


# “The Size Effect”

How Small Stocks Came to be Part of a Well Diversified Portfolio



## “The Size Effect”

### How Small Stocks Came to be Part of a Well Diversified Portfolio




**Betsy Wills**  
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Rocky Mountain Chapter

**Puget Sound Chapter  
Investors Education Conference  
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## Agenda

- Risk v. return
- Evolution of small stocks as part of a portfolio
  - Modern Portfolio Theory (MPT)
  - Capital Asset Pricing Model (CAPM)
  - The “Size Effect”
  - Russell 2000
- Importance of diversification
- Benefits of small stocks
- BI’s SSGPlus online small stocks screen

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A large blue rectangular box with the text "Risk vs Return" centered inside in white, bold, sans-serif font.

# Risk vs Return

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## **Risk vs Return** **A Fundamental Principal of Finance**

- The relationship between investment risk and return is a fundamental investment principle
- The higher the risk, the higher the potential return
- Taking more risk also means more potential for loss
- Ultimate risk is loss of your principal

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## **Risk vs Return** **A Fundamental Principal of Finance**

- Many different types of investments and asset classes:
  - Stocks
  - Bonds
  - Government securities
  - Real estate
  - Commodities
- All of these asset classes come with varying levels of investment risk

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## Risk vs Return

### A Fundamental Principal of Finance

The question that analysts and investors have pondered was how to construct a portfolio of stocks that would provide a greater return than the market with an acceptable degree of risk?

It all started in the early 1950s ...

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# Modern Portfolio Theory

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## Modern Portfolio Theory


### MPT




- In 1952, Markowitz published his portfolio theory in the Journal of Finance
- MPT encourages investors to choose investments that match how much risk they're willing to take
- MPT measures the risk of all assets held in a portfolio

**Harry Markowitz**  
Co-winner of 1990 Nobel Prize for Economic Sciences

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## Modern Portfolio Theory



- MPT focuses on diversification as a means to build wealth
- Diversification is investing in a basket of different assets

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## Modern Portfolio Theory

MPT makes and supports two key arguments:

- 1) A portfolio risk and total return profile is more important than the risk and return profile of any individual investment in that portfolio
- 2) Once you determine your risk tolerance, construct a well diversified portfolio that optimizes the potential return.

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CAPM

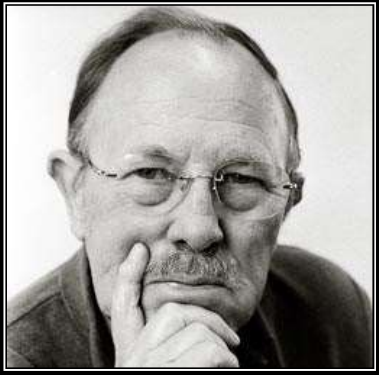
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## Capital Asset Pricing Model CAPM



**William Sharpe**  
Co-Winner  
1990 Nobel Prize  
For Economic Sciences

- It was envisioned in early 1960s by William Sharpe
- CAPM simplified MPT. It made it more practical and introduced specific and systematic risk
- CAPM measures the risk of individual securities and assets that would be added to a portfolio

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## Capital Asset Pricing Model CAPM

- CAPM, an expansion of MFT, allows the pricing of risky assets
- Sharpe’s theory showed that a portfolio could be a combination of risky assets and less-risky assets.

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## Capital Asset Pricing Model CAPM

- Sharpe’s question was ‘How does risk, specifically risk that cannot be diversified away, affect returns?’
- Sharpe identified two types of risk:

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## Capital Asset Pricing Model Systemic or Market Risk

- 1) Systemic or Market Risk:
  - Impacts the entire market
    - Inflation
    - Interest rates
    - Economic conditions
    - Wars
  - All investments are impacted in similar ways

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## Capital Asset Pricing Model Specific Risk

### 2) Specific Risk:

- Risks that are unique to that investment
- Company stocks are impacted by that company's events:
  - Sudden death of company president or leader without a succession plan
  - Development of a drug to treat a pandemic
  - Negligence in software update

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## Capital Asset Pricing Model Beta

Sharpe's theories led to the concept of “beta”

Q: What is beta?

A: A measure of the systematic risk or volatility of a security or a portfolio compared to the market

>1 = More volatile than the market

<1 = Less volatile than the market

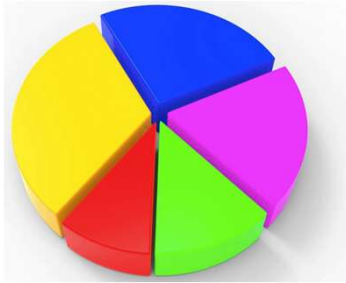
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## Capital Asset Pricing Model Diversification Reduces Specific Risk



- Sharpe found:
  - Specific risk can be reduced by diversification
  - Systemic or market risk is more difficult since it affects all investments the same way

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## Capital Asset Pricing Model CAPM

- First formal asset-pricing model
- Mathematical model used to determine the expected return on an investment based on its systemic risk
- Systemic (or market) risk is determined by only using beta
  - Historical data is used to estimate beta

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## Capital Asset Pricing Model CAPM

- It describes the relationship between the expected return and risk of a security
- It helps investors understand the returns they can expect given the level of risk they assume
- CAPM is widely used in the financial industry

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## Capital Asset Pricing Model CAPM

- CAPM is used in:
  - Financial Modeling
    - Forecasting a business’s financial performance into the future
    - Combines accounting, business and historical and projected financial information to make business decisions
  - Asset valuation
    - Process of determining the fair market or present value of assets (like stocks)

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## Recap of MPT and CAPM

- MPT:
  - Method for selecting investments in order to maximize their overall returns within an acceptable level of risk
  - Attempts to strike the balance between risk and reward to keep those returns steady
  - Diversifies assets in a portfolio
- CAPM:
  - Uses Beta and measures the risk of individual securities and assets that would be added into a portfolio
  - It helps investors understand the returns they can expect given the level of risk they are willing to assume

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## Small Company Stocks as Part of a Well Diversified Portfolio?

But, how did small company stocks come to be part of a well diversified portfolio?

The next development was ...

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# The Size Effect

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## The “Size Effect”



**Rolf W. Banz**  
MBA & PhD  
Graduate School of Business  
University of Chicago

- In 1981, he examined the returns of small-cap and large-cap companies listed on the NYSE from 1926 to 1975
  
- Banz later started an investment boutique firm in London
  - Concentrated on small cap investments
  - Sold to Alliance Capital

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## The “Size Effect” Banz’s Methodology

- Examined the relationship between the total market value of the common stock of a company and its return
- Banz created 25 portfolios:
  - First, he assigned all the stocks to 1 of 5 portfolios on the basis of the market value of the stock
  - Then, the securities in each of those 5 portfolios were in turn assigned to 1 of 5 portfolios, based on their 5-year beta

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## The “Size Effect” Banz’s Methodology

- Each portfolio contained a similar number of securities
- OTC small and large stocks were not included in the study
- Portfolios were updated every year

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## The “Size Effect” Study Results

- The common stock of NYSE small companies had, on average, higher risk-adjusted returns than the common stock of large firms
- Found empirical evidence that small companies have greater returns than larger companies over time
- Banz called this phenomenon the “Size Effect”

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## The “Size Effect”

- The “Size Effect” was one of the most remarkable discoveries of modern finance
- It showed there is a relationship between company size and return
- It was the first major modification to the CAPM
- Small company stocks began to be integrated into portfolios to diversify risk and increase returns

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# Russell 2000 Index

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## Russell 2000 Index



**Frank Russell**  
Retired Merrill Lynch Broker  
Frank Russell Company Founder  
1936

- Frank Russell Company offered investment counseling services and started a mutual fund
  
- In 1982, the firm created several indexes of stocks as a way to gauge money managers' success against the growth of the market as a whole
  
- In 1984, George Russell (grandson) started the Russell 2000 Index

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# “The Size Effect”

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## Russell 2000 Index

- Russell 2000 Index was the first benchmark devoted to small-cap stocks
- Composed of the 2000 smallest-cap US securities
- Serves as an important benchmark for tracking small-cap performances versus the balance of the market

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## Russell 2000 Index

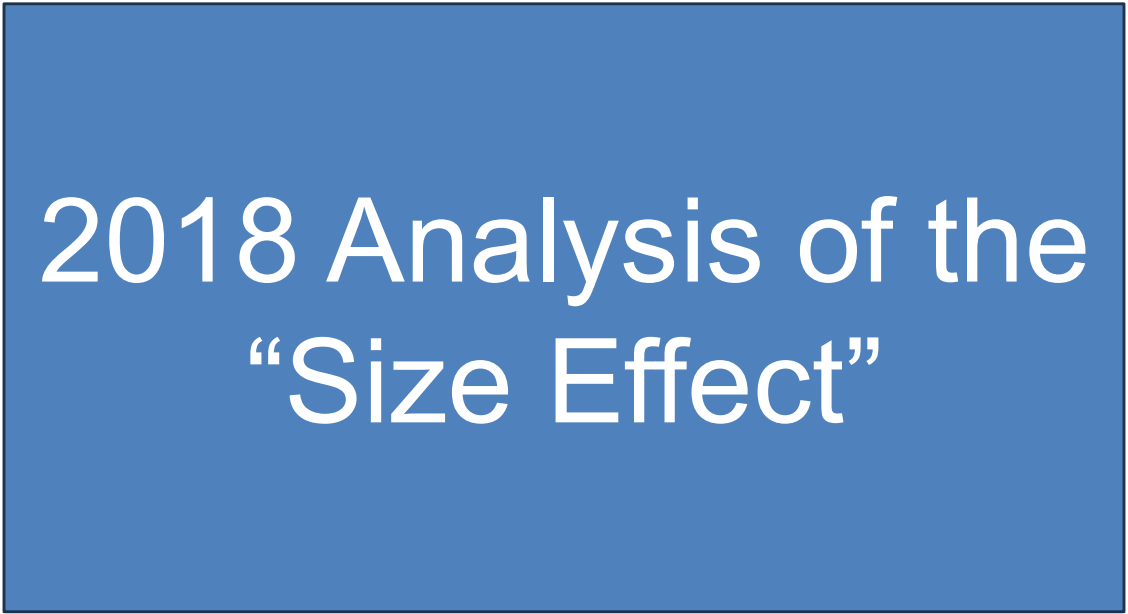
- Tends to have a larger standard deviation in comparison to the S&P 500
- Tends to yield larger returns in positive market environments
- In 2014, London Stock Exchange Group (LSEG) purchased the Frank Russell Company
- Today, the Russell 2000 is maintained by a subsidiary of the LSEG

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2018 Analysis of the  
“Size Effect”

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## 2018 Journal of Portfolio Management Findings

- In 2018, Banz’s findings were studied in an article for the Journal of Portfolio Management
- The authors found the Size Effect diminished shortly after its discovery and publication
- Identified 9 possible reasons for its disappearance ...

Discussed with Permission of the Journal of Portfolio Management

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## 2018 Journal of Portfolio Management Findings

- 1) Explosion of small cap funds and indices after 1981 may have priced it away
  
- 2) Institutional investors' continued demand for large stocks in the 1980s and 1990s increased the prices of large companies relative to small companies
  
- 3) Small companies experienced a series of negative profitability shocks in the 1980s and 1990s

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## 2018 Journal of Portfolio Management Findings

- 4) There were errors in historical databases of stock prices
  
- 5) Size Effect varies considerably depending on how “size” is measured:
  - Market Cap
  - Book Equity
  - Sales
  - Number of employees

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## 2018 Journal of Portfolio Management Findings

6) Some stocks had been dropped from the NYSE - these delisted stocks had no return information available for them and were therefore removed from the analysis

- Negative events caused the delisting
- Delisting events are more likely to occur in smaller companies
- As a result, the performance of small stocks looked better than it actually was relative to large stocks

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## 2018 Journal of Portfolio Management Findings

7) The Size Effect does not work for other asset classes

- It works only on individual equities

8) Not statistically significant outside the US markets

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## 2018 Journal of Portfolio Management Findings

- 9) The Size Effect was mostly found in micro-caps
- Micro-caps are the bottom 5% of all stocks
  - More difficult to study
  - The control and minimization of trading costs was critical

But, they did find something very interesting ...

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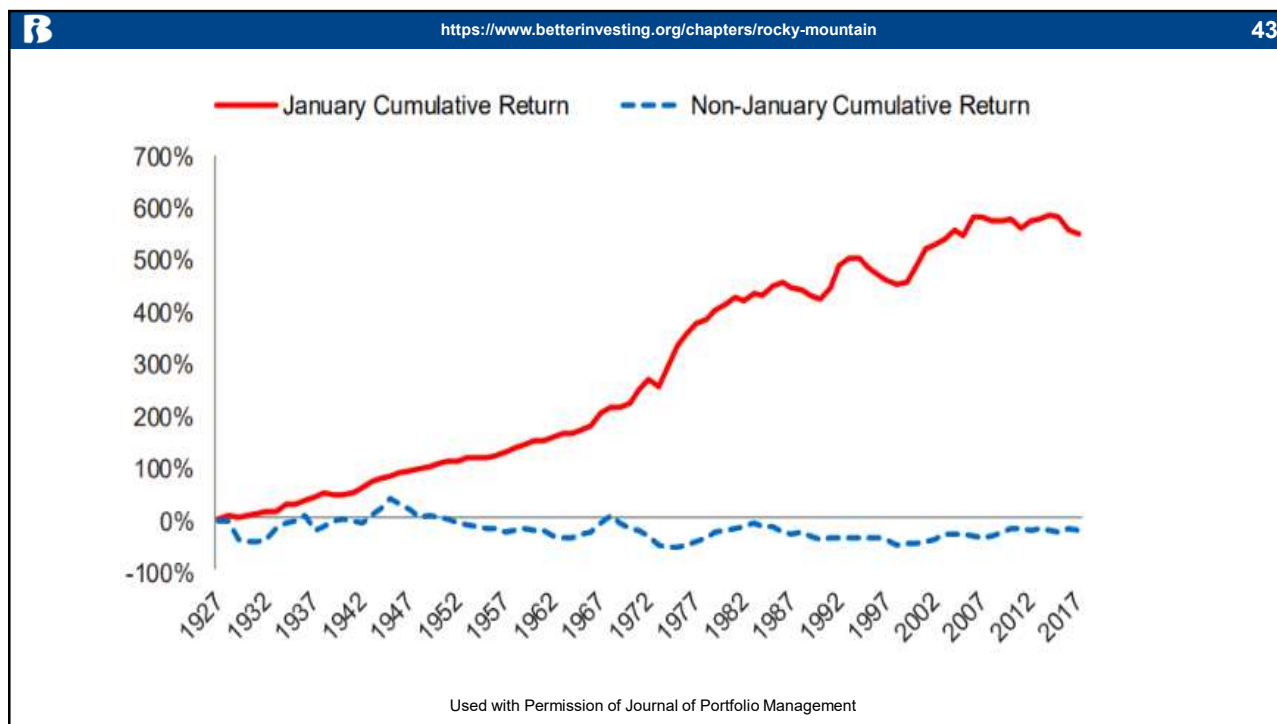
## 2018 Journal of Portfolio Management Findings

- From 1926-2017, the Size Effect was dominated by a January Seasonal Effect
- The January Effect is a phenomenon where stocks tend to rise more during the month of January compared to other months
  - There is a large and statistically significant premium in January but not in any other month(s)
- Especially small stocks!!

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Risk vs. Return  
Large vs. Small

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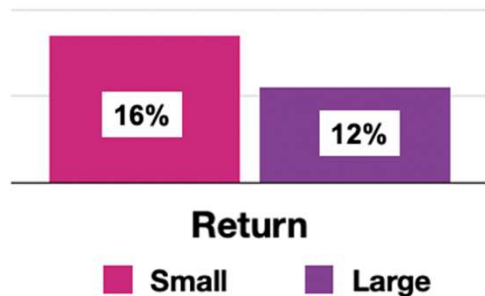
## Risk vs. Return Over Time

- Risk vs. Return is over the long-term
- Small companies are riskier than large companies
- Investors in small company stocks should expect losses and periods of underperformance relative to large company stocks
- To induce investors to invest in small companies instead of large companies, the investors' required rate of return must be greater

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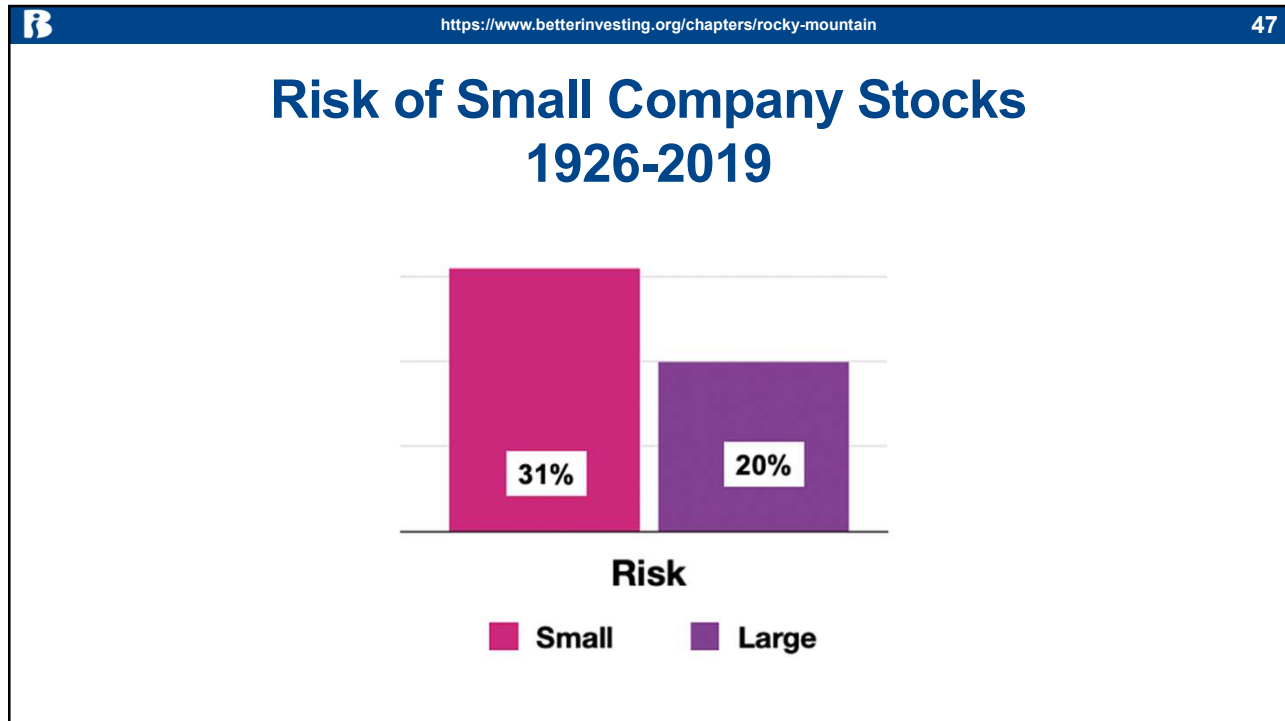
## Return on Small Company Stocks 1926-2019



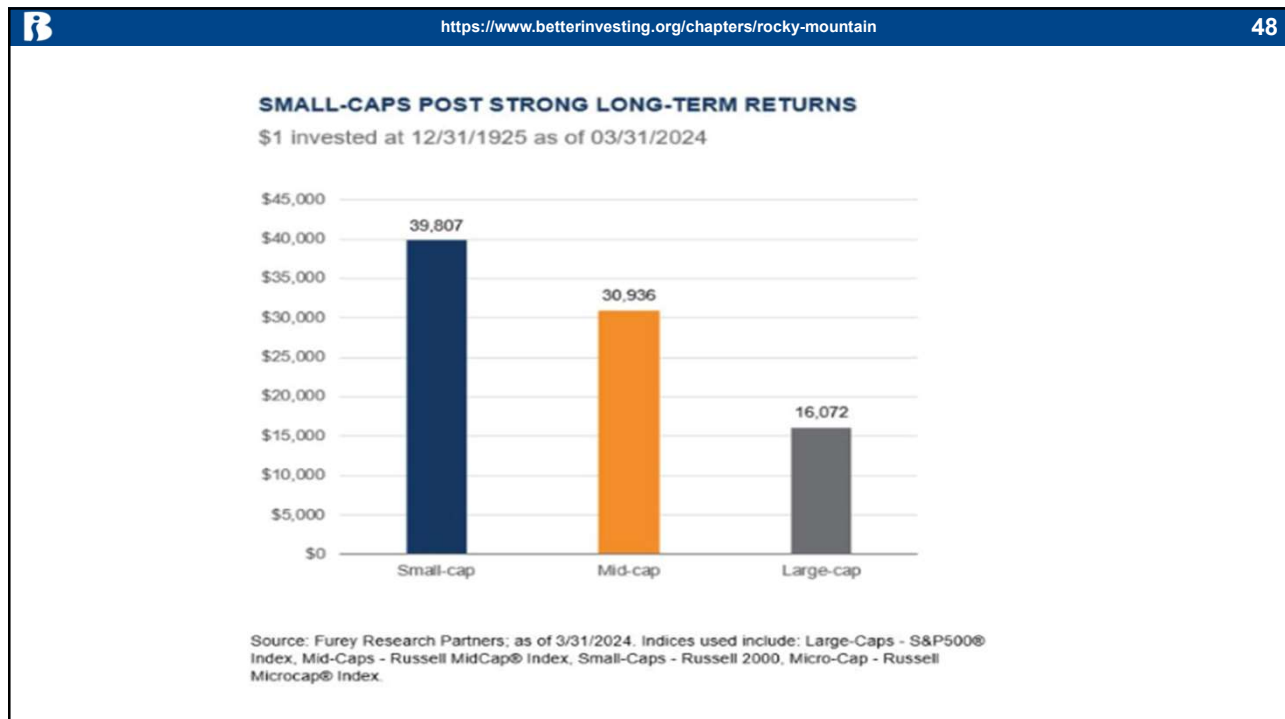
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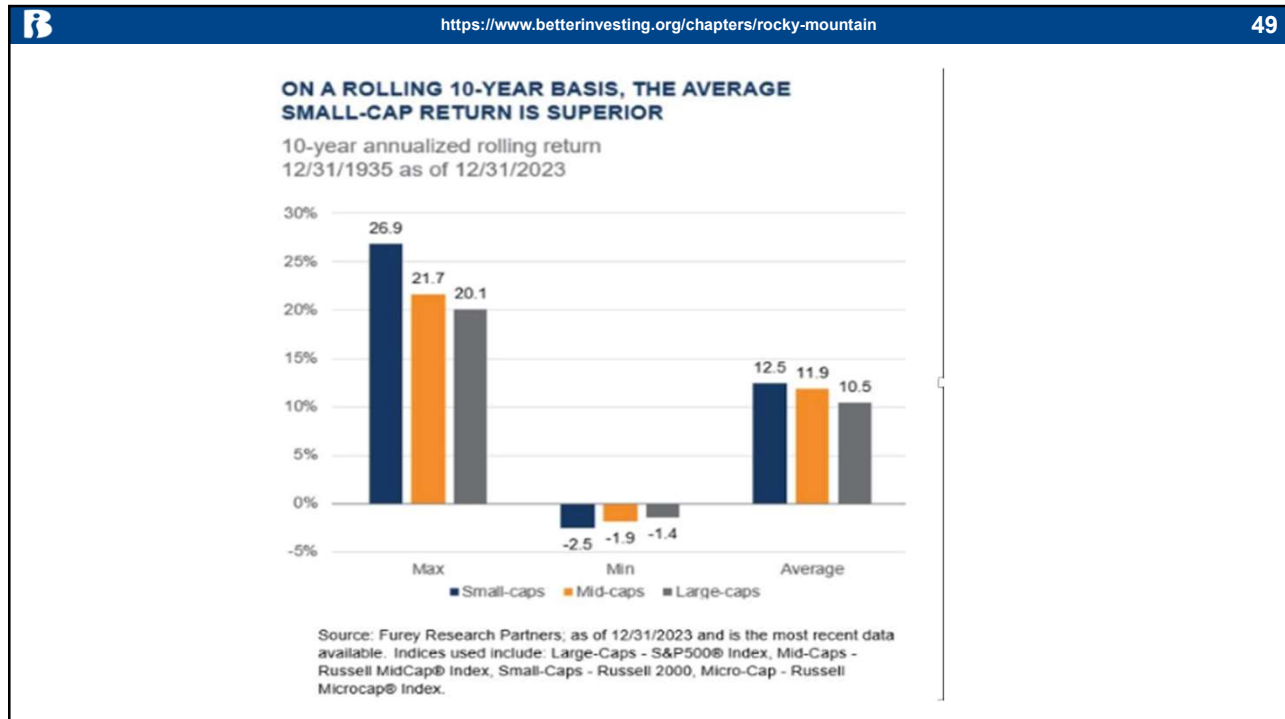


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## Biggest Up and Down Years for the Russell 2000

Biggest Russell 2000 Down Years	Biggest Russell 2000 Up Years
2008: -34.15%	2003: 47.58%
1990: -21.46%	1991: 43.68%
2022: -20.48%	2013: 38.69%
2002: -20.37%	2009: 28.51%
2018: -11.11%	2010: 26.93%
	1995: 26.21%
	2019: 25.39%
	1988: 22.38%
	2016: 21.60%
	1997: 20.52%
	2020: 20.03%

<https://tradethatswing.com/historical-average-returns-of-the-russell-2000-index-iwm/>

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## Investor Frame of Mind

- Small company stock investors must be able to “ride the rollercoaster”
  - Not need liquidity
  - Not to worry
  - Be able to sleep at night

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## Some Benefits of Investing in Small Companies

- Diversification: Small-cap stocks act differently than large-cap
- Smaller companies grow revenues and earnings faster than larger, more mature, companies
- It is easier to double your money with a small company than a large company
  - It's easier for a \$10 stock to go to \$20 than it is for a \$100 stock to go to \$200


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## Jeff Bezos' Philosophy of Investing



- *"Given a 10% chance of a 100 times payoff, you should take that bet every time."*
- *Bezos "makes his investments based on if it's going to change people's lives."*

Jeff Bezos

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# Benefits of Diversification

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## Diversification



- Is all about striking the right balance between risk and potential for financial reward
- Diversification is a common investing technique used to reduce your chances of experiencing large losses
- "Don't put all your eggs into one basket!"

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## Diversification



*"The only investors who shouldn't diversify are those who are right 100% of the time."*

**Sir John Templeton**  
Founder of Templeton Mutual Funds  
"Arguably the greatest global stock picker of the century"  
*Money Magazine*, January 1999

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## Benefits of Diversification

- By spreading investments across different asset classes, sectors, and geographic regions, investors can minimize the impact of a single investment going wrong
- If an investor only focuses on a particular industry, they may suffer significant losses if that industry faces challenges
  - Remember the Dot.com Bubble in 2000-2001?

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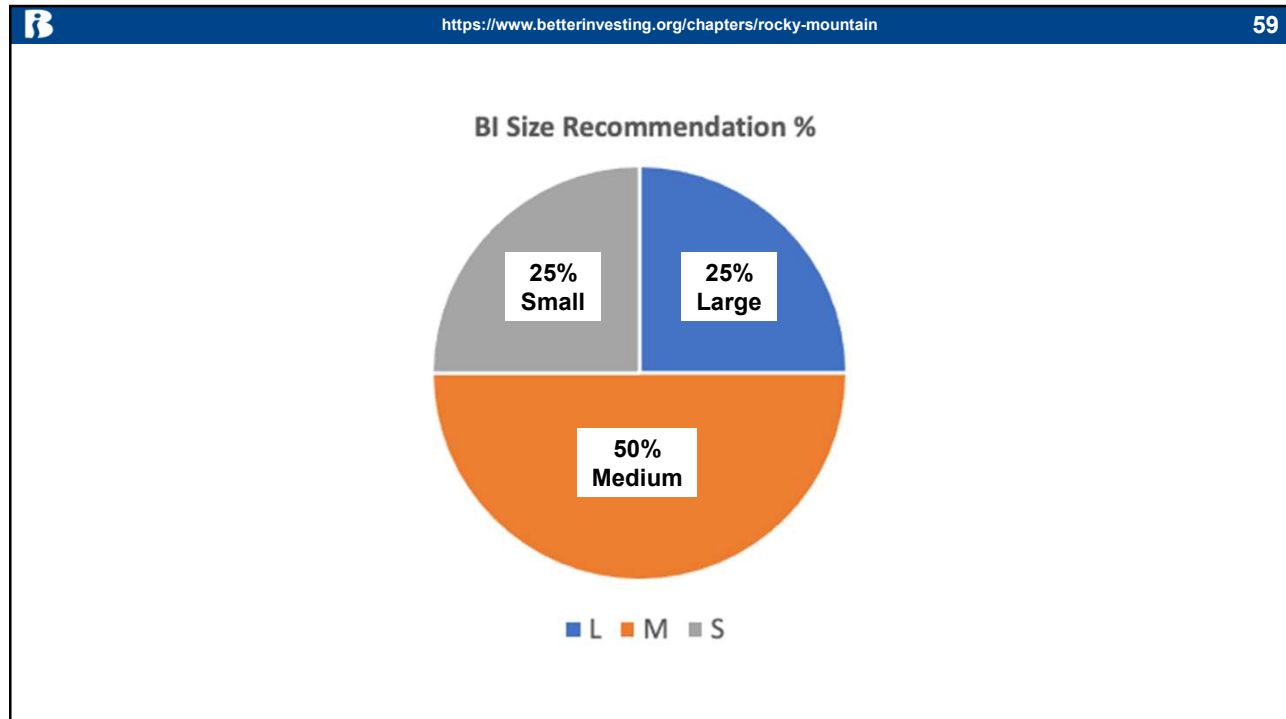


BI Guidelines


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## Summary

- Instead of viewing the stocks in your portfolio in isolation, look at them as they relate to each other:
  - Potential return
  - Level of Risk
- When you create a portfolio, select different assets whose performances aren't correlated
- This will allow you to balance the risk offered by each choice

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## What Characteristics of Small Stocks Do We Look For?

- Target small-company stocks with a history of outperformance
  - Earnings growth
  - Sales growth
  - Profitable
  - Low P/E
  - Stock price growth
  - Developing moat, if possible
- Alternatively, use a mutual fund or ETF for general broad exposure

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## BI's Definition of Small Stock and Online Screen

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## BI's Definition of Small, Medium and Large Stocks

Sales	Size	Acceptable Growth
< \$1 billion	Small	At Least 12%
\$1 B- \$10 B	Medium	7% - 12%
> \$10 billion	Large	5% - 7%

BI recommends 25% of Your Portfolio be in Small Company Stocks

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**BETTERINVESTING**  
**SSG-PLUS**

### BI Screener Tool

**Stock Ideas - Search for a Company**

**Search Criteria**

9 Yr Sales Growth (%):

9 Yr Earnings Growth (%):

5 Yr EPS R-squared:

Size: Small Medium Large

Sector:

Dividend Yield (%):

Pre-Tax Profit Trend: Up Even Down

Return on Equity Trend: Up Even Down

Morningstar Growth Grade:

Morningstar Profit. Grade:

Morningstar Financial Health:

PE / Historical EPS Growth:

Traded Exchange:

**Predefined Screens**

Quality	?
Value	?
Quality + Dividend Yield	?
Small Company	?
Roster of Quality	?
A-List Stocks	?

**Small Company Criteria**

- EPS R2 5 Year between 0.85 and 1.0
- Pre-tax Profit Trend = Up or Even
- Return on Equity Trend = Up or Even
- Debt / Capital % <= 40.0
- Sales (M\$) between 100 and 1000
- Historical 5 Year Sales Growth % > 12.0
- Last 4Q Sales Growth % > 12.0
- Historical 5 Year EPS Growth % > 12.0
- Last 4Q EPS Growth % > 12.0

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## Small Stock Screen Criteria

- EPS R<sup>2</sup> 5 Year between 0.85 and 1.0
- Pre-tax Profit Trend = Up or Even
- Return on Equity Trend = Up or Even
- Debt / Capital % < = 40.0
- Sales between \$1M and \$10M
- Historical 5 Year Sales Growth % > 12.0
- Last Quarter Sales Growth % > 12.0
- Historical 5 Year EPS Growth % > 12.0
- Last Quarter EPS Growth % > 12.0

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## Sources:

- [Modern Portfolio Theory: Definition, Examples, & Limitations | Britannica Money](#)
- Rebecca Baldrige, *The Capital Asset Pricing Model (CAPM)*, [What Is CAPM? – Forbes Advisor](#)
- Ron Alquist, Ronen Israel and Tobias Moskowitz, Fact, Fiction and the Size Effect, *The Journal of Portfolio Management*, Fall 2018 [Fact Fiction and the Size Effect.pdf](#)
- Rolf W. Banz, The Relationship Between Return and Market Value of Common Stocks, *Journal of Financial Economics* 9 (1981) [PII: 0304-405X\(81\)90018-0 \(dailystocks.com\)](#)

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## Thank you!

Contact me at:

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