

Self-fulfilling liquidity dry-ups

FREDERIC MALHERBE

(10.1111-jofi.12063)

Do financial institutions hold too little or too much liquidity?

There is a widely shared view that financial institutions expose themselves to excessive liquidity risk (Acharya-Krishnamurthy-Perotti (VOX 2011)). In other words, they tend to hold too little liquidity. The problem is that extreme reliance on short-term debt or unrestrained maturity mismatch can result in *fire sales*. Such a mechanism goes as follows. Imagine that, for some reasons, financial institutions need cash and start selling assets. If buyers haven't much cash available, prices must drop for markets to clear. But then, these institutions must sell more assets to raise the cash they need, which amplifies downward price pressures. This mechanism, which negatively affects the system as a whole, has been pinpointed as a major magnifying factor of the recent financial crisis. Accordingly, new regulation has increased liquidity requirements for financial institutions.

But, somehow paradoxically, a number of policy makers and academics have also pointed out unusual cash hoarding behavior by major financial institutions since the 2007 to 2009 financial crisis in general and a further surge in the euro area since the end of 2011. Many have also expressed concerns that such behavior worsens economic outcomes (see, for instance, Bernanke (2008)).

In this paper, I show that liquidity holding does impair the functioning of markets when sellers are potentially better informed than buyers. Furthermore, cash hoarding can result in a self-fulfilling liquidity dry-up.

You are sitting on a pile of cash, why do you want to sell assets?

I propose a *market for lemons* (Akerlof 1970) model of liquidity in which cash holding by some agents negatively affects others because it worsens the lemons problem in the future, thereby reducing market liquidity. The intuition for why holding cash worsens adverse selection (i.e. the lemons problem) is best understood from a buyer's point of view: the more cash a seller is expected to have on hand, the less likely it is that he is trading because of a need to raise cash, and the more likely it is that he is trying to pass on a lemon.

How does it work?

To illustrate this mechanism and its implication for the functioning of markets, let me walk you through the two possible outcomes in the model.

Imagine you have a dollar to allocate between cash and a risky asset that pays off after two periods. Its expected return is positive and that on cash is zero. There is a return-liquidity trade-off because you need some cash at the interim date. However, there is a market in which you can sell shares of the risky asset before maturity. An important aspect of the situation is that once you have invested in the asset, you privately learn whether it is a *peach* (its return is high) or a *lemon* (its return is negative). Finally, there are many investors facing a similar choice and, to simplify matters, there is a large number of potential buyers at the interim date.

The most important feature of the environment is that the market price is affected by the market's perceived average motive for trading: either a need for cash or the private knowledge that the asset is a lemon.

In that situation, what is your optimal allocation decision? In fact, it depends on what other investors do. To see this, assume first that buyers believe only lemons are for sale. Accordingly, the market price is very low. In that case, it is optimal to hold just enough cash to cover you interim needs. That way, you never have to sell a peach in a lemons market. Now, if all investors follow this logic and decide to hoard, no peaches are for sale. Thus, only lemons trade, which is consistent with buyer's beliefs. This therefore constitutes an equilibrium, which I interpret as a self-fulfilling liquidity dry-up.

In contrast, assume that buyers believe the mixture of assets for sale is not too bad. Assume further that the market price consistent with their beliefs is such that selling at the interim date does not imply a nominal loss. In that case, you have no reason to hold cash because it is a dominated asset. But then, the only way to cover your interim liquidity needs is to sell shares of your asset, even if it is a peach. If buyers expect some investors to follow this logic, they are willing to pay a better price because they infer that some peaches are trading too. Under some conditions, this price can be high enough so that it is indeed optimal for all investors not to hold cash. There is then another equilibrium, without cash holding and with a milder lemons problem; hence with a better functioning and more liquid market.

It turns out that all agents are better off in the second equilibrium. The key mechanism goes as follows: when you decide to hold cash, the expected quality of your future sales decreases (that is, you become more likely to sell lemons). This depresses the market price, which negatively affects other investors. Thus your decision to hold cash negatively affects other investors (this is an example of *negative externality*). Moreover, the lower the expected market price, the more appealing it is for everyone to hold cash. Thus, holding cash also presents *strategic complementarities* (which is the opposite of what usually happens in fire-sales models). That is, if other investors start to hold more cash, the best response for you is to do the same. This mechanism therefore helps to understand widespread hoarding behavior.

Relevant context, main empirical predictions, and policy implications

The model applies to markets where sellers may be better informed than potential buyers. For example, this can be the case of markets for financial securities, such as common stocks or asset-backed securities, or for corporate assets.

The main empirical predictions relates to the severity of adverse selection in contexts where sellers' "liquidity positions" are hard to assess by outsiders. Thus, these predictions are more likely to apply where sellers are large and complex companies with opaque balance sheets rather than small companies operating a single line of business (see Tirole (JEL 2011) on the difficulty of assessing liquidity positions).

Prediction 1: *Adverse selection intensifies in periods of high cash holdings.*

A worsening of adverse selection in a given market is characterized by lower prices, lower volumes, and lower average quality of the assets that are traded (compared to those that are not) and by higher incentives to invest in costly information acquisition about these assets.

The unusual and widespread hoarding behavior that has been observed in the aftermath of the recent financial crisis makes it an interesting context for testing this prediction. A case in point could be asset-backed securities. While their design is supposed to alleviate adverse selection, these securities had largely become "toxic" in the fall of 2008, a phenomenon widely associated with adverse selection. However, the economy had also entered a recession that was likely to be severe. Bad news about fundamentals increases the information sensitivity of debt-like assets and makes them more prone to adverse selection. But this second channel is not incompatible with the cash holding one. In fact, the two effects are likely to reinforce each other and would probably be hard to disentangle during this period. Still, issuance in securitization markets has, by and large, not recovered, while macroeconomic fundamentals have arguably improved (at least in the U.S.). This provides support for the economic significance of the cash holding channel.

Prediction 2: *When sellers' cash needs decrease (increase), or when other sources of cash become more (less) easily available to them, adverse selection intensifies (abates).*

This prediction applies, for instance, to markets in which financial institutions are natural sellers/issuers. An example of changing refinancing conditions could be an increase in the range of collateral eligible for borrowing at the central bank or a change in the class of institutions that can access central bank lending. Such changes have been made during the recent crisis to ease the short-term funding of financial institutions. The model suggests that they may actually have worsened adverse selection in other markets (such as those for asset-backed securities, for example). The same must be said of the European Central Bank's recent launch of long-term refinancing operations (LTRO), since it implies a protracted period of easy refinancing for financial institutions in the euro area.

Liquidity requirements for financial institutions (such as the liquidity coverage ratio imposed by Basel III) seems an appropriate regulatory response to fire sale externalities. However, an implication of my model is that such policies are likely to have adverse unintended consequences when trades reflect private

information. By reducing the future need to raise cash, they deter market participation for this motive, which impairs market liquidity. Another policy implication is that flooding financial institutions with liquidity to foster new investment (which major central banks have arguably done recently) may exacerbate adverse selection in markets for legacy assets.

Conclusion

The paper shows that, when sellers are better informed than potential buyers, they negatively affects the functioning of markets by holding cash. The results shed light on a new channel through which hoarding behavior may impair the efficient allocation of resources.

By and large, these results contrast with those of fire-sale literature, in which liquidity holding positively affects the system. Whether private agents tend to hold too much or too little liquidity thus depends on the nature of the underlying friction (whether there is an adverse selection or moral hazard problem). The respective policy implications are opposite. In particular, my model suggests that imposing liquidity requirements on financial institutions, a policy that mitigates fire-sale externalities, is likely to have adverse unintended consequences in markets prone to adverse selection.

The regulatory response to the recent crisis suggests that fire sales are seen as most relevant. However, given the current amount of excess reserves of financial institutions in Europe and in the U.S., it is difficult to argue that private agents always tend to hold too little liquidity and that hoarding behavior is only a remote theoretical possibility. Regulators should therefore not overlook the mechanism highlighted in this paper.