

The impact of  
“Private and Public Supply of Liquidity”  
by Holmstrom and Tirole

The third Ross prize has been awarded to “Private and Public Supply of Liquidity,” written by Bengt Holmstrom from the Massachusetts Institute of Technology and Jean Tirole from the Toulouse School of Economics and published in the *Journal of Political Economy* in 1998. This article has made two fundamental contributions to our understanding of liquidity needs and liquidity provision in a market economy. First, it developed a framework for analysing the need of firms to have access to liquidity in order to meet uncertain payment obligations. Second, the paper has shown that private institutions, markets or intermediaries, may be unable to provide for these needs in an efficient manner, in which case government intervention can improve on market outcomes.

The main innovation of the paper is to show how the interaction of moral hazard on the side of borrowers and an absence of effective commitment on the side of investors can create problems for liquidity provision by private institutions. Because such problems have in fact been much in evidence in the recent financial crisis, the paper has had a large impact on the literature explaining the breakdown of liquidity in the crisis.

The building block of Holmstrom and Tirole (1998) is an elegant model of liquidity needs of a credit-constrained firm. The firm is credit-constrained because moral hazard limits the extent to which it can pledge eventual returns to outside investors. When finance and investment are initially chosen, liquidity needs are not yet known, so the firm must choose whether to provide for such needs *ex ante* or to provide for them *ex post*, when they arise. Providing for them *ex ante* by borrowing more than is needed for investment and holding the difference in cash is inefficient in those states where more cash is held than is needed to meet liquidity needs. Providing for liquidity needs *ex post* is not possible if the market is unwilling to provide the needed extra finance on a stand-alone basis; the assumption here is that private investors cannot commit *ex ante* to provide contingent financing *ex post*.

If liquidity needs are independent across firms, so that a law of large numbers applies, the problem can be solved by an intermediary providing firms with credit lines. Because this intermediary itself is not subject to uncertainty or moral hazard, it can raise funds when they are needed so that there is no need for firms to hold cash or similar assets to cover their liquidity needs. If liquidity needs of firms are strongly correlated, however, the intermediary may be unable to obtain the funding needed to cover the additional needs of firms.

In this latter case, an efficient outcome is achieved by the government supplying the market with bonds, which firms can hold with a view to liquidating them when they need cash. In the model, the proceeds of the bonds are distributed to the public by lump sum subsidies; the debt service is financed by lump sum taxes. The bonds thus provide a mechanism by which the population at large, including private investors, can commit to providing firms with resources

when they need them to cover their liquidity needs. The arrangement is beneficial because there is no need for firms to actually hold real assets that are liquid and can be used at will.

The role of government borrowing as a substitute for private borrowing is the subject of the large public-economics literature on Ricardian equivalence. Ricardian equivalence asserts that, if private individuals and the government can borrow and lend under the same conditions and if the government relies on lump sum taxes and subsidies, then government borrowing will not affect overall outcomes because, whatever the government does, will be neutralized by countervailing actions of individuals trying to counteract the effects of lump sum taxes and subsidies associated with government borrowing. Government borrowing will affect overall outcomes however, if private individuals and the government do not have the same market access. Most of this public-economics literature addresses this issue in the context of overlapping generations models in which government borrowing imposes a burden on future generations that are not yet present in today's markets.

A small literature also considers government borrowing as a substitute for private borrowing when private borrowing is fraught with enforcement problems. A prominent example is borrowing for the purpose of education, i.e. investment in human capital. Holmstrom and Tirole (1998) show that government borrowing as a substitute for private borrowing is also important for investors, firms and asset markets. Most importantly, they show that, by providing a paper-based mechanism for committing resources to covering liquidity needs, government borrowing can improve on the way in which the economy deals with the fact that *ex ante* such needs are uncertain. This mechanism is advantageous because it avoids the need to devote real resources to the purpose; moreover, it avoids the frictions inherent in private-market approaches to the problem.

Such frictions have been very much in evidence in the context of the financial crisis: In the run-up to the crisis, market participants used maturity transformation and liquidity transformation in order "to produce" liquid assets from long-term real investments. Such procedures avoided the need to put resources into short-term rather than long-term investments as a way of obtaining liquidity, i.e. they avoided the waste that Holmstrom and Tirole (1998) see as associated with liquidity provision by real asset holdings. However, under the influence of the aggregate shocks of 2006-2008, the system broke down, and the assets ceased to be liquid. Moreover, the experience of 2007-2009 fully confirmed the assessment in Holmstrom and Tirole (1998) that market funding is fraught with a risk of discontinuation, i.e., the inability or unwillingness of private investors to pre-commit to provide funding in the future may threaten a breakdown of funding, with large systemic implications.

The importance of Holmstrom and Tirole's (1998) analysis for understanding the demand and supply of liquidity in macroeconomic and finance settings can be seen by the many papers that cite it prominently. See, for example, Caballero and Krishnamurthy (2006), Diamond and Rajan (2005), Gertler and Karadi (2011), Longstaff (2004) and Lorenzoni (2008).

## References

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