



Liquidity risk in securities settlement

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Abstract

This paper studies the potential impact on securities settlement systems (SSSs) of a major market disruption, caused by the default of the largest player. A multi-period, multi-security model with intraday credit is used to simulate direct and second-round settlement failures triggered by the default, as well as the dynamics of settlement failures, arising from a lag in settlement relative to the date of trades. The effects of the defaulter's net trade position, the numbers of securities and participants in the market, and participants' trading behavior are also analyzed.

We show that in SSSs – contrary to payment systems – large and persistent settlement failures are possible even when ample liquidity is provided. Central bank liquidity support to SSSs thus cannot eliminate settlement failures due to major market disruptions. This is due to the fact that securities transactions involve a cash leg and a securities leg, and liquidity can affect only the cash side of a transaction. Whereas a broad program of securities borrowing and lending might help, it is precisely during periods of market disruption that participants will be least willing to lend securities.

Settlement failures can continue to occur beyond the period corresponding to the lag in settlement. This is due to the fact that, upon observation of a default, market participants must form expectations about the impact of the default, and these expectations affect current trading behavior. If, ex post, fewer of the previous trades settle than expected, new settlement failures will occur. This result has interesting implications for financial stability. On the one hand, conservative reactions by market participants to a default – for example by limiting the volume of trades – can result in a more rapid return of the settlement system to a normal level of efficiency. On the other hand, limitation of trading by market participants can reduce market liquidity, which may have a negative impact on financial stability.

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1. Introduction

A prerequisite for the development of a viable capital market is a well functioning transactions infrastructure. The settlement of securities transactions is an important component of this infrastructure, as it determines the legal transfer of the securities that are traded. This infrastructure must operate in a seamless and integrated manner, in order to minimize the costs and risks for the end users in the market and to facilitate the allocation of capital. Hence, securities settlement systems (SSSs) are crucial to the financial system and are often supported by the central bank as lender of last resort.¹

Disruptions in the settlement infrastructure can lead to increased transaction costs and to a possible erosion of market liquidity which, if serious enough, may undermine financial stability. An extreme example of the potential severity of settlement failures was provided by the September 11 attacks. Settlement failures in the US Treasury market jumped from \$1.7 billion per day in the week ending September 5 to \$190 billion per day in the week ending September 19 (see [Fleming and Garbade, 2002](#)). Failures rose initially because of the destruction of communication facilities, but remained high because the lending and borrowing program was ill-suited to absorb the massive shock.

This paper explores the potential consequences of a market disruption that is less severe than the September 11 attack but that is nevertheless serious; namely, the default of the largest participant in the market. This type of shock is of interest for policy makers and SSSs alike. Indeed, among the recommendations for securities settlement systems recently set forth by the Committee on Payment and Settlement Systems and the International Organization of Securities Commissions is that “SSSs that extend intraday credit to participants . . . should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle.” (see [BIS, 2001](#)). Similar scenarios are also used by SSSs for stress testing purposes.

Although a number of previous studies have analyzed the impacts of major disruptions to payment systems and the extent of resulting contagion, very little investigation of disruptions in SSSs has been undertaken. Such analysis may yield new insights, due to several differences between securities settlement and payment systems which could potentially lead to important differences in the impacts of shocks in the two systems.

A first key difference between payment systems and SSSs is that unlike payments, securities transactions involve a securities leg as well as a cash leg. This gives rise in securities settlement to principal risk, which is the risk that the seller of a security delivers the security but does not receive cash in return or that the buyer of a security makes the payment but does not receive delivery of the security. The response to this risk has been to implement delivery-versus-payment (DVP) systems – by which settlement finality of the securities and cash leg occurs at the same time, and thus principal risk is eliminated. However, default by a major participant can still have an impact on liquidity in the SSS if unsettled

¹ We use the term SSS to refer to all of the participants as well as the financial infrastructure involved in securities settlement.

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