

International Finance

Session 5 — Financial Institutions and Firms: International Portfolio Investment

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One portfolio, twelve countries

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- Adjusted for risk, the international portfolio wins in **every one of the twelve countries** studied.

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- More return and more risk — so the comparison needs a measure that handles both at once.
- Adjusted for risk, the international portfolio wins in **every one of the twelve countries** studied.
- Today is about why that gain exists, how large it is, and what stops investors from taking it.

Where we are

Sessions 3 and 4 went through the **instruments**. We now turn to the **institutions** that hold them, and the first question is how anyone should hold a portfolio at all.

Today:

1. **International portfolio investment**
— risk reduction, the optimal portfolio,
exchange-rate effects and the limits

Next session:

2. Mutual funds · 3. Muñoz (2020) · 4. Insurance · 5. Investment firms ·
3. Bank management · 7. Economic efficiency

One question runs through all of it: **why does an intermediary exist at all?**

Everything an institution does, an investor could in principle do alone — so each institution has to earn its place.

1 · International portfolio investment

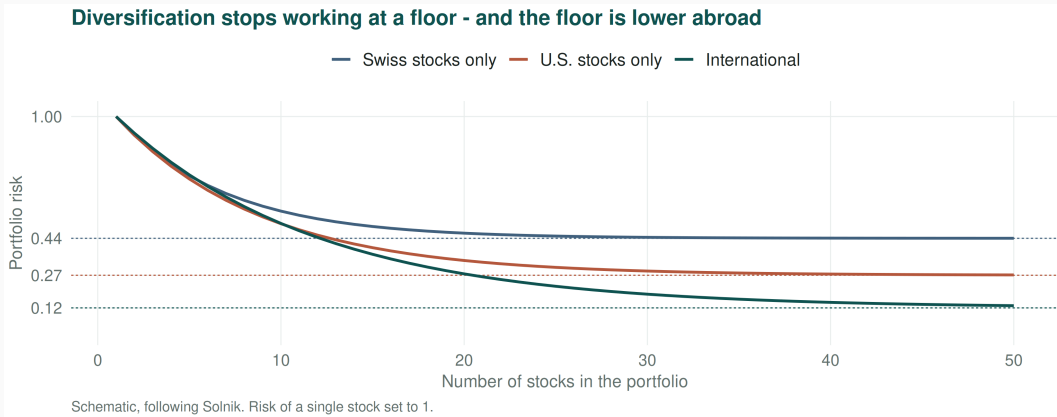
1 · Why diversification works

Portfolio risk falls as you add securities, but only because their returns do not move together. **Correlation**, not the number of holdings, does the work.

Average correlation of monthly stock returns, **within** a country (on the diagonal) and **between** countries:

	AU	FR	DE	JP	NL	CH	UK	US
Aus- tralia	0.586							
France	0.286	0.576						
Ger- many	0.183	0.312	0.653					
Japan	0.152	0.238	0.300	0.416				
Nether- lands	0.241	0.344	0.509	0.282	0.624			

1 · How far risk falls



Keep adding stocks and risk falls — but only to a floor. What remains is **systematic risk**: the part no amount of diversification removes.

1 · Measuring performance

The **world beta** measures how sensitive a national market is to world market movements — the systematic part, which diversification cannot remove.

The **Sharpe performance measure** puts return and risk in one number: excess return per unit of total risk.

$$SHP_i = \frac{\bar{R}_i - R_f}{\sigma_i}$$

- $\bar{R}_i$ — mean return of market i
- σ_i — standard deviation of those returns
- R_f — the risk-free rate (US Treasury bill)

Monthly, 1980–2007:

Market	Mean	SD		SHP
Sweden	1.67	7.11	1.17	0.168
Netherlands	1.35	5.19	0.99	0.167
United States	1.11	4.25	0.88	0.149
Hong Kong	1.54	8.77	1.06	0.121
France	1.20	6.00	1.04	0.121
Japan	0.92	6.53	1.10	0.067

1 · The optimal portfolio

Investors prefer more wealth to less and dislike risk. With a risk-free asset available, the best portfolio of risky assets is the one that **maximises the Sharpe ratio**:

$$\max(SHP_{op}) = \frac{\bar{R}_{op} - R_f}{\sigma_{op}}$$

With two risky assets A and B:

Substituting and maximising with respect to the weights gives

$$\bar{R}_{op} = x_A \bar{R}_A + x_B \bar{R}_B$$

$$\sigma_{op} = [x_A^2 \sigma_A^2 + x_B^2 \sigma_B^2 + 2x_A x_B \sigma_{AB}]^{1/2}$$

$$x_A = \frac{(\bar{R}_A - R_f)\sigma_B^2 - (\bar{R}_B - R_f)\sigma_{AB}}{(\bar{R}_A - R_f)\sigma_B^2 + (\bar{R}_B - R_f)\sigma_A^2 - 2(\bar{R}_A - R_f)\sigma_{AB}}$$

$$x_B = 1 - x_A$$

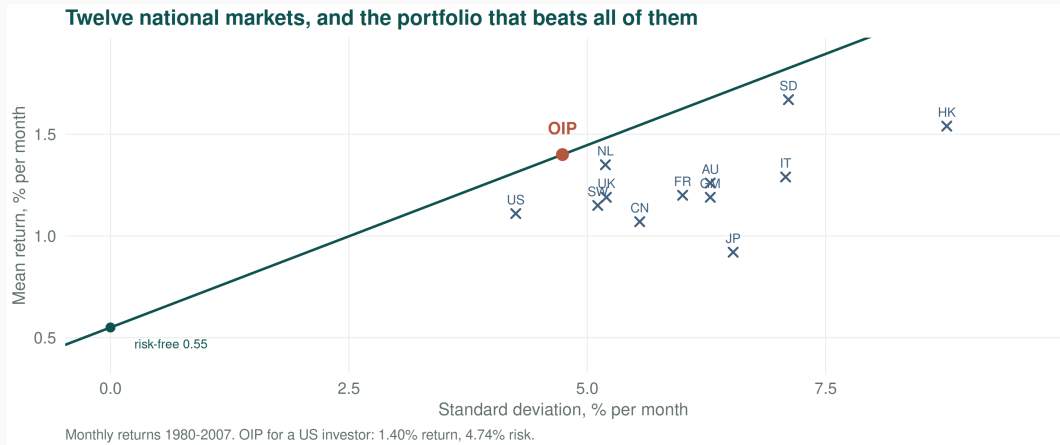
1 · Problem 5.1

For 1980.1–2001.12, monthly, in percent, for the US and Netherlands indexes:

$$\bar{R}_{US} = 1.26, \sigma_{US}^2 = 19.62 \cdot \bar{R}_{NL} = 1.38, \sigma_{NL}^2 = 26.52 \cdot R_f = 0.55 \cdot \\ \sigma_{US,NL} = 14.14$$

1. What is the optimal international portfolio?
2. What are its expected return and risk?
3. What is its Sharpe performance?
4. How does that compare with the US alone?

1 · The efficient set, drawn



1 · What the optimal portfolio holds

For a **US investor**, the optimal international portfolio over 1980–2007:

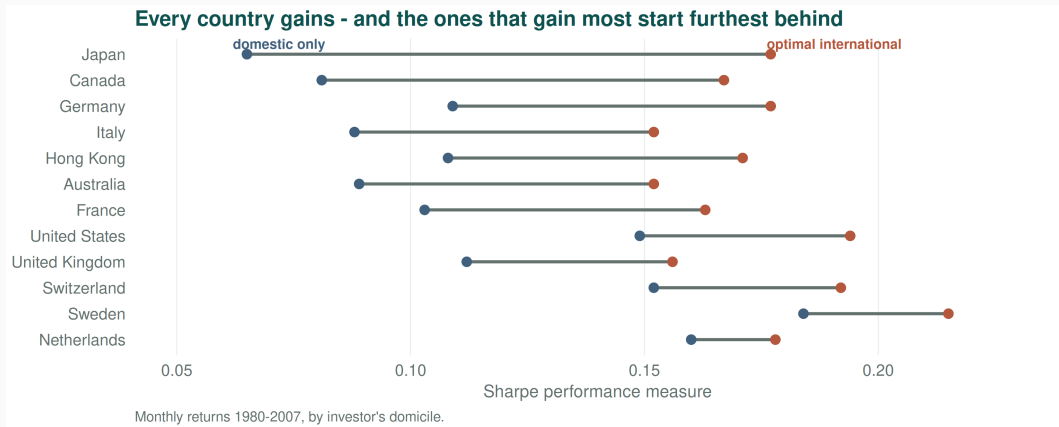
Market	Weight
Netherlands	31.11%
Sweden	28.01%
United States	20.70%
Hong Kong	8.76%
Italy	6.60%
Australia	4.82%
Total	100%

Three things to notice:

- Only **six** of the twelve markets appear at all. The others add nothing once these are held.
- The investor's **own market is a fifth** of the portfolio, not the whole of it.
- The weights are **not** proportional to market size. Sweden is a small market with a large weight, because its returns were high and only loosely correlated with the rest.

The composition differs by the investor's **domicile**, because each investor's home market is already in their portfolio.

1 · The size of the gain



1 · The exchange rate comes with it

A US resident investing abroad earns the foreign return **and** whatever the currency does:

$$R_{i\$} = R_i + e_i + R_i e_i \quad \text{since} \quad 1 + R_{i\$} = (1 + R_i)(1 + e_i)$$

where R_i is the local-currency return and e_i the change in the exchange rate — positive when the foreign currency **appreciates** against the dollar.

The currency affects **risk** through three separate channels:

$$Var(R_{i\$}) = Var(R_i) + Var(e_i) + 2 Cov(R_i, e_i) + \Delta Var$$

its own volatility, its **covariance** with the local market, and the cross-product term.

1 · Problem 5.2

A US resident has just sold shares in a British firm. The shares returned **15%** in pounds, over a period in which the pound **depreciated 5%** against the dollar.

What is the dollar return, in percentage terms?

1 · Other ways to get there

International bonds. Less studied than equities, and exchange risk makes the gains hard to realise — though **currency forwards** can hedge most of it away.

International mutual funds.

Diversification bought at home: no extra transaction or information costs, no legal barriers, and professional managers.

Country funds. Invest in a single foreign market — useful for building your own allocation, or for reaching markets otherwise closed.

ADRs. Foreign shares repackaged to trade on a US exchange, in dollars.

ETFs. Track a foreign index and trade like a single stock.

Hedge funds. Privately pooled, aggressive and flexible — leverage, short positions, derivatives, across currencies, bonds, stocks, commodities and property. Sought for **absolute** returns, whether markets rise or fall, with the risk that entails.

1 · Problem 5.3

US-based international mutual funds, against the S&P 500 and the US MNC index, monthly over 1977–1986:

	Mean return	SD	β_{US}
US-based international mutual funds	1.58	5.78	0.69
S&P 500	1.17	4.25	1.00
US MNC index	1.34	4.38	0.98

What is your analysis of their relative performance?

The US MNC index holds the 60 US multinationals with the highest share of international revenue.

1 · Why almost nobody does it

Home bias. Investors hold far more domestic equity than any model recommends. Four explanations are offered:

- Domestic securities provide services foreign ones do not, such as **hedging domestic inflation**.
- **Barriers**, formal and informal — legal, administrative, transaction and information costs, taxes.
- The **prudent man rule**: institutions may simply be forbidden to hold more than a set fraction abroad.
- It may be fading, as markets integrate and country funds and international

Large-cap bias. Portfolios that do go abroad concentrate in large firms — and large firms are the worst vehicle for the job.

- Large caps are typically **multinationals**, with foreign customers and investors, so their returns are driven by **common global factors** and are highly correlated.
- **Small-cap** firms are driven by **local** factors, so they are the more effective instrument for international diversification.

Session 6 continues the chapter: **mutual funds**, the **Muñoz (2020)** reading, **insurance companies**, **investment firms**, **bank management** and **economic efficiency**.

Read **Muñoz (2020)** on the boards of socially responsible mutual funds before the session. The discussion is assessed.

Press **O** for the slide overview · **C** to draw · **S** for speaker notes · **F** for fullscreen · **E** then print for a PDF of the slides.