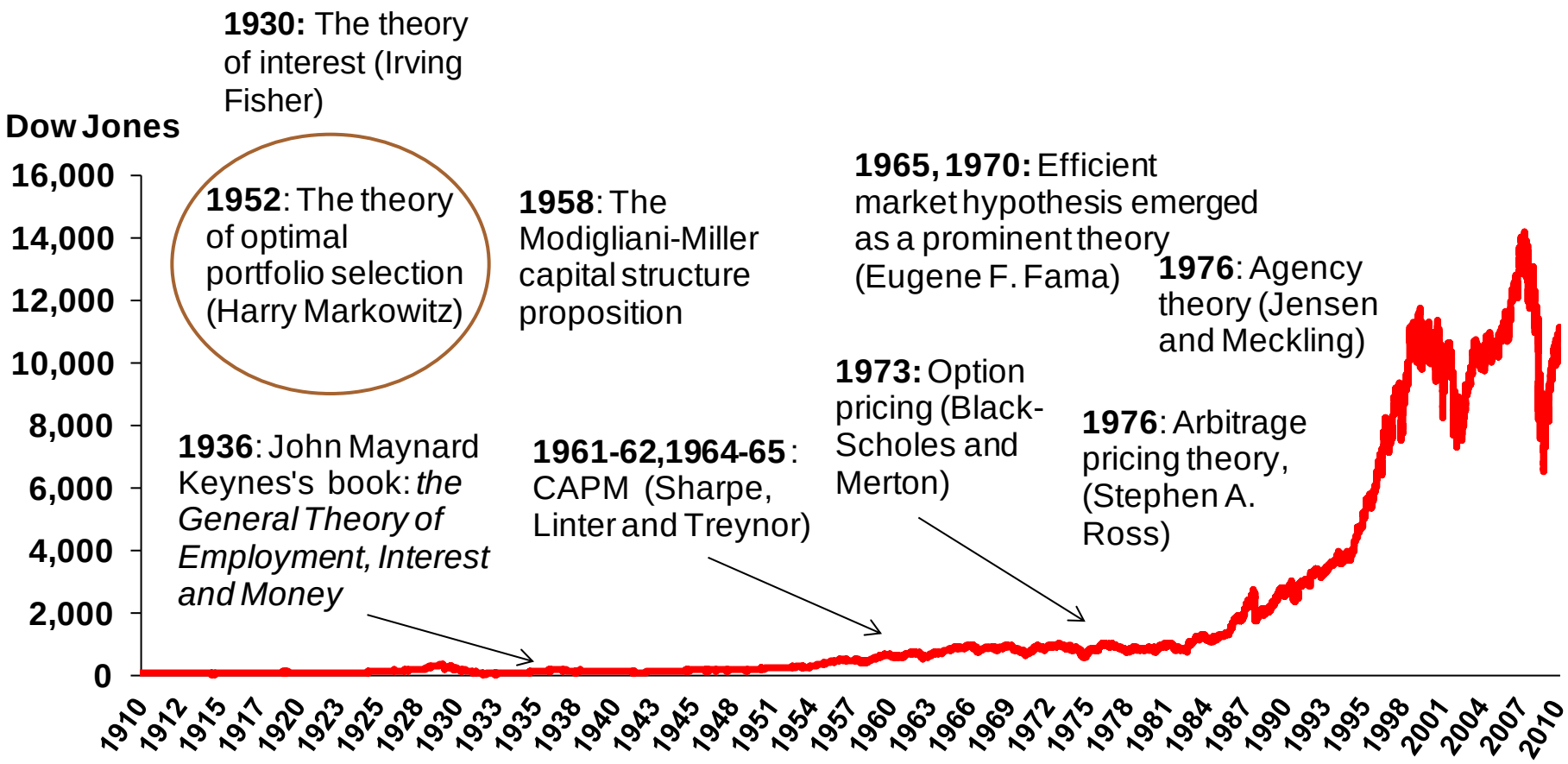
# Diversification – The Single Most Misunderstood Concept

## *Risk Reduction vs. Surety of Outcome*

Terry R. O’Neill

**The O’Neill Company**

# Development of Finance Theory



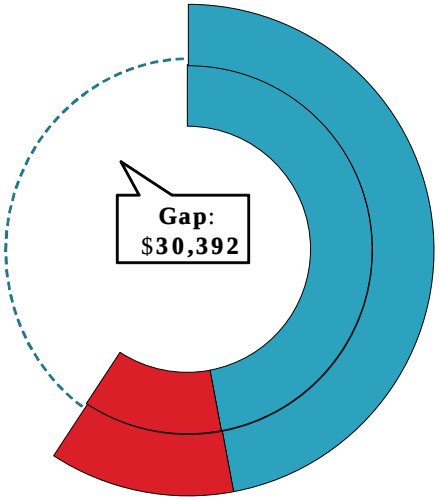
# Retirement Shortfall

**Annual retirement income needed: $74,545**

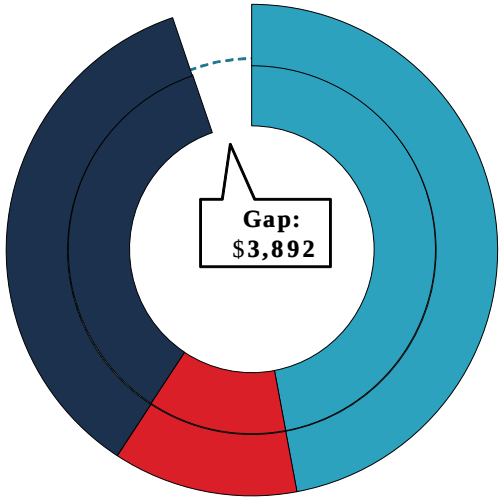
| | |
|---|---|
| Social Security: | **$35,080** |
| 401(k): | **$9,073** |
| Pension: | **$26,500** |

Based on a 2009 median income of $87,700 for households whose heads are 60 62 years old, and a median 2010 401(k) of $149,400 for that group. Assumes households need 85% of pre retirement in come in retirement.

**Households With 401(k)s**




**Households with 401(k)s and pensions**




Sources: Center for Retirement Research at Boston College; Federal Reserve; New York Life Insurance Company

# Three Approaches to Risk Management

**Active tactical asset allocation**

**or**

**Balanced portfolio of stocks and bonds**

**or**

**Put options**

# Diversification - Definition

- **“Another means to control portfolio risk is diversification, by which we mean that investments are made in a wide variety of assets so that the exposure to the risk of any particular security is limited. By placing one’s eggs in many baskets, overall portfolio risk actually may be less than the risk . . .”**

***Investments, Zvi Bodie, Alex Kane, Alan Marcus, Irwin, Homewood, IL, 1989, Page 138***

# We Encourage Our Clients to Diversify – We Tell Them This Is a Good Idea Because:

- **Our clients seek higher returns…**
- **…and lower risk**
- **We tell them to diversify because this will reduce the risk of their portfolios**
  - Perhaps… declines will, as a result, be less severe and less likely

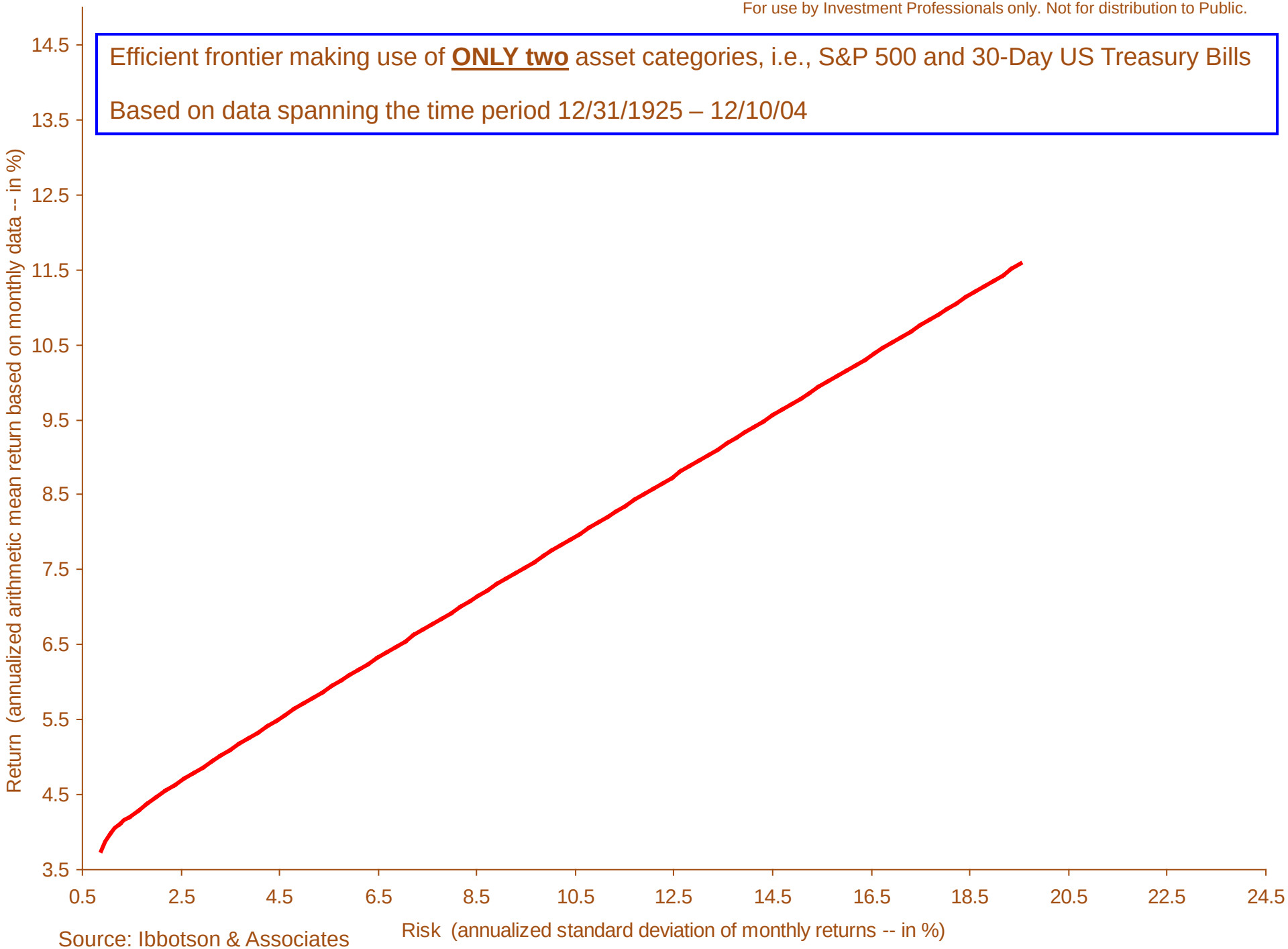
# Is Multi Asset Class Diversification an Adequate Risk Management Strategy?

# Does Diversification Work?

- **Looked at 16 different asset categories**
  - S&P 500 (12/31/25 – 12/10/04)
  - Ibbotson small cap stocks (12/31/25 – 12/10/04)
  - Fama-French small growth stocks (6/30/27 – 12/10/04)
  - Fama-French small value stocks (6/30/27 – 12/10/04)
  - IA mid cap growth stocks (12/31/67 – 12/10/04)
  - IA Mid cap value stocks (12/31/67 – 12/10/04)
  - IA small cap growth stocks (12/31/67 – 12/10/04)
  - IA small cap value stocks (12/31/67 – 12/10/04)
  - IA micro cap growth stocks (12/31/67 – 12/10/04)
  - IA micro cap value stocks (12/31/67 – 12/10/04)
  - MSCI EAFE stocks (12/31/69 – 12/10/04)
  - MSCI World ex US stocks (12/31/69 – 12/10/04)
  - Wilshire real estate securities (1/31/69 – 12/10/04)
  - MLM futures total return (12/31/60 – 12/10/04)
  - Gold (12/31/67 – 12/10/04)
  - Goldman Sachs commodity total return (12/31/69 – 12/10/04)

Efficient frontier making use of **ONLY two** asset categories, i.e., S&P 500 and 30-Day US Treasury Bills

Based on data spanning the time period 12/31/1925 – 12/10/04

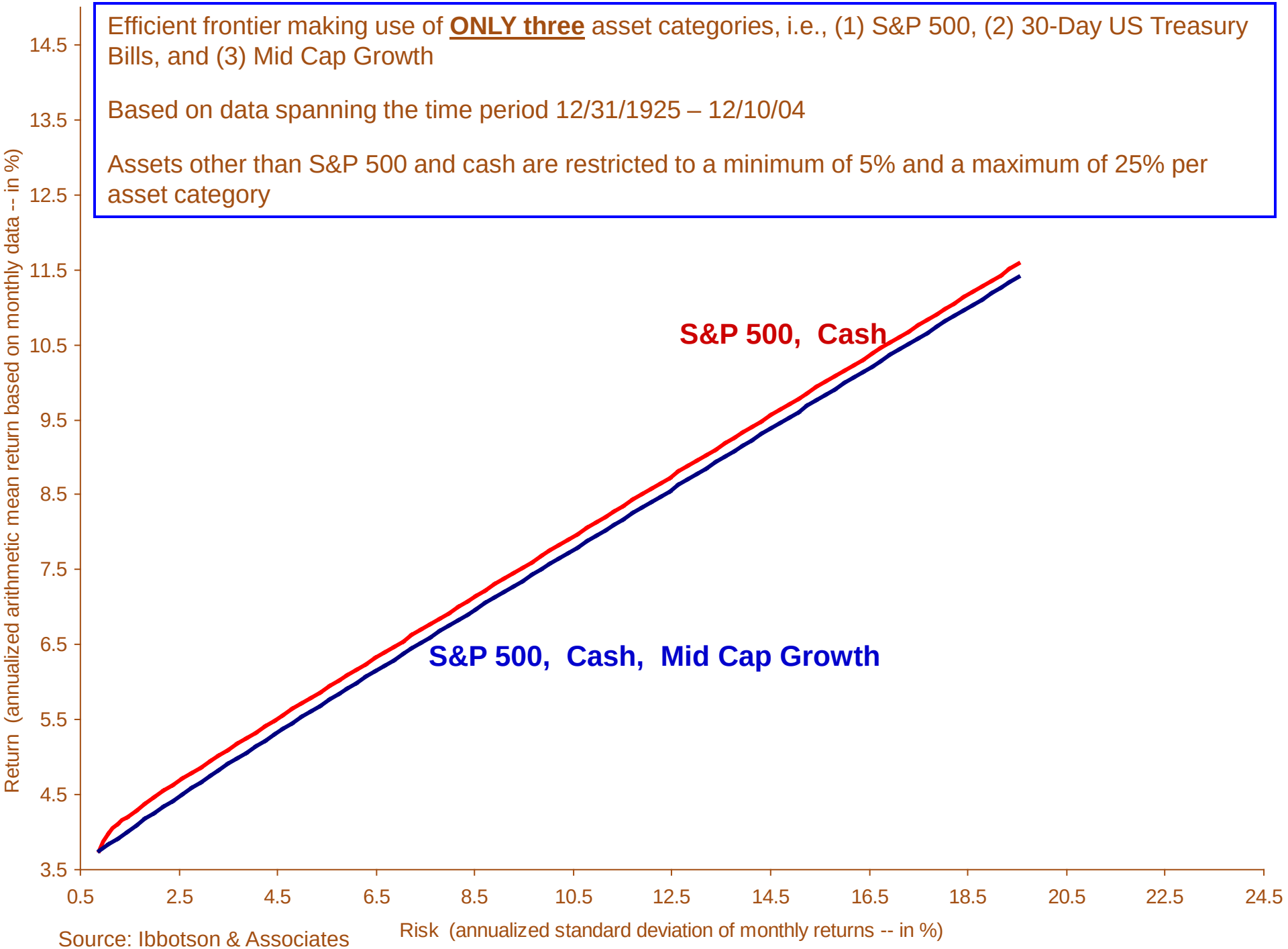



Source: Ibbotson & Associates

Efficient frontier making use of **ONLY three** asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, and (3) Mid Cap Growth

Based on data spanning the time period 12/31/1925 – 12/10/04

Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category

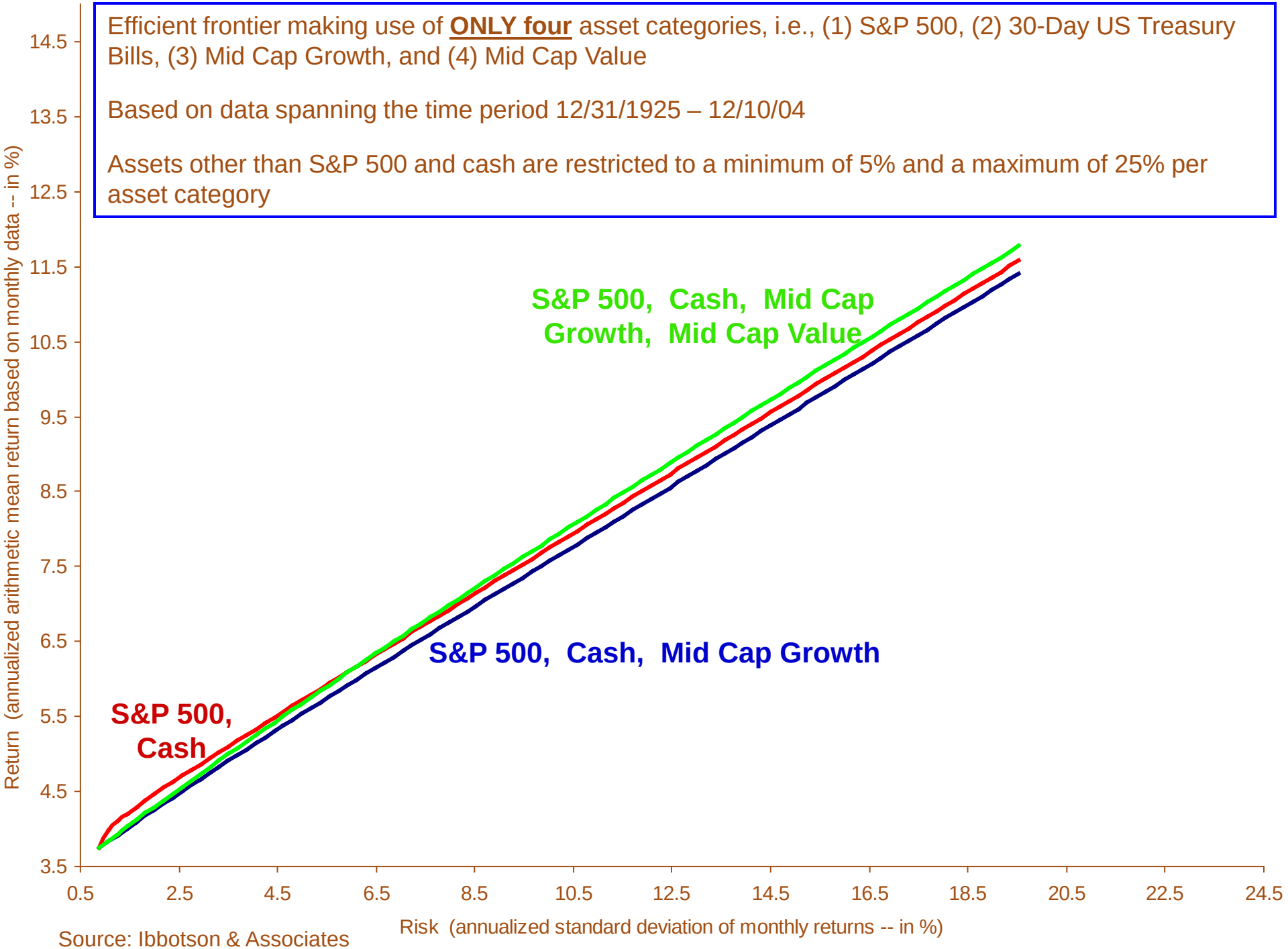



Source: Ibbotson & Associates

Efficient frontier making use of **ONLY four** asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, and (4) Mid Cap Value

Based on data spanning the time period 12/31/1925 – 12/10/04

Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category

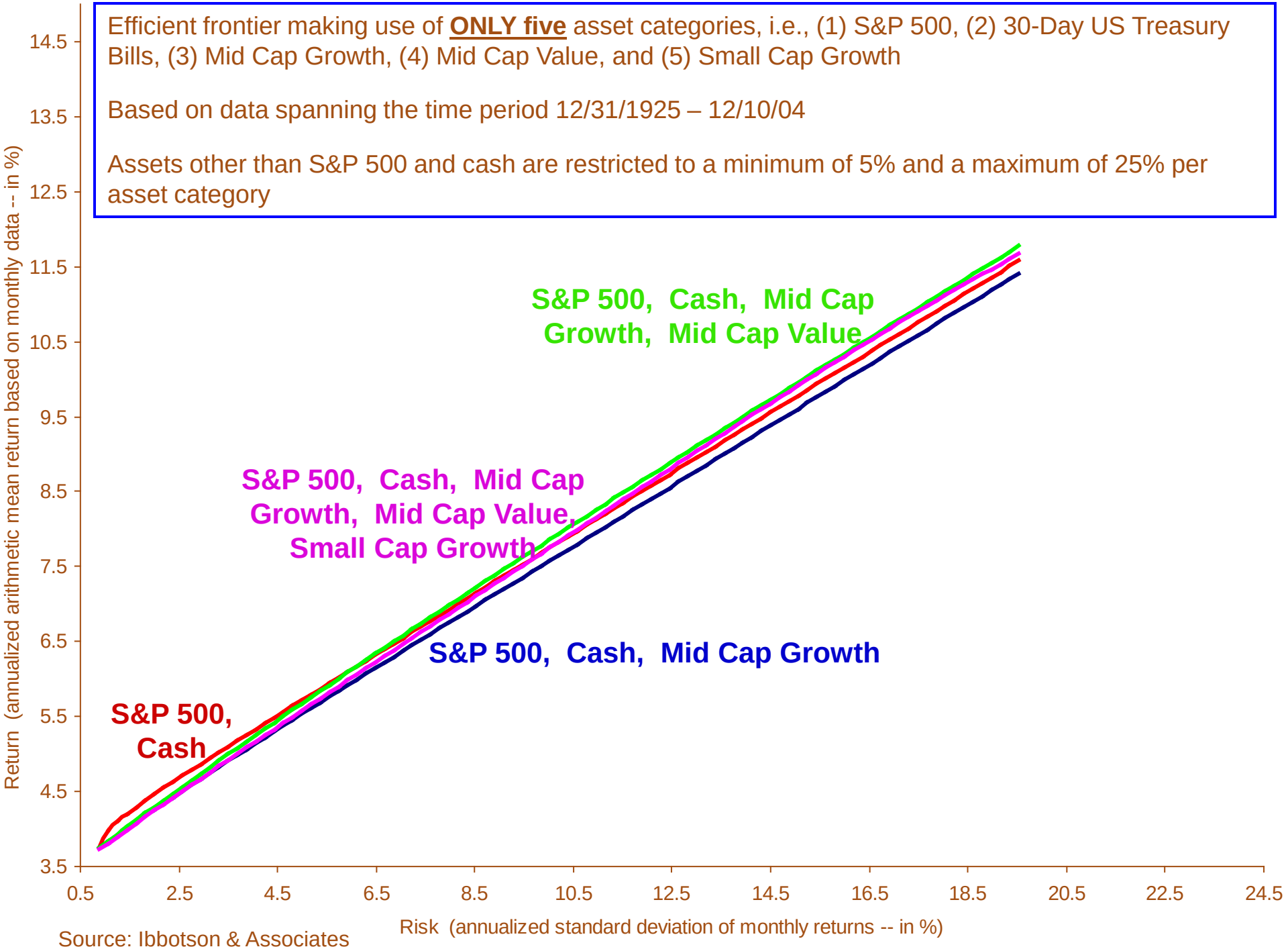



Source: Ibbotson & Associates

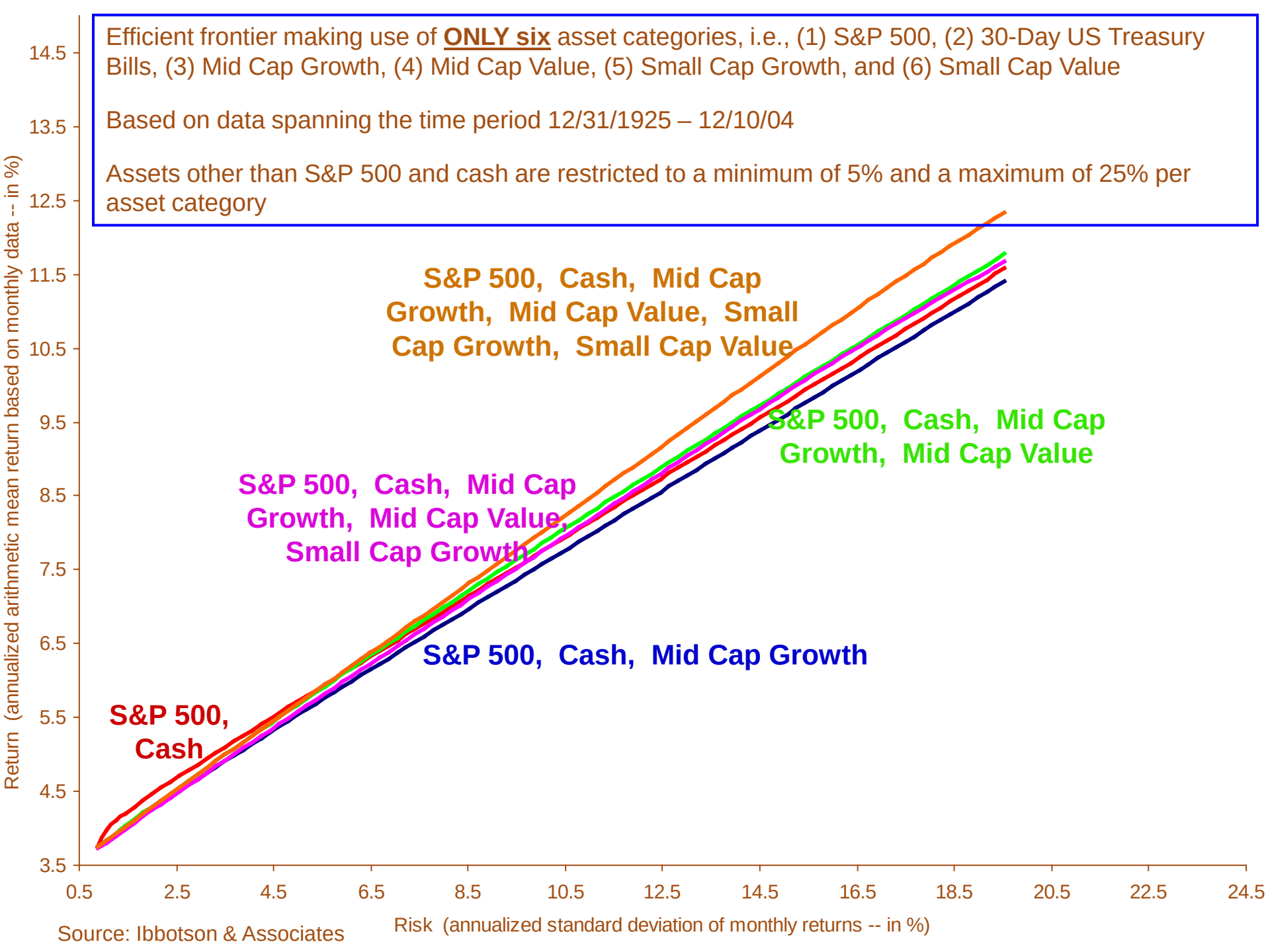
Efficient frontier making use of **ONLY five** asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, (4) Mid Cap Value, and (5) Small Cap Growth

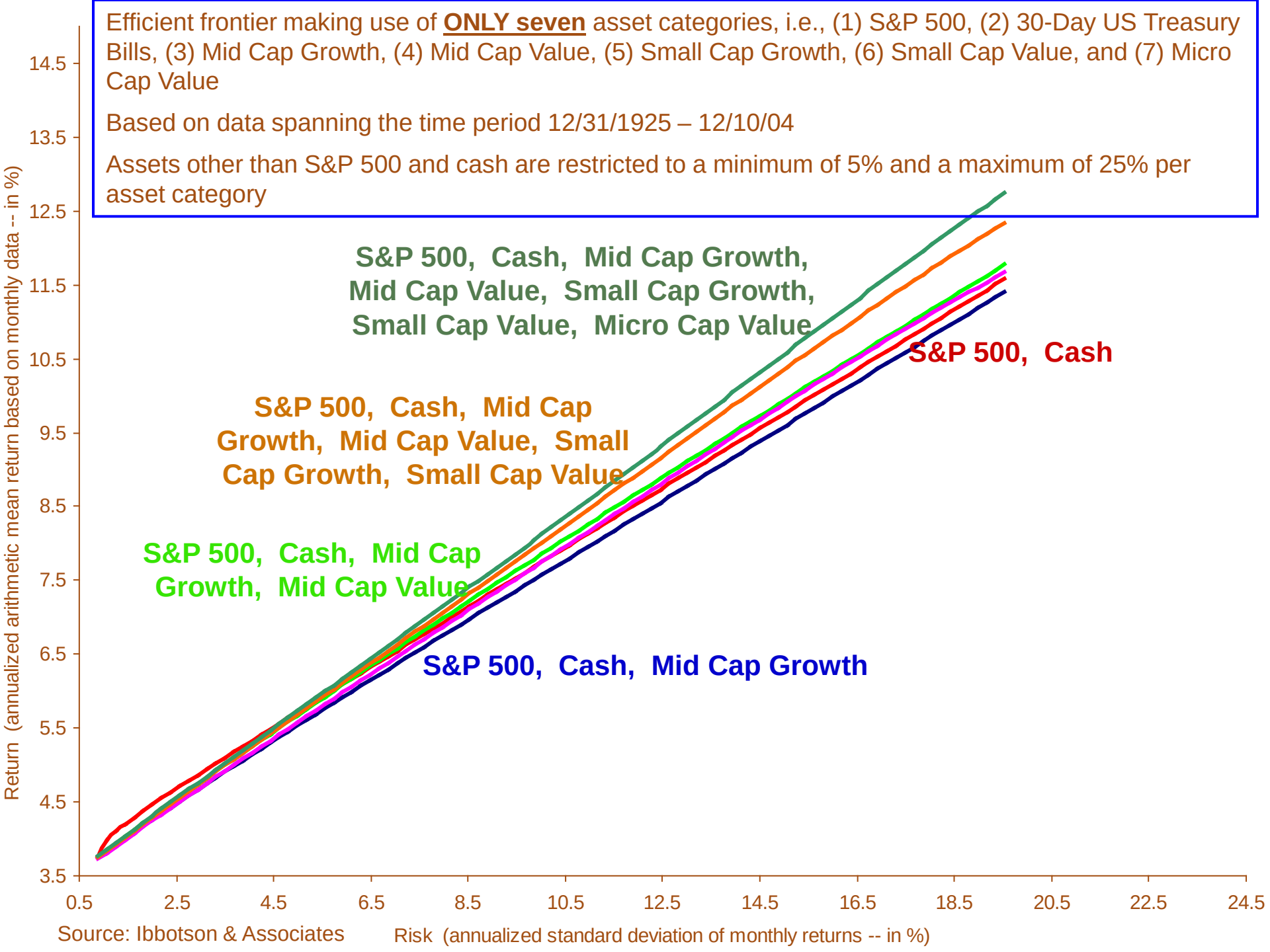
Based on data spanning the time period 12/31/1925 – 12/10/04

Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category




Source: Ibbotson & Associates


Efficient frontier making use of ONLY six asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, (4) Mid Cap Value, (5) Small Cap Growth, and (6) Small Cap Value
Based on data spanning the time period 12/31/1925 – 12/10/04
Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value
S&P 500, Cash, Mid Cap Growth, Mid Cap Value
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth
S&P 500, Cash, Mid Cap Growth
S&P 500, Cash
Return (annualized arithmetic mean return based on monthly data -- in %)
14.5
13.5
12.5
11.5
10.5
9.5
8.5
7.5
6.5
5.5
4.5
3.5
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
Risk (annualized standard deviation of monthly returns -- in %)
Source: Ibbotson & Associates


Efficient frontier making use of ONLY seven asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, (4) Mid Cap Value, (5) Small Cap Growth, (6) Small Cap Value, and (7) Micro Cap Value
Based on data spanning the time period 12/31/1925 – 12/10/04
Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value
S&P 500, Cash
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value
S&P 500, Cash, Mid Cap Growth, Mid Cap Value
S&P 500, Cash, Mid Cap Growth
Return (annualized arithmetic mean return based on monthly data -- in %)
14.5
13.5
12.5
11.5
10.5
9.5
8.5
7.5
6.5
5.5
4.5
3.5
0.5
2.5
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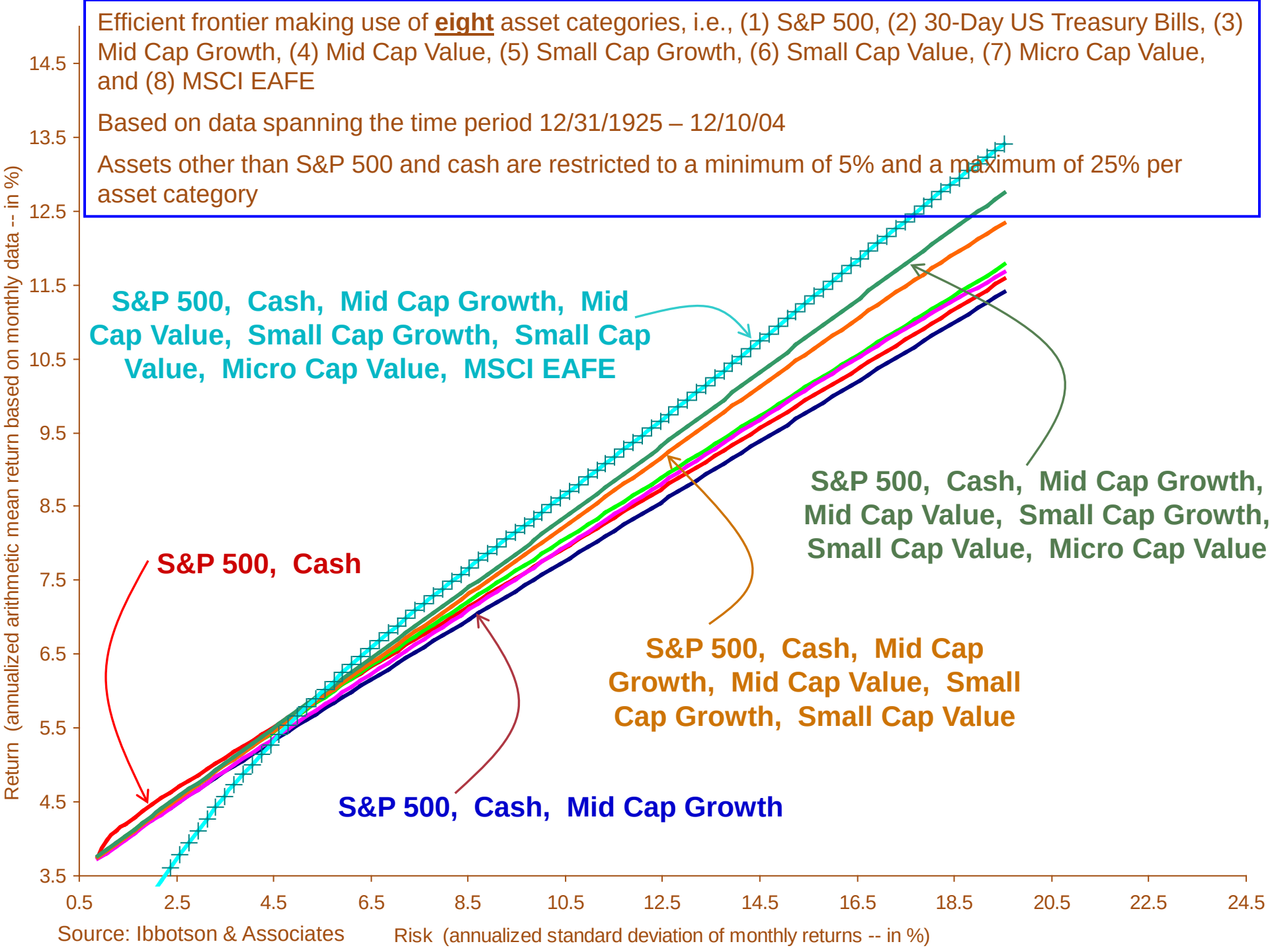
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
Source: Ibbotson & Associates
Risk (annualized standard deviation of monthly returns -- in %)


Efficient frontier making use of eight asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, (4) Mid Cap Value, (5) Small Cap Growth, (6) Small Cap Value, (7) Micro Cap Value, and (8) MSCI EAFE
Based on data spanning the time period 12/31/1925 – 12/10/04
Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value, MSCI EAFE
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value
S&P 500, Cash
S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value
S&P 500, Cash, Mid Cap Growth
Return (annualized arithmetic mean return based on monthly data -- in %)
14.5
13.5
12.5
11.5
10.5
9.5
8.5
7.5
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4.5
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10.5
12.5
14.5
16.5
18.5
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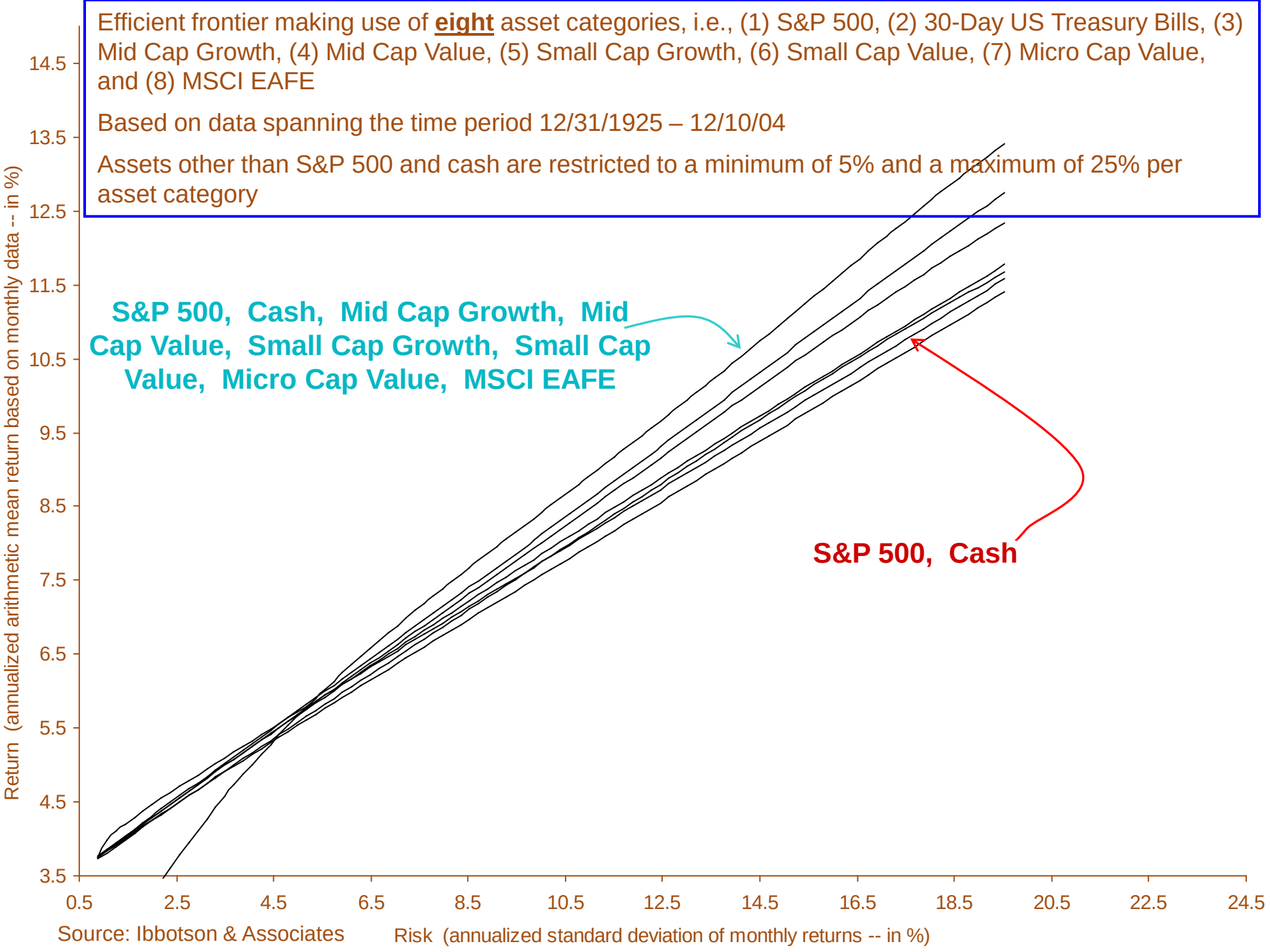
22.5
24.5
Source: Ibbotson & Associates
Risk (annualized standard deviation of monthly returns -- in %)

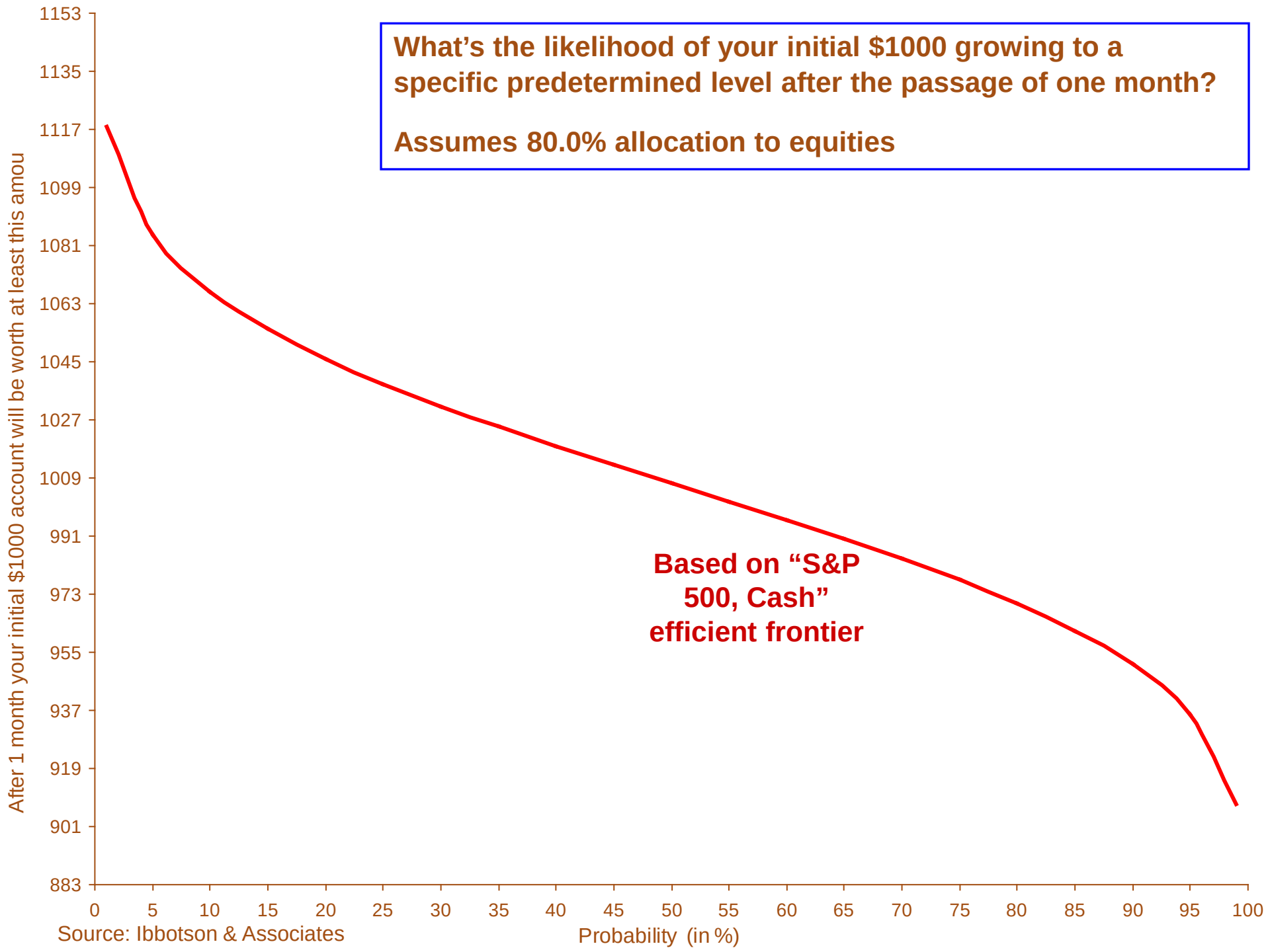
Efficient frontier making use of **eight** asset categories, i.e., (1) S&P 500, (2) 30-Day US Treasury Bills, (3) Mid Cap Growth, (4) Mid Cap Value, (5) Small Cap Growth, (6) Small Cap Value, (7) Micro Cap Value, and (8) MSCI EAFE

Based on data spanning the time period 12/31/1925 – 12/10/04

Assets other than S&P 500 and cash are restricted to a minimum of 5% and a maximum of 25% per asset category




Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash" efficient frontier
After 1 month your initial $1000 account will be worth at least this amou
1153
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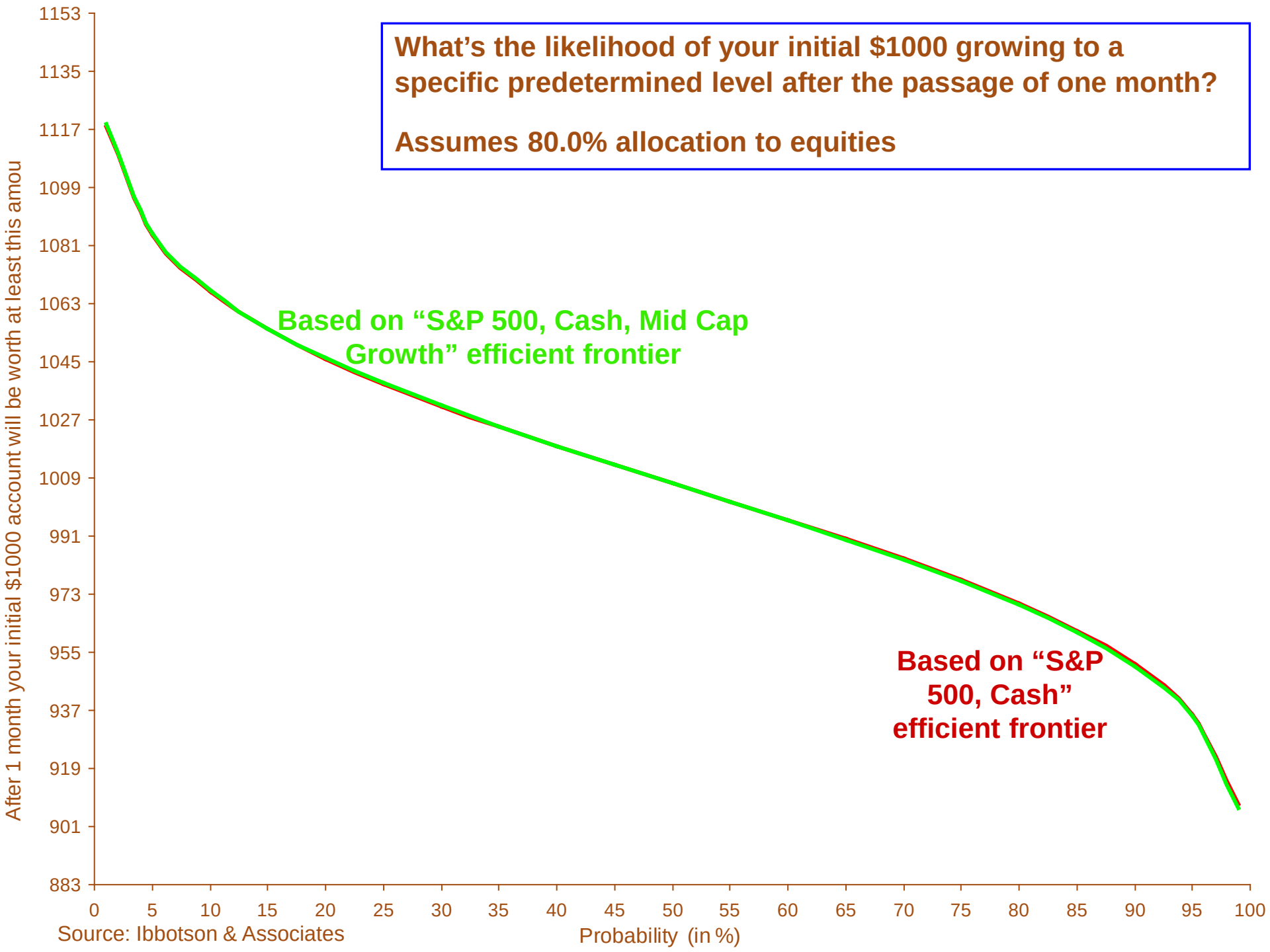
Probability (in %)
Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth" efficient frontier
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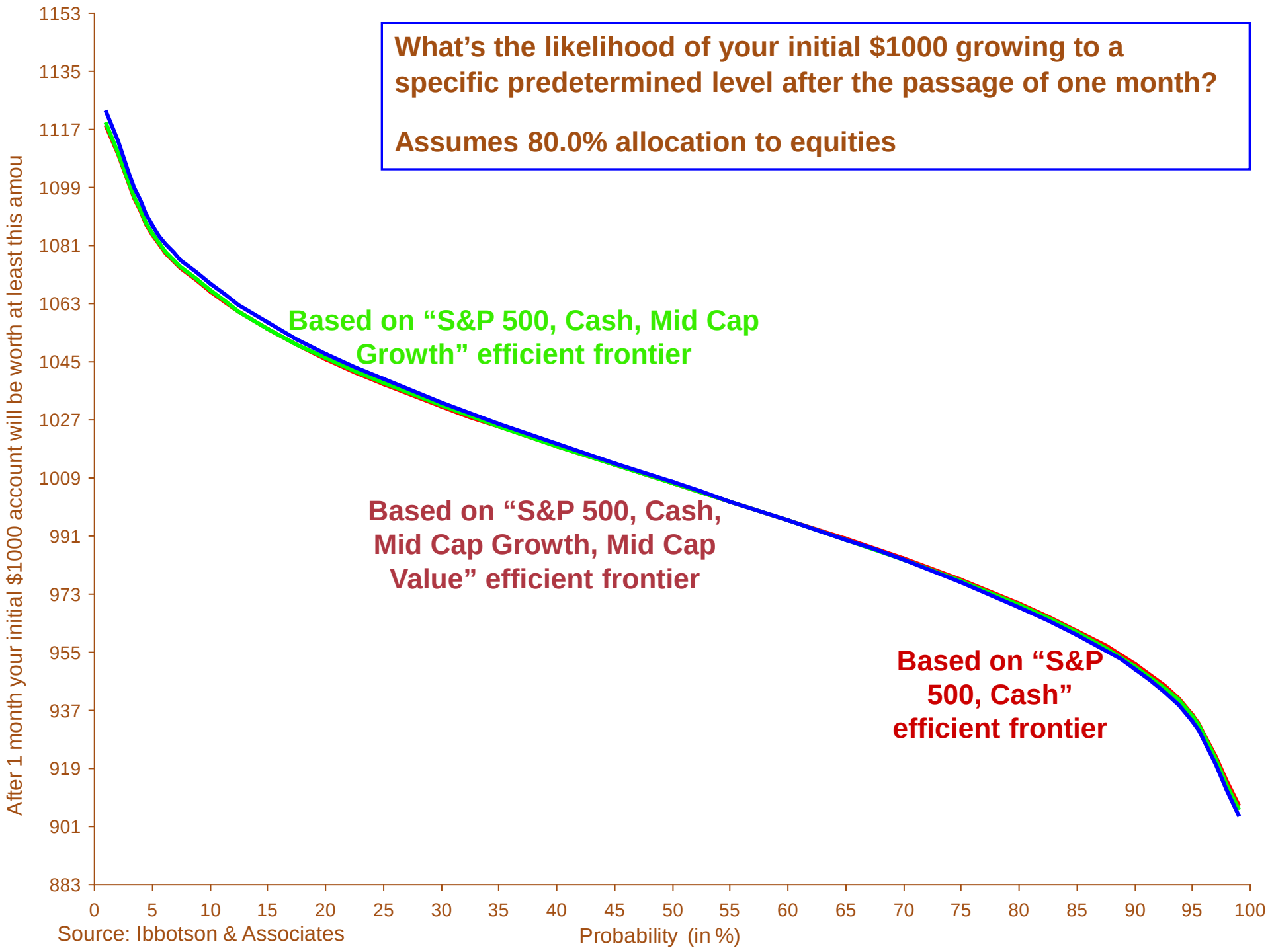
What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value" efficient frontier
Based on "S&P 500, Cash" efficient frontier
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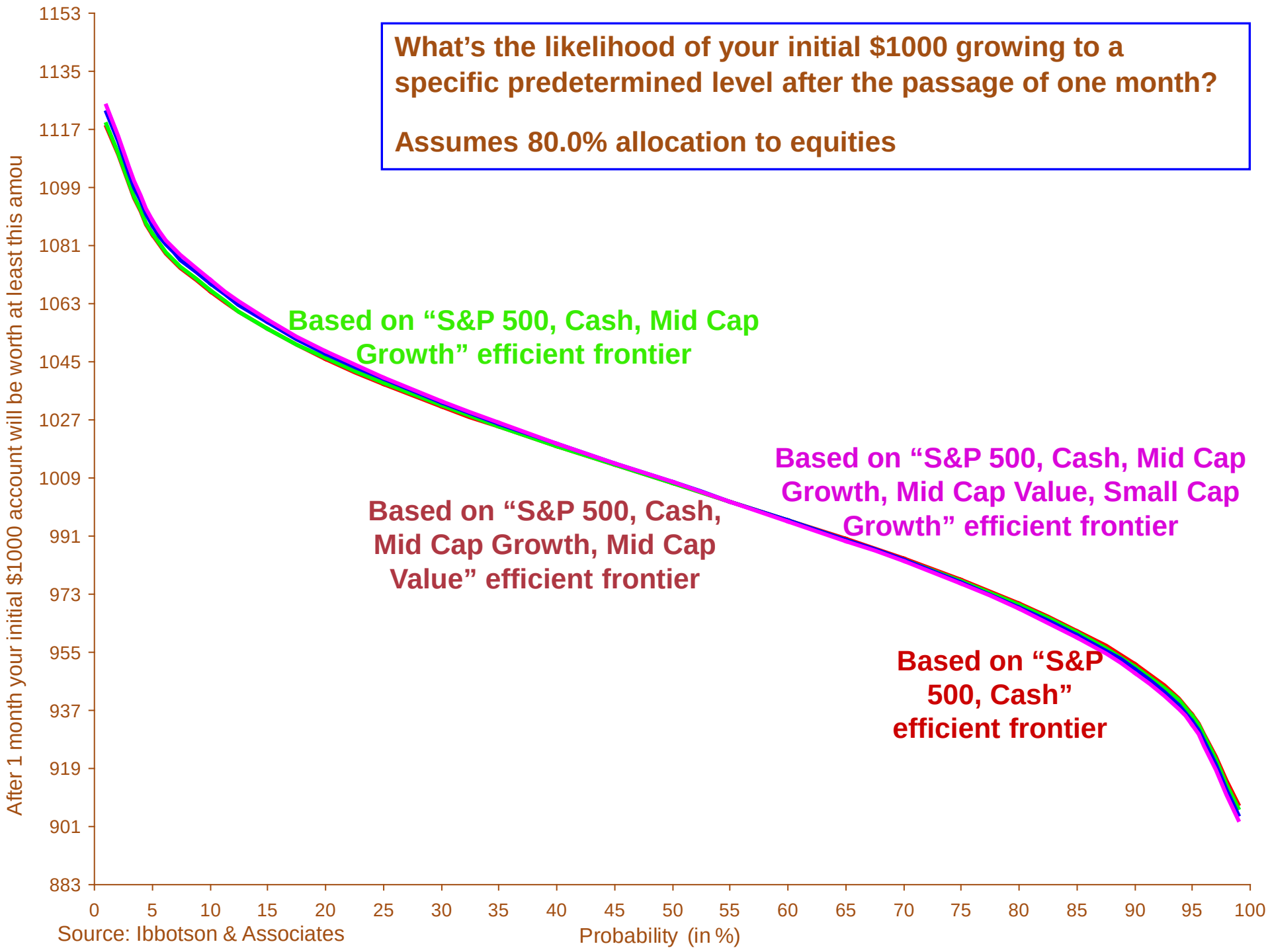
Probability (in %)
Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value" efficient frontier
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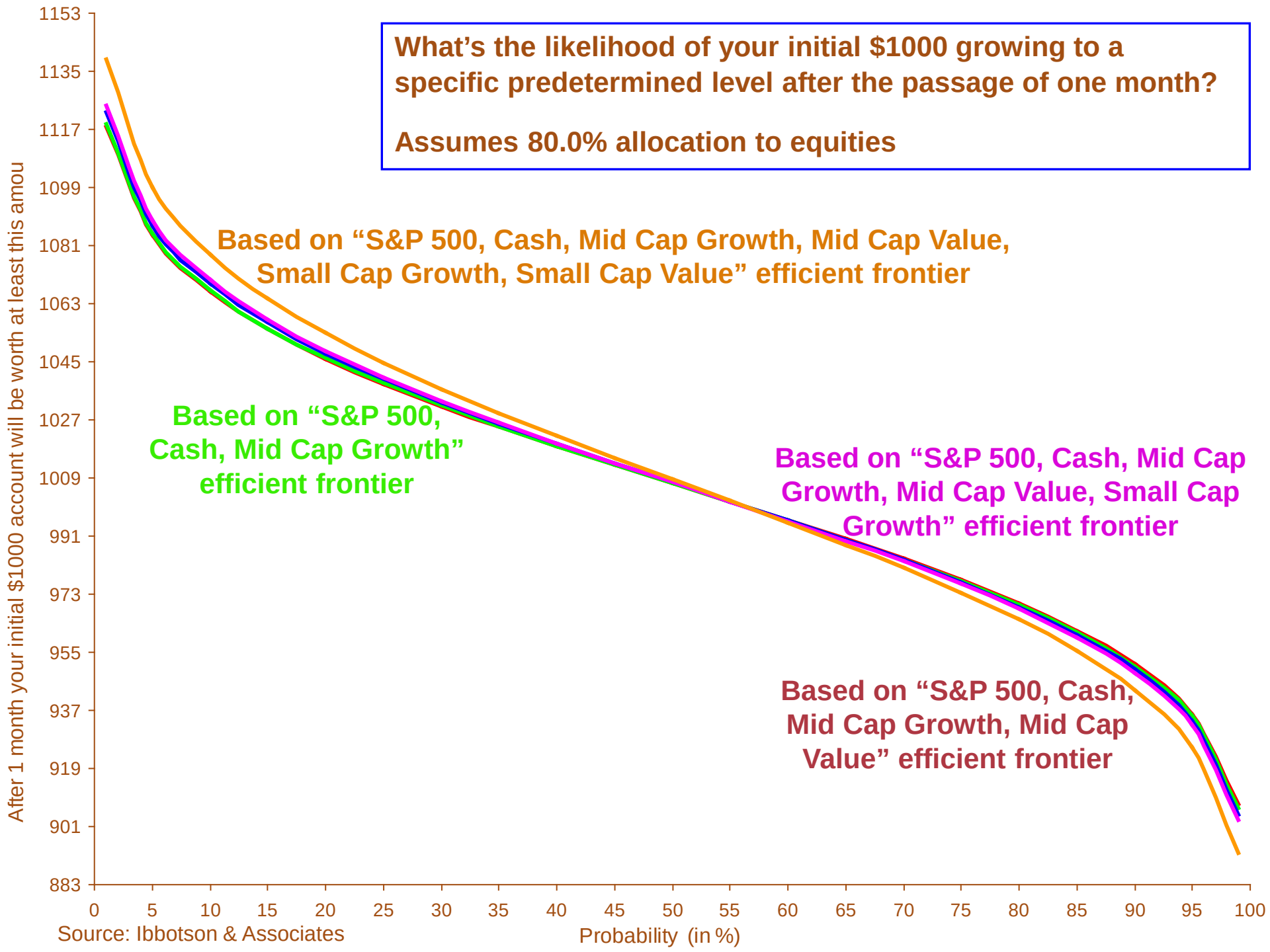
What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value" efficient frontier
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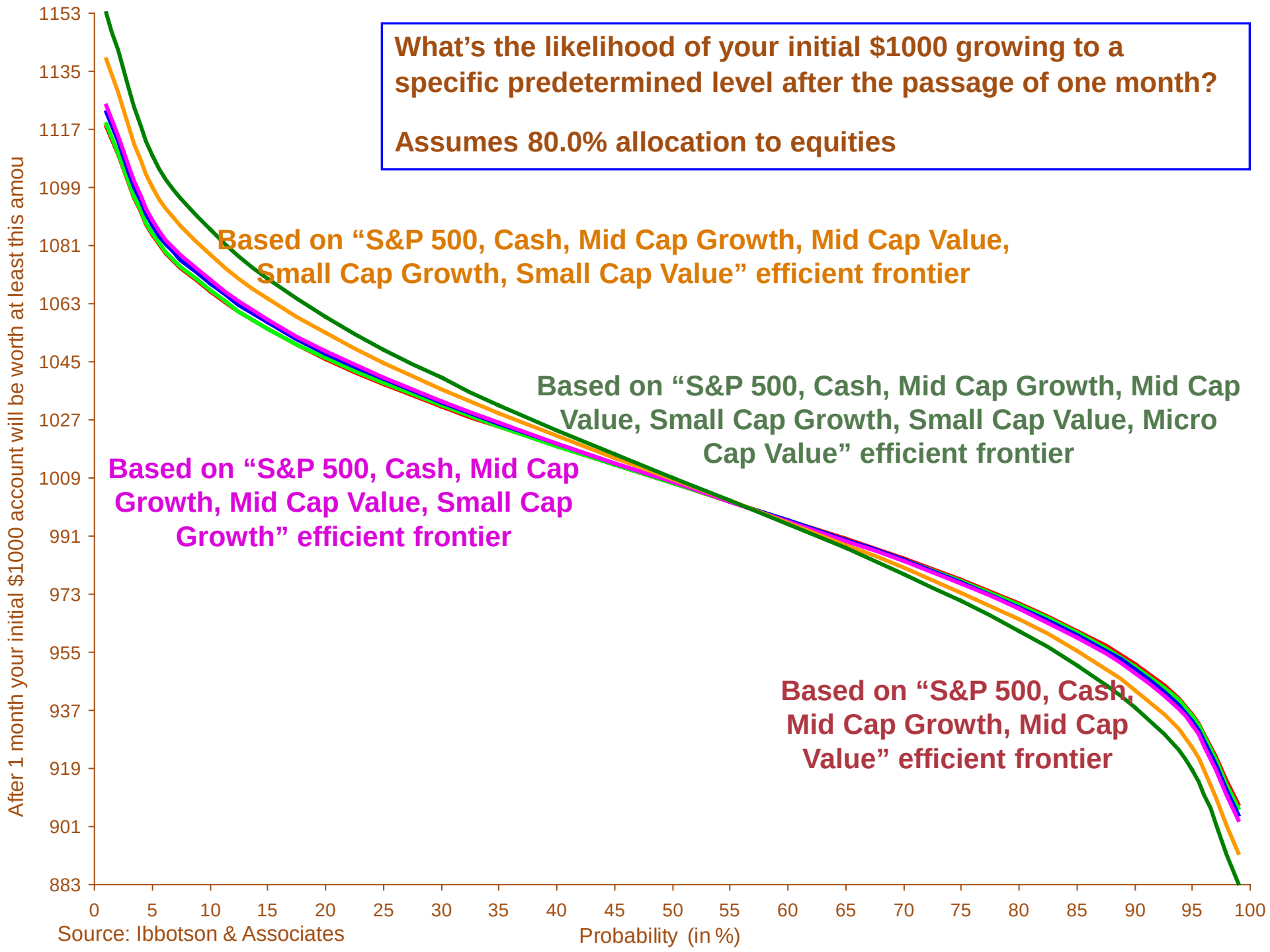
Probability (in %)
Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth" efficient frontier
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Probability (in %)
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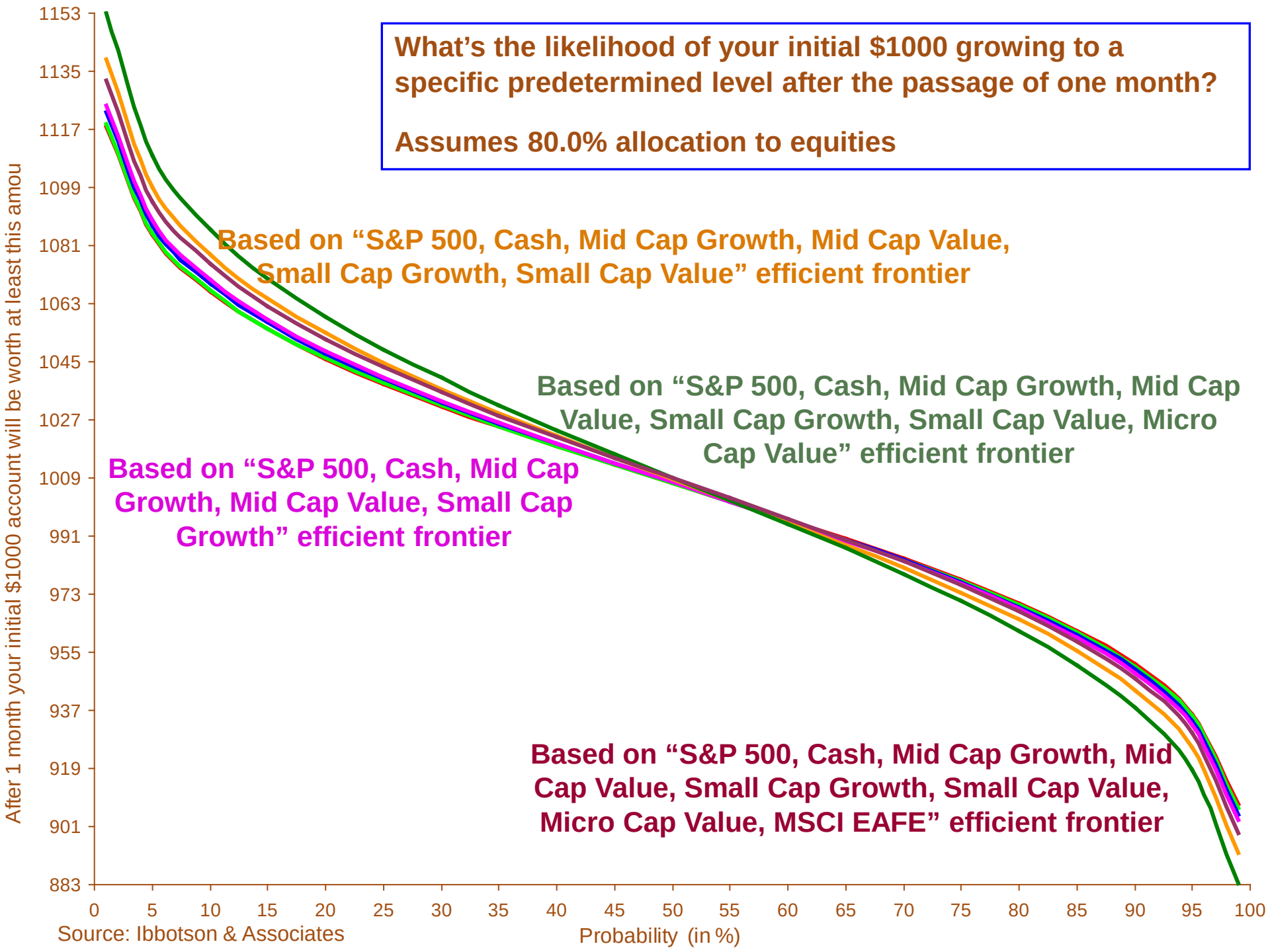
What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value, MSCI EAFE" efficient frontier
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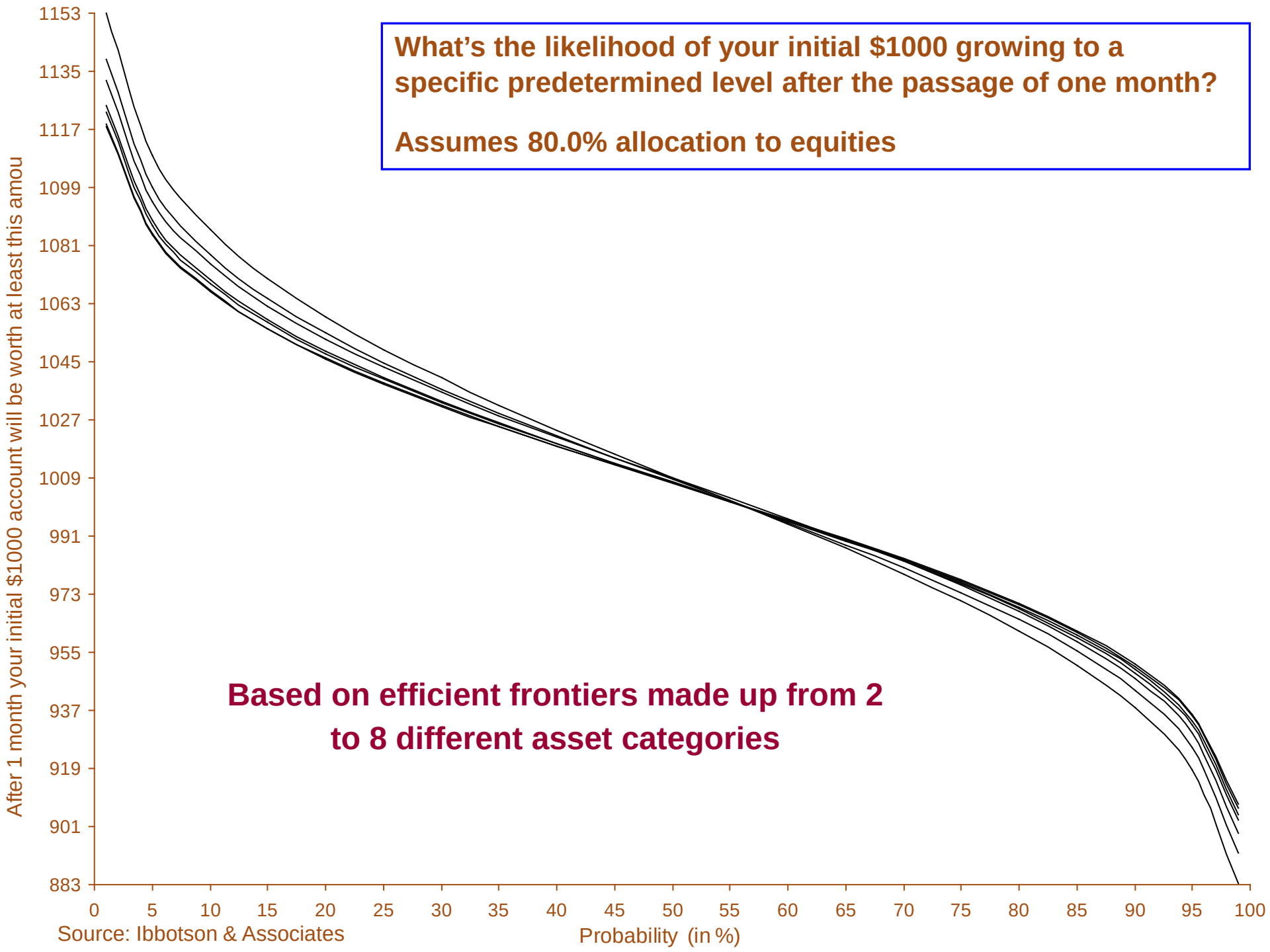
Probability (in %)
Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on efficient frontiers made up from 2 to 8 different asset categories
After 1 month your initial $1000 account will be worth at least this amou
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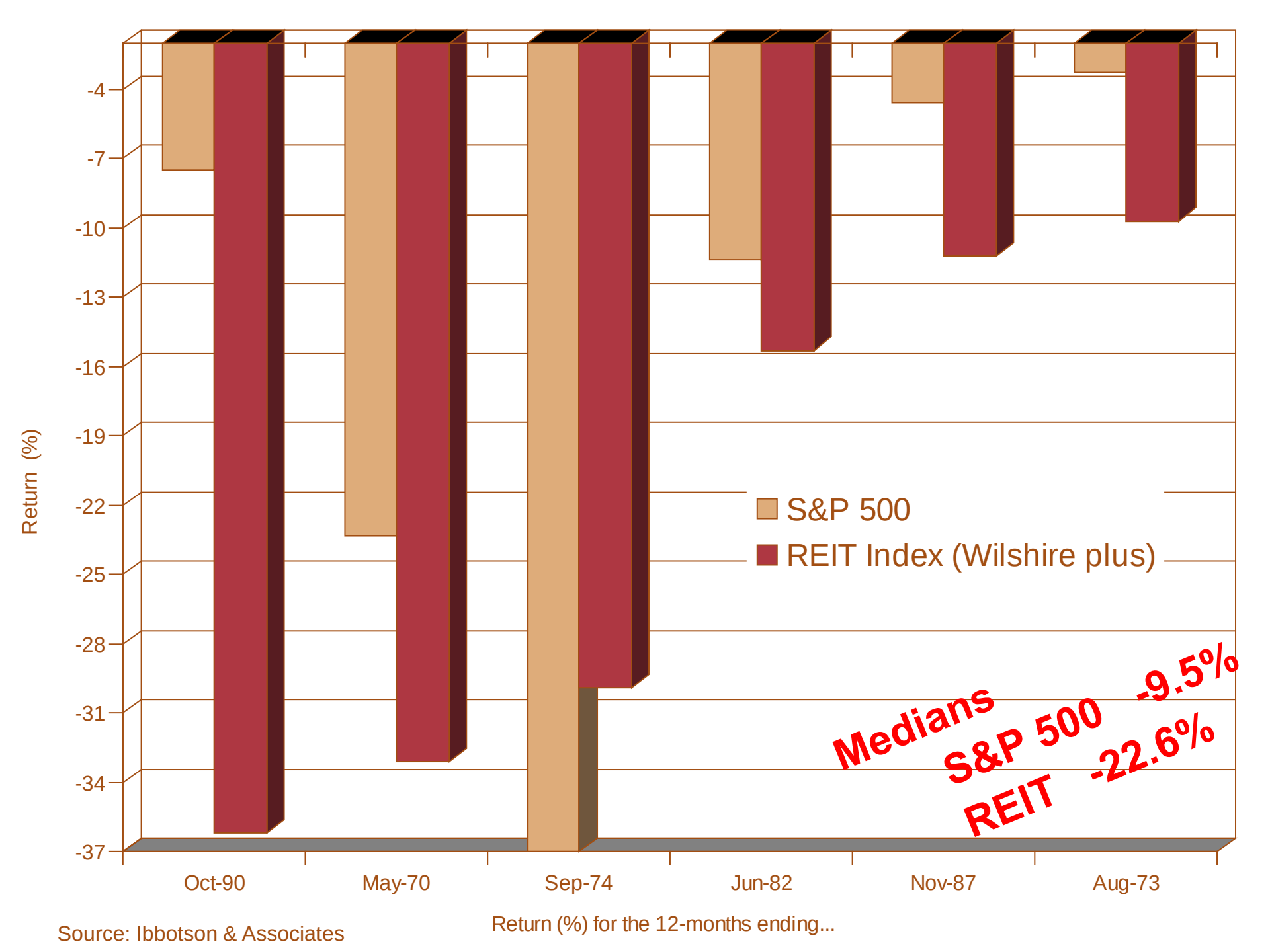
Probability (in %)
Source: Ibbotson & Associates

# Diversification is Not a Useful Risk Management Tool


-4
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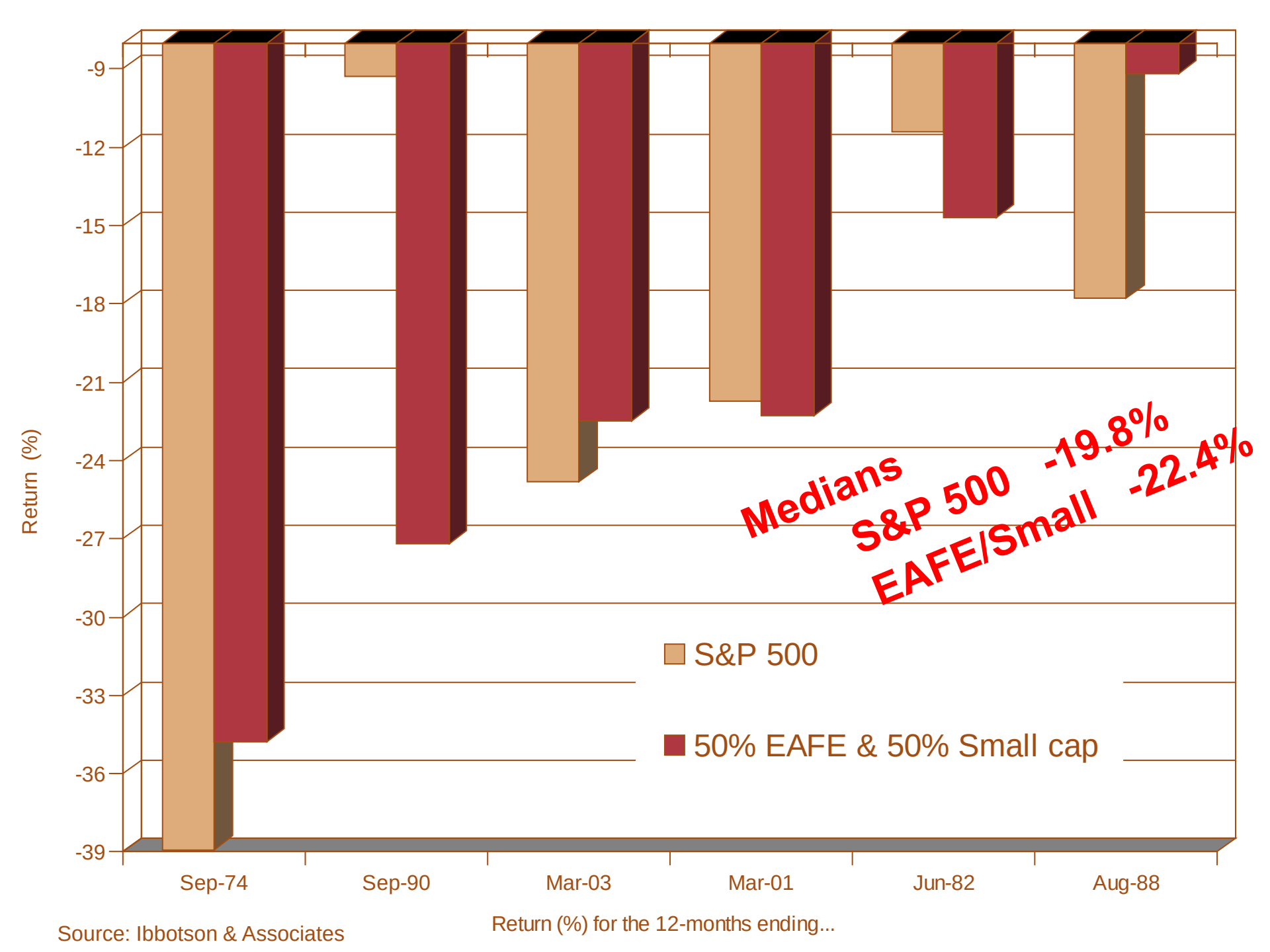
-16
-19
-22
-25
-28
-31
-34
-37
Return (%)
S&P 500
REIT Index (Wilshire plus)
Medians
S&P 500 -9.5%
REIT -22.6%
Oct-90
May-70
Sep-74
Jun-82
Nov-87
Aug-73
Return (%) for the 12-months ending...
Source: Ibbotson & Associates




Source: Ibbotson & Associates

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*

*Updated through 9/30/04

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - **Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse**

*Updated through 9/30/04

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- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse
  - **Median amount worse was –1.74% (per month)**

*Updated through 9/30/04

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse
  - Median amount worse was –1.74% (per month)
- **Found that**
  - **Equal-weighting diversification delivered a lower return than simple use of S&P 500 49.1% of the time**

*Updated through 9/30/04

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse
  - Median amount worse was –1.74% (per month)
- **Found that**
  - Equal-weighting diversification delivered a lower return than simple use of S&P 500 49.1% of the time
  - **Median amount was –1.57% (per month)**

*Updated through 9/30/04

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse
  - Median amount worse was –1.74% (per month)
- **Found that**
  - Equal-weighting diversification delivered a lower return than simple use of S&P 500 49.1% of the time
  - Median amount was –1.57% (per month)
- **Found that**
  - **Out of last 945 months, S&P fell more than 5% during 98 months (10.4% of the time)***

*Updated through 9/30/04

# Does Diversification Work?

- **Found that**
  - Out of last 945 months, S&P was negative 364 months (38.5% of the time)*
  - Of these 364 months of negative S&P 500 returns, 48.5% of the time equal-weighting diversification made the returns worse
  - Median amount worse was –1.74% (per month)
- **Found that**
  - Equal-weighting diversification delivered a lower return than simple use of S&P 500 49.1% of the time
  - Median amount was –1.57% (per month)
- **Found that**
  - Out of last 945 months, S&P fell more than 5% during 98 months (10.4% of the time)*
  - **Of these 98 months of sub –5% S&P 500 returns, 56.3% of the time equal-weighting diversification made the returns worse***

*Updated through 9/30/04

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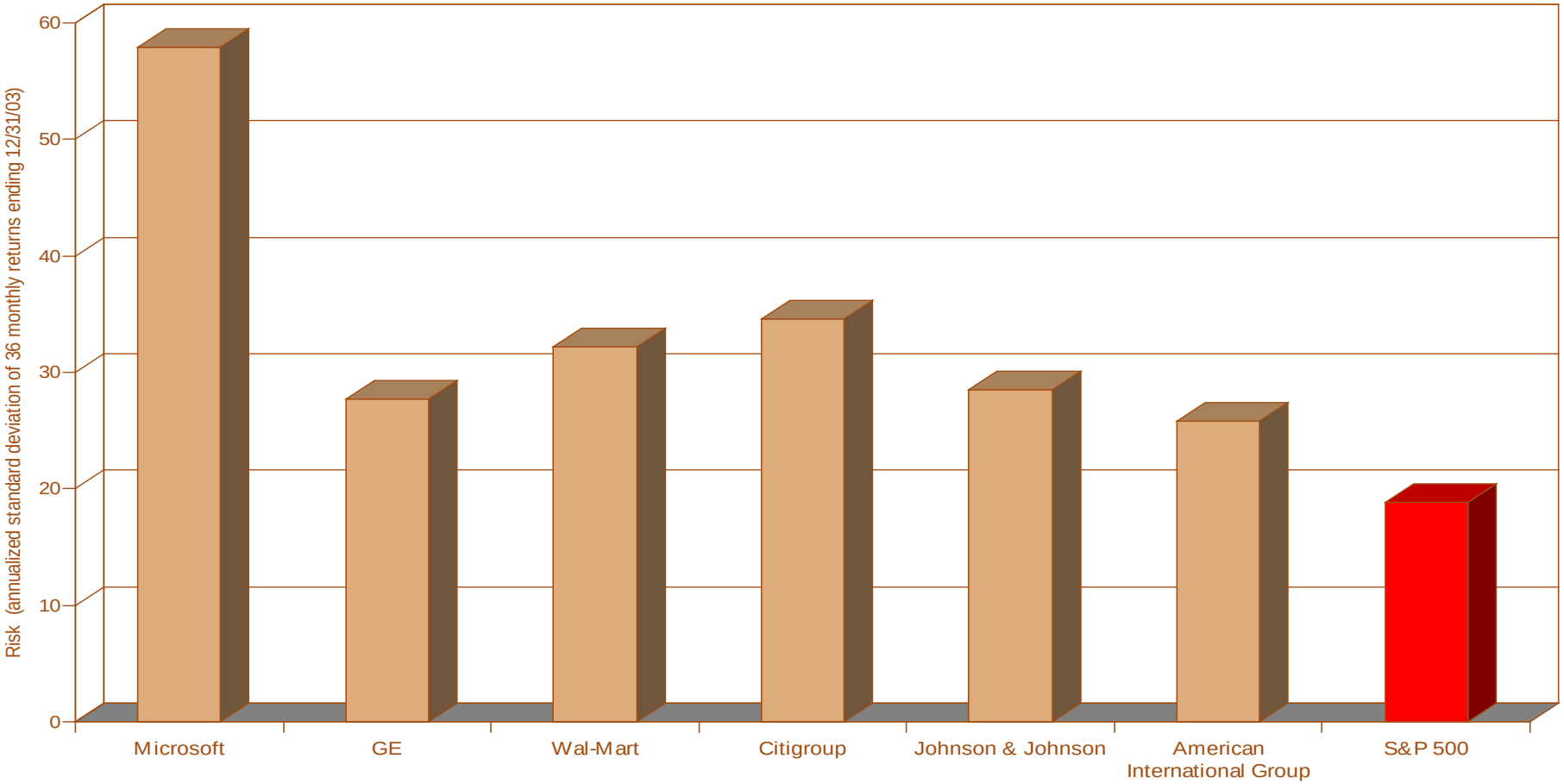
- **Found that**
  - Out of last 945 months, S&P fell more than 5% during 98 months (10.4% of the time)*
  - Of these 98 months of sub –5% S&P 500 returns, 56.3% of the time equal-weighting diversification made the returns worse*
  - **Median amount worse was –2.30% (per month)**

*Updated through 9/30/04

# Diversifying to the Level of the S&P 500 is Value Added




Source: Ibbotson & Associates

# Proposed Argument

**Conventional wisdom holds that diversification is a useful tool for risk-reduction covering short-term periods such as a year or less. It claims that by encouraging our clients to spread their portfolios across a series of different asset classes we help them to reduce the chance of loss. However, the data since 1925 demonstrates that over the long term, diversification's power, as a risk-management tool is at best negligible.**

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**Nevertheless, diversification may be one of the most powerful, useful tools we have available to use with our clients. The magnitude of the benefit is well beyond what is generally understood by most clients.**

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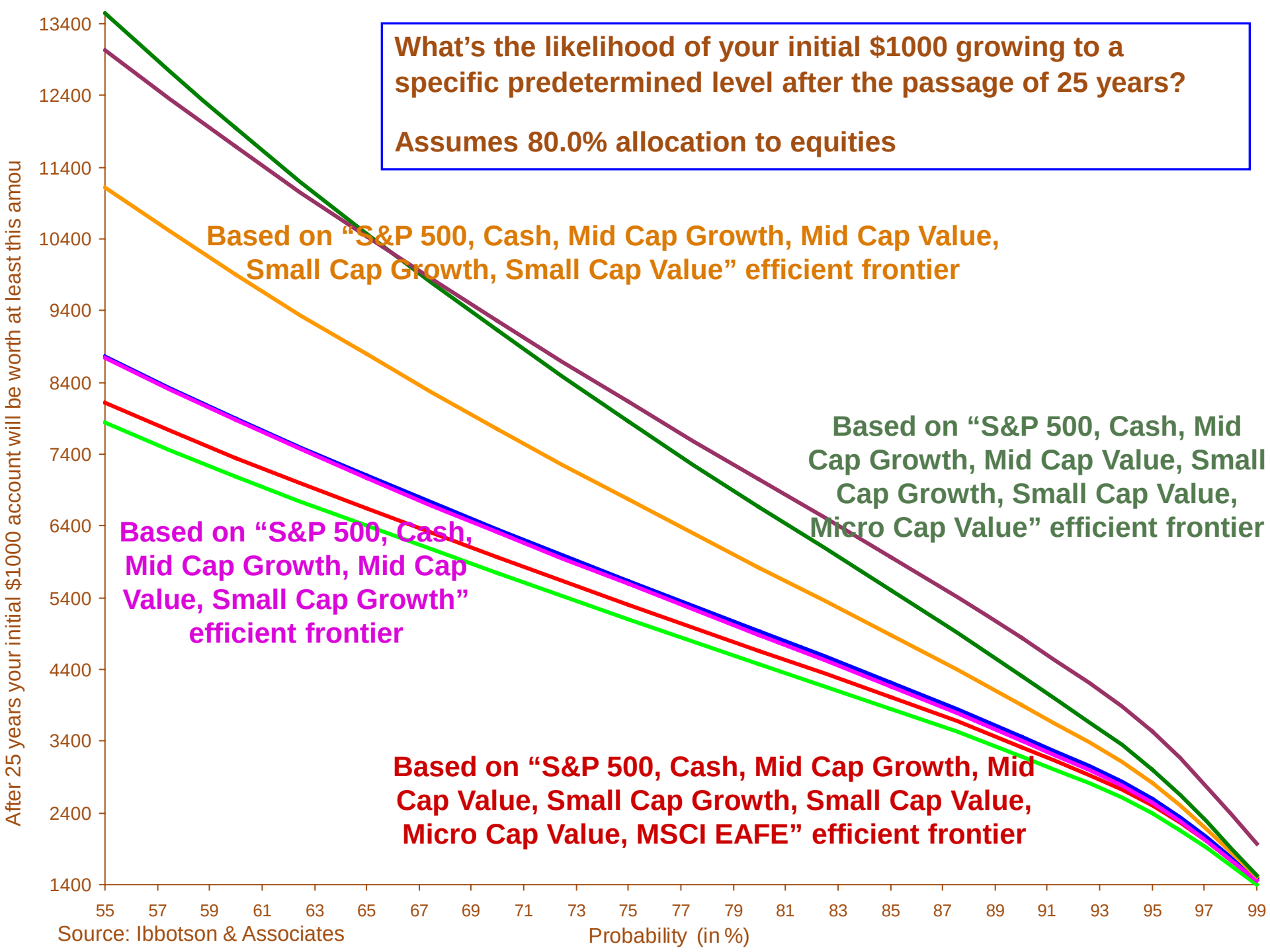
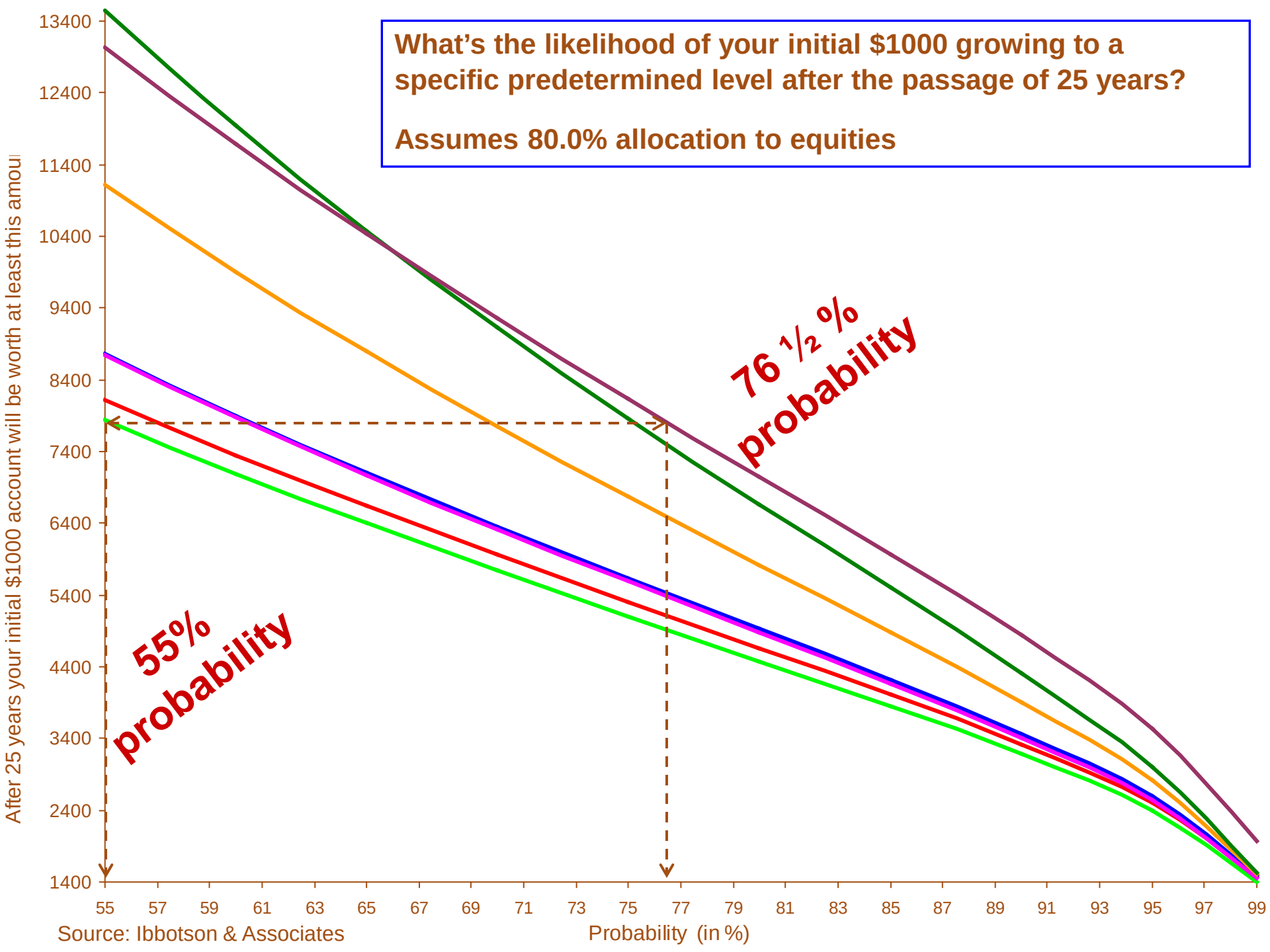
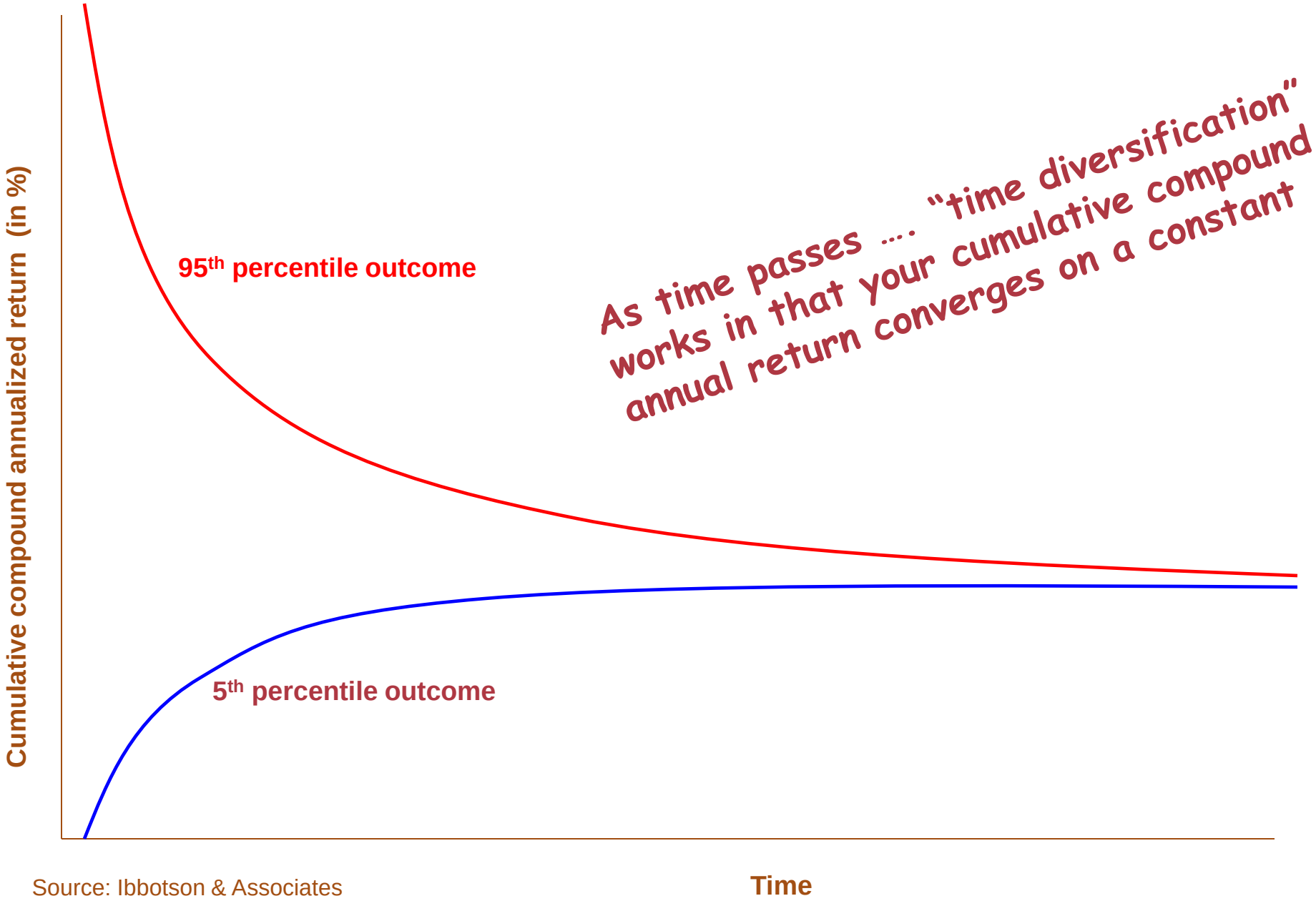
**Diversification's power, however, is not as a risk-reduction mechanism, but instead as a method for radically increasing the probability of achieving some long-range (e.g., 25 years out) investment goal.**


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of 25 years?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth" efficient frontier
Based on "S&P 500, Cash, Mid Cap Growth, Mid Cap Value, Small Cap Growth, Small Cap Value, Micro Cap Value, MSCI EAFE" efficient frontier
After 25 years your initial $1000 account will be worth at least this amou
13400
12400
11400
10400
9400
8400
7400
6400
5400
4400
3400
2400
1400
55
57
59
61
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
Probability (in %)
Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of 25 years?
Assumes 80.0% allocation to equities
76 ½ % probability
55% probability
After 25 years your initial $1000 account will be worth at least this amou
13400
12400
11400
10400
9400
8400
7400
6400
5400
4400
3400
2400
1400
55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99
Probability (in %)
Source: Ibbotson & Associates


Source: Ibbotson & Associates

# Zvi Bodie Makes the Argument Against "Time Diversification"




Source: Ibbotson & Associates

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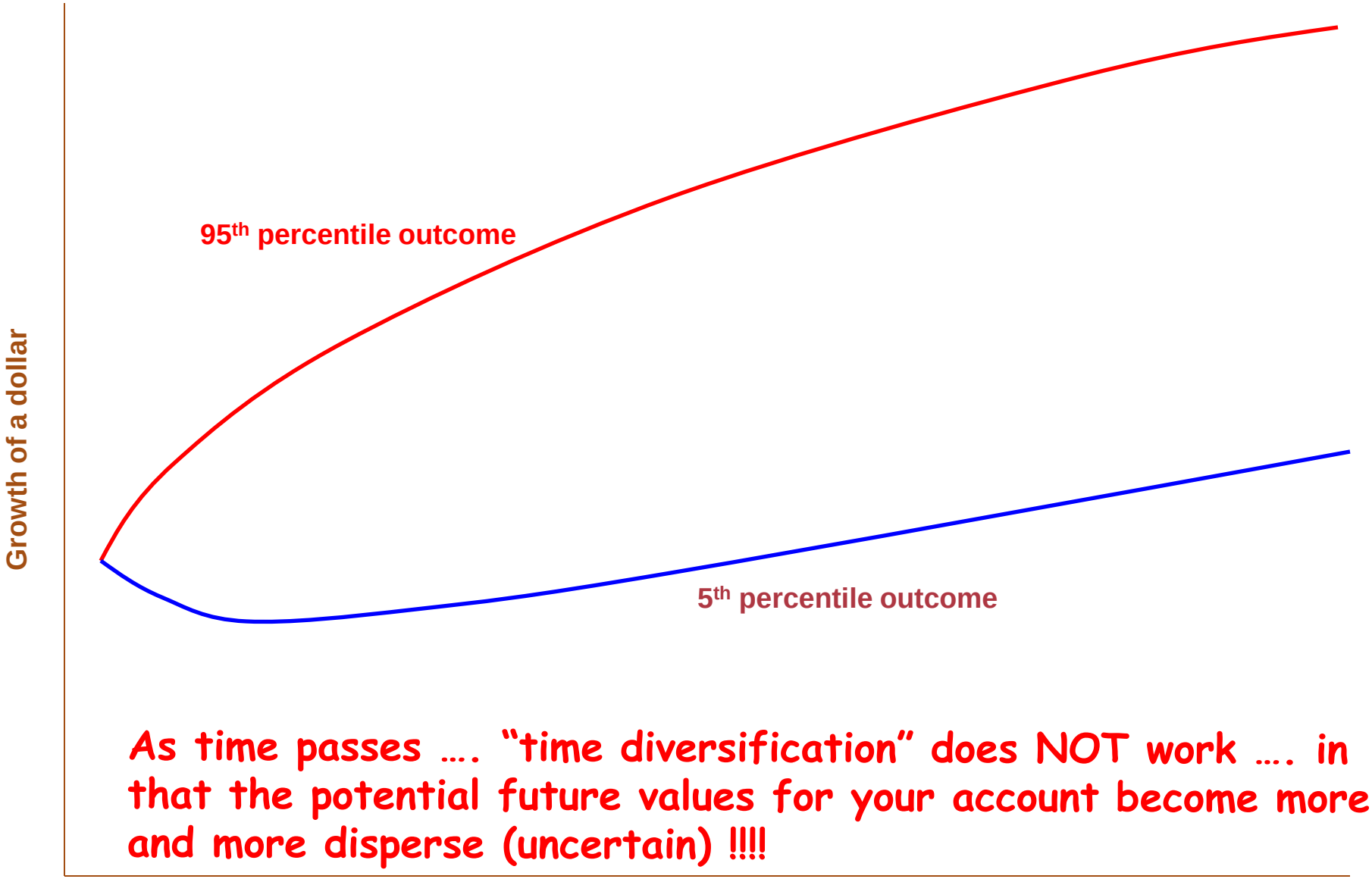
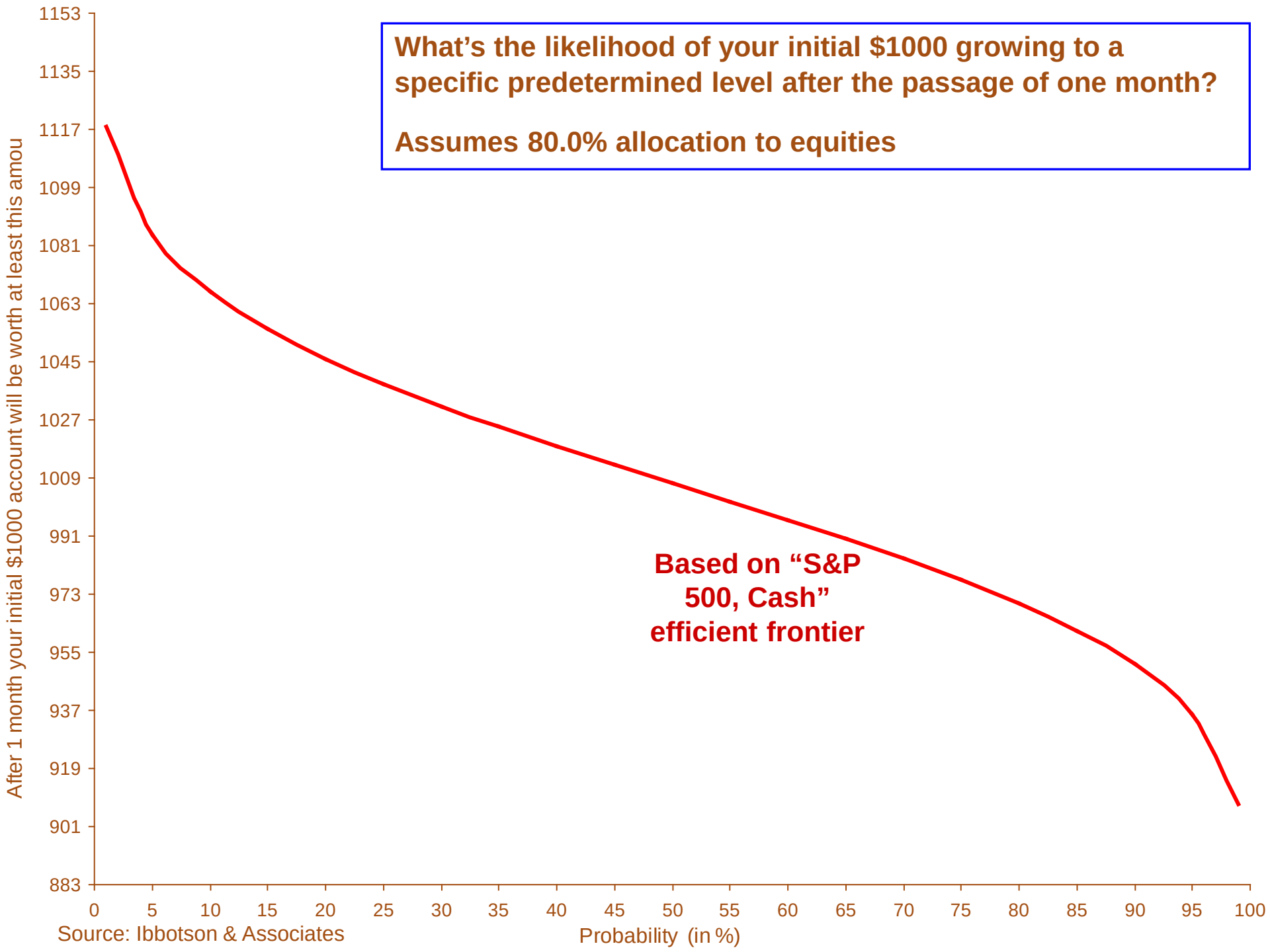



As time passes …. "time diversification" does NOT work …. in that the potential future values for your account become more and more disperse (uncertain) !!!!

Source: Ibbotson & Associates


What's the likelihood of your initial $1000 growing to a specific predetermined level after the passage of one month?
Assumes 80.0% allocation to equities
Based on "S&P 500, Cash" efficient frontier
After 1 month your initial $1000 account will be worth at least this amou
1153
1135
1117
1099
1081
1063
1045
1027
1009
991
973
955
937
919
901
883
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Probability (in %)
Source: Ibbotson & Associates

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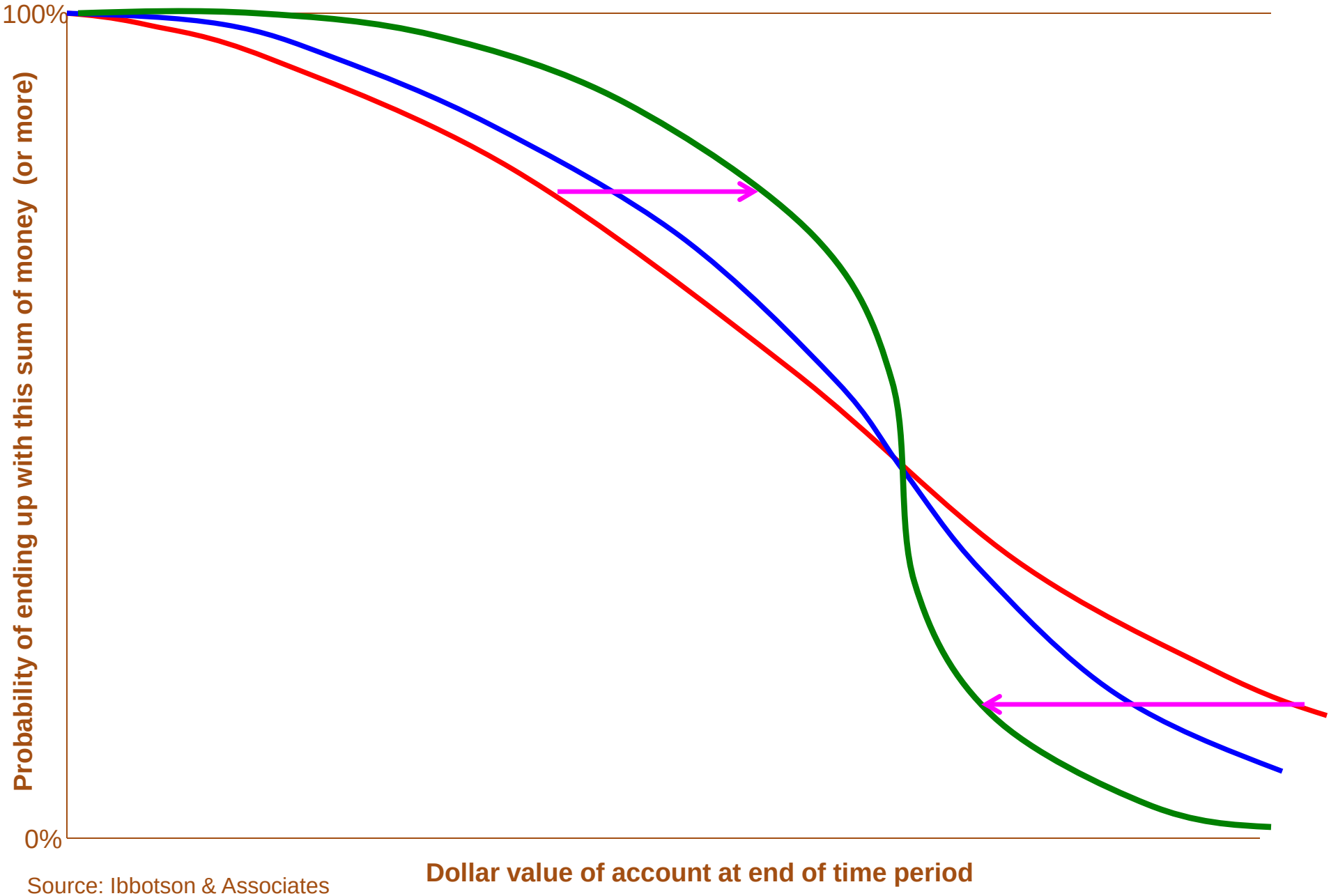
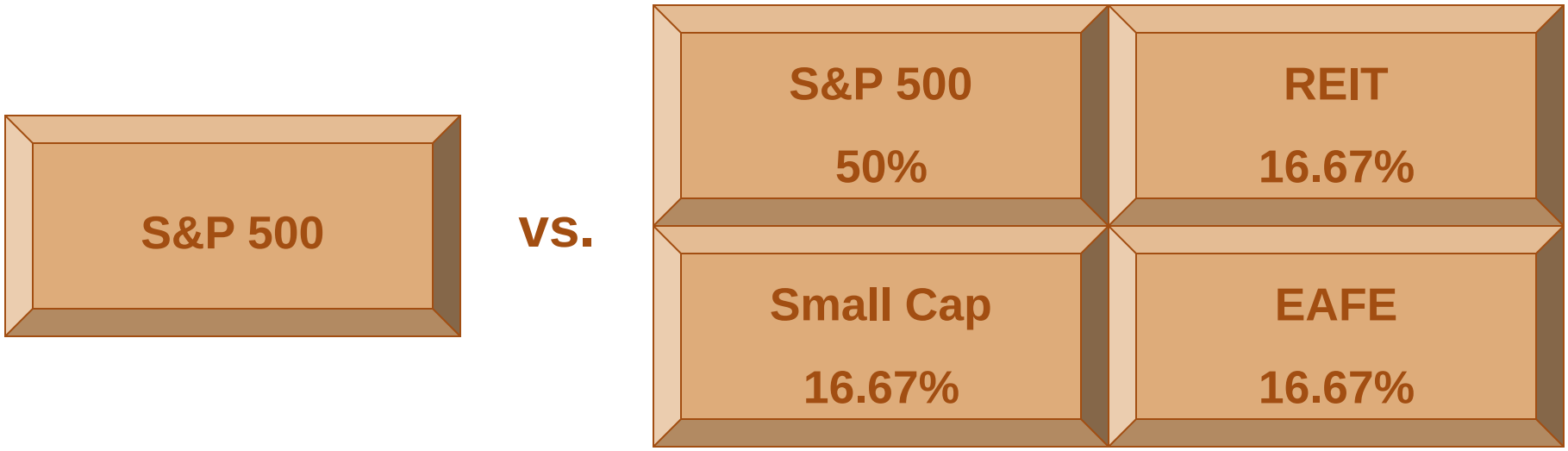
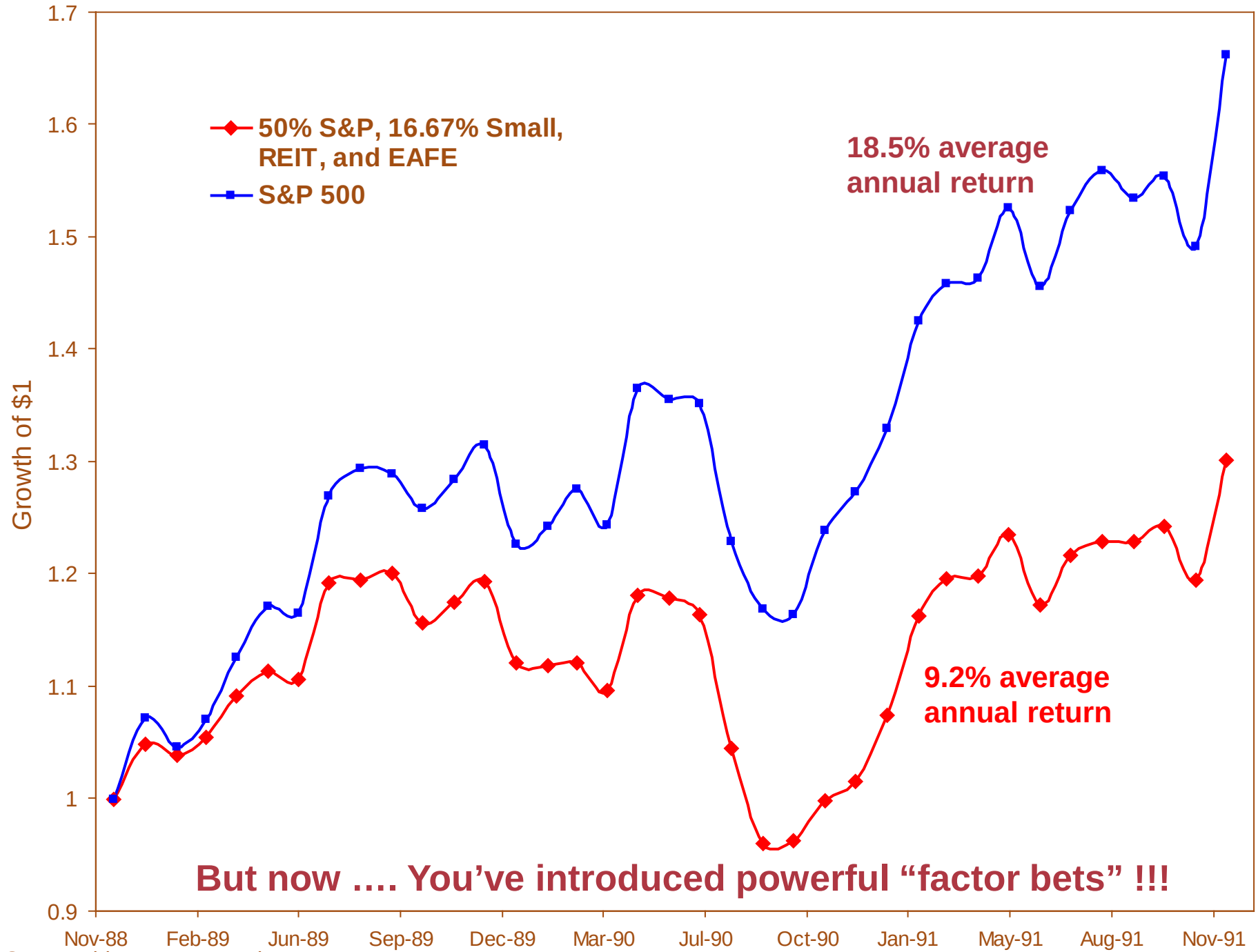



Source: Ibbotson & Associates

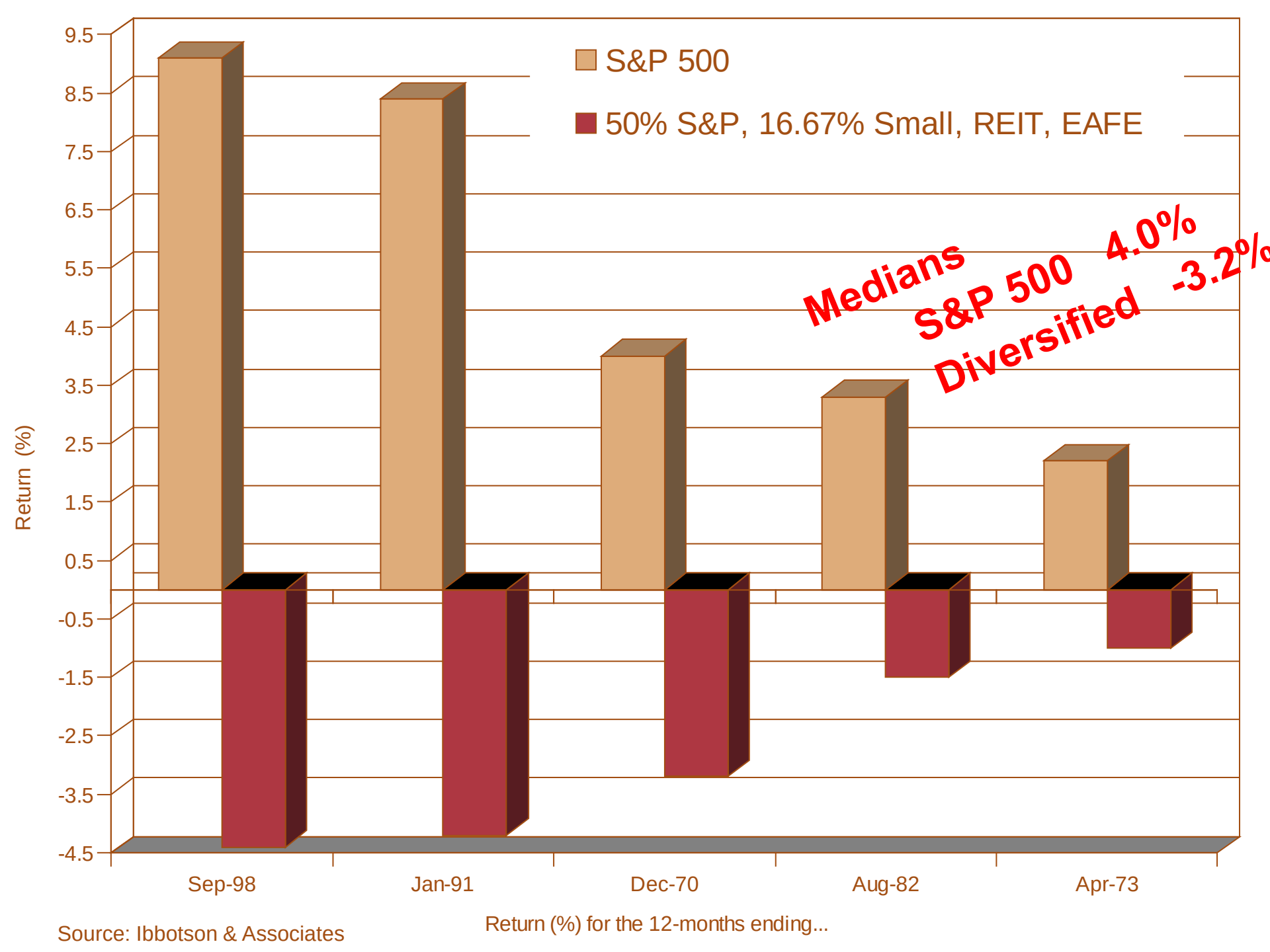
# Burden of Expectations Management




**But now…You've introduced powerful "factor bets" !!!**



Source: Ibbotson & Associates


S&P 500
50% S&P, 16.67% Small, REIT, EAFE
Medians
S&P 500 4.0%
Diversified -3.2%
9.5
8.5
7.5
6.5
5.5
4.5
3.5
2.5
1.5
0.5
-0.5
-1.5
-2.5
-3.5
-4.5
Return (%)
Sep-98
Jan-91
Dec-70
Aug-82
Apr-73
Return (%) for the 12-months ending...
Source: Ibbotson & Associates

# Conclusions

- **Diversification is not useful for “risk management”**
- **Use it anyway because:**
  - Extremely powerful tool
  - Useful for “surety of long-term outcomes”
- **Burden of expectations management**
- **If insufficient … don’t use**

# Thank you!

## Thank you for your time, attention and participation

Terry R. O’Neill of The O’Neill Company is a Registered Investment Advisor.

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