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Co-Managing Economic and Regulatory Capital With Corporate Finance Optimization

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Abstract

As the use of internal economic capital models becomes more pervasive in the banking and insurance industries, practitioners are challenged to manage their internal assessment of economic risk capital alongside regulatory constraints. To the extent that economic and regulatory capital differ, firms must deploy return on equity (ROE) maximizing strategies that take both risk measures into account. Most strategies presented in existing literature focus on the risk, or "demand," side of the equation—fine-tuning business mix/investment strategy to maximize economic profit while keeping regulatory capital requirements in check. In this paper, the focus is on the "supply" side—fine-tuning the source (and cost) of capital available to support risk. This paper demonstrates how this mechanism can be used to optimize a firm's corporate finance structure. In an optimal capital structure, investors are compensated commensurate to the riskiness of their capital, and redundant, or "idle," regulatory capital requirements are minimized if not altogether eliminated.

1. Introduction

The paradigm of co-managing economic and regulatory capital requirements presents unique challenges and opportunities for financial institutions. As firms develop sophisticated internal perspectives of their risk profiles through economic capital (EC) modeling, regulatory capital (RC) requirements imposed by supervisory bodies are increasingly interpreted as an aggregate capitalization constraint rather than a realistic measure of risk. As such, the risk practitioner's objective of maximizing economic value is often complicated by competing regulatory considerations.

When EC exceeds RC, the regulatory requirement does not impose a substantial constraint to the firm's risk strategy. The firm capitalizes itself according to the EC requirements implied by its risk models and makes marginal capital expenditures primarily to maximize return on EC. RC is evaluated and actively kept in check but does not directly affect the risk strategy.

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However, the more common and challenging situation is when RC exceeds EC. This will be the focus in this paper. When RC requirements are overly punitive, firms are challenged to manage the "gap," or "idle" capital—the extent to which the firm is overcapitalized above its EC requirements. In this context, we define the gap, G, as follows:

$$G = RC - EC. \tag{1}$$

This gap is idle in the sense that it does not bear any risk. A firm capitalized according to its EC requirements will, by definition, remain solvent at the confidence level expected by its capital providers. Any excess capital is economically redundant.[2] In this paper, the examination is on how to optimally finance these economic redundancies such that the firm's financiers are appropriately compensated and the deadweight losses from the redundancies are minimized.

The rest of this paper is structured as follows. In Section 2, the interplay of economic and regulatory measures, and their roles in the firm's overall objective of maximizing economic value, are formally defined. In Section 3, an augmented capital optimization framework in which the source (and cost) of capital available is the primary control variable is proposed. In Section 4, the application of the proposed framework through an illustrative example is demonstrated. In Section 5, how to implicitly apply this framework through deal selection rather than explicit refinancing is explored. In Section 6, commentary is provided on potential impacts to industry stakeholders. In Section 7, a summary of findings and remark on opportunities for further research forms the conclusion.

2. Problem Definition

In this section, a formal optimization framework incorporating both economic and regulatory capital measures is defined. Given this dual-metric framework, how overly punitive RC creates inefficient risk-return profiles is then demonstrated.

Regulatory capital is the level of capitalization imposed by supervisory bodies to ensure the financial system is adequately capitalized on aggregate. It is widely acknowledged that RC does not necessarily reflect, nor intends to reflect, the true risk profile of each specific institution. Rather, it serves primarily to ensure financial stability, consistency and governance. Regulators will define both core (Tier 1, or equity) capital requirements, and total (Tier 1 and Tier 2, or both debt and equity) capital requirements, as follows:

[2] Subject, of course, to the firm's risk appetite for capital adequacy, which we will ignore in this paper for the purposes of illustrating our framework.

$$RC_{Core} = Prescribed\ minimum\ equity\ (or\ equivalent)\ requirement, \quad (2)$$
$$RC_{Total} = Prescribed\ minimum\ total\ requirement. \quad (3)$$

On the other hand, economic capital is the level of capitalization required to remain solvent at the confidence level expected by creditors. Creditors include providers of both corporate debt and deposits/policyholder reserves. Debtholders expect the firm to hold enough equity capital to not default in line with its debt rating; deposit/policyholders expect the firm to hold enough total capital (equity and debt) to not default in line with its financial strength rating. These two levels of required capitalization are commonly defined as going and gone concerns, respectively. They are typically quantified probabilistically (for example, using Monte Carlo techniques) according to the loss distribution of the underlying portfolio, L. EC is the unexpected loss, as measured by value at risk (VaR) or another suitable tail risk measure in excess of the expected loss. EC for the going and gone concerns are respectively defined at confidence levels commensurate to the firm's target debt and financial strength ratings (α and γ here),[3] as follows:

$$EC_{Going} = VaR_{\alpha}(L) - E(L), \quad (4)$$
$$EC_{Gone} = VaR_{\gamma}(L) - E(L). \quad (5)$$

By definition, γ will be a higher percentile than α, since debt is subordinated to deposits/policyholder reserves. The probabilities that a default occurs on debt and deposits/policyholder reserves are thus, respectively, $(1-\alpha)$ and $(1-\gamma)$. A thorough discussion of economic capital modelling and its motivations are beyond the scope of this paper; it suffices for readers to interpret EC_{Going} and EC_{Gone} as the economic analogs to RC_{Core} and RC_{Total}, respectively.

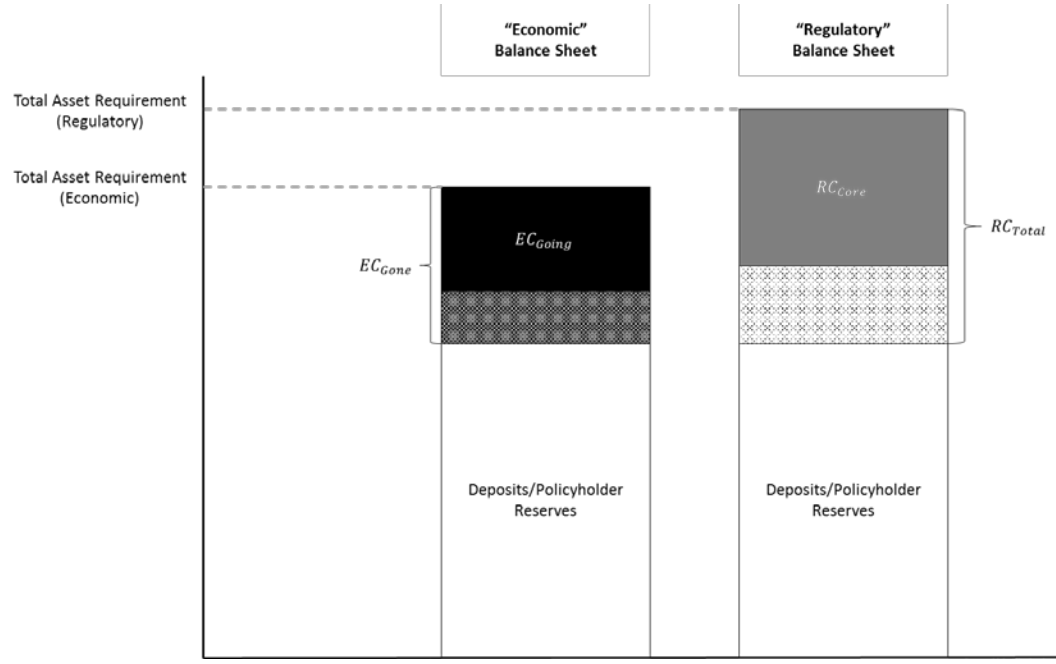
Additionally, firms apply a buffer to their RC and EC measures to maintain a strong capital position following smaller, near-term losses. For simplicity, this nuance is ignored for this particular analysis. Thus, to summarize:

- RC_{Core} is the minimum **core** capital (i.e., Tier 1) required by regulators
- RC_{Total} is the minimum **total** capital (i.e., Tier 1 and Tier 2) required by regulators
- EC_{Going} is the minimum **core** capital required to meet the target debt rating
- EC_{Gone} is the minimum **total** capital required to meet the target financial strength rating

These quantities are compared and labeled in Figure 1.

[3] For example, if a firm has a target debt rating of BBB, suppose the market expectation is for similarly rated debt to default 1 out of 200 times, or 0.5%. This translates to a confidence level of 1 – 0.5% = 99.5%.

Figure 1. Comparison of "Economic" and "Regulatory" Balance Sheets



A firm's objective is to maximize net economic profit (NEP), that is, the extra net income generated above its cost of equity, to shareholders. Net income (NI), broadly defined, is comprised of both investment and underwriting profits, as applicable. For a given cost of equity, k_e, NEP is defined as follows:

$$NEP = E(NI) - k_e \times Shareholder\ Equity. \tag{6}$$

In Equation (6), "shareholder equity" is deliberately undefined. Conventionally, a firm targets equity capitalization to sufficiently meet both EC_{Going} and RC_{Core} requirements, that is, $\max(EC_{Going}, RC_{Core})$. However, as will be formulated, any excess equity capitalization above EC_{Going} is economically redundant and should not earn the cost of equity, k_e. Thus, Equation (6) simply serves as a broad definition of the objective function for now.

Now, it can be illustrated how contradictory EC and RC measures create inefficient risk-return profiles when RC exceeds EC. For simplicity, suppose capital requirements are entirely financed by shareholder equity—even the gap, G, as defined in Equation (1), and, for brevity, the subscripts to EC and RC presented in equations (2)–(5) are omitted. That is, core and total capital are equivalent as the firm does not carry debt. Then, according to Equation (6), it is expected that

$$\frac{E(NI)}{Shareholder\ Equity} = \frac{E(NI)}{\max(EC, RC)} = \frac{E(NI)}{RC} \geq k_e. \tag{7}$$

In this case, the capital base can be deconstructed as follows, per Equation (1),

$$RC = EC + G. \tag{8}$$

Economically, only EC should be earning k_e. G is strictly less risky, and should correspondingly earn less, say $k_x < k_e$. In an efficient market, the provider of RC should only expect to earn:

$$\frac{EC \times k_e + G \times k_x}{RC} = \frac{EC}{RC} \times k_e + \frac{G}{RC} \times k_x < k_e. \tag{9}$$

However, a rational equity investor would not accept that part of their investment is only earning k_x; they can synthetically create the exposure themselves by only investing EC into the firm and the remaining G in a less risky position. Thus, if RC is fully financed through shareholder equity, the firm must be able to generate additional net income to compensate for the drag caused by G. The only way to accomplish this is to overcharge customers for the risk assumed by the firm, which is neither a sustainable nor particularly ethical strategy.[4] Combining equations (7) and (9), it can be seen that the implied return on EC is indeed higher than k_e:

$$\frac{RC \times k_e - G \times k_x}{EC} = \frac{EC \times k_e + G \times (k_e - k_x)}{EC} = k_e + \frac{G \times (k_e - k_x)}{EC} > k_e. \tag{10}$$

The strategy presented in this paper is to borrow the gap, G, at a cost of k_x, and only finance EC with shareholder equity, at a cost of k_e. Note that in this particular construct, G has the risk profile of corporate debt because EC is by definition sufficient to absorb losses in advance of default on debt at the desired confidence level. Hence, any excess yield of k_x above the firm's cost of debt, k_d, is purely alpha for the capital provider. The firm can exploit this advantage by financing G with a debt-like instrument. For simplicity, the effect of taxation is ignored and simply assume net income is earnings before interest and taxes (EBIT) less interest expenses:

[4] The only alternatives are to increase revenue (i.e., overcharge customers) or decrease operating expenses. It is assumed operating expenses would already be minimized as this is a well-understood source of value, hence it is expected the cost of these gaps are, in fact, imposed on customers.

$$E(NI) = E(EBIT) - Interest\ Expense = E(EBIT) - k_x \times G. \quad (11)$$

Now, Equation (11) can be substituted into Equation (6). As demonstrated in equations (7)–(10), this objective function has a higher maximum than simply financing the entire regulatory capital requirement with shareholder equity. Thus, the aim is to optimize as follows:

$$\max E(EBIT) - k_x \times G - k_e \times EC. \quad (12)$$

In the next section, ways to appropriately finance these gaps, extending to the paradigm where core and total capital differ, as is the case for firms that carry corporate debt, are proposed. In this case, there are, in fact, two gaps: between core requirements (as shown previously); and between total requirements (which has interesting implications). Through this mechanism, firms can develop a corporate finance optimization framework in which the source (and cost) of capital available to support risk is the primary control variable.

3. Proposed Capital Optimization Framework

In this section, a framework is developed to use capital refinancing as a tool to optimize NEP. Given disparities between EC and RC, firms can employ either risk strategies, fine-tuning business mix/investment strategy to manage the "demand" for capital, or financing strategies, fine-tuning the "supply" (and cost) of capital available to support risk. The latter is the focus.

To begin, the capital measures defined in the previous section, and their relative risk-bearing capacity are reintroduced. This is summarized in Figure 2.

Figure 2. Economic and Regulatory Capital Requirements Relative to Confidence Level

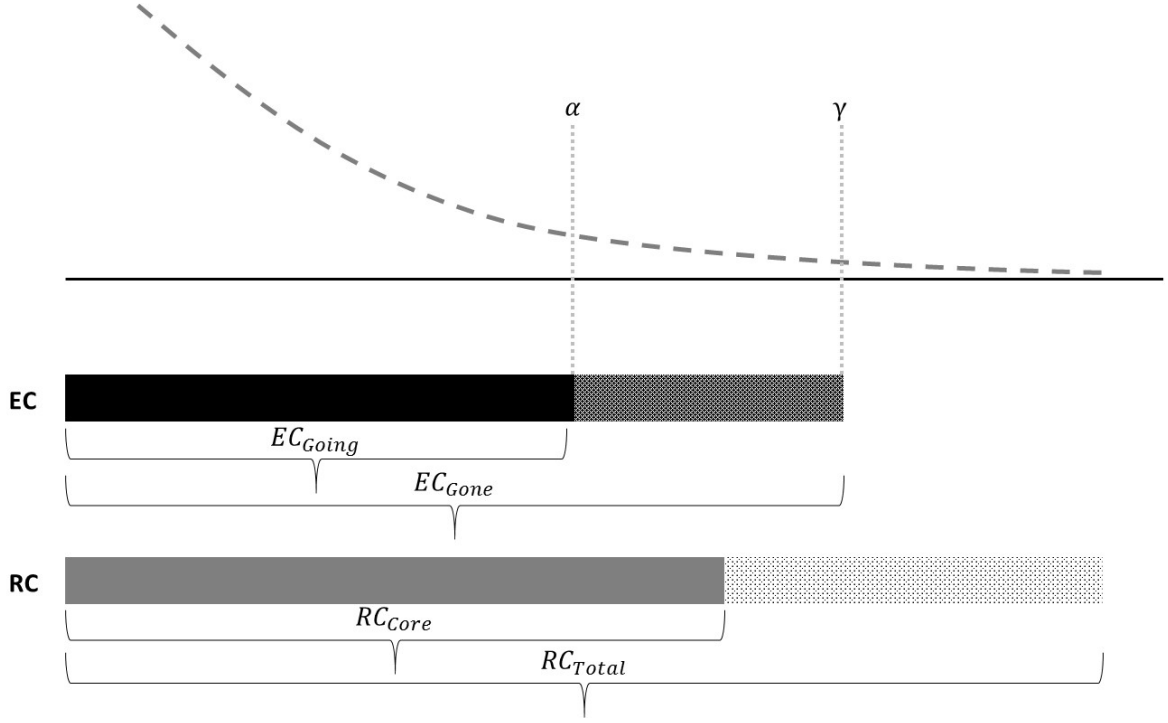


Figure 2 depicts the situation where a firm measures EC_{Going} at a confidence level of α and EC_{Gone} at γ. In addition, their minimum equity capitalization and total capitalization are constrained by RC_{Core} and RC_{Total}, respectively. By definition, the EC_{Going} requirement must be supported by equity (or equivalent) capital to adequately protect debtholders against default. Additionally, the quantity $RC_{Core} - EC_{Going}$, denoted G_1, must also be supported by equity (or equivalent) capital to satisfy regulatory requirements. However, the probability of G_1 absorbing losses is less than $(1 - \alpha)$, the point at which equity capital is expected to be exhausted. It is therefore less risky than pure equity and the capital provider should expect to earn a commensurately lower return. Analogously, the quantity $RC_{Total} - EC_{Gone}$, denoted G_2, will only absorb losses at a probability less than $(1 - \gamma)$, and the capital provider should thus expect to earn commensurately lower than the cost of debt. These gaps, and their corresponding cost of capital, are identified in Figure 3.

Figure 3. Gaps Between Economic and Regulatory Capital Measures

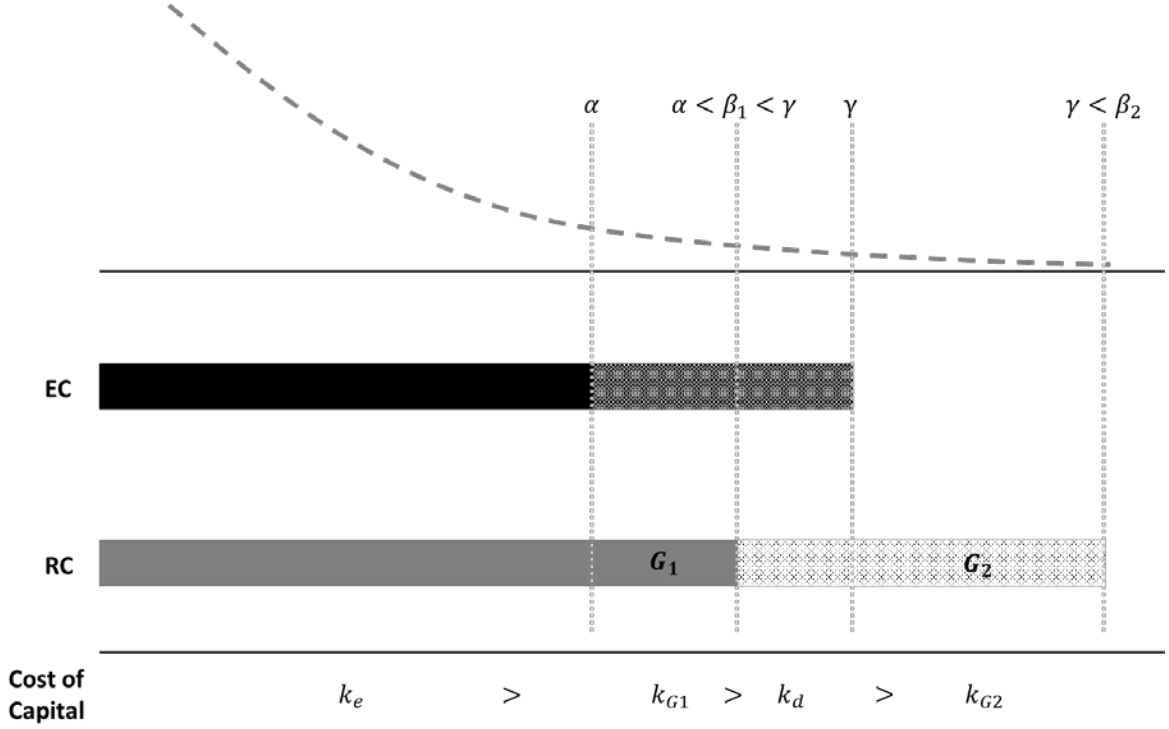


Figure 3 illustrates that the gap G_1 should earn a return somewhere between the cost of debt and the cost of equity given its relative risk profile. However, to meet regulatory requirements, the capital available to support it must qualify as Tier 1 (equity-like). To fund G_1, the firm can engage in a financing structure that behaves like hybrid debt. One option is reverse convertible debt, where the firm has the option to convert the debt financing to equity to prevent bankruptcy. In exchange for this option, this structure returns higher than the cost of straight debt (but still less than equity). The cost of this tranche is denoted as k_{G1}. It is important to note that any return on this tranche above the cost of straight debt is pure alpha for the financier since the conversion option would only be utilized following an event to the magnitude of a corporate default. This is because EC_{Going} is by definition calibrated to the firm's target debt rating, hence losses exceeding EC_{Going} only occur at a probability commensurate with corporate default.

Similarly, the gap G_2 should earn less than the cost of debt, given its relative risk profile. In fact, the market expects the firm to be insolvent before G_2 absorb losses and prices its capital accordingly. However, to meet regulatory requirements, the firm must have capital available to support G_2. As this tranche is, paradoxically, less risky than the firm itself,[5] it cannot be efficiently supported by the firm's own balance sheet. This produces a very interesting result,

[5] "Riskiness" of the firm, as measured by financial strength rating, suggests the market expects this firm would default on deposit/policyholders before the G_2 tranche is called on to absorb losses though the very existence of G_2 would prevent this default, hence the paradox.

namely that the G_2 tranche cannot be efficiently funded by the firm's own capital instruments. The firm can secure external funding through a letter of credit and/or some form of securitization. The cost of this tranche is denoted as k_{G2}.

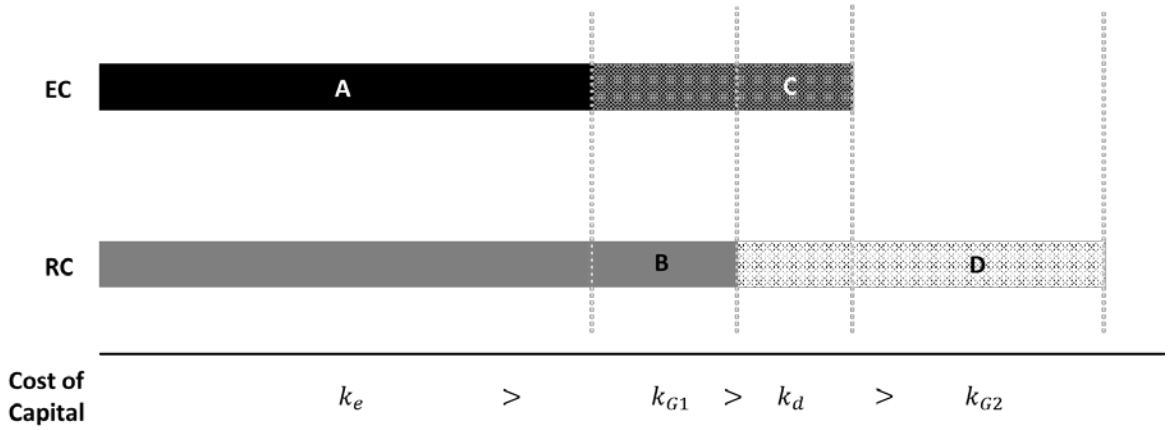
An interesting observation of Figure 3 is that the regulatory capital requirements do line up with some economic measure of risk, just not at the percentiles α and γ, as desired. Indeed, the regulatory capital requirements prescribe core and total capitalization at percentiles $\beta_1 > \alpha$ and $\beta_2 > \gamma$, respectively. Correspondingly, the firm has an economically justifiable case to solicit a ratings upgrade from the rating agency. For example, if α corresponds to a BBB debt rating, the firm's debtholders are actually protected up to β_1, which may correspond to a A– debt rating. The rating agency should interpret this overcapitalization as grounds for a rating upgrade; however, in the absence of that accommodation, a refinancing strategy to explicitly release economically redundant capital is presented.

For simplicity, the tax impacts of debt financing are ignored. Combining all the constituent tranches of the firm's optimal corporate finance structure, an appropriate weighted-average cost of capital (WACC) is determined as follows:

$$k_{WACC} = \frac{EC_{Going} \times k_e + G_1 \times k_{G1} + (EC_{Gone} - RC_{Core}) \times k_d + G_2 \times k_{G2}}{RC_{Total}}. \qquad (11)$$

Stated otherwise, each tranche can be labeled as shown in Figure 4.

Figure 4. Identification of Different Tranches of Capital Structure



Then WACC can then be calculated:

$$k_{WACC} = \frac{A \times k_e + B \times k_{G1} + C \times k_d + D \times k_{G2}}{A + B + C + D}. \quad (12)$$

Equation (12) defines an economically defensible WACC for the financial institution, taking into account redundant regulatory requirements. This WACC then forms the basis for evaluating profitability and informing deal acceptance criteria. In the next section, this framework is applied to a simple numerical example.

4. Illustrative Example

To illustrate how the proposed corporate finance optimization framework can create value for the firm, a hypothetical institution with the following risk profile is introduced with the parameters illustrated in Table 1.

Table 1. Assumptions for Illustrative Example

Item	Value
EC_{Going}	100
EC_{Gone}	130
RC_{Core}	120
RC_{Total}	150
k_e	12%
k_d	6%
$EBIT$	16

As previously mentioned, the effects of taxation are ignored in this illustration for simplicity. As can be seen, RC forms a binding constraint for both the core and total capital requirements. The firm's profitability in the case where the capital requirements are funded only by shareholder equity and debt is examined first. In this case, the firm carries debt totaling $D = RC_{Total} - RC_{Core} = 150 - 120 = 30$ and equity totaling $E = RC_{Core} = 120$. Through this initial financing structure, capital requirements are funded as shown in Table 2.

Table 2. Cost of Capital Under Original Capital Structure

Tranche	Quantity	Cost of Capital
E	120	$k_e = 12\%$
D	30	$k_d = 6\%$
Total	150	$k_{WACC} = 10.8\%$

Now, the firm's profitability under this initial structure is calculated as seen in Table 3.

Table 3. Income Statement Under Original Capital Structure

Item	Calculation	Line	Value
EBIT	Given	(A)	16
Interest on debt ($D \cdot k_d$)	30 x 6%	(B)	1.8
Net income	(A) – (B)	(C)	14.2
Shareholder equity (E)	Given	(D)	120
Return on equity (ROE)	(C)/(D)		**11.8%**
Cost of equity ($E \cdot k_e$)	120 x 12%	(E)	14.4
Net economic profit (NEP)	(C) – (E)		**–0.2**

As can be seen from the previous corporate finance structure, the return on equity (ROE) accruing to shareholders does not meet their cost of equity expectations. Thus, the firm creates a net economic loss for its shareholders. Given this corporate finance structure, the only alternative is to create more earnings via price increases, cost savings or a combination. Ultimately, this implies that the economic loss is passed on to other stakeholders (e.g., customers).

Now, the impact on profitability is evaluated if the firm's gaps are funded more effectively. First, a redundant core capital requirement of $G_1 = RC_{Core} - EC_{Going} = 120 - 100 = 20$ is noted. According to the framework, this quantity should earn its provider $k_{G1} : k_d < k_{G1} < k_e$. In this example, $6\% < k_{G1} < 12\%$. For illustration, the midpoint is selected at 9%. Note that when G_1 is funded, some of the original equity is bought back such that $E = RC_{Core} - G_1 = EC_{Going} = 100$. Second, a redundant total capital requirement of $G_2 = RC_{Total} - EC_{Gone} = 150 - 130 = 20$ is noted. According to the framework, this quantity should earn its provider $k_{G2} : 0 < k_{G2} < k_d$. In this example, $0\% < k_{G2} < 6\%$. For illustration, a midpoint at 3% is selected. Note that when G_2 is funded, some of the original debt is retired such that $D = RC_{Total} - RC_{Core} - G_2 = 30 - 20 = 10$. Through this financing optimization, the total capital requirements are funded as shown in Table 4.

Table 4. Cost of Capital Under New Capital Structure

Tranche	Quantity	Cost of Capital
E	100	$k_e = 12\%$
G_1	20	$k_{G1} = 9\%$
D	10	$k_d = 6\%$
G_2	20	$k_{G2} = 3\%$
Total	150	$k_{WACC} = 10\%$

WACC for the new financing structure is given by Equation (12). Note that WACC has been reduced from the initial financing structure, from 10.8% to 10%. Now, the firm's profitability is recalculated under this new structure. For a side-by-side comparison, the line items from the original structure are repeated in Table 5.

Table 5. Comparison of Income Statements Under Original and New Capital Structures

Item	Original	New
EBIT	16	16
Interest on G_2	–	0.6
Interest on debt ($D \cdot k_d$)	1.8	0.6
Interest on G_1	–	1.8
Net income	14.2	13
Shareholder equity (E)	120	100
Return on equity (ROE)	**11.8%**	**13.0%**
Cost of equity ($E \cdot k_e$)	14.4	12
Net economic profit (NEP)	**–0.2**	**+1.0**

As illustrated, the new corporate finance structure creates economic profit for the firm's shareholders, without having to generate additional earnings. Excessive regulatory capital requirements, which create tranches of economically idle capital, create deadweight losses for the capital provider. These losses are in turn often passed on to customers via price increases. By accessing alternative capital markets to efficiently finance economic redundancies imposed by overly punitive regulatory requirements, the firm creates shareholder value and minimizes, if not altogether eliminates, deadweight losses.

5. Application to Deal Selection

In this section, how to implicitly apply this framework to deal selection, that is, the demand for capital, without explicitly refinancing the supply of capital, is considered.

It has essentially been proposed that there is an appropriate and unique WACC for each particular composition of EC and RC. Specifically, risks that demand substantially less EC than RC should be granted lower hurdle rates because their inclusion in the portfolio does not marginally impose a significant solvency threat to the firm.

With that in mind, hurdle rates can be determined on a case-by-case basis, reflecting each deal's economic risk profile, rather than uniformly applying a single hurdle rate criterion for every deal acceptance. To illustrate this concept, a new deal with the following characteristics is considered in Table 6.

Table 6. Assumptions for Illustrative Deal

Item	Value
EC_{Going}	20
EC_{Gone}	30
RC_{Core}	30
RC_{Total}	40
$EBIT$	4

Notably, this deal has punitive RC requirements relative to its economic risk profile. Thus, the firm would need to hold debt totaling $D = RC_{Total} - RC_{Core} = 40 - 30 = 10$ and equity totalling $E = RC_{Core} = 30$ to adequately capitalize this deal. Evaluated with respect to a uniform hurdle rate (assuming the same cost of capital as the previous section), it would be concluded, as shown in Table 7, that:

Table 7. Hurdle Rate for New Deal Using Uniform Capital Costing

Tranche	Quantity	Cost of Capital
E	30	$k_e = 12\%$
D	10	$k_d = 6\%$
Total	40	$k_{WACC} = 10.5\%$

This implies that a deal should only be accepted if it yields at least 10.5%; however, the deal under consideration only yields $4/40 = 10\%$, and would hence be rejected under traditional hurdle rate analysis.

Applying the framework, $G_1 = RC_{Core} - EC_{Going} = 30 - 20 = 10$ and $G_2 = RC_{Total} - EC_{Gone} = 40 - 30 = 10$. Thus, actual cost of capital for the deal can be seen in Table 8.

Table 8. Hurdle Rate for New Deal Using Deal-Specific Capital Costing

Tranche	Quantity	Cost of Capital
E	20	$k_e = 12\%$
G_1	10	$k_{G1} = 9\%$
D	0	$k_d = 6\%$
G_2	10	$k_{G2} = 3\%$
Total	40	$k_{WACC} = 9\%$

From this perspective, the deal is economically accretive to the firm, given the outsize earnings relative to the economic capital at risk. This fact is obscured by the overly punitive regulatory capital requirements that render this deal underperforming.

Of course, without the explicit refinancing strategy proposed in this paper, management would have to convince shareholders to accept this deal at a lower hurdle rate, which, as discussed in Section 2, would likely not be accepted given the shareholders' ability to synthesize this position on their own. Nevertheless, conventional deal acceptance analysis has the potential to overlook economically accretive deals to the extent that hurdle rates overstate the economic risk profile of a particular deal. This leads to suboptimal capital deployment across the industry, insofar as all market participants reject an economically accretive deal due to punitive regulations.

This analysis evaluates one deal on a standalone basis, under the proposed framework. A natural extension, and an opportunity for further research, is to apply this concept marginally, that is, considering the impact of adding a particular deal to an existing portfolio. In this case, the appropriate hurdle rate will not only vary by the capital profile of the deal, but also by the portfolio to which is it added. The implication is intriguing and intuitive, namely that every firm will have different acceptance criteria for every deal, depending on their existing risk profile.

6. Implications and Impact to Key Stakeholders

In this section, the broader implications and impacts of the proposed framework to key stakeholders in the value chain are considered. The section starts with commentary on why this paradigm exists and then specifically discuss the perspectives of shareholders, debt capital markets, rating agencies, regulators and deposit/policyholders.

The general overcapitalization of the industry is, at least in part, an outcome of information asymmetry. External stakeholders do not have as accurate or sophisticated a perspective of the firm's risk profile as does the firm itself. As a result, regulatory and rating agency capital requirements tend to include a margin of conservatism and/or prudence to compensate. More robust risk disclosure, as propagated through initiatives such as the Internal Capital Adequacy and Assessment Process (ICAAP, for banks) and the Own Risk and Solvency Assessment (ORSA, for insurers), as well as the introduction of "Pillar 3" public risk disclosures under Basel III, Solvency II and other advanced supervisory regimes, will provide the capital markets with more relevant and insightful risk information. This will result in more appropriate risk capital pricing, and ultimately a convergence of a firm's WACC toward the paradigm presented in this paper.

For shareholders, the value proposition of this corporate finance optimization framework is clear: ROE is generated commensurate to the expected return, without having to fund economic redundancies that create a drag on profitability. The firm can repatriate equity capital previously locked in to fund these gaps and can in turn return this capital to shareholders and/or redeploy it more strategically. Overall, WACC for the firm is lowered, with the incremental cost of capital savings accruing to shareholders. Depending on the competitive landscape, shareholders also have the flexibility of passing on this value to customers.

For debt capital markets, the framework enables new asset tranches for investors. For the convertible debt arrangements proposed to fund G_1, investors can earn yield above the firm's straight debt offerings but are still cushioned by equity at the level expected by straight debt creditors. Recall that EC_{Going} is the amount of equity capitalization required to meet the firm's target debt rating; thus, investors in the G_1 tranche accrue economic profit to the extent that these securities yield higher than straight debt. Analogously, for the external securitization arrangements proposed to fund G_2, investors are cushioned by equity and debt at a level expected by deposit/policyholders. Thus, investors in the G_2 tranche accrue economic profit to the extent that these securities yield higher than an asset of comparable credit quality to the firm's target financial strength rating.

For rating agencies, the evidence of excess capital should imply that the firm's liabilities are more secure than its current debt and financial strength ratings imply. Indeed, as an alternative to the financing optimization presented in this paper, the firm can justifiably solicit a ratings upgrade such that its economic capital requirements are aligned with the regulatory requirements

(recall, at a higher target rating, the firm must hold EC at a higher percentile). In any case, this financing strategy does not put debtholder or deposit/policyholder funds at greater economic risk so the rating agencies should be impartial, at worst, or accommodating, at best.

For regulators, the firm is still adequately capitalized to their model specifications, with assets qualifying for the desired level of quality. On aggregate, deposits/policyholder reserves are still cushioned by the total amount of capitalization required by the regulator. Furthermore, creating this level of granularity and transparency in the capital structure will allow supervisors to identify where economic and regulatory views diverge, which will provide valuable insight into ongoing developments in capital requirements.

For deposit/policyholders, the case where the gaps are not efficiently funded will ultimately result in higher pricing. When shareholders are forced to fund economically redundant capital requirements, they will either have to accept a commensurately lower return or impose a higher cost of capital on customers. Of course, the latter will happen in the absence of price competition. By creating this alternate corporate finance structure, the firm can return the desired value to its investors without imposing these economically redundant costs on customers. Longer term, customers can benefit from this optimal funding arrangement as firms begin to pass on cost of capital savings downstream to bolster their competitive position.

In summary, economic redundancies imposed by overly punitive regulation creates deadweight losses, which are ultimately borne by some stakeholder in the value chain. By optimizing the corporate finance structure for the firm, these deadweight losses can be minimized or eliminated. This creates win-win outcomes for all stakeholders involved.

7. Conclusion

In this paper, the common and challenging paradigm in which a firm must capitalize itself beyond its economic assessment of risk due to regulatory requirements is examined. These economic redundancies, or gaps, impose a deadweight loss to the value chain.

A capital optimization framework in which these gaps are financed commensurate to their relative riskiness is proposed. It is demonstrated that this new corporate finance structure can lower weighted-average cost of capital, unlock idle capital and, ultimately, create economic value for shareholders.

Several simplifying assumptions were made to facilitate this analysis. In particular, the proposal would have a substantial impact on a firm’s cash flow profile, which was not discussed here. The framework effectively recommends increasing financial leverage; firms should be cognizant of increased interest expense as a result of this increased leverage, and the applicability of this strategy will vary on a case-by-case basis. Indeed, an opportunity for further analysis is to

impose leverage limits that realistically reflect the regulatory environment. The effects of corporate taxation were also ignored for simplicity; further analysis into the effects of the tax shield and the convexity of the tax rate would be insightful. Finally, the purpose of this paper was to illustrate the concept of this framework rather than demonstrate its practical implementation. Further research opportunities to apply this framework empirically are needed.

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