

Chapter 6

Brokerage Transactions for Mutual Funds

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Primary Responsibilities of Mutual Fund Traders

- Trader seeks to accomplish a manager' s goals
 - According to instructions received from the manager
 - In the most advantageous way for the fund shareholders (i.e., best execution)
- Trading strategies used in an attempt to minimize "market impact"
 - Retain a broker as agent to work an order for a fund
 - Go directly to the market or electronic facility
 - Create a "basket trade"

Primary Responsibilities of Mutual Fund Traders (cont.)

- Broker-dealer selection may depend on successful services such as
 - Providing search services (i.e., finding the other side of a trade)
 - Providing anonymity for large orders
 - Providing research services to support successful investment decisions

Other Functions of Mutual Fund Traders

- Providing market information to managers and analysts
- Performing cloning of a master fund to multiple similar versions
- Maintaining an appropriate level of cash in a fund while trading
- Performing compliance checks on proposed/executed trades
- Interfacing with the back office to ensure proper settlement (includes communicating with the broker, fund accounting, and custodian bank)

Fiduciary Responsibilities of a Fund Trader: Best Execution

- Trader's primary responsibility is to seek "best execution"
 - Not precisely defined by the SEC; entails balancing a number of factors
 - Doesn't require trading at lowest commission or lowest price
 - Shouldn't be judged by focusing only on individual trades
 - Fund's board of directors must make periodic assessment of execution quality made by the fund's traders

Fiduciary Responsibilities of a Fund Trader: Best Execution (cont.)

- Execution quality can be evaluated using sophisticated analytical models
 - Abel/Noser compares "cost" of trades for a fund to the Abel/Noser universe
 - Plexus compares the "cost" of trades for a fund to the "expected cost"

Fiduciary Responsibilities of a Fund Trader: Specific Issues

- Use of a broker affiliated with a fund
- Use of soft dollars
- Allocation of trades among sister funds
- Interfund trades

Chapter 7

Marketing of Mutual Funds

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Distribution of Mutual Funds

- Critical factors for increasing or retaining customers
 - Performance
 - Distribution => focus of chapter 7
 - Service

Distribution of Mutual Funds (cont.)

- Main distribution channels for mutual funds
 - Intermediary: funds purchased through a third party such as a
 - Broker: dealer, bank, insurance company, financial planner, or registered investment adviser
 - Direct: purchased from the fund sponsor or through a fund supermarket
 - Retirement: includes
 - 401(k) and other defined contribution plans plus
 - Individual retirement accounts

The Intermediary Channel: Broker-Dealers

- Full-service BDs were among the first purveyors of mutual funds
- Overall, BDs comprise ~65% of intermediary market for mutual funds
 - May sell proprietary or independent funds
 - Are normally compensated for mutual funds sales and advice through
 - Sales commissions (loads) paid by the investor
 - Annual distribution charges (12b-1 fees) paid directly by the fund

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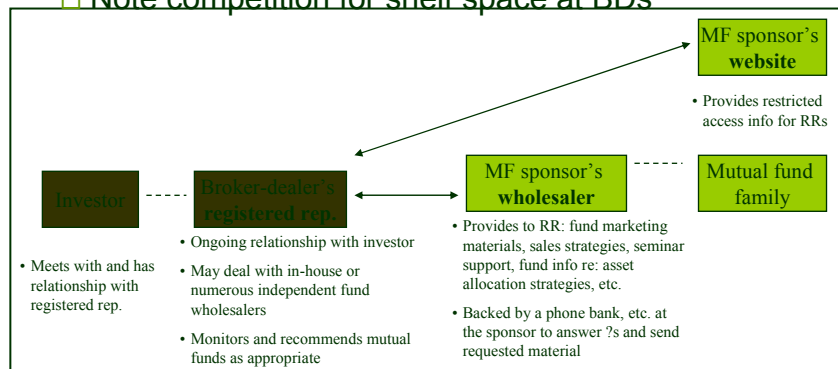
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The Intermediary Channel: Broker-Dealers (cont.)

- Example of sales and service model
 - Note competition for shelf space at BDs



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The Intermediary Channel: Commercial Banks and Insurance Companies

■ Commercial banks

- Initially prohibited from sponsoring or underwriting mutual funds by Glass-Steagall (repealed in late 1999)
- Now banks can distribute third-party funds and establish their own funds
- Different competitive challenges for large versus small banks
- Overall, manage ~30% of fund assets, primarily money market
- Approximately 6–7% of annual mutual fund sales are through banks

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The Intermediary Channel: Commercial Banks and Insurance Companies (cont.)

■ Insurance companies

- Distribute funds and variable annuity products
 - VAs are one of the fastest growing mutual fund products
 - VAs are tax driven; after-tax contributions then grow tax-deferred
- Many insurance companies now own mutual fund managers
- Overall, manage ~7% of fund assets

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The Intermediary Channel: RIAs and Financial Planners

- RIAs (Registered Investment Advisers)
 - Rose to prominence in late 1980s – 90s as more customers chose to pay for advice on an annual basis versus through traditional commissions
 - May be independent or affiliated with larger firms
- Financial planners
 - Often offer a broader range of services than RIAs, including estate planning and tax advice
 - Although many charge an annual fee based on percentage of a client' s assets (as do RIAs), some financial planners are commission-based

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The Intermediary Channel: RIAs and Financial Planners (cont.)

- Both are viewed as independent from specific funds
 - Tend to focus on the no-load fund universe or
 - Tend to purchase funds through a no-transaction fee supermarket arrangement

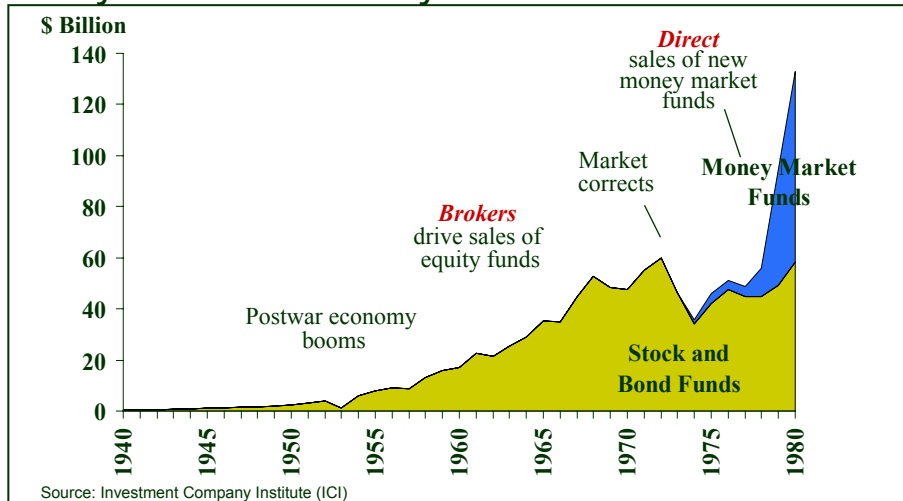
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Intermediary versus Direct Channel: Key Drivers of Early Fund Asset Growth



Source: Investment Company Institute (ICI)

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The Direct Channel: Direct Marketers

- Became popular in 1970s with advent and sales of money market funds
- Promote lower-cost fund sales with limited guidance (versus intermediary)
 - Some promote “no-load” funds
 - Pure no-load funds: have no load and no 12b-1 fee
 - No-load funds: have no load and 12b-1 fee <25 bp
 - Some promote lowered annual fees
 - May cap fees at a specified level or create funds with low fees for certain investors (e.g., those with longtime and/or larger accounts)

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The Direct Channel: Direct Marketers (cont.)

- Promote convenience of services available
 - Started with extensive phone centers, walk-in offices, or investor centers
 - Internet created another sales and service model
- Investor's appetite for advice has challenged the channel
 - Internet has helped to provide site for interactive tools and general DIY investment planning
 - Perhaps partly responsible for decline in pure direct channel sales

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Mutual Fund Supermarket

- How it works
 - Fund/fund sponsor pays annual fee (25–35 bp) to operator of supermarket
 - Operator “displays” and advertises funds and effects transactions with buyers
 - Schwab was first operator in 1992; together with Fidelity, dominates the market
 - Provide a consolidated statement of holdings to customers
 - Direct buyers are individuals, but investment advisers also “shop” there

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Mutual Fund Supermarket (cont.)

- Pros for fund sponsor
 - Do not have to build own distribution network
 - All shareholder services provided at low cost
 - Can gather assets quickly through good performance
- Cons for fund sponsor
 - Give up control of customers
 - Give up a portion of future revenues
 - Assets are more dependent on short-term performance

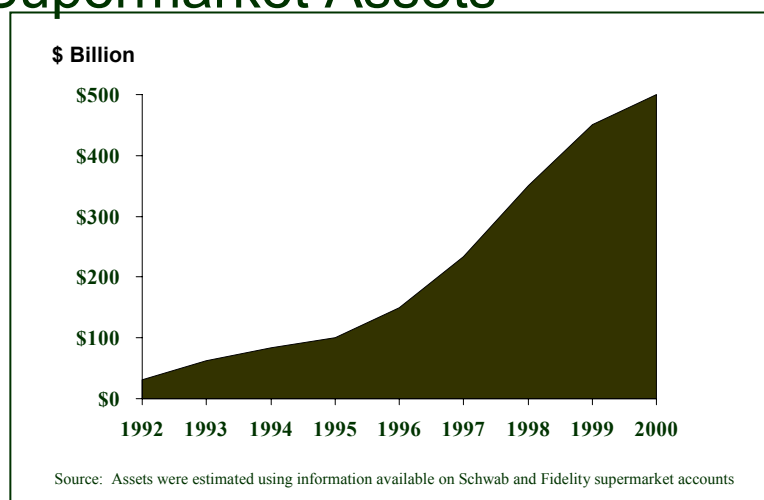
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Mutual Fund Supermarket Assets



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Cross-Channel Trends: Open Architecture

- Provides investors (in any distribution channel) to centralized access to products from many fund sponsors
- Has prompted increased spending on fund advertising that focuses on
 - “Value-added” services such as advice
 - Overall brand
 - Top performance (this type of ad is heavily regulated by SEC and NASD)

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Cross-Channel Trends: Open Architecture (cont.)

- Has led to creation of account aggregation (AA)
 - Investors can view all their online accounts at other institutions on the AA provider's website
 - AA providers can strengthen their relationship with client by providing analytical tools and marketing targeted products and services
 - Success will depend on investors' comfort with giving all their account information to one financial provider

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Cross-Channel Trends: Advice

- Proliferation of investment choices has led to explosion in investment information => created a growing demand for advice
- High net-worth advice
 - Often for investors with >\$1 million in investable financial assets
 - Advice may come in the form of products responsive to personal needs
 - Mutual fund wraps—discretionary management of a portfolio of mutual funds
 - Separate accounts—un-pooled portfolio of securities run by a professional manager; personalized and tax-sensitive

Cross-Channel Trends: Advice (cont.)

- Smaller account advice
 - Not cost effective to offer high levels of customized, personalized service
 - Advice may come in the form of one fund solutions and Internet-based tools
 - One fund solutions include: asset allocation funds, lifestyle funds
 - Internet-based tools offer semi-customized solutions based on inputs about investment goals, time frames, risk tolerances, etc.

Cross-Channel Trends: Needs-Based Marketing

- Seeks to meet particular needs with specific products and services
 - Focuses on very common needs
 - Extension of advice-oriented products and services
- College planning
 - Internet tools help calculate sum needed to meet a goal within a time frame

Cross-Channel Trends: Needs-Based Marketing (cont.)

- College planning (cont.)
 - Various tax-advantaged options exist to assist with education saving
 - UTMA/UGMA (custodial) accounts allow income and capital gains to be taxed at the minor's tax rate versus the donor-custodian
 - Education IRAs allow certain limited contributions to grow tax-free until a child reaches 18; specified distributions are also tax-free
 - Section 529 plans allow states to offer specified college savings plans; specified distributions are excluded from federal tax; donors may contribute a lump sum up to \$50,000 without being subject to gift taxes
- Wealth transfers
 - Programs to assist in estate planning
 - New products intended to facilitate charitable giving

Supplement

Style Analysis

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Reducing the Dimensionality Of the Investment Task

- Hundreds of thousands securities
 - Bonds
 - Stocks
 - Derivatives
 - Currencies etc.
- Need to identify a relatively small number of key factors

Factor Models

- Bond models
- Equity factor models
- Multi-country equity models
- Asset class models
- Derivative risk models

A generic linear factor model

$$\tilde{R}_i = b_{i1} \tilde{F}_1 + b_{i2} \tilde{F}_2 + \dots + b_{in} \tilde{F}_n + \tilde{e}_i$$

\tilde{F}_j = factor j

b_{ij} = sensitivity of R_j to factor j

\tilde{e}_i = non-factor component of return

Terminology

- Factor Sensitivities (b' s)
 - Exposures
 - Factor loadings
 - Style
- Non-factor Component
 - idiosyncratic
 - security-specific
 - selection return

The Effects Of Diversification

- Factor-related risk
 - Exposures averaged
 - Risk depends on exposures and factor covariance matrix
- Risk is averaged, not reduced
 - Non-factor related risk
 - Depends on squared exposures
 - Risk is reduced as average exposure decrease

Possible Criteria For Evaluation Of a Factor Model

- Out-of-sample performance
- Goodness of fit
- Low correlations among residuals
- Superior results with used as part of a decision process

Portfolio Characteristics

$$b_{pj} = \sum_i X_{ip} b_{ij}$$

$$e_p = \sum_i X_{ip} e_i$$

X_{ip} = proportion of security i in portfolio p

Performance Attribution

$$R_{pt} = b_{p1t}F_{1t} + \dots + b_{pnt}F_{nt} + e_{pt}$$

Comparative performance attribution

$$R_{pt} = b_{p1t}F_{1t} + \dots + b_{pnt}F_{nt} + e_{pt}$$
$$R_{Bt} = b_{B1t}F_{1t} + \dots + b_{Bnt}F_{nt} + e_{Bt}$$

Comparative performance attribution (cont.)

$$R_{pt} - R_{Bt} =$$

$$(b_{p1t} - b_{B1t}) F_{1t} + (b_{p2t} - b_{B2t}) F_{2t}$$

$$\cdots + (b_{pnt} - b_{Bnt}) F_{nt} + (e_{pt} - e_{Bt})$$

Comparative performance attribution (cont.)

$$e_{pt} - e_{Bt} = (X_{1pt} - X_{1Bt}) e_{1t} +$$

$$(X_{2pt} - X_{2Bt}) e_{2t} + \cdots$$

Asset Class Factor Models

b_{ij} values sum to 1.0

e_i is selection return

$\sum b_{ij}F_j$ is style return

$b_{i1} \cdots b_{in}$ effective asset mix

Typical Asset Classes

- Fixed Income
 - Maturity
 - Default Risk
 - Prepayment Options
- Equity
 - Value / Growth
 - Large / Small
 - Foreign
- Fixed / Equity
 - Hedged / Unhedged

Portfolio Composition-Based Approaches

- Use a model to estimate exposures of each security to the underlying asset classes
- Portfolio exposures are value-weighted averages of security exposures
- Provides estimates of the portfolio at a given time
- Security exposures difficult to measure due to noise
- May be expensive

Portfolio Return-Based Approaches

- Compare portfolio with asset classes returns to estimate exposures
- Can use historic returns on present portfolio or historic returns on portfolios held in the past
- Lower noise on portfolio returns may provide better estimates of exposures
- Usually expensive

Central Analytic Tasks

- Specification of an appropriate factor
- Estimation of the relevant coefficients (b 's)
- Estimation of factor risks, correlations and expected returns
- Estimation of residual risks and expected returns
- Design of appropriate optimization procedures

A typical Top-Down Approach to Investment Management

- Select Asset Classes
- Determine an optimal Asset Allocation
- Map investment products to asset class exposures
- Allocate funds among investment products
 - obtain desired asset allocation
 - Add value (if possible)
- Analyze performance

Fidelity Magellan: Selection Return Statistics

Mean Selection	0.39	
Std Dev of selection	1.16	
Sharpe Ratio	0.34	
T-Statistic	2.63	
Selection Percentile	99.6	

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88年	基金數	塑化	紡織	機電	營建	金融	OTC
封閉型	6	27.66%	1.18%	24.54%	2.85%	6.32%	25.91%
科技類股票型	12	4.54%	2.07%	60.76%	0.10%	0.08%	22.62%
中小型股票型	7	17.76%	1.05%	35.31%	0.41%	0.32%	34.59%
特殊類股票型	5	15.63%	1.11%	34.49%	0.95%	17.09%	20.64%
上櫃股票型	15	4.07%	0.01%	23.69%	0.01%	3.46%	67.39%
債券股票平衡型	4	7.79%	0.69%	38.37%	1.02%	0.00%	9.12%
一般股票型	66	17.11%	0.80%	44.33%	1.83%	1.52%	26.21%
國外募集	8	20.12%	1.63%	37.48%	2.34%	5.45%	27.40%
Total	123	13.51%	0.99%	37.36%	0.10%	4.11%	29.50%

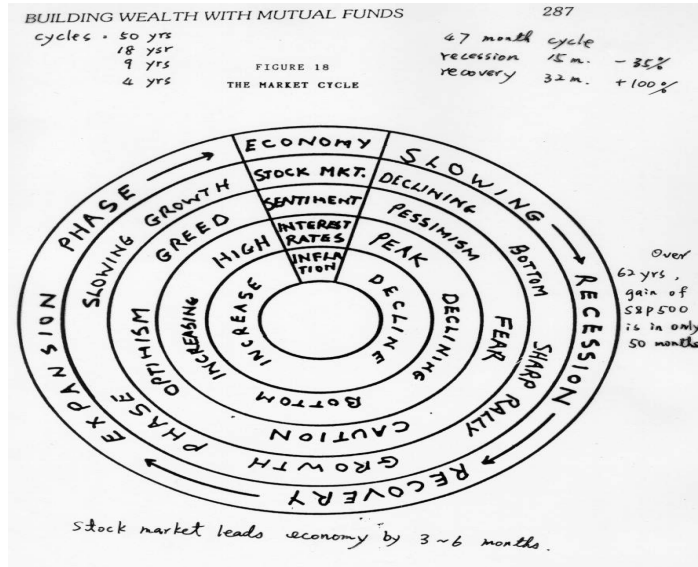
88年	30天RP	一個月定存	R-Square	mean(ei)
封閉型	10.33%	1.20%	82.93%	-0.14%
科技類股票型	5.86%	3.97%	84.47%	0.19%
中小型股票型	7.80%	2.75%	77.61%	-0.14%
特殊類股票型	6.74%	3.35%	88.29%	-0.34%
上櫃股票型	0.89%	0.49%	83.09%	-0.05%
債券股票平衡型	30.43%	12.59%	83.17%	-0.06%
一般股票型	5.41%	2.80%	84.76%	0.01%
國外募集	4.71%	0.88%	87.48%	-0.14%
Total	9.64%	3.88%	83.47%	-0.08%

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經濟榮枯與市場循環



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美國20世紀主要股市空頭時期

The Major Bear Markets Of the Twentieth Century

Year	Duration (Months)	Decline of Dow Jones Industrial Average
1900	12	32%
1903	12	38%
1907	10	45%
1912	25	24%
1917	13	40%
1919	21	46%
1929	34	90%
1937	56	52%
1946	37	25%
1966	8	27%
1968	18	37%
1973	24	47%
1977	15	26%
1981	16	25%
1987	2	41%

Note: Smaller bear markets have occurred in addition to those cited, for example a 20% decline in 1990.

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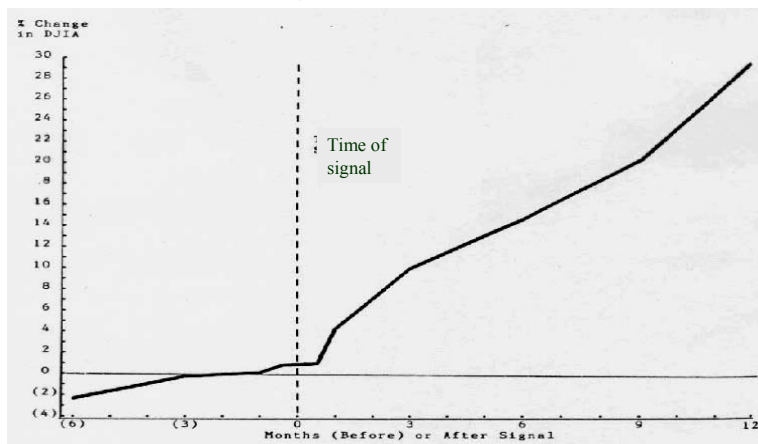
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Fed 調息對股市之影響

Stock Price and Federal Reserve Action

Changes in the Dow Jones Industrial average before and after the Federal Reserve Board eases monetary policy on two consecutive occasions. Most signals result from two consecutive reductions in the discount rate. Values are averages, 1914 – 1991.



Based on data from Growth Fund Research, Inc.

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股價乘數之歷史統計

Measures of Market Value

Ratio	Average Value	Historic High	Historic Low
Price to Book Value (Assets minus Liabilities per share out standing)	1.6	4.2 (1929)	0.5 (1932)
Price to Earning (Price divided by earnings per share out standing)	14.1	28.0 (1935)	6 (1979)
Price to Dividend (Price divided by dividend per share out standing)	22.6	38.4 (1987)	6 (1932)

Based on the Dow Jones industrial average. Numbers in parenthesis indicate years of occurrence.

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股價 / 股利比值之區間頻率統計

Frequency of Price/Dividend Ratios of the S&P 500

(The historical average value is 23)

Price/Dividend Ratio	Percentage of Total Time during the Twentieth century
7.0 - 14.99	7%
15.0 - 19.99	27%
20.0 - 22.99	20%
23.0 - 29.99	30%
30.0 - 33.99	13%
34.0 +	3%

Based on data from Growth Fund Research, Inc

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不同股價 / 股利比值區間一年後之報酬率統計

The Probable consequence various price/divided ratios

The probability magnitude of gains and losses in the twelve months following various prices/divided ratios, 1971 through 1990.

Price/Dividend Ratio	Rising Market		Declining Market	
	Chance of Gain	Average Gain	Chance of Loss	Average Loss
8.0 - 11.99	76%	41%	24%	(13%)
12.0 - 15.99	69%	21%	31%	(14%)
16.0 - 19.99	63%	19%	38%	(11%)
20.0 - 23.99	62%	21%	38%	(15%)
24.0 - 27.99	57%	18%	43%	(21%)
28.0 - 31.99	55%	15%	45%	(17%)
32.0 - 35.99	40%	8%	60%	(12%)
36.0 - 39.99	0%	0%	100%	(17%)

Numbers in parenthesis represent negative values.

Based on data from Growth Fund Research, Inc.

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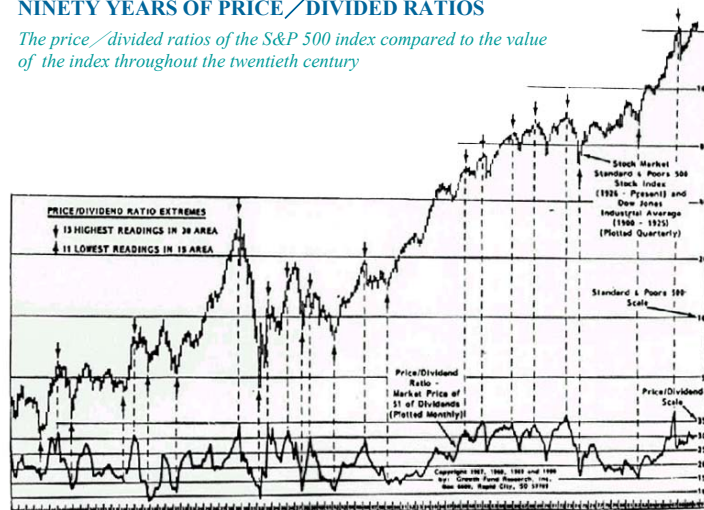
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股價 / 股利與 S&P 指數之走勢

NINETY YEARS OF PRICE/DIVIDED RATIOS

The price/divided ratios of the S&P 500 index compared to the value of the index throughout the twentieth century



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入選 FORBES 榮譽基金之次年表現

Performance of Forbes "Honor Roll" in a ten year period

Performance of the open-ended domestic funds in the Honor Roll, 1981 through 1990. Represents the first year of performance after being nominated to the Honor Roll.

	Average Annual Compound Total Return
S&P 500 Index Fund	16.3%
Forbes Stock Fund Average	15.0%
Honor Roll Average	15.4%
Best Performer Each Year in Honor Roll	32.0%
Worst Performer Each Year in Honor Roll	1.4%
No-Load Funds Most Frequently Appearing in the Honor Roll:	
Nicholas (9)	19.2%
Twentieth Century Select (7)	20.3%
Acorn (5)	16.1%
Janus (5)	21.0%
Mutual Shares (5)	17.8%
Average	19.3%

Numbers in parenthesis indicate frequency of appearance over a ten year period.

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攻擊型 VS. 防禦型基金

FUND PERFORMANCE IN UP AND DOWN MARKETS

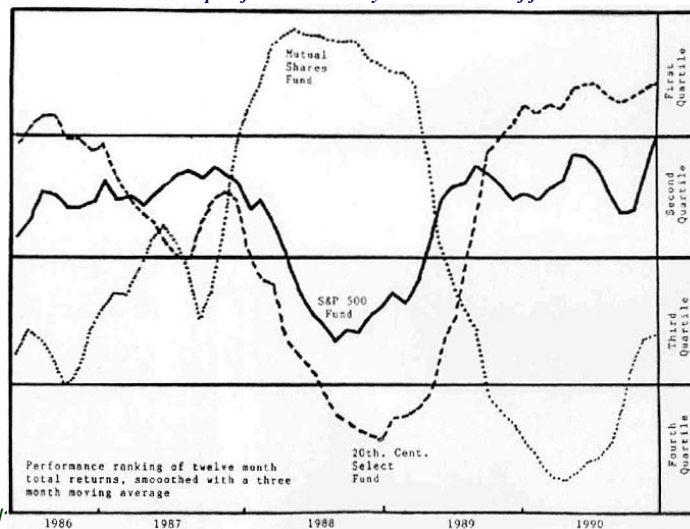
	Down Market	Up Market	Up Market	Total Period
Reference Letters on Figure 15	A - B	B - C	D - E	A - E
Dates	From: 7/19/90 Through: 10/11/90	10/11/90 11/15/90	1/9/91 2/28/91	7/19/90/ 2/28/91
S&P 500 Index	365 - 295	295 - 317	313 - 367	365 - 367
Percentage Movement	(19.2%)	7.5%	17.3%	0.5%
Defensive Funds				
Mathers	(0.5%)	1.7%	2.4%	(0.9%)
Strong Investment	(3.0%)	1.1%	4.5%	1.0%
Lindner Dividend	(5.8%)	(1.0%)	9.8%	(2.0%)
Average	(3.1%)	0.6%	5.6%	(0.6%)
Aggressive Funds				
T. R. Price Science and Technology	(33.1%)	15.3%	36.4%	10.1%
20th Cent. Vista	(35.1%)	8.7%	31.5%	(6.6%)
Neuberger Guardian	(20.8%)	8.0%	21.6%	3.6%
Average	(29.7%)	10.7%	29.8%	2.4%

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市場循環與基金表現

THE COUNTER CYCLICAL MOVEMENT OF FUNDS

An example of the individual cyclical movement of funds



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在不同精確度下動態資產配置之附加價值

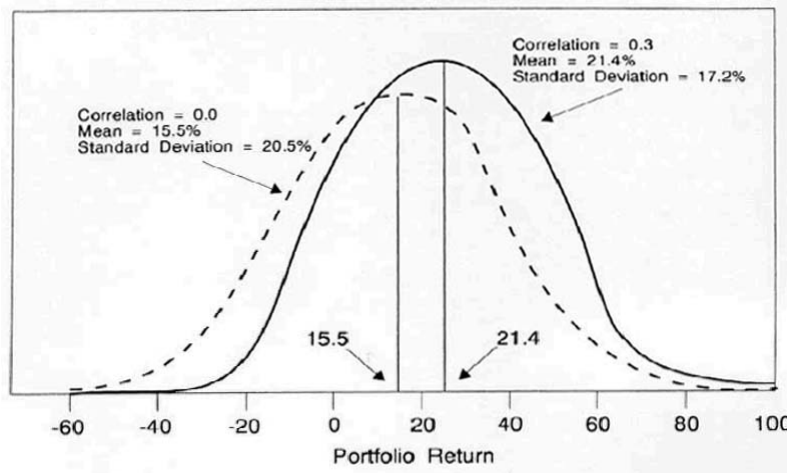
Risk and returns of an asset allocator's portfolio (switching allowed once a month)

(1)	(2)	(3) = (2) - 15.5	(4)	(5) = (2)/(4)	(6)
Correlation Between the Leading Indicators & Stock Returns	Mean Annual Return of Asset Allocator's Portfolio	Value Added by Asset Allocator, Relative to Buy- and Hold-Stock Portfolio	Standard Deviation of Annual Return on Asset Allocator's Portfolio	Ratio of Mean to Standard Deviation	Percentage of Periods When Asset Allocator's Portfolio is Invested in Stocks
0.0	15.5	0.0	20.5	0.76	100.0
0.1	16.0	0.5	19.4	0.82	86.1
0.2	18.5	3.0	17.9	1.03	70.8
0.3	21.4	5.9	17.2	1.24	64.9
0.4	24.8	9.3	16.6	1.49	60.6
0.5	28.5	13.0	16.3	1.75	58.6
0.6	31.7	16.2	15.8	2.00	56.8
0.7	34.9	19.4	15.6	2.24	56.1
0.8	38.7	23.2	15.2	2.55	55.7
0.9	42.8	27.3	14.8	2.89	54.4
1.0	46.8	31.3	14.3	3.27	54.2

*The value of perfect information has been compared to the value of a put option on the stock portfolio by Merton (1981). In a sense the goal of asset allocator is to create the same pattern but pay as little as possible for the put option.

買入持有 VS. 動態資產配置之報酬率分配

The distribution of returns on an asset allocator's portfolio where correlation between Between a leading indicator and stock returns are 0.0 and 0.3



交易成本對動態資產配置 附加價值之影響

Effect of misestimation of correlation on value added by an asset allocator
(monthly switching; 0.1% transaction cost)

True Correlation	Value Added When Estimated Correlation is:					
	0	0.1	0.2	0.3	0.4	0.5
0.0	0.0	-1.3	-3.1	-3.8	-4.7	-4.0
0.1	0.0	0.2	0.5	-1.1	-0.8	-1.2
0.2	0.0	1.8	2.4	2.2	2.0	2.2
0.3	0.0	3.3	5.3	5.5	5.7	5.4
0.4	0.0	4.9	8.1	8.4	8.8	8.2

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信賴度估計誤差對動態資產配置 報酬率之影響

Effect of transaction costs on the value added by an asset allocator (monthly switching)

Correlation Between the Leading Indicator and Stock Returns	Value Added by an Asset Allocator When Transaction Costs Are		
	0.0%	0.1%	1.0%
0.0	0	0	0
0.1	0.5	0.2	0
0.2	3	2.4	0.1
0.3	5.9	5.5	1.2
0.4	9.3	8.8	3.4
0.5	13	11.9	6.4
0.6	16.2	15.6	9.5
0.7	19.4	19.2	12.9
0.8	23.2	22.6	16.8
0.9	27.3	26.4	20
1.0	31.3	30.7	23.4

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預期股票風險溢酬與投資報酬率之關係

Stocks / Bills Premium* and Subsequent Performance Stocks vs. Bills 1951-1989

Premium Range	# No. Obs.	Avg. Subsequent Excess Return			Probability of Postive Excess Return		
		1 mo.	3 mo.	12 mo.	1 mo.	3 mo.	12 mo.
> 10	10	2.5%	6.8%	26.1%	80%	80%	100%
8-9.9	64	1.9	4.8	16.7	66	78	89
6-7.9	102	0.5	2.0	6.1	57	63	63
5-5.9	64	0.7	1.6	4.8	61	70	67
4-4.9	107	0.4	1.8	2.7	60	64	62
2-3.9	96	(0.1)	(1.4)	2.8	48	42	60
< 2	25	(1.8)	(1.7)	(6.9)	32	36	40
	468	0.5	1.5	5.7	57	61	66

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績效指標

\tilde{R}_{pt} : 投資組合 p 在第 t 期之報酬率

\tilde{R}_{mt} : 市場組合在第 t 期之報酬率

R_{ft} : 第 t 期之無風險報酬率

β_p : 投資組合 p 之貝他係數

σ_p : 投資組合 p 之報酬率標準差

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■ Sharpe 指標

Sharpe指標

$$S_p = \frac{R_p - R_f}{\sigma_p} \quad (1)$$

Sharpe指標衡量投資組合承擔一單位的總風險（以標準差衡量）所得到的風險溢酬。

■ Treynor 指標

Treynor指標

$$T_p = \frac{R_p - R_f}{\beta_p} \quad (2)$$

Treynor指標衡量投資組合承擔一單位的系統風險所得到的風險溢酬。

■ Jensen 指標

Jensen指標

$$\bar{R}_{pt} - \bar{R}_{ft} = J_p + \beta_p (\bar{R}_{mt} - \bar{R}_{ft}) + \varepsilon_{pt} \quad (3)$$

J_p 即為投資組合 p 的 Jensen 指標。Jensen 指標衡量一個投資組合與證券市場線（SML）的垂直距離。 $J_p > 0$ 代表正的績效， $J_p < 0$ 代表負的績效。

■ Information Ratio 指標

$$I_p = \frac{\sum_{t=1}^n (R_{pt} - R_{mt})}{\sigma_{(R_{pt} - R_{mt})}} \quad (4)$$

■ Treynor & Mazuy

Treynor & Mazuy (1966)

$$\tilde{R}_{pt} - \tilde{R}_{ft} = \alpha_p + \beta_p(\tilde{R}_{mt} - \tilde{R}_{ft}) + \gamma_p(\tilde{R}_{mt} - \tilde{R}_{ft})^2 + \varepsilon_{pt} \quad (5)$$

Treynor & Mazuy 認為若基金經理人具擇時能力，則特徵線 (characteristic line) 應為曲線而非直線。 γ_p 可衡量特徵線的曲度， $\gamma_p > 0$ 代表經理人有正的擇時能力， $\gamma_p < 0$ 代表負的擇時能力。 α_p 則可用以衡量選股能力。

■ Chang & Lewellen

Chang & Lewellen (1984)

$$\begin{aligned} \tilde{R}_{pt} - \tilde{R}_{ft} = & \alpha_p + \beta_{1p} \text{Min}(0, \tilde{R}_{mt} - \tilde{R}_{ft}) \\ & + \beta_{2p} \text{Max}(0, \tilde{R}_{mt} - \tilde{R}_{ft}) + \varepsilon_{pt} \end{aligned} \quad (6)$$

α_p 衡量投資組合 p 的選股能力， β_{1p} 衡量空頭時期投資組合的貝他係數， β_{2p} 衡量多頭時期投資組合的貝他係數。如果一個經理人具有擇時能力，則 $(\beta_{2p} - \beta_{1p})$ 應大於零。

■ Henriksson

Henriksson (1984)

$$\begin{aligned} \tilde{R}_{pt} - \tilde{R}_{ft} = & \alpha_p + \beta_{1p}(\tilde{R}_{mt} - \tilde{R}_{ft}) \\ & + \beta_{2p} \text{Max}(0, \tilde{R}_{mt} - \tilde{R}_{ft}) + \varepsilon_{pt} \end{aligned} \quad (5)$$

基金經理人之擇時能力可視為一買權 (call option)，由 β_{2p} 加以衡量， $\beta_{2p} > 0$ 代表有正的擇時能力。 α_p 衡量選股能力。