Compensation contracts and fire sales

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\begin{abstract}
This paper analyzes the impact of remuneration practices on banks' risk-taking in a model with fire sales externalities. When these externalities are not internalized by a bank's shareholders and executives, borrowing and fire sales are higher than the socially optimal level. Our analysis shows that plain-vanilla equity fails to internalize fire sales externalities. Deferred equity and long-term bonuses unrelated to short-term profits can restore social efficiency. Bail-in bonds can achieve efficiency at a smaller cost since they allow for state-contingent payments. It is not the level but the composition of variable compensation that determines the inefficiency. Excessive regulation may lead to suboptimal levels of risk-taking. Government guarantees reinforce the fire sales externalities and the need for regulation.

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1. Introduction

Since the beginning of the “Great Recession,” executive compensation at banks and other financial institutions has been the subject of an intense debate.\(^1\) This paper analyzes the impact of remuneration practices on banks' risk-taking, captured by the level of short-term leverage, in a model with fire sales externalities. These externalities are at the center of the new macroprudential approach to regulation (Kashyap et al., 2011), but the literature has not yet studied executive compensation as a tool to address them. First, we show that when these externalities are not internalized by a bank's shareholders and executives, borrowing is higher than the socially optimal level. We then analyze four compensation structures proposed by the academic literature. Our objective is to study the ability of these structures to induce the socially optimal level of leverage and fire sales. We show that bailout guarantees reinforce the fire sales externalities.

Fire sales occur when financially distressed firms need to sell assets at prices below their value in a best-use scenario. Fire sales can be quite sizeable and lead to high discounts relative to face value. For instance, in March, 2012, Spain’s Banco Santander sold property-backed loans for EUR 750 million at a 62 percent discount to face value. In June of the same year, the UK’s Lloyds sold property-backed loans for EUR 971 million after a discount of 52 percent.\(^2\)

Fire sales per se need not be socially inefficient. They may simply represent a redistribution of wealth among agents. In that case we talk of an “unconstrained efficient” equilibrium. On the other hand, fire sales may generate negative fire sales externalities that affect social welfare. There are three main theories as to why fire sales are socially inefficient (see Shleifer and Vishny, 2011 or Dâvila, 2014 for surveys). First, when markets are incomplete, fire sales are inefficient if they hammer asset sellers with higher marginal utility of consumption or investment. Examples of this mechanism can be found, for instance, in Geanakoplos and

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Second, fire sales are inefficient if they involve assets that serve as collateral. Some recent examples in the literature include Bianchi (2010), Benigno et al. (2012), Gersbach and Rochet (2012), Jeanne and Korinek (2010) or Stein (2012). Finally, fire sales are inefficient if the assets end up in the hands of buyers who mismanage them. Krugman (1998), Aguiar and Copinath (2005) and Acharya et al. (2010) examine this hypothesis in the context of fire sales by domestic credit-constrained firms to foreign investors. In any of these cases, fire sales lead to welfare losses for society.

The literature refers to “constrained efficient” equilibrium, like in Bianchi (2010), as second-best scenarios where the fire sales inefficiency cannot be eliminated (for example, when markets are still incomplete, collateral constraints are present, or some buyers are more efficient than others), but the equilibrium has the “socially right” level of fire sales. That is, the borrower, when making the leverage decision, fully understands the effect of potential fire sales on equilibrium asset prices and chooses the right level of borrowing. Constrained inefficiency happens when borrowers fail to correctly internalize the link between their actions and asset prices; thus, they “overborrow” from a social perspective. For instance, overborrowing may happen when borrowers are atomistic and do not take into account the general equilibrium effect of asset sales on prices (Lorenzoni, 2008; Stein, 2012); or when borrowers differ from agents who face collateral constraints, and these borrowers only take into account their own utility when borrowing (Dávila, 2014). We study if and under what conditions certain compensation structures lead to constrained efficient levels of leverage and fire sales.

We analyze the following compensation structures: (1) Equity; (2) Deferred equity; (3) Long-term bonuses; and (4) Bail-in bonds that are written down to equity if short-term profits yield long-term losses for the bank. Our choices are motivated by the policy discussion on regulating executive compensation. For example, in Europe, the Liikanen Report (published by a group of experts the E.U. Commission has appointed to reform the E.U. banking sector) proposed three measures: an absolute cap on overall compensation (possibly linked to paid-out dividends), a relative cap on the level of variable to fixed income, and claw-backs on deferred compensation. By contrast, in the U.S., the Squam Lake Report (French et al., 2010) explicitly recommends that governments “regulate the structure but not the level of executive compensation in financial firms.” Namely, it advocates for the implementation of deferred contingent compensation schemes whereby financial institutions might be required to withhold part of the estimated dollar value of each executive’s annual compensation (including cash, stock, and option grants), for several years. At the end of this period, employees would receive the fixed dollar amount of their deferred compensation if the firm has not declared bankruptcy or received government support.1

In our model, a representative bank has long-term investments with a non-stochastic return. In the short term, the bank can leverage its performance by taking on short-term debt and investing in a project with random return. If the short-term investment turns out to be unprofitable, the bank cannot pay its creditors without selling its long-term assets. We can interpret this liquidity shortage, for example, as the need to comply with a minimum capital ratio requirement (see, for instance, Hanson and Stein, 2011 and the references therein). Additional debt is not available since, for instance, losses occur in a systemic crisis in which distressed banks have no access to debt markets. Moreover, we assume that the bank cannot raise equity due to the “debt overhang” problem identified by Myers (1977). Thus, the bank, in order to meet its debt payments, must sell the long-term asset (property-backed loans, for instance) at a price below the asset’s net present value. Hence, we call these sales “fire sales.”

First, we do not take a stand on the mechanism, among those previously discussed, that renders fire sales inefficient. We focus on the necessary condition, whatever the mechanism, for the equilibrium to be “constrained inefficient”, that is, when borrowers do not correctly internalize the equilibrium price at which the asset will have to be sold. In that case, executives and shareholders under-estimate the cost of liquidity. They think that they will receive a price per asset sold higher than the price they will actually receive. Thus, the bank over-borrows relative to what is socially optimal. In the event of a crisis, fire sales are excessive and asset prices are over-depressed. Second, we use Krugman’s (1998) mechanism to explicitly define the social welfare function that the regulator maximizes.

Regulating compensation can achieve superior outcomes because it alters the incentives of bank executives. First, plain-vanilla equity fails, on its own, to internalize fire sales externalities, as it fails to “penalize” short-term relative to long-term payoffs. Deferred equity and long-term bonuses unrelated to short-term profits can restore the efficiency loss induced by the externality. Long-term bonuses unrelated to short-term profits increase the opportunity cost of fire sales, thus, reducing fire sales. Deferred compensation works if agents value one dollar less in the future than in the present. If that is the case, then deferred compensation reduces the rewards from short-term debt and thus the incentives to leverage and sell at a discount in the case of a liquidity shock. Deferred compensation would be useless if it is placed in an interest-making account paying the same interest rate as the bank executives’ discount rate. In fact, deferred compensation can be thought of as a tax on compensation, where the tax rate is the executives’ discount rate. Bail-in bonds reduce incentives to short-term debt by paying equity in cases of bank distress, in which equity has no value. The advantage of bail-in bonds is that they are a “cheaper” way to provide incentives. They increase the opportunity cost of fire sales in periods with liquidity needs while avoiding any remuneration for executives in periods with no liquidity problems.

Our numerical exercises show that regulating the level of incentives can backfire. Setting upper or lower bounds on the number of shares, deferred shares and/or the size of long-term bonuses may lead bank executives to an overcautious choice of debt and, ultimately, fire sales below the socially optimal level. Overall, our findings support the Squam Lake report’s recommendation: regulating the level of executives compensation may be suboptimal.

Finally, we analyze how fire sales externalities interact with the existence of government guarantees on banks’ losses. When banks enjoy either implicit, or explicit, government guarantees, a moral hazard problem arises: banks have incentives to over-invest in risky assets. Government guarantees are usually considered one of the main arguments behind banks’ excessive risk taking before the financial crisis. In Section 7, we show that the addition of government guarantees, to the fire sales externalities of price-taking banks, reinforces the need for regulating executive compensation. With government guarantees, banks borrow even

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1 Some of these recommendations have been reflected in recent regulatory changes. In the U.S., the Dodd-Frank Act requires regulatory agencies to prohibit compensation practices that encourage inappropriate risk-taking activities, albeit no final agreement among the agencies involved has been reached yet. In the Euro Area, the Capital Requirements Directive IV has established a cap on bonuses: they cannot exceed 100 per cent of salary (200 per cent if the company wins shareholder approval). In the U.K., the new Remuneration Code has extended the minimum deferral period of senior bank executives to seven years. At least 60 percent of awards of directors and other high-earners must be deferred. Even some banks have started to implement several of these measures on their own initiative. In 2013, UBS became the first big bank to give senior bankers bonuses in the form of “bail-in” bonds that can be wiped out if the bank’s regulatory capital falls below 7 per cent, or in the case of a “non-viability” loss (“UBS leads way with bonuses shake-up”, Financial Times, February 5, 2013).
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