

Currency Management

by J-F Courville
State Street Associates / State Street Bank and Trust
Company

Canadian Investment Review Conference
Montebello, Quebec
August 2001

Currency Management

1. Why hedge currencies?

- Decoupling the risk components
- The diversification argument
- Efficient risk control
- Currency hedging and the risk of loss
- Measuring currency and portfolio risks

2. Establishing a currency management policy

- Setting a currency benchmark
- Implementing and evaluating a currency overlay program

Decoupling the risks

International investing decisions based on a combination of asset underlay and currency decisions together lead to sub-optimal portfolio decisions

fi Often the conditions that positively affect the underlying asset are negative for the currency and vice versa

fi Currencies offer zero expected returns, therefore introducing uncompensated risk

Solution: Separate the underlying asset decision and the currency decision by hedging

The diversification argument

“The reason I chose to invest overseas in the first place was to diversify my portfolio. Part of that diversification arises from exposure to currencies. Therefore, why should I hedge that currency exposure?”

The diversification argument

Many investors underestimate the correlations through a failure to measure risk and returns from a base currency perspective.

If:

$$s_L = .10$$

$$s_C = .10$$

$$r_{L,C} = 0$$

Then:

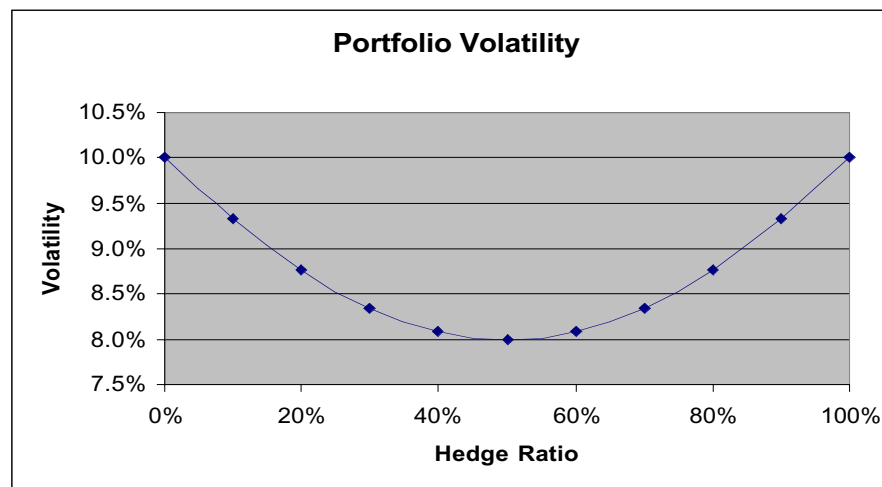
$$r_{FA,C} = (r_{L,C} \times s_L + s_C) / s_{FA} = .71$$

Since so much of the risk and return of the base currency denominated foreign asset is explained by the currency, it is logical for the correlation to be substantial. The diversification effect of currencies is thus overestimated.

Efficient Risk Control

The minimum risk exposure to a currency forward contract equals

$$- \text{Correlation} \times \frac{\text{Portfolio Standard Deviation}}{\text{Currency Standard Deviation}} = - \text{Beta}$$



$$\begin{aligned} r &= .60 \\ s_P &= .10 \\ s_C &= .12 \end{aligned}$$

Efficient Risk Control

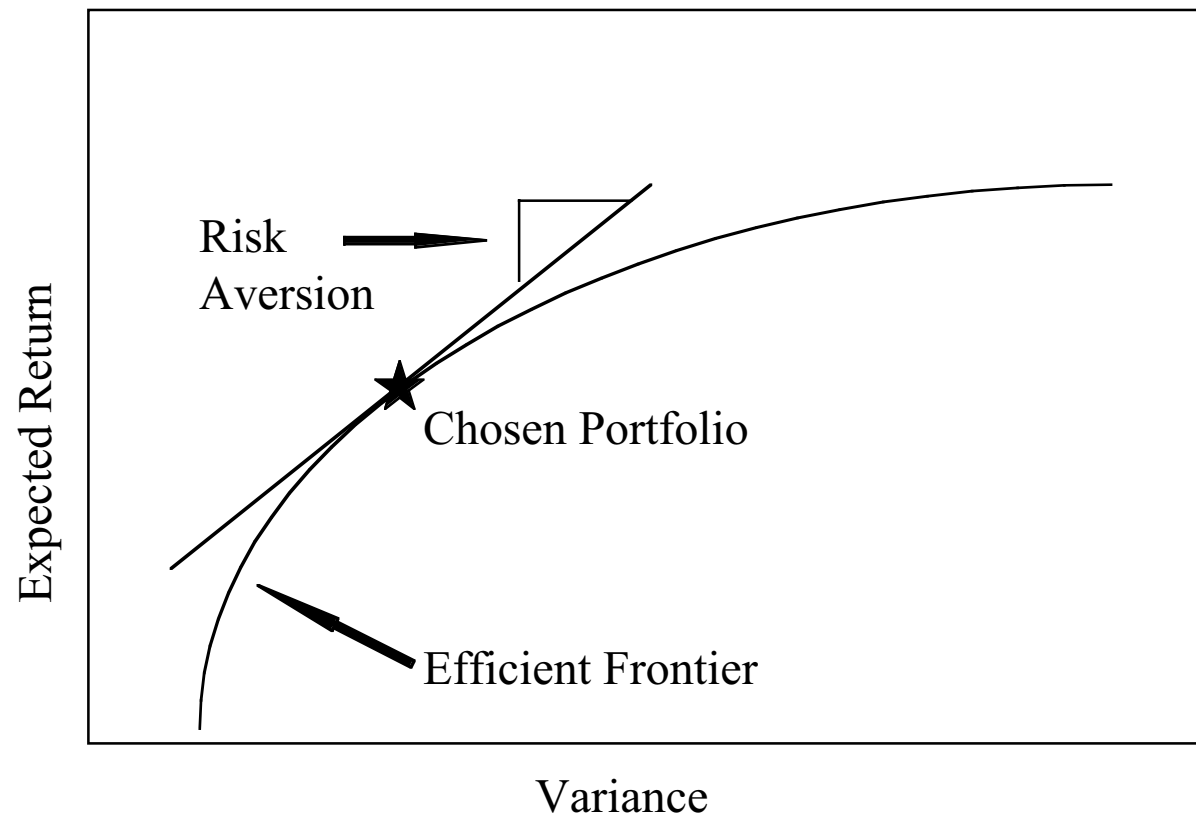
The optimal currency hedging policy does not minimize risk. It balances risk reduction with the cost of hedging by maximizing:

$$\text{Expected return} - \text{Risk Aversion} \times \text{Standard Deviation}^2$$

Process

- Determine investor's risk aversion.
- Estimate hedging costs and forward contract variances and covariances.
- Solve for forward contract exposures that maximize the above quantity.

Efficient Risk Control



Efficient Risk Control

- ¥ Whereas the choice of a portfolio implicitly answers the following question:
How many units of expected return are you willing to give up in order to lower your portfolio's risk by one unit?
- ¥ A rational currency hedging policy answers the following question:
How many units of currency hedging costs are you willing to incur in order to lower your portfolio's risk by one unit?
- ¥ A rational approach ensures that both questions are answered consistently.

Currency Hedging and the Risk of Loss

The most common retort to hedging currency exposure is:

Currency returns wash out over the long run.

Currency Hedging and the Risk of Loss

Do currency returns wash out over the long run?

USD/GBP

1860: 7.39

2001: 1.42

USD/CAD

1991: 1.1190

2001: 1.5400

Currency Hedging and the Risk of Loss

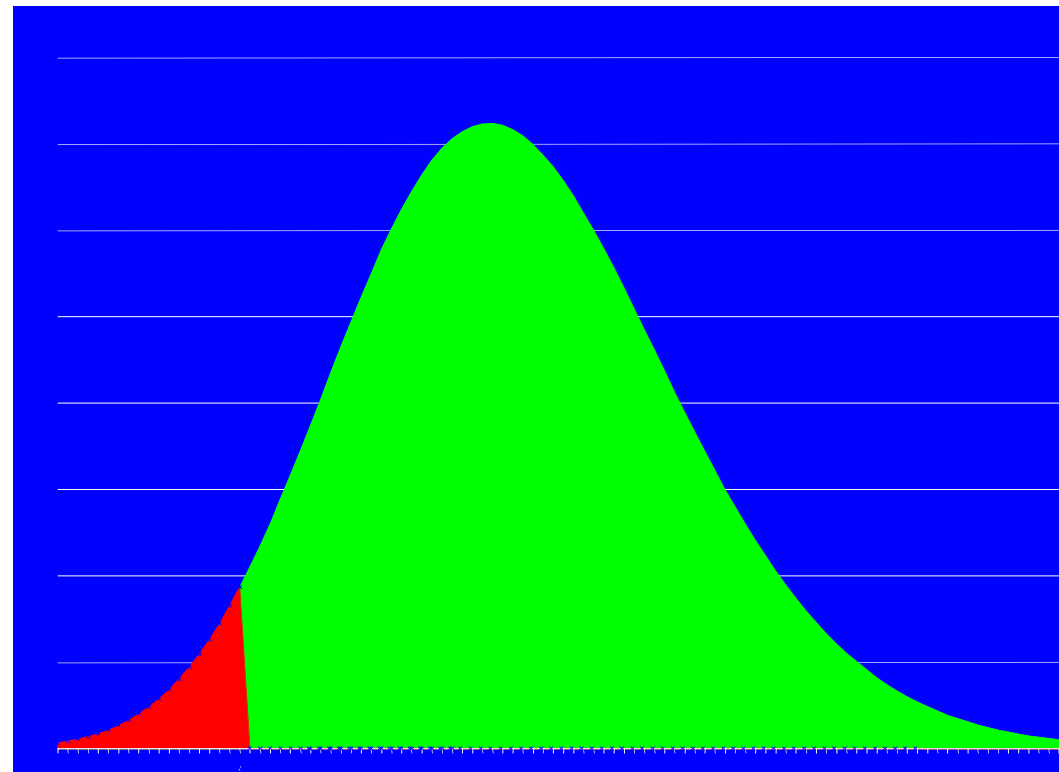
In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean will be flat.”

John Maynard Keynes

Currency Hedging and the Risk of Loss

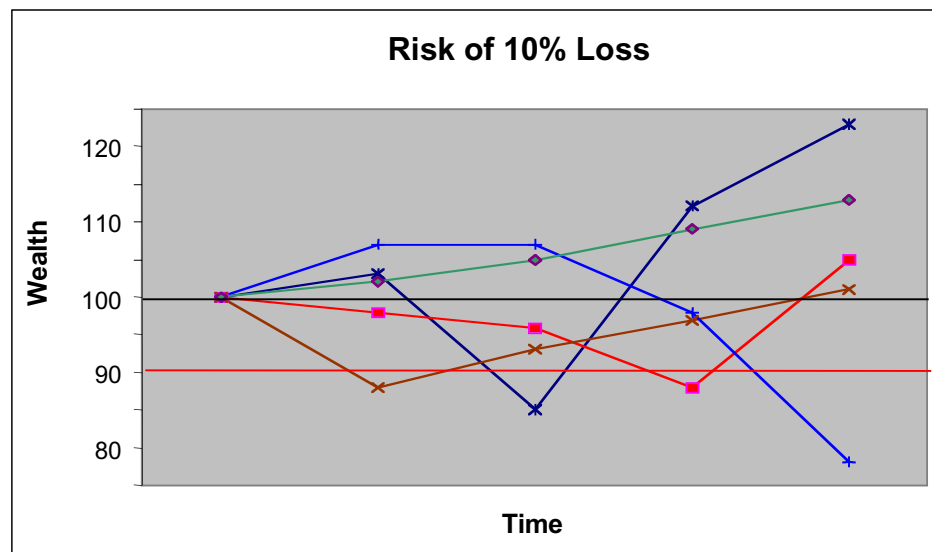
Ending Wealth Distribution

Probability



Ending Wealth

Currency Hedging and the Risk of Loss



Currency Hedging and the Risk of Loss

Probability of Loss:

$$N[(\ln(1+L) - \mu T) / (s \sqrt{T})] + \frac{(1+L)^{2\mu/s^2}}{1} N[(\ln(1+L) + \mu T) / (s \sqrt{T})]$$

Continuous Value at Risk:

Solve for L at given probability

Currency Hedging and the Risk of Loss

Japanese Stocks, Bonds, and Currency Return and Risk Assumptions

	Expected Return	Standard Deviation	Correlations		
			Stocks	Bonds	JPY
Japanese Stocks	10.00%	21.87%	100.00%		
Japanese Bonds	5.00%	16.01%	42.01%	100.00%	
JPY	0.00%	14.81%	53.58%	91.08%	100.00%

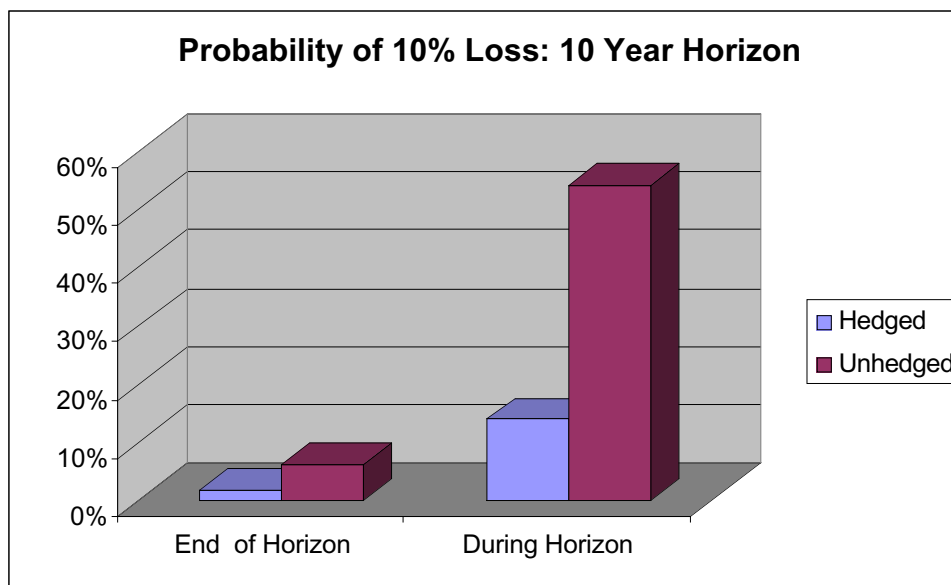
Currency Hedging and the Risk of Loss

Japanese Stock and Bond Portfolio (50/50) Optimally Hedged versus Unhedged

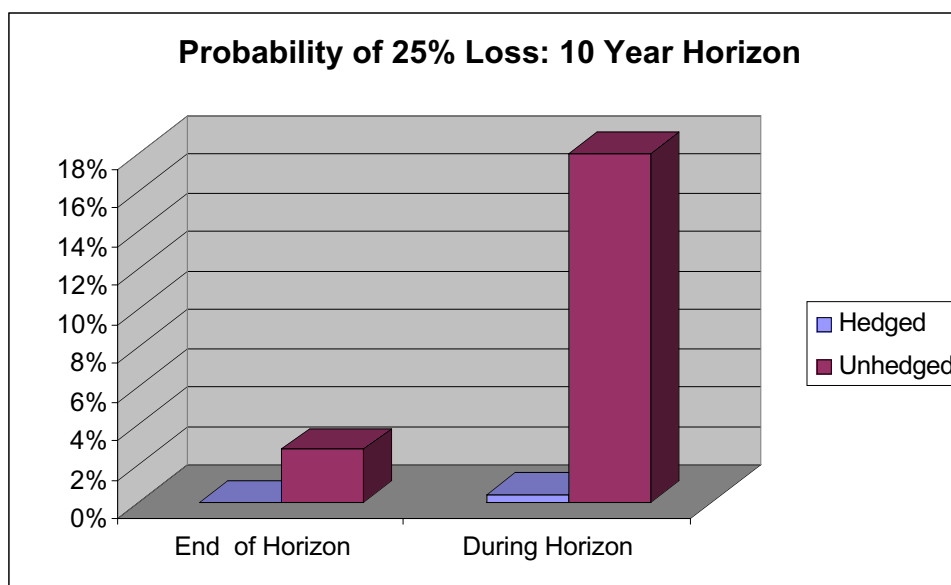
	Unhedged	87.72% Hedged
Expected Return	7.50%	7.41%
Standard Deviation	16.04%	9.17%

Hedging costs 10 basis points
Risk aversion 1

Currency Hedging and the Risk of Loss



Currency Hedging and the Risk of Loss



Establishing a currency management policy

1. Setting a currency benchmark

- A uniform currency benchmark (0%, 50%, 100%, somewhere in between)

or better

- An optimal currency benchmark (free the constraints and set on a currency-specific basis, considering optimality and hedgeability)

Establishing a currency management policy

2. Implementing the currency program

- Active management
- Passive management
- Manager diversification?

Summary

- ¥ Currency exposure introduces both diversification and volatility to a portfolio.
- ¥ The optimal currency hedge ratio balances risk reduction with hedging costs.
- ¥ An appropriate measure of risk is needed when considering currencies: a more realistic VAR measure.
- ¥ Optimal currency hedging reduces within horizon risk substantially over long horizons even if currency returns cancel out over the long run.