

Buchholz, Lucas

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Adresse des Verfassers:  
Lucas Buchholz  
Wolfsgangstraße 1 I 60322 I Frankfurt am Main I Germany  
Email: [l.buchholz@zeppelin-university.net](mailto:l.buchholz@zeppelin-university.net)  
Mobile: 0049/1712603705

**“Fire sales – what can be done about them?”**  
**On systemic risks in financial markets**

Lucas Buchholz

Redakteure  
für die Fakultät für Wirtschaftswissenschaft

Prof. Dr. Michèle Morner / Prof. Dr. Birger P. Priddat

Für den Inhalt der Papiere sind die jeweiligen Autor verantwortlich.

# **“Fire sales – what can be done about them?”**

## **On systemic risks in financial markets**

Lucas Buchholz

### **1. Introduction**

At least since the financial crisis that started in 2008, our financial system is more and more thought of, in a critical way. The effects that a crash of the financial system would have on the real economy would now be bigger than ever. This is due to the fact that even the real economy is financed more and more through credit. However, the financial system before 2008 was the riskiest it ever was because of its very high levels of leverage. This leverage, and the lending connected to it, has increased the interdependence and complexity of the financial system to an extent that hardly any major player's action would not have a direct effect on other players. This has led to systemic risk, of which fire sales are a perfect example. The system of creditors, arbitrageurs and the “providers” of financial products cannot be understood anymore to an extent that would be enough to be able to assess the real risk of an investment. Thus, irrational emotions such as “hope” and “fear” are the determinants of a lot of behaviour on the financial market. The fear of further losses after a slight decrease in the value of an asset can cause the creditor to increase the margin of an arbitrageur, leaving him illiquid and thus forced to sell the assets quickly. The following decrease in price will have the same effect for other traders, leading to a systemic risk.

Systemic risk has traditionally been excluded by economic theories such as the arbitrary pricing theory, totally ignoring the fact of the feedback of one's own actions on others in the context of a highly complex network. The “too big to fail” phenomenon has also risen in the last decades, as some financial institutions increase continuously in size. If an institution reaches a certain size, its failure would imply consequences for most other agents in the system, that would lead to a collapse of the system resulting in a stop in the supply of money. The modern state and

the modern economy depends highly on the availability of capital, therefore the financial system must not collapse. Even smaller events, such as fire sales of certain asset classes resulting in a breakdown of a specific market can have enormous effects and lead eventually into a liquidity crisis, then affecting the real economy negatively.

In a world where wide parts of the real economy depend on the availability of capital, the question arises, of how such a system risk, endangering the welfare of millions of people could be controlled? Or how the negative effects of an ongoing fire sale could be reduced to a minimum? This essay tries to show different explanations for fire sales in the financial market and shows several possibilities, how fire sales could be dealt with. First it is going to give an introduction to fire sales, especially of financial assets, then presenting the different policy options. At the end, a conclusion will be drawn, trying to answer the question if fire sales which are extremely complex and depends on a million factors could be controlled by the government and what the implications of such a control might be. The essay is not looking at empirical data of fire sales but rather approaching the topic from an argumentative and theoretical point of view. The essay will also not cover the question if a single government would even be able to regulate the financial system to an extent that it would actually make a difference, or if a group of important governments, or even all major government would need to work together in order to be effective and make a real difference.

## **2. Fire sales**

*“A bank that simply suffers large losses may be forced to reduce its risk by selling assets at distressed or fire-sale prices. If other banks must revalue their assets at these temporarily low market values, the first sale can set off a cascade of fire sales that inflicts losses on many institutions. Thus, whether through defaults or fire sales, one troubled bank can damage many others, reducing the financial system’s capacity to bear risk and make loans.”*

A fire sale is basically a sale, which is not carried out voluntarily but forced, and the asset is very often sold at a dislocated price. Generally it must be differentiated between fire sales of real assets and fire sales of financial assets. The obligation to sell, results from the seller’s need to pay

back the credit. In this case, the payment can only be done through selling assets. The potential buyers are normally also selling assets in a similar fashion as the original seller in order to minimise the risk of losses. Therefore, the price is dislocated, as they themselves are indebted and not able to buy the assets sold. Then, assets are bought by non-specialists who do not buy assets at a normally set price, having conscience about the lack of their own speciality in these assets. Assets might then also be bought by arbitrageurs who are speculating on the rise of the assets and also a stabilisation of the market.

A fire sale of financial assets is normally carried out in a way that a certain bank, investment bank, hedge fund or other holder of assets starts selling a certain asset or assets of a specific kind all at the same time. At the beginning of the fire sale, prices that are roughly at the same level as the prices were before the fire sale decision are achieved. As the market realised the over-supply of these assets, the price drops rapidly as the number of potential buyers decreases as well.

Fire sales often lead to strong reductions in asset prices. The prices of similar assets also decline very often, as the sellers of these assets are afraid of an “infection” and therefore sometimes panic and try to sell these assets before everyone else does to avoid big losses. This fear of “infection” then leads to an actual infection and thus the fire sales can turn out to be a systemic risk, “infecting” more and more assets and potentially leading to a total market crash with a total excess of supply and hardly any buyers leading to a massive drop in asset prices. This generally involves big losses for a wide group of investors. Fire sales have not been the only cause of the financial crisis but have surely contributed to the general market failure a big deal.

Collateralised lending is the force that facilitates fire sales the most. This includes fire sales of real assets as well as financial assets. This type of lending includes collateral as hedging of a loan by using a specific property as a security. This security is used to ensure repayment of the loan because if the loan is not repaid, the lender has the right to liquidise the collateral. This might be done very quickly for various reasons. Debt could be modelled as a contract that allows the creditor to supervise the cash flows of the borrower and in the case of default of the loan, the cash shifts into the lenders property. Thus, an asset fire sale is sale were high-valuation buyers are not capable of buying shares because of the debt overhang problems occurring simultaneously. For example, a company borrows money to finance an asset such as a bus. The bus is then used by the

entrepreneur to generate cash flows. The best way to structure the debt would be to have a combination of short-term and long-term senior debt, which is then collateralised by the asset, in this case the bus. So, if the project turns out to be bad, the lender can sell the bus, this can also be fixed in the contract.

The market asset is then sold in consists of specialist and non-specialist buyers. In the case of the bus, the specialist buyers would be other bus companies and the non-specialist buyers would be an investor who buys the bus to lease it to other bus companies. These non-specialist buyers have lower valuations of the asset then the specialist buyers. The key point in this is that the specialist buyer does not buy the asset because it itself might be financially constraint. Therefore, he is unable to bid at the exact time when the asset is sold.'

This however raises the question of why the creditor and borrower do not negotiate again about the cash rather then transferring the asset to the lender? And thus, why does the lender not hold on to the asset, once he repossesses it, until the condition for liquidation has improved? Generally speaking, it is everyone's interest to avoid a fire sale. However, very often borrowers do not posses the liquidity needed to avoid a fire sale and for the time being, they cannot increase their capital as they are constrained by overhang from senior debt. Thus, if a high valuation buyer is not available, a fire sale is nearly impossible to avoid.

## **2.1 Fire Sales of financial assets**

Although there is evidence of fire sales in real assets, fire sales of financial assets have much bigger effects because financial investors such as banks, investment banks or hedge funds are financed with money that can be removed very quickly. As a general example, demand deposits in banks could be used but also deposits in hedge funds can be removed quickly. Very often, commercial paper is used as a debt instrument, which has duration between a day and several months. That way, the credit needs to be continuously renewed. Also, investment banks and hedge funds started to use repurchase agreements, which are basically very short-term loans, which are then secured by longer-term loans.

A severe problem for the financial investors are sudden stops in short-term financing which

can then lead to rows of liquidation of assets in order to obtain cash. This force to liquidate assets affects investors and their competitors. This was a central aspect of the financial crisis that started in 2008. An investor tries to acquire funds from outside and then bets against the mispricing of a security because, being an arbitrageur, hopes that it will vanish after a certain period of time. However, if the price dislocation proceeds or gets even worse, the arbitrageur loses money in the short term. Very often the outside investors who he got his loan from do not know if the losses of these assets are temporary or are simply a bad strategy and the price might not even be dislocated. If the outside investors lose confidence in the arbitrageur they very often decide to withdraw the money. In this case, the arbitrageur needs to acquire cash to pay back the creditors. He does that by reducing his positions even though holding his position or even increasing it would be very attractive. Problematic however is that the arbitrageur will not be the only one following a certain strategy. If a group of arbitrageurs are all confronted with fund withdrawals, all of them start to sell this particular asset. Thus, this lead to a increase in the mispricing which leads to more losses then self-reinforcing capital withdrawal and therefore leading to fire sales. The process only stops because at some point the marginal productivity decreases that much that selling the assets can be considered to reduce losses in any relevant way anymore.

In the context of debt contracts, which are collateralised by securities, time-varying margins are important. In order to secure themselves from default, creditors ask borrowers to put in a margin. This means that they lend less than the full amount of the price of the collateral. In the case of the decrease of the market price, the creditors very often ask the borrowers to increase the collateral and therefore the margin are they ask for a return of some of the money. If the borrower is not able to get hold of this cash, the lender is likely to liquidate the collateral. This can on the one hand side lead to a fire sale because the value of the collateral declines. Then, the borrower cannot acquire the cash to maintain the loan and thus, the asset gets liquidated. On the other hand, it can also lead to a fire sale but in a different way. Margins can be determined endogenously. Price volatility can be increased by a negative shock to the collateral. Then lenders and investors try to move their margins back to an equilibrium, which again requires the borrower to find some new cash. Generally, margin calls, the call of an investor to increase the margin, are extreme destabilising and lead often to the liquidation of assets, as an increase in cash is needed.

For example, a certain asset costs 100€ and the margin is 10. A certain arbitrageur uses 20€

of his own money and 80€ come from a credit. If the share then loses 15% of value and goes down to 85€, the net value is now only 5€. The asset can then either be sold or additional cash needs to be paid to the lender in this it must be 5€ at least so that the net value of the asset is over 10€ again. A decline in the funding liquidity occurs when security prices drop and at the same time margins go up. The then occurring fire sales make markets illiquid in the meaning that prices and values are diverging strongly. This phenomenon called market liquidity is influenced by the vicious cycle of falling prices, increasing margins, further fall in prices, and so on, the result being the total illiquidity of the market. Through the possibility of concentrating on portfolios of stocks that are held by mutual funds at the beginning of a quarter, and knowing the returns because mutual funds report net values of the assets on a continuous basis, it is possible to predict which positions will be liquidated at the end of the quarter in the case of a poor performance of the funds.

## **2.2 Policy implication**

Fire sales are part of the systemic risk in the financial market. It could even be argued that they are contributing to it significantly. Therefore, government policies that are capable of limiting fire sales or their externalities are essential to improve the economic wellbeing. Policies can be either designed to reduce the negative effects of an ongoing fire sale or even try to prevent the occurrence of a fire sale scenario. Examples for the latter are an increase in the “Capital cushions of financial firms and improvements in the plumbing of the financial system”. Also policies such as “mandating higher hair cuts and margins in derivative markets aim to stop the cycle of deleveraging and fire sales” even before they start. On the other hand there are policies that try to limit already ongoing fire sales. During ongoing fire sales, a lot of banks, investment banks or hedge funds are put aside as they are financially constrained and not able to access capital. On the one hand side, the government can lend banks against risky collateral and on the other hand the government can buy positions directly and “provide subsidies targeted at the purchasers of certain assets.”

It is argued that capital injections into the financial market is more beneficial than the purchase of assets by the government since the government is not able to assess whether there is a true mispricing of the assets or if the fall in prices is just a movement towards the real equilibrium.



Thus, in the worst case, a government purchase of assets resulting in an actual mispricing of assets could therefore even result in losses. The positive results of liquidity injections into the financial market might on the other side not result in a relaxation of the situation. Banks might instead of engaging into new lending try to hold the newly acquired cash back or may buy assets leaving the prices below a level where new lending would be profitable. Furthermore, the provision of government funds could also be supporting institutions that eventually fail or lead to more risky investments as the institution assumes that it will be bailed out and could therefore afford to take more risk and thus increase its chance of profit. However, the purchase of collateral can deal with the issue of mispricing in a more direct way, not financing overly risky banks gambling on a bail out by the government. A way to counter the problem of supporting toxic assets could be to support rather less toxic assets, which then as a consequence would increase the chance of further lending and reduce potential government losses.

The buying of assets during a fire sale has been seen in a suspicious way by economists. A government buying busses or airplanes during a fire sales seems rare. However, the purchase of financial assets is an entirely different issue. Financial markets have a strong influence on markets for real goods, as they provide the capital for entrepreneurship. Therefore, there is a higher interest of a government to interfere in a financial market. A government would also never be as efficient as the private sector in holding airplanes and leading them for a good price. On the other hand it can be argued that the Central Bank of a country is at least roughly efficient in purchasing financial positions and can also avoid buying “lemons” by only buying relatively safe assets. However, it cannot be said with certainty that only buying assets with a low risk will be enough to stop the fire sale. Very often assets that carry a very high-risk rather than low-risk assets are sold in a fire sale. This problem is however very hard to combat while the fire sale is already ongoing. Also depending on the size of the fire sale, it must be determined if the government is even financially capable of purchasing enough shares to stop the cascade.

Obviously the government can never know if an asset is cheap or if the price is just the reflection of the risk behind that asset. But since the financial crisis started in 2008 with the bankruptcy of Lehman Brothers, it has been quite evident that illiquidity was the problem. For example “10-year government agency bonds that the Fed ended up buying were yielding up to 170 basis points more than similar duration Treasury bonds. This compares to a normal spread on

agency paper of 10 to 30 basis points. In many other markets, wide credit spreads for the highest quality borrowers pointed to illiquidity rather than fundamental problems.” The Federal Reserve witnessed the crash of financial papers and repo markets, which pushed buyers that would have naturally bought such positions out of the market. They however, did rely on these markets in order to be able to purchase risky debt. This is another argument that the problem was illiquidity caused by fire sales rather than pure insolvency.

During the financial crisis, the response of the US government to fire sales had various forms. On the one hand side the government bailed out some banks and other financial institutions but on the other hand side, it also provided cash against risky collateral and purchase some financial positions. Before the bankruptcy of the Lehman Brothers in 2008, the general reaction was the provision of liquidity. The year after debt of agencies was essential. It is very hard to tell which of the strategies was the relevant one to stop the direct crisis in the beginning of 2009. One thing however can be said: the pure injections of liquidity and the saving of several financial institutions in 2008 was not enough to stop the cascade.

The complementary combination of hard preventive policies to avoid fire sales and softer policies during the ongoing of a fire sale seems to be an effective possibility. Generally it can be advised strongly to governments to interfere in the market while fire sales are ongoing. Otherwise, severe harms to the financial market and its lending capacity and thus the whole economy are probable. Soft advisable policies such as purchasing mispriced securities directly or supporting the purchase of those by market participants must be accompanied by measures that reduce the risk of a fire sale even occurring. This seems to be the better option than supporting financial institutions that are managed in a poor way.

### **3. Conclusion**

The effects of financial shocks are very negative for the financial system and even the real economy. The financial system is, unlike the real economy, highly based on trust and confidence and on the other side on fear and anxiety. This is especially the case, as the financial system is based highly on the leverage effect. The vast use of money that is not owned by one enables financial actors to generate profits that are far beyond the possibilities they would have had, of

they only used their own money. However, when things go wrong, this high level of leverage can cause severe problems for the debtor and cause him to sell assets at a highly dislocated price, harming the system around him.

To prevent this, or at least to reduce the risk of a fire sale and to minimize its effect while it is ongoing, the most important point is to reduce the level of leverage used in the market. Most policies and measures presented above are in a way intending to increase the amount of capital an institution has to hold. If this capital is present in a liquid form, it can reduce the negative effects of a fire sale a great deal and, depending on the amount, might even prevent it. The idea of holding security capital in a liquid form that is not used to generate profits by investing it, is against the idea of arbitrageurs. Therefore, they do not have a real incentive to just hold capital for the case of a crisis because they see all the lost potential profits. And as they do not consider the harm they are causing for others in the case of a fire sale, they are engaging into that risky behaviour.

This behaviour must be regulated by the state, forcing the leverage to go down. The risk of a fire sale can never be eliminated fully, even if there would be no leverage at all, and lending would be forbidden. But, the likelihood can be reduced and the effects can be limited if more own capital is used by financial actors. Therefore, the policies presented above are pointing into the right direction. Even, if in the short term negative effects can only be eliminated by supporting poorly managed institutions and buying toxic assets in the short term, in the long term by introducing an insurance or simply reducing the amount of money that banks are allowed to create, the systemic risk will be reduced. As the systemic risk could be seen as a classis market failure, only the state can and must regulate the risky financial behaviour and when trying to reduce the leverage and discouraging highly risky financial behaviour, it will be successful. A radical reduction of the leverage would most likely not be possible in the short run as the system is too dependent on credit, but over the time, the capital ratios can be increase, reducing the chance of a fire sale and thus minimising systemic risk.

However, even though the measures and policies are most likely effective, the question arises how they could be implemented in order to have a real effect? How many governments or how many states would need to implement such measures simultaneously for them to actually regulate the global financial system? Furthermore, the role of the high-frequency traders in fire

sales and the systemic risk and the possibility to regulate them must be evaluated. This however would be beyond the scope of this essay.

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