

Operationalizing Financial Covenants

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Since the seminal papers by [Jensen and Meckling \(1976\)](#) and [Myers \(1977\)](#), the corporate finance literature has recognized the critical role of incentives and agency issues in the choice of a firm’s capital structure and investment decisions. In the context of lending agreements, one possible way through which incentives can be aligned involves the use of covenants, which are contractual terms stipulating what borrowers should (or should not) do during the life of the loan. However, while the finance literature has developed key insights about the *role* of covenants, their *optimal design* “has not received much direct attention” ([Gârleanu and Zwiebel 2009](#)), and their interplay with a firm’s operational decisions has not been studied.

This paper is aimed as a first step towards addressing such issues. More precisely, we examine lending contracts between a bank and a retailer faced with the problem of dynamically managing an inventory investment. We focus on the optimal design of *financial* covenants, which require borrowers to meet particular financial metrics during the life of the loan. Failure to abide by these covenants transfers control rights to lenders, granting them the *option* to intervene and influence managerial decisions, e.g., by possibly imposing changes in corporate policies, including new covenants, renegotiating claims, and even forcing the firm into bankruptcy, seizing and liquidating its assets ([Hilson 2013](#), [Tirole 2006](#)).

To facilitate exposition, we frame our study in the context of asset-based lending (ABL), a form of secured lending that allows firms to leverage their liquid working assets (such as inventory or accounts receivable) as collateral, to obtain financing. In this setting, we raise the following questions:

From the firm’s perspective, how do financial covenants impact operational decisions and flexibility? From the lender’s perspective, what is the optimal financial covenant, and how does it depend on operational characteristics of the borrower, such as demand distribution, inventory depreciation or profit margin?

To address these questions, we consider a game between a cash-constrained newsvendor (retailer) and a bank that operates in a perfectly competitive lending market, and can provide

additional funds via an inventory-based term loan. In addition to interest rate and loan limit, the loan agreement carries a covenant on the retailer’s ongoing performance. To capture the role played by the covenant, we extend the classical newsvendor model by including an intermediate period, at which the players are able to review sales: if considered “weak,” the retailer has the option to liquidate any unsold inventory and exit the market early, or otherwise continue. At the same time, if the covenant is breached, the bank has the option of seizing control and forcing liquidation, to protect its investment. Both players are risk-neutral and have perfect information. We work through the game via backward induction: at the intermediate period, the retailer and bank decide on how to optimally manage their investment, i.e., by liquidating or continuing based on observed operational performance; at contract inception, the bank chooses the interest rate, loan limit, and covenant terms, and the retailer chooses his order quantity. We also consider alternative settings and extensions, under which the lending market is monopolistic, or partial liquidation of inventory (e.g., through “fire sales”) is possible, for both players.

Contributions. To the best of our knowledge, this paper is the first in the operations literature to study multi-period inventory management under endogenous financing decisions. This allows us to explicitly link covenant terms in lending agreements to operational factors.

We find that leverage can distort inventory liquidation policies in non-trivial ways. In particular, when reviewing the sales at the intermediate period, sufficiently leveraged retailers may follow counterintuitive, non-threshold policies, preferring continuation when sales are very weak, and liquidation when they are strong. We also show that the lender’s liquidation preferences may also follow a similar pattern, and discuss how this can lead to perverse behavior, such as misreporting of sales.

When lending markets are perfectly competitive, we show that retailers who are not faced with any covenants may order quantities that are strictly smaller than the channel optimum, and follow sub-optimal inventory liquidation policies. Furthermore, we show how suitably designed financial covenants *fully* restore channel optimality, and thus emerge as

critical terms in lending agreements.

In contrast to papers in the finance literature, which typically study the role of financial covenants in mitigating agency conflict, we focus on their optimal design. In particular, we precisely characterize the optimal covenant terms and their stringency, discussing their dependency on the initial equity level and various market parameters. Surprisingly, we show that, when market demand is stronger, profit margins are higher, or inventory sustains its value, retailers are faced with *more stringent* covenants in equilibrium.

Finally, we show that the relationship between covenant inclusion and bankruptcy risk is subtle, and critically depends on the competition in the lending market, and the residual growth in product demand.

Our contributions provide theoretical justification, and are very well aligned with various recent empirical findings in the finance and accounting literature.

References

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