

INTERNATIONAL FINANCE



MGMT 957

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No, I don't understand my husband's theory of relativity,
but I know my husband, and I know he can be trusted.

Elsa Einstein

It is theory that decides what can be observed.

Albert Einstein

Capital Asset Pricing Model	2
The Market Model	3
The Fama-French Three Factor Model.....	5
Momentum.....	7
Value, Size, Momentum at a Glance	10
Home Bias.....	11
Discussion Article.....	13
Practice Problem Set with Solutions—Butler Ch. 21	17

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CAPITAL ASSET PRICING MODEL

Assumptions

- 1) **Perfect, frictionless** financial markets (no taxes, no transaction costs, no short-sale constraint, securities are perfectly divisible)
- 2) Investors are **rational mean-variance optimizers** with **equal horizon** and **equal access to costless information** and market prices. They are **price takers**.
- 3) **Homogeneous** expectations
- 4) Everyone can borrow and lend at a **fixed riskless rate** of interest, r_F

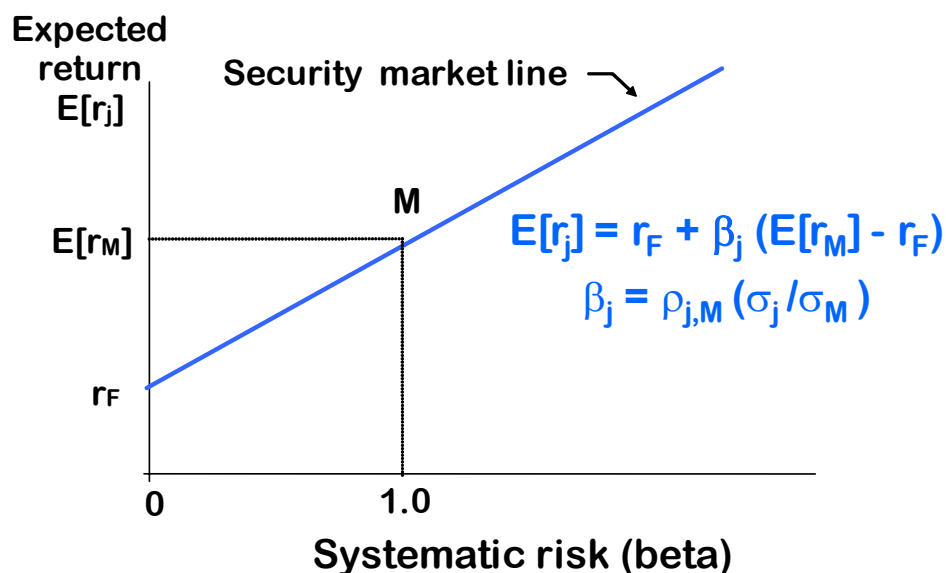
❖ **Q1.** What does “price takers” mean?

❖ **Q2.** What does “homogeneous expectations” imply? Is this likely to hold, especially in an international context?

CAPM gives a **linear** relation between a security’s expected excess return (security/portfolio j) and the expected excess return on the market portfolio, M :

$$E[r_j] - r_f = \beta_{j,M}(E[r_M] - r_f)$$

This relation is called the **security market line** when plotted.

The Security Market Line

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- **Standard deviation** σ_j is an appropriate risk measure for asset j if it is the **only** asset traded.
- If there are multiple assets, **beta** is a more appropriate measure of risk.
- An asset with a **high beta** offers a higher return when the market does well, but it does not provide insurance when you most need it—when the market goes down, we need more money, but the price of a high beta asset also declines. Such an asset is **risky** in this sense.
- Thus, a **high beta** asset is less useful in hedging your wealth, and therefore must offer **higher expected return** to induce investors to hold it. This is the idea underlying the **CAPM**.

THE MARKET MODEL

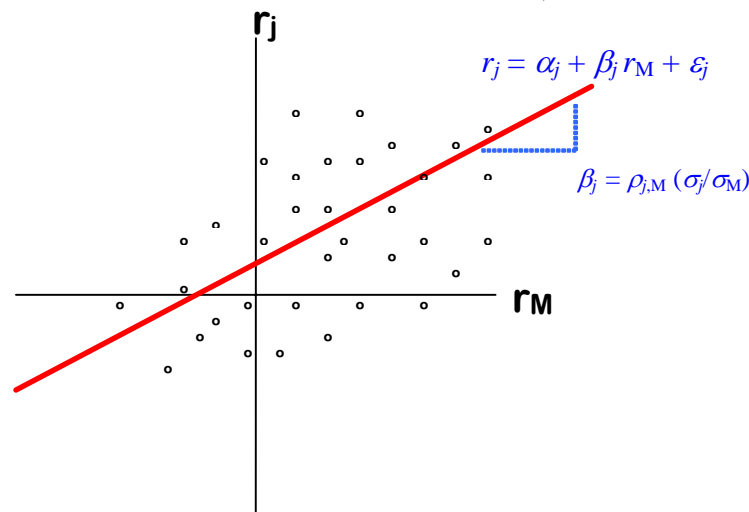
This can be thought of as an empirical implementation of CAPM (any test of CAPM is subject to Roll's critique, though). Beta can be estimated by a **market model**,

$$r_j - r_f = \alpha_j + \beta_j (r_M - r_f) + \varepsilon_j$$

where, assuming r_f is constant,

$$\begin{aligned} \beta_j &= \text{cov}(r_j, r_M) / \text{var}(r_M) \\ &= \rho_{j,M} \sigma_j / \sigma_M \end{aligned}$$

where $\rho_{j,M}$ is the correlation coefficient between r_j and r_M (the same beta as CAPM).



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“Dollar to Rally—Or Retreat” – WSJ 7/29/2004

- ❖ “Even the relatively small shifts in **currencies** so far this year have had an **impact** on other investments. Take the **German stock market**. This year through Tuesday, it is **down 4.8% in euro terms**, ... But **to an American** who tallies wins and losses in dollars, that **deficit widens to 8.9%** because the **dollar has strengthened**... Similarly, the **Tokyo market’s 5.3% rise** expands to **6.4% for a resident of one of the 12 euro-zone countries**, but **shrinks to 1.8% in dollar returns**.”

Volume:

- ❖ “... the **\$1.2 trillion-a-day global foreign exchange market** has been stoic as a mule.”
 - The latest statistic shows **\$1.9 trillion daily so far in 2005**.

Volatility:

- ❖ “... that hasn’t stopped economists, strategists, and other prognosticators from predicting that a **big breakout for the dollar is imminent**—and that a **big rally or a big retreat** is in store. Needless to say, **they disagree** on which.”
 - **Question**. This means the dollar is expected to be **highly volatile** against other currencies. If you want to speculate using **options**, what will be your strategy?

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THE FAMA-FRENCH THREE FACTOR MODEL

Fama and French propose an empirical version of **APT** or **ICAPM** (intertemporal, not international) that explains stock returns:

$$r_t - r_F = a + b_1MKT_t + b_2SMB_t + b_3HML_t + \varepsilon_t$$

where

- ◆ MKT_t is the excess return on the market portfolio
- ◆ SMB_t is the difference between the small and big **size** stock returns
- ◆ HML_t is the difference between the high and low **book-to-market** (B/M) stock returns (**value** vs. **growth**; this represents relative **financial distress**)

Fama & French, 1993, "Common Risk Factors in Stock and Bond Returns,"
Journal of Financial Economics, 33, 3-56.

These factors were identified in their previous paper. There, they find that the relative financial distress is also proxied by

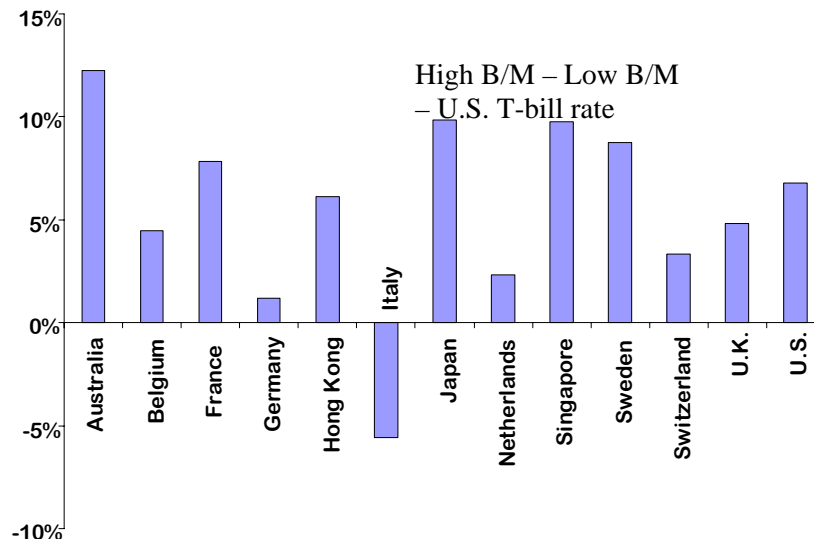
- ◆ **Earnings/price ratio** (E/P)
- ◆ **Cash flow/price ratio** (C/P)

Fama & French, 1992, "The Cross-Section of Expected Stock Returns," *Journal of Finance*.

Value Premium in International Markets

- Fama and French extended their study to **international** stocks
 - ◆ **Value** stocks have higher mean returns than growth stocks in 12 of 13 international markets
 - ◆ The average difference in mean return is 7.60% per year

Value premium in excess of the U.S. T-bill rate



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➤ Based on this finding, they test:

- ◆ whether CAPM can explain the average returns on **global** value and growth portfolios
- ◆ whether APT or ICAPM can explain them

CAPM Regression

$$R - F = a + b[M - F] + e(t)$$

R - F	a	b	t(a)	t(b = 1)	R ²	s(e)
HB/M	0.41	0.94	4.29	-2.50	0.88	1.48
HE/P	0.32	0.95	3.96	-2.58	0.91	1.25
HC/P	0.31	0.93	3.59	-3.43	0.89	1.37
HD/P	0.29	0.87	3.77	-6.80	0.90	1.22
LB/M	-0.21	1.03	-4.02	2.85	0.97	0.81
LE/P	-0.23	1.04	-4.27	3.57	0.96	0.83
LC/P	-0.28	1.01	-3.84	0.44	0.93	1.13
LD/P	-0.22	1.07	-3.49	4.41	0.95	1.00

R - F is the average excess global portfolio return, formed on the basis of book-to-market equity (B/M), earnings/price (E/P), cash flow/price (C/P), or dividend/price (D/P). The leading H and L denote value (high) and growth (low) portfolios, respectively. M - F is the excess global market return.

❖ **Q3.** If CAPM is correct, what would you expect about the intercept in the above regression?

APT/ICAPM Regression

$$R - F = a + b[M - F] + c[H - LB/M] + e(t)$$

R - F	a	b	c	t(a)	t(b = 1)	t(c)	R ²	s(e)
HB/M								
HE/P	0.04	0.99	0.45	0.72	-0.62	20.09	0.97	0.77
HC/P	-0.00	0.98	0.51	-0.02	-1.97	21.95	0.96	0.80
HD/P	0.10	0.90	0.32	1.46	-6.23	10.80	0.93	1.01
LB/M								
LE/P	-0.07	1.02	-0.26	-1.63	2.26	-14.67	0.98	0.61
LC/P	-0.16	0.99	-0.19	-2.27	-0.62	-6.28	0.94	1.05
LD/P	-0.03	1.04	-0.31	-0.64	3.37	-14.45	0.97	0.74

H-LB/M represents returns on high B/M minus low B/M stocks.

Fama & French, "Value versus Growth: The International Evidence," Journal of Finance, December 1998.

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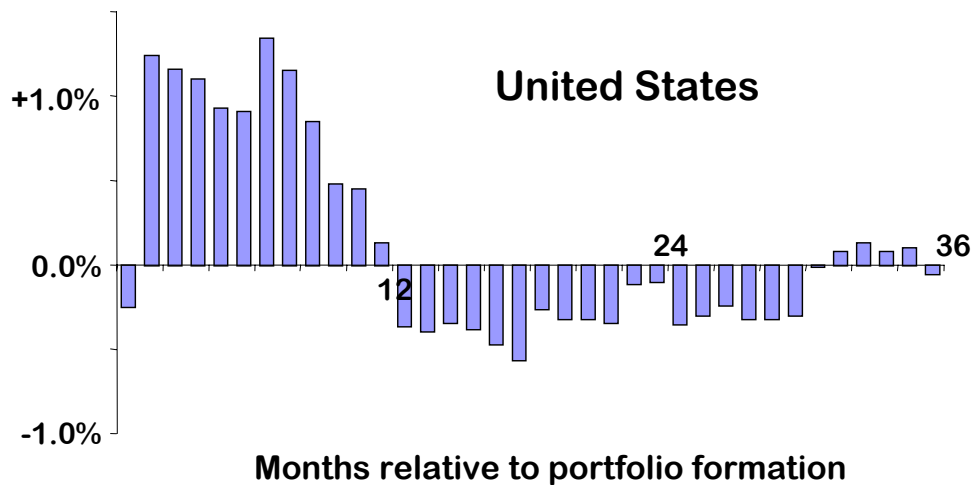
MOMENTUM

Jegadeesh & Titman categorized stocks into 10 equal-sized portfolios according to return over the **preceding** 6 months and measured return after the portfolio formation for various holding periods. Their strategy is to:

- **Buy winners** - stocks with the **highest** return over the preceding 6 months
- **Sell losers** - stocks with the **lowest** return over the preceding 6 months

Momentum Profits

mean monthly return
(winners - losers)



- **Short-term Momentum (return continuation)**
 - ◆ Over the **first twelve months**, portfolios formed on past winners realized cumulative returns that were 9.5 percent greater than returns to the portfolio of losers.
- ❖ **Q4.** Is this consistent with market efficiency?
- ❖ **Q5.** As a behavioral explanation, which is consistent with momentum, investor overreaction or underreaction?

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➤ **Long-run Reversal**

- ◆ This Winner-over-Loser pattern subsequently reversed itself, with the winners giving up more than half of their accumulated gain over losers **during the next 16 months**.

Jegadeesh & Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," Journal of Finance, March 1993.

Momentum in International Markets

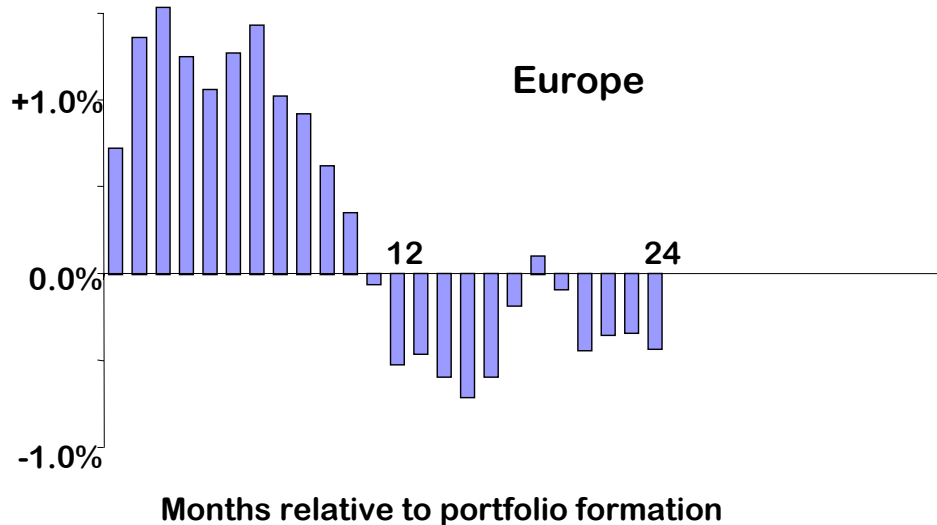
Rouwenhorst examined momentum in 12 European stock markets

- Past winners outperformed losers by **more than one percent per month** after correcting for risk
- Momentum was strongest in smaller firms, although it was present in **all size deciles**.

International Momentum Return (average across 12 European countries, 1980-1995)

- ◆ Return continuation lasts for about **one year**, and then is partially reversed

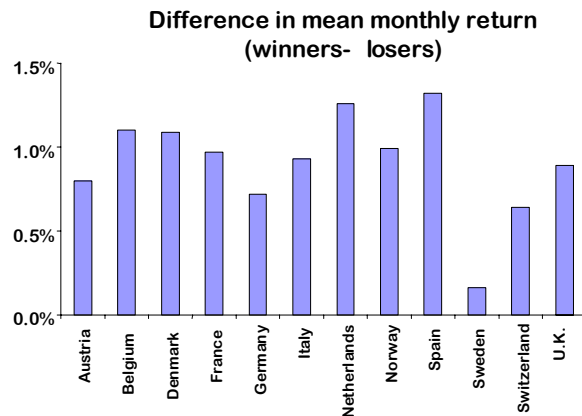
**Difference in
mean monthly return
(winners - losers)**



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Momentum by Country

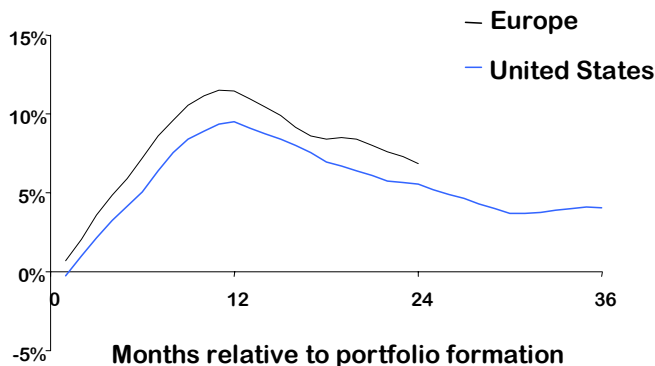
- ◆ A Winner-versus-Loser pattern was present in **each of the twelve** European stock markets, even after controlling for country risk, market risk, and firm size effects.



Cumulative Momentum Returns – US vs. Europe

- ◆ The **similarity** between the U.S. and Europe is striking.

Winner minus loser cumulative returns



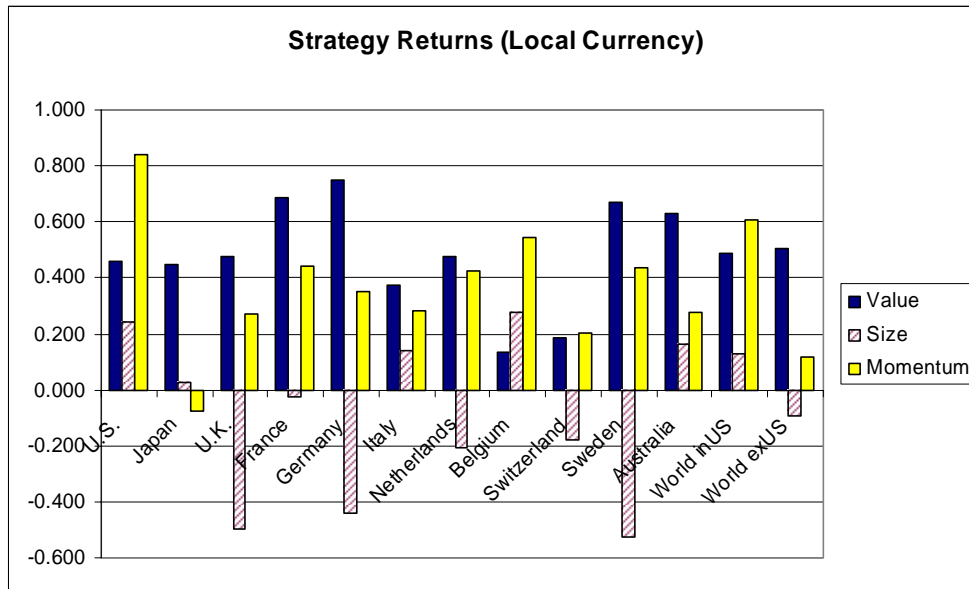
- Evidence of momentum in national and international markets is **difficult to reconcile** with an **efficient** capital market.

- ◆ The problem is the curious **reversal** in the Winner-minus-Loser returns that occurs after about one year.
- ◆ If the superior return performance of Winners over Losers did not reverse itself, an **omitted risk factor** could plausibly have driven the return difference between the two portfolios.

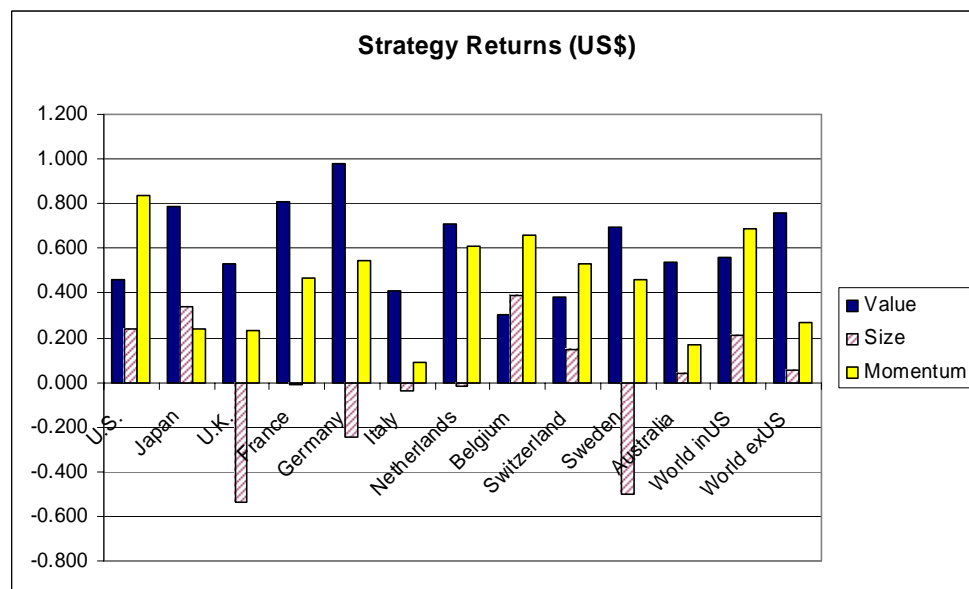
K. Geert Rouwenhorst, "International Momentum Strategies,"
Journal of Finance, February 1998.

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VALUE, SIZE, MOMENTUM AT A GLANCE
(local currency returns)



❖ Are these returns available to US investors (US\$ returns)?



Data is from DataStream International, monthly, Jan 1963-Sep 2005 available.
 Each strategy is a long-short portfolio of the two extreme quintiles, equally weighted.
 Annual rebalancing for value and size. Monthly rebalancing for momentum.

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HOME BIAS

- Despite the potential benefits of international portfolio diversification, most investors tilt their portfolios **toward domestic** securities.

	Portfolio weights	
	Predicted Market cap as percent of total	Actual Percentage in domestic equities
France	2.6%	64.4%
Germany	3.2%	75.4%
Italy	1.9%	91.0%
Japan	43.7%	86.7%
Spain	1.1%	94.2%
Sweden	0.8%	100.0%*
U.K.	10.3%	78.5%
U.S.	36.4%	98.0%

Source: Cooper & Kaplanis, "Home Bias in Equity Portfolios, Inflation Hedging, and International Capital Market Equilibrium," *Review of Financial Studies*, Spring 1994.

Note *: Cooper and Kaplanis used data from the late 1980s, at which time Sweden did not allow cross-border investments. Swedish investors were consequently 100% invested in Swedish assets. This constraint was removed in the early 1990s.

- ◆ "Predicted portfolio weight" is the percentage of the world's total market capitalization. These are the weights investors would hold if all investors were diversified on a value-weighted basis across international assets—the **world market portfolio**.
- ◆ Investors in **all** countries have a significant **home bias**.

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Why is there home bias?

➤ Investor irrationality?

- ◆ According to Barber and Odean, **men trade nearly 50% more than women**. **Excessive trading reduces** men's returns by 2.65% per year, and women's by 1.72% per year, relative to buy-and-hold investors.

Barber and Odean, "Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment," *Quarterly Journal of Economics*, 2001.

➤ Unequal access to information?

- ◆ It is difficult to get and interpret information from **distant markets**
- ◆ Once invested, it is difficult to monitor the actions of **distant managers**

Empirical evidence

- ◆ Individuals prefer investments that are **culturally similar** and **geographically nearby**
- ◆ Grinblatt and Keloharju find that investors in Finland are more likely to own firms that are **located nearby**, communicate in their **native tongue** (Swedish vs Finnish), or have CEOs of the **same cultural background**.

Grinblatt and Keloharju, "How Distance, Language, and Culture Influence Stockholdings and Trades," *Journal of Finance* (2001)

- ◆ According to Coval and Moskowitz, U.S. fund managers prefer **local firms**, especially **small** and **highly levered** firms that produce nontraded goods. Information and monitoring costs are particularly high for these firms.

Coval and Moskowitz, "Home Bias at Home: Local Equity Preference in Domestic Portfolios," *Journal of Finance* (1999)

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DISCUSSION ARTICLE**“Why Overseas Stock Funds Are Back in Favor”** – WSJ 9/10/2004

- ❖ “In the 1990s, after shares of U.S. companies rocketed past those of overseas companies, many U.S. investors **ignored** advice to stash some money in **mutual funds** that focus on **international stocks** to **diversify their portfolios** and **lower their volatility.**”
- ❖ “Wall Street gurus ... say **non-U.S. stocks** are appealing now because they trade at **lower multiples to their earnings** than American stocks, boast **higher dividend yields** and often operate in countries with **better long-term growth prospects** than the U.S.”
- ❖ “... beyond the well-known **diversification argument**, foreign stocks might have a benefit U.S. investors will be more excited about: **higher returns**”
- ❖ “Last month, Vanguard Group **shut** its **\$1.4 billion** International Explore Fund to new investors after it took in about **\$500 million** in new cash this year.”

Vanguard International Explore Fund

<http://flagship5.vanguard.com/VGApp/hnw/FundsSnapshot?FundId=0126&FundIntExt=INT>

Overview

Total net assets: \$1.6 billion

stocks: 252

Fund style

Type: International/Global Stock

Category: Foreign Small/Mid Growth

Risk attributes

Beta: 1.06 relative to S&P/Citigroup EM EPAC Index

R²: 0.94

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Ten Largest Holdings as of 10/31/2004

- 1 YIT-Yhtyma Oyj
- 2 Swedish Match AB
- 3 Eiffage SA
- 4 Hochtief AG
- 5 Katokichi Co., Ltd.
- 6 Red Electrica de Espana SA
- 7 C&C Group PLC
- 8 SES Global FDR
- 9 DCC PLC
- 10 Public Power Corp.

Ten largest holdings = 8.5% of total net assets

Question. What is the possible reason that Vanguard shut up this fund? Would this happen in a frictionless market?

Question. Calculate how much the fund invests per stock. The 5th largest holding of the fund is a small Japanese company called Katokichi (listed Tokyo Stock Exchange, 1st Section). Its total asset is about \$2.4 billion, the market capital is \$868 million. See how big the investment is.

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- ❖ “Firms like Lord Abbett are encouraging financial advisers to **boost their target foreign holdings** in client portfolios—**often set around 10%**”
- ❖ “To be sure, investing in foreign stock funds can be a **pricier** proposition than investing in U.S. funds. The average **foreign-stock mutual fund** charges annual fees of **1.86%** of assets, compared with 1.53% for the average U.S. stock fund, ...”
- ❖ “Overseas investments also tend to be **riskier**, due to **political** and **currency uncertainties...**”
- ❖ “Some experts argue that investors would be better off **owning shares of U.S. companies that do business globally** to benefit from rising economics growth overseas.”
 - This is another way to diversify your investment globally.
- ❖ The article points out **low price-earnings ratio** and **high dividend yield** of foreign stocks.

	P/E	D/P
European stocks	14	3%
Asian stocks	14	2.7%
U.S. stocks	18	1.8%

Question. Use the Gordon growth formula to obtain a rough estimate of the spread between the discounting rate and the growth rate ($r - g$) when $D/P = 3\%$.

- ❖ “The impact of a **weak dollar** also can be significant. Last year, the Dow Jones Euro Stoxx 50 rose 16% in euros, but **39% when translated into dollars.**”
- ❖ “The **U.S.** remains the world’s **largest** and **most liquid** stock market, accounting for roughly **50% of global market capitalization.**”

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Suggested Solutions to Questions

- Q1.** The word “price takers” means that an investor is so small that his trade does not affect the prices. The corresponding economic term is “competitive” investors.
- Q2.** Homogeneous expectation implies that all investors draw the same mean variance frontier. The statistical way of saying this is that “all investors agree on the probability distribution of asset returns.” Combined with 5), this implies that everybody holds the same market portfolio in equilibrium. This is unlikely to hold in an international context. For example, the U.S. T-bond is a riskless asset for U.S. investors, but not for any foreign investor because of the exchange rate risk.
- Q3.** If CAPM is correct, we expect the intercept term to be insignificantly different from zero.
- Q4.** Hard to reconcile with the efficient market hypothesis. In an **efficient** capital market, stocks are correctly priced by **rational** investors **reacting instantaneously** and **without bias** to new information. Thus, strategies based on past prices should earn no abnormal return. Even if we take the position that there may be an omitted risk factor, the return **reversal** beyond 1 year is hard to explain.
- Q5.** Underreaction. If investors slowly react to information, information is only partially and gradually incorporated into stock prices.

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PRACTICE PROBLEM SET WITH SOLUTIONS—BUTLER CH. 21

Solve the following end-of-chapter problems from *Butler*:

- ❖ *Butler* 21.2, 21.3 a b, 21.4 a b, 21.7 a b (assume the findings of the past research still hold)

Suggested Solutions

- 21.2 a. $\beta_{DC} = \rho_{DC, \text{Germany}} (\sigma_{DC} / \sigma_{\text{Germany}}) = (0.44)(0.105 / 0.046) \approx 1.00$ relative to the MSCI German stock market index.
 b. $r_{DC} = r_F + \beta_{DC} (E[r_M] - r_F) = 0.05 + (1.00)(0.06) \approx 0.110$, or 11.0%
 c. $\beta_{\text{Germany, World}} = \rho_{\text{Germany, World}} (\sigma_{\text{Germany}} / \sigma_{\text{World}}) = (0.494) (0.0413 / 0.0526) = 0.3879$ relative to the world market index.
- 21.3 a. According to BP's factor sensitivities, BP shares should rise with an increase in world industrial production, a decrease in the price of oil, or a depreciation of the pound (against currencies in BP's trading basket).
 b.
$$E(r) = \mu + \beta_{\text{Prod}} F_{\text{Prod}} + \beta_{\text{Oil}} F_{\text{Oil}} + \beta_{\text{Spot}} F_{\text{Spot}}$$

$$= 14\% + (1.5)(2\%) + (-0.80)(10\%) + (0.01)(-5\%)$$

$$= 14\% + 3\% - 8\% - 0.05\% = 8.95\%.$$
- 21.4 a. According to Paribas' factor sensitivities, Paribas shares should rise with an increase in industrial production, an increase in the price of oil, or an appreciation of the euro (against currencies in Elf's trading basket). Share price should fall with an increase in the term premium or the default premium.
 b.
$$E(r) = \mu + \beta_{\text{Prod}} F_{\text{Prod}} + \beta_{\text{Oil}} F_{\text{Oil}} + \beta_{\text{Term}} F_{\text{Term}} + \beta_{\text{Risk}} F_{\text{Risk}} + \beta_{\text{Spot}} F_{\text{Spot}}$$

$$= 12\% + (1.10)(10\%) + (0.60)(10\%) + (-0.05)(10\%) + (-0.10)(10\%) + (-0.02)(10\%) = 12\%$$

$$+ 11\% + 6\% - 0.5\% - 1\% - 0.2\% = 27.3\%.$$
- 21.7 a. Momentum strategies invest in recent winners (stocks with high returns over a recent period) and avoid or short-sell recent losers. In Jegadeesh and Titman's [1992] study of U.S. stocks, the return difference between winner and loser portfolios was 9.5 percent over the year following formation of the winner and loser portfolios. During the second year after portfolio formation, U.S. winners lost about one-half of this accumulated gain.
 b. In Rouwenhorst's [1998] study of 12 European markets, winners beat losers by 12 percent over the first year after portfolio formation. As in the U.S., winners lost some of their accumulated gain during the subsequent year. Momentum strategies hold promise for international markets.