.1 FAILS MONITORING AND REPORTING

Monitoring and reporting fails varies across EU SSSs both in terms of frequency and in terms of the applicable disclosure policy in each jurisdiction.

Automatic monitoring and reporting procedures are usually in place, especially where the business volumes clearly justify the implementation of such infrastructures. Nevertheless, more recently established systems also have the required controls in place, even though the business activity is more limited.

Approaches also differ with regard to reporting and information sharing about the results of fails monitoring. In some cases reporting on fails is discussed during *regular meetings with market participants*. In addition, *ad hoc studies* may be conducted and subsequently discussed with the market in view of possible changes to the rules or procedures of the actors involved (e.g. SSSs, clearing members acting as custodian banks, national banking associations, NCBs, etc).

The disclosure policy on fails varies across the EU in terms of which authority receives the reports and how often. In some cases NCBs, the securities regulators and/or the boards of the SSSs are the recipients of fails reports, while in other cases only the individual participants concerned or the user groups are informed of such failures. In a limited number of cases the general public may also be informed via publication of fails statistics. The disclosure frequency may be per settlement cycle, periodic (e.g. daily/monthly/yearly) or ad hoc.

2.2.2 AVERAGE FAIL RATES

It is very difficult to draw comparable conclusions with respect to average fail rates, given that EU SSSs do not apply a uniform methodology. The European Central Securities Depositories Association (ECSDA) also carried out work on settlement discipline in Europe

which was presented at the Contact Group on Euro Securities Infrastructures (COGESI) meeting at the end of November 2010.

2.2.3 DETERMINANTS OF FAILS

Due to the absence of (publicly available) comparable data, it is also very difficult to establish a direct general relationship between fails and other variables. Nevertheless, based on anecdotal evidence and past experience, fails are *generally expected to increase* on days coinciding with:

- important corporate events or new issuances by big or well-known companies;
- strong trading activity (in volume or in value), particularly if the securities involved are traded on several markets and/or in several countries;
- the settlement of derivatives on the same (underlying) securities;
- the start of new systems or the entry of foreign participants who may not be familiar with a system's rules and procedures; and
- stress situations in markets which cause a dramatic reduction in securities lending.

3 MEASURES TO PREVENT FAILS

3.1 MARKET RULES, REGULATIONS AND BEST PRACTICES AT TRADING LEVEL OR PRE-SETTLEMENT LEVEL

Among the main possible measures to prevent fails (see Box 1), the most commonly used at trading level is STP, mainly via automated transmission of (pre-matched) settlement instructions from exchanges and CCPs. Rules for reporting trades to the settlement systems are sometimes set at trading level.

POSSIBLE MEASURES TO PREVENT FAILS

The following broad categories of measures to prevent fails (at the level of the general market organisation and at the level of securities settlement infrastructure) have been identified:

- A high level of straight-through-processing (STP) of market transactions at the various levels of the transaction processing chain. Reducing manual intervention decreases the occurrence of mistakes in settlement instructions (for instance, automated transmission of settlement instructions from exchanges or CCPs to the settlement systems).
- The existence of a CCP also contributes to diminishing fail rates in various ways: indirectly, because the CCP relieves parties from directly accepting and managing risks vis-à-vis a number of counterparties of different standing; and directly, when multilateral netting is used, which is generally the case, by reducing the value of cash and securities that need to be settled to a net position.
- Technical pre-settlement measures aimed at avoiding first-instance fails (like matching facilities to detect possible operational mistakes as early as possible, or early information facilities to promptly inform SSS participants of any securities/cash shortage and enable them to take appropriate action). This allows correction of incorrect instructions.
- Hold-release mechanisms that induce early matching and allow matching to be separated from the availability of cash or securities.
- Technical measures aimed at facilitating settlement and reducing liquidity risk and securities needs (like queue management facilities, settlement optimisation techniques, and multiple settlement cycles during the day).
- Services/procedures to mitigate liquidity risk: credit facilities, securities lending programmes, shaping mechanisms, partial delivery solutions.
- Regular publication of settlement fails data, typically aggregated by security issue (ISIN) and without indication of the failing participants, in order to inform the market about which instruments may be temporarily scarce.

3.2 TECHNICAL/PROCEDURAL PRE-SETTLEMENT MEASURES

The measures most commonly in place are as follows:

- Mandatory matching procedures (sometimes matched instructions are binding and cannot be cancelled unless bilaterally agreed). Unmatched transactions that are not corrected by the start of

settlement are excluded from the settlement procedure (either cancelled or set aside).

- Pre-settlement informative processes (used to simulate settlement and provide customers with information about transactions that are likely to fail). These reports may take the form of “allegement” reports (where instructions have been sent by one party, but no corresponding instructions have yet been entered by the

other party), un-matched reports (both parties have submitted instructions but they do not match) or account statements at S-1 (showing the balance that would occur if settlement took place as simulated).

- Liquidity optimisation measures, such as sizing (where the SSS splits a large transaction that would fail into a number of transactions of smaller value to try to settle as many of the (individual) transactions as possible) and queuing.
- Incentives for early submission of instructions (e.g. trade information amendments may cost less if done well in advance of the settlement date, lower fees are charged for instructions arriving before the settlement date, higher fees are charged for instructions received after the deadline of S-1, etc.).

3.3 SETTLEMENT FACILITATING SERVICES

The SSSs provide a range of services that can facilitate settlement, like securities lending and borrowing programmes for the securities leg, as well as the services provided by triparty collateral management agents. For the cash leg, intraday credit and self-collateralisation services (securities being delivered are used as collateral to provide intraday credit which enables cash settlement) are used. Another solution sometimes adopted in the

last settlement cycle of the day is partial delivery,⁴ where the non-failing party is given the option of accepting a partial delivery of cash or securities without prejudice to its right to receive the remaining assets as soon as they become available. Assets delivered later may be marked-to-market.

3.4 REVIEWS OF SSSs' REGULATIONS AND PROCEDURES SO AS TO FACILITATE SETTLEMENT

SSSs monitor fails and discuss within their user groups possible ways to enhance settlement efficiency by revising current procedures.

4 MEASURES TO DISCOURAGE FAILS

4.1 PENALTY SCHEMES

As a last resort, penalty schemes may be introduced by SSSs as part of a market settlement discipline framework for violations of the rules, including settlement fails. Furthermore, penalty charges may also be agreed bilaterally between participants. It has been argued that, in the absence of a harmonised approach to settlement failure penalties, market distortions could arise (e.g. if penalties are applied in the national central securities depository (CSD) of issuance, but not in other CSDs holding and settling the same securities).

⁴ Intraday partialling may also be offered.

Box 2

POSSIBLE MEASURES TO DISCOURAGE FAILS

Three main possible measures to discourage fails can be identified:

- Measures aimed at increasing the cost of fails, like margins based on fails mark-to-market and/or penalties.
- Publication of data about chronic fails including, in extreme cases, the identity of the failing participants.
- Suspension of the participant in extreme cases of repeated fails.

A distinction is made between *fees* (which are payable to the SSS as compensation for administrative costs) and *penalties* (which may be collected by the SSS in favour of the innocent party as compensation for the loss suffered). A scheme normally contains one or more of the following measures:

- **Delay fees:** a flat fee (fixed amount per delay) is charged to participants who have failed to settle, excluding those that failed to deliver after having suffered a fail to receive (within a daisy chain, see section 1.2). Higher delay fees may be charged in the case of repeated fails or in the case of subsequent fails being suffered by other parties after an initial fail.
- **Compensation penalties:** often collected by the SSS and paid to the innocent party, which is normally a percentage of the failed transaction.
- **Cancellation fees:** which may be higher than the delay fee.
- **Cancellation penalties:** which may be higher than the compensation penalty.
- **Other penalties:** if the fail is not resolved and measures to mitigate the effects of fails are activated (e.g. use of mutual clearing funds or guarantee funds, buy-in or sell-out procedures),

the failing party has to pay for the whole costs of the procedure.

4.2 OTHER MEASURES TO DISCOURAGE FAILS

The publication of data about chronic fails, including, in extreme cases, the identity of the failing participants, may be used to discourage fails.

In addition, the exclusion of the failing participant from the SSS is also an option, though very extreme.

5 MEASURES TO MITIGATE THE EFFECTS OF FAILS

5.1 DEFINITION OF AGED FAILS IN THE DIFFERENT SYSTEMS

As mentioned in section 1.1, a fail becomes “aged” when it remains unsettled for more than a prescribed period of time beyond the settlement date (the length of the period of time may be defined differently across settlement systems). During the period of time between the original intended settlement date and the date when resolution measures are activated, the failed transactions are normally retained in the system and re-proposed for settlement in subsequent settlement cycles (this modality is typical of net settlement models). When a fail becomes aged, it may either be cancelled or the SSS may be entitled to activate another mitigation measure.

Box 3

MEASURES TO MITIGATE THE EFFECTS OF FAILED SETTLEMENT

This category of measures typically includes:

- special procedures for handling aged fails (fails that remain unresolved after a certain period of time) which may provide for the exclusion of the transactions from the settlement process (e.g. cancellation, forced close-out or buy-in of the securities, the activation of securities lending facilities);

- the postponement of the deadline for the receipt of a customer’s instructions to be settled in another SSS; and
- the activation of special liquidity funds/pools.

Under extreme circumstances, the effect of fails on the liquidity of the whole market could be serious enough to require the adoption by authorities and/or policy makers of ad hoc measures aimed at lowering the cost of borrowing securities (e.g. the exceptional measure taken by the US Treasury to alleviate the persistent liquidity problems following the terrorist attacks on 11 September 2001, by carrying out a “snap” (previously unscheduled) auction)⁵.

The length of the aging period depends on i) whether the fail is related to the cash leg or the securities leg of a transaction (it tends to be shorter for cash fails) and ii) whether it occurred in a regulated, on-exchange system or in OTC trades (longer/more flexible for OTC).

5.2 FORCED BUY-IN/SELL-OUT AND ACTIVATION OF LIQUIDITY AND GUARANTEE FUNDS

These measures have the objective of avoiding propagation of liquidity risks due to fails, by making sure that the innocent party receives the assets and can, in turn, meet its own obligations:

- In a forced buy-in procedure, the SSS buys the securities that could not be delivered on behalf of (and at the expense of) the failing party for the benefit of the buying party. The failing party may be required to provide cash collateral in order to finance the purchase. Alternatively the SSS may acquire a lien on the cash and other assets held in the accounts of the failing party. If a guarantee fund exists, the failing party may be required to advance the funds for the buy-in by making a payment into the fund.
- A forced sell-out is the opposite transaction, carried out by selling securities (or other collateral) of the party failing to deliver cash in order to complete the transaction in favour of the selling party.

Mutual clearing funds/guarantee funds may also be used to cover the positions of the failing participants.

5.3 POTENTIAL ROLE OF CCPS IN FACILITATING SETTLEMENT

As recognised in CPSS-IOSCO Recommendations 3 and 4 for SSSs⁶ among other measures, trade netting through a CCP may limit pre-settlement risk. For instance :

- Most CCPs provide multilateral netting which reduces the cash and securities positions settled to a net position. Reducing the liquidity participants need in order to settle their transactions limits the likelihood of settlement fails.
- CCP risk management procedures, which also cover the possibility of participant default, limit the risk that a default will have a significant impact on fail rates. This contributes to the efficient handling of fails and to the containment of their propagation among participants.
- CCPs may contribute to providing incentives for proper behaviour by participants through the marking-to-market (and thus implicitly the pricing) of fails, buy-in procedures, etc.

⁵ Fleming, M.J. and Garbade, K.D. (2005).

⁶ See Committee on Payment and Settlement Systems/Technical Committee of the International Organization of Securities Commissions, *Recommendations for securities settlement systems*, BIS, November 2001.

It should be noted that these benefits are not directly linked to the CCP clearing function and can be obtained not only by adopting multilateral netting, but also by using sophisticated optimisation algorithms in a gross settlement environment, appropriate risk mitigation solutions (like buy-ins, guarantee funds, marking-to-market of fails), and/or a market discipline regime at settlement or trading level.

5.4 FAILS MANAGEMENT IN DVP MODELS 3 AND 2

Under DVP models 3 and 2, a securities fail may impede the settlement of a whole batch.

In DVP model 3, in which both legs are settled on a net basis, it may be the case that parties that have no direct involvement in the failed trade are also adversely affected. In Europe, six SSSs use DVP model 3 (in Austria, Denmark, Greece, Latvia, Hungary and Italy).

In DVP model 2 securities are settled on gross basis and cash on net basis, but under “all or nothing” mechanisms. If there are not enough securities for complete settlement, all of the settlement batch has to be stopped and, as in the case of DVP model 3, the transactions not covered by the securities or cash available are excluded from the batch.

Box 4

MEASURES TO PREVENT AND MINIMISE THE IMPACT OF FAILS IN DVP MODEL 3

There are various approaches to preventing and minimising the impact of such fails, such as:

- running algorithms to determine the maximum amount of transactions it is possible to settle on the basis of cash and securities available on the accounts of participants – the transactions which are not covered by the securities or cash available to the relevant participants are set aside and deferred to the subsequent settlement cycle, so as to avoid impeding the timely completion of the settlement phase;
- conducting simulation exercises to test the robustness of the system;
- temporarily interrupting the settlement cycle;
- excluding the failed transactions from the netting cycle and postponing their settlement to the next business day;
- encouraging the defaulting participants to declare in advance that delays are expected and to indicate, where possible, when the situation is likely to be resolved;
- encouraging participants to maintain over-collateralised positions;
- putting guarantees in place to ensure settlement;
- using buy-in procedures; and
- maintaining guarantee funds.

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