

RMI 655: Hypocom Case Analysis



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Executive Summary

This report evaluates HypoCom's risk exposures and provides recommendations to enhance the firm's FCFs and achieve its strategic goal of acquiring a competitor. The objective of risk management in this context is to determine the optimal risk management strategy to increase overall firm value through minimizing the cost of risk.

Our team analyzed five risk management options:

1. **No Risk Management:** Accepting all risk without mitigation.
2. **Fire Insurance Policy (A):** Separate policies for inventory and property damage, offering tailored coverage with specific premiums and deductibles.
3. **Fire Insurance Policy (B):** A bundled policy combining inventory and property coverage under a single plan with a higher aggregate deductible but broader limits.
4. **Steel Price Hedging:** A derivative-based solution to stabilize steel price volatility, providing payouts if prices exceed a specified threshold.
5. **Dual Trigger Insurance Policy:** A comprehensive solution covering fire damage and steel price volatility, triggered when both risks occur simultaneously, with a low premium cost.

After evaluating the cost-effectiveness, coverage, and financial implications of each option, we recommend: Option (2) Fire Insurance Policy (A): Separate Policies for Inventory and Property Damage. Our decision was guided by criteria such as Expected losses, correlations for the expected losses, and effect on net cashflows.

Managerial Problem Definition

HypoCom is seeking a risk management strategy to ensure its financial stability and ability to pursue strategic objectives, particularly that of acquiring a competitor to expand market share. The board has tasked us with evaluating the company's current risk exposures, determining their impact on firm value, and recommending optimal strategies to mitigate these risks effectively.

The primary objective is to manage HypoCom's risks in a way that maximizes Free Cash Flow while ensuring sufficient financial resources for the acquisition. Specifically, HypoCom must maintain an FCF of at least \$6 million to avoid borrowing. Borrowing imposes significant financial burdens due to high-interest costs and reputational risks tied to financial distress. A failure to secure the acquisition could result in severe competitive disadvantages.

Key challenges include:

- Fire Risk: A fire could damage existing property and inventory, thereby disrupting operations, reducing output, and negatively impacting cash flow.
- Steel Price Risk: Fluctuations in steel prices could increase costs or affect the market dynamics if lower prices attract new competitors.
- Union Strike Risk: Labor unrest, particularly in France, threatens production continuity.
- New Entrant Risk: The likelihood of new competitors entering the market could erode HypoCom's market share, especially under low steel price conditions.
- Correlations: Interdependencies among these risks could amplify their collective impact on FCF.

Constraints include:

- Maintaining production quality and delivery reliability.
- Avoiding financial distress penalties and safeguarding HypoCom's reputation.
- Balancing the cost and effectiveness of risk management strategies against their impact on firm value.

Our role as consultants is to quantify these risks, identify their interdependencies, and propose risk management strategies that optimize FCF while aligning with HypoCom's strategic goals.

Formulation and Solution Methodology

The objective of HypoCom is to **maximize firm value**, represented as **Net Cash Flow**. To achieve this, the objective of risk management is to **minimize the cost of risk**.

The firm's **NCF** can be expressed as:

$$\text{NCF} = \text{Revenue} - \text{Costs}$$

Where:

$$\text{Revenue} = P \cdot Q$$

- P: Price per unit (constant).
- Q: Quantity of units sold (random variable).

Solution Methodology for revenue:

- **Price per unit:** \$500
- **Quantity of units sold:** 40,000 was given as the expected quantity with company executives saying a 20% fluctuation in either direction of the forecast would not be surprising. So that made it safe to assume a normal distribution.
 - a. First, we used formula **=RiskNormal(0,0.2)** to calculate the distribution of quantity volatility.
 - b. Then to calculate quantity sold we used formula **=RiskOutput()+40000*(1+L5)** which is used in order to take into account the volatility calculation.

$$\text{So, Revenue} = \$500 * [=RiskOutput()+40000*(1+L5)]$$

$$\text{Revenue} = \$500 * 40,000$$

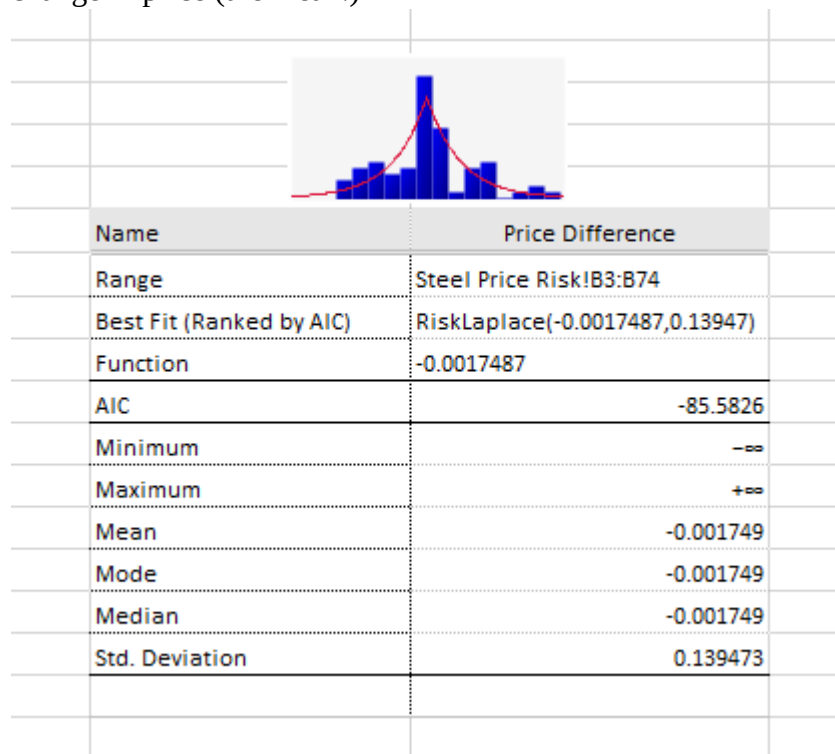
$$\text{Revenue} = \$20,000,000$$

Costs = (Fixed costs) + (Variable Costs) + (Risk of loss)

- Fixed costs (constant).
- Variable Costs (random variable).
- Risk of Loss (Random variable).

Solution Methodology for Costs

- **Fixed Costs:** \$2,000,000
- **Variable Costs:**
 - o Steel costs are Hypocom's only variable cost. To calculate them we needed 2 components:
 - First, Quantity of Steel (in pounds) being bought. Hypocom is buying 7,200 tons (2,000 lbs.) of steel.
 - $7,200 * 2,000 = 14,400,000$ pounds of steel
 - Second, Price of steel per pound. To calculate that we took the price of steel per pound from the year before of \$0.32 and added the expected change in price to that number. To get the expected change in price we took the data for price difference in steel from the years 1953-2023 (which has been adjusted for inflation, detrended, and seasonally adjusted) and used @Risk to get a best fit distribution, which then gave us the expected change in price (the mean.)



- Variable costs = $14,400,000 * (\$0.32 + (-0.001749))$
- Variable Costs = $14,400,000 * \$0.3183$

- **Variable Costs = \$4,582,818.72**
- Risk of Loss:
 - Costs associated with fire damage (random variable).
 - Fire frequency: Modeled as **=RiskFitDistribution(Fire!\$B\$2:\$B\$2201,1,, "AIC",RiskCorrmat(Matrix,1))**, producing a frequency of 0.14
 - Fire severity: Modeled as **=RiskFitDistribution(Fire!\$C\$2:\$C\$287,1,, "AIC")**, producing a severity of \$4.25M
 - Fire loss was determined to have property and inventory damage components, with direct and indirect losses for each. The direct property loss was modeled as Frequency multiplied by Severity, yielding a result of \$2.96M, while the indirect property loss was an estimated 25% of this value, \$0.74M. This is a total value of \$3.69M in property losses.
 - Indirect inventory loss due to fire was described as 25% of direct inventory losses. Fire inventory damage was modeled as **=RiskOutput() + (\$3.69 * 2.12) * 1.25 = \$9.79M**.
 - The total losses attributable to fire, including both property and inventory losses, were modeled as **\$2.96M + \$9.79M = \$13.48M**.
 - Direct fire losses in property are a 1:1 increase in Purchase of Fixed Assets, while direct fire losses in inventory are a 1:1 decrease in Cash From Revenue.
- Costs of a new entrant in the industry (random variable).
 - We chose to model the risk of new entrants in a similar way to the risk analysts of the project.
 - The frequency distribution can be modeled as:
 - =RiskPoisson(.6)
 - The severity distribution can be modeled as:
 - =Risklognorm(5500,100)
 - Then to combine these two distributions, we used a compound distribution:
 - =riskcompound(frequency, severity)
 - The total effect on revenue can be modeled by the product of revenue / unit and the compound distribution:
 - =riskoutput() + Compound distribution*-500
- Cost of Union strike effect (random variable).
 - We chose to model the risk of a union strike in line with the analysis done by the risk analysts.
 - The distribution of the length of a union strike was modeling using a triangle distribution in @risk
 - =Risktriang(0,5,14) which returned a mean of 6.3333
 - Next, we know that the loss of revenue / day is \$225,000, so we can multiply the distribution by -225,000 to create a distribution that reflects the costs of a union strike

- =riskoutput() + distribution of Union strike * revenue strike per day)
 - This value can be subtracted from overall cash flow to see the affect of union strike on cash flow
- Correlations of these risks:
 - To ensure we accounted for the correlations of the risks, we attached a correlation matrix to the following variables in our analysis:
 - The frequency distribution of fire risk
 - The frequency distribution of new entrant risk
 - The distribution of steel price risk
 - The distribution of union strike risk

0

	A	B	C	D	E
@RISK Correlations		Fire risk / Fire in \$B\$36	Price Difference in \$B\$51	Union strike r	New entrant risk / Fire in \$B\$16
Fire risk / Fire in \$B\$36		1.000			
Price Difference in \$B\$51		0.000	1.000		
Union strike risk / Fire in \$B\$29		0.200	0.000	1.000	
New entrant risk / Fire in \$B\$16		0.550	-0.350	0.700	1.000

Solution Methodology for Insurance Policies

- We produced a model of 2024 Pro Forma Cash Flow statements, while implementing the risks and additional costs of capital
 - We started by modeling the expected cash from revenue itself using a normal distribution and subtracted the expected effect of new entrants.
- To factor in the cost of capital we used the following formulas
 - The interest expense calculations are referencing the total cash flows before interest expense and financing penalties, and if that amount exceeds a certain threshold, the corresponding interest expense/financing penalty is added and then factored into the final calculation of cash flow after risk management.

Financing Costs			
Interest Expenses		\$ 375,000.00	
		\$ 375,000.00	=IF(\$L\$30<L42,M42,0)
		\$ -	=IF(\$L\$30<L43,M43,0)
		\$ -	=IF(\$L\$30<L44,M44,0)
Financing Penalties		\$ -	=IF(L30<L47,M47,0)
Net Cash Flow (After Risk Management and Financing)		\$ 4,904,629.25	
		less than	interest
		6000000	375000
		3500000	562500
		1000000	812500
		Financing Penalty	
		2000000	1500000

Next, we factored in the costs using the calculations provided in the Solution Methodology for Costs, producing the NCF before RM and Financing. In order to factor in RM we used each metric provided for each risk management option using @risk to simulate outputs. Finally, we factored in the cost of financing using the method shown above.

Risk Management options

Option (1) No Risk Management

2024 Pro Forma Cashflow Statement:

PRO FORMA CASH FLOW STATEMENT		2024 Projects
Cash from Revenue		
Quantity Sold		36,704.90
Disrtibution of quantity volatility		0
Price per unit		500
Cash from Revenue	\$	18,352,447.97
Cash Expenses		
Fixed Costs	\$	2,000,000.00
Variable Costs		
Steel		
Quantity of Steel (pounds)		14400000
Average Price of Steel over Year (per pound)	\$	0.3183
Total cost of steel	\$	4,582,818.72
Purchase of Fixed Assets	\$	3,693,980.35
Cash Expenses	\$	10,276,799.07
Other Losses		
New Entrant risk		-1647552.033
Union Strike Risk		-1425000
Total Fire Loss		3,783,047.94
Net Cash Flow (Before Risk Management and Financing)		\$ (4,785,951.08)
Risk Management		
Costs	\$	-
Indemnity Payouts	\$	-
Total Cash Flow Before Interest + Financing Penalties		\$ (4,785,951.08)
Financing Costs		
Interest Expenses	\$	1,750,000.00
	\$	375,000.00
	\$	562,500.00
	\$	812,500.00
Financing Penalties	\$	1,500,000.00
Net Cash Flow (After Risk Management and Financing)		\$ (8,035,951.08)

Option (2) Fire Insurance Policy (A): Separate Policies for Inventory and Property Damage

- Premium is \$430,000 for inventory coverage, with a per-occurrence deductible of \$500,000 and a limit of \$15.5M. The insurer will indemnify HypoCom for inventory damage caused by fire. The policy also covers all indirect costs associated with inventory loss.
- Premium is \$195,000 for property coverage, with a per-occurrence deductible of \$250,000 and a limit of \$5.25M. The insurer will indemnify HypoCom for structural property damage caused by fire. The policy also covers all indirect costs associated with property damage.

2024 Pro Forma Cashflow Statement:

PRO FORMA CASH FLOW STATEMENT			2024 Projects
Cash from Revenue			
	Quantity Sold		36,704.90
	Disrtibution of quantity volatility		0
	Price per unit		500
	Cash from Revenue		\$ 18,352,447.97
Cash Expenses			
	Fixed Costs		\$ 2,000,000.00
	Variable Costs		
	Steel		
	Quantity of Steel (pounds)		14400000
	Average Price of Steel over Year (per pound)		\$ 0.3183
	Total cost of steel		\$ 4,582,818.72
	Purchase of Fixed Assets		3,693,980.35
	Cash Expenses		\$ 10,276,799.07
Other Losses			
	New Entrant risk		-1647552.033
	Union Strike Risk		-1425000
	Total Fire Loss		3,789,047.94
Net Cash Flow (Before Risk Management and Financing)			\$ (4,785,951.08)
Risk Management			
	Costs		\$ 625,000.00
	Indemnity Payouts	=IF(ABS(L22)>500000,ABS(L22)-500000,0))+IF(L16>016,L16-016,0)	\$ 12,733,028.29
Total Cash Flow Before Interest + Financing Penalties			\$ 7,322,077.21
Financing Costs			
	Interest Expenses		\$ -
			\$ -
			\$ -
			\$ -
	Financing Penalties		\$ -
Net Cash Flow (After Risk Management and Financing)			\$ 7,322,077.21

Option (3) Fire Insurance Policy (B): Bundled Policy for Inventory and Property

The insurer will indemnify HypoCom for damage caused by fire, both structural property damage and damage to inventory. The policy also covers all indirect costs associated with a fire.

- Premium is \$590,000 for inventory AND property coverage, with an annual aggregate deductible of \$1.0M and a limit of \$30.0M

2024 Pro Forma Cashflow Statement:

PRO FORMA CASH FLOW STATEMENT			2024 Projects
Cash from Revenue			
	Quantity Sold		36,704.90
	Disrtibution of quantity volatility		0
	Price per unit		500
	Cash from Revenue		\$ 18,352,447.97
Cash Expenses			
	Fixed Costs		\$ 2,000,000.00
	Variable Costs		
	Steel		
	Quantity of Steel (pounds)		14400000
	Average Price of Steel over Year (per pound)		\$ 0.3183
	Total cost of steel		\$ 4,582,818.72
	Purchase of Fixed Assets		3,693,980.35
	Cash Expenses		\$ 10,276,799.07
Other Losses			
	New Entrant risk		-1647552.033
	Union Strike Risk		-1425000
	Total Fire Loss		3,783,047.94
Net Cash Flow (Before Risk Management and Financing)			\$ (4,785,951.08)
Risk Management			
	Costs		\$ 1,000,000.00
	Indemnity Payouts	= (IF (ABS (L22) + ABS (L16) > 590000, ABS (L22) + ABS (L16) - 590000, 0))	\$ 12,893,028.29
Total Cash Flow Before Interest + Financing Penalties			\$ 7,107,077.21
Financing Costs			
	Interest Expenses		\$ -
			\$ -
			\$ -
			\$ -
	Financing Penalties		\$ -
Net Cash Flow (After Risk Management and Financing)			\$ 7,107,077.21

Option (4) Steel Price Hedging

By working with an investment bank, the firm has found that it can access the derivative markets to secure a steel risk management contract. The contract costs \$250,000 upfront. If the price of steel rises above \$0.42 per pound during the year, the contract will pay \$144,000 for every \$0.01 above \$0.42 per pound. So, for example, if the average price of steel in the year is \$0.43, then the contract will pay off \$144,000. If the average price of steel is \$0.47, then the contract pays off \$720,000

2024 Pro Forma Cashflow Statement:

PRO FORMA CASH FLOW STATEMENT				2024 Projects
Cash from Revenue				
	Quantity Sold			36,704.90
	Disrtibution of quantity volatility			0
	Price per unit			500
	Cash from Revenue			\$ 18,352,447.97
Cash Expenses				
	Fixed Costs			\$ 2,000,000.00
	Variable Costs			
	Steel			
	Quantity of Steel (pounds)			14400000
	Average Price of Steel over Year (per pound)			\$ 0.3183
	Total cost of steel			\$ 4,582,818.72
	Purchase of Fixed Assets			\$ 3,693,980.35
	Cash Expenses			\$ 10,276,799.07
Other Losses				
	New Entrant risk			-1647552.033
	Union Strike Risk			-1425000
	Total Fire Loss			3,789,047.94
Net Cash Flow (Before Risk Management and Financing)				\$ (4,785,951.08)
Risk Management				
	Costs			\$ 250,000.00
	Indemnity Payouts	=IF(L14>0.9,0.10*((0.9-L14)/0.1),0)		\$ -
Total Cash Flow Before Interest + Financing Penalties				\$ (5,035,951.08)
Financing Costs				
	Interest Expenses			\$ 1,750,000.00
				\$ 375,000.00
				\$ 562,500.00
				\$ 812,500.00
	Financing Penalties			\$ 1,500,000.00
Net Cash Flow (After Risk Management and Financing)				\$ (8,285,951.08)

Option (5) Dual Trigger Insurance Policy

This policy covers fire damage (inventory and property, direct and indirect) and a steel hedge if both of the events below occur:

- The spot price of steel is over \$0.35 per pound, **AND**
- A fire causes more than \$250,000 in total damage (inventory and property, direct and indirect)
- If **Both** of these events occur, then the policy will pay:
 - o For ALL losses from fire (inventory and property, direct and indirect) above a \$250,000 annual aggregate deductible, and
 - o \$144,000 for every \$0.01 above a steel price of \$0.35 per pound
- The Premium is \$65,000

2024 Pro Forma Cashflow Statement:

PRO FORMA CASH FLOW STATEMENT		2024 Projects
Cash from Revenue		
Quantity Sold		36,704.90
Disrtibution of quantity volatility		0
Price per unit		500
Cash from Revenue		\$ 18,352,447.97
Cash Expenses		
Fixed Costs		\$ 2,000,000.00
Variable Costs		
Steel		
Quantity of Steel (pounds)		14400000
Average Price of Steel over Year (per pound)		\$ 0.3183
Total cost of steel		\$ 4,582,818.72
Purchase of Fixed Assets		\$ 3,693,980.35
Cash Expenses		\$ 10,276,799.07
Other Losses		
New Entrant risk		-1647552.033
Union Strike Risk		-1425000
Total Fire Loss		3,789,047.94
Net Cash Flow (Before Risk Management and Financing)		\$ (4,785,951.08)
Risk Management		
Costs		\$ 65,000.00
Indemnity Payouts		\$ -
Total Cash Flow Before Interest + Financing Penalties		\$ (4,850,951.08)
Financing Costs		
Interest Expenses		\$ 1,750,000.00
		\$ 375,000.00
		\$ 562,500.00
		\$ 812,500.00
Financing Penalties		\$ 1,500,000.00
Net Cash Flow (After Risk Management and Financing)		\$ (8,100,951.08)