

## HOW MANY STOCKS TO BUY

If you want an indication of how many different stocks you might buy with a specific amount of money, and how much money you might put into each, try the following formulas or table on the left, where M= number of thousands of dollars represented by your entire common stock portfolio.

The table to the right indicates the amount of specific risk that is "diversified away" by putting equal amounts of money in the number of issues indicated. Specific risk is the risk unique to an individual security. It can be diversified away, reduced, or minimized by owning moderate amounts of several or many different stocks. Market risk is the risk inherent in the stock market, and it cannot be diversified away.

Total Portfolio Value \$M	Number of Issues to Own			Amount to Invest in Each		
	Minimum = $\sqrt{2M}$	A Happy Medium $\approx 1.7\sqrt{M}$	Maximum = $2\sqrt{M}$	Minimum = $\frac{\sqrt{M}}{2}$	A Happy Medium = $\frac{\sqrt{M}}{1.7}$	Maximum = $\frac{M}{2}$
1	1	2	2	\$ 500	\$ 500	\$ 1,000
2	2	2	3	\$ 700	\$ 1,000	\$ 1,000
3	2	3	3	\$ 1,000	\$ 1,000	\$ 1,500
4	3	3	4	\$ 1,000	\$ 1,300	\$ 1,300
5	3	4	4	\$ 1,300	\$ 1,300	\$ 1,700
6	3	4	5	\$ 1,200	\$ 1,500	\$ 2,000
7	4	5	5	\$ 1,400	\$ 1,400	\$ 1,800
8	4	5	6	\$ 1,300	\$ 1,600	\$ 2,000
9	4	5	6	\$ 1,500	\$ 1,800	\$ 2,300
10	4	5	6	\$ 1,700	\$ 2,000	\$ 2,500
15	5	7	8	\$ 1,900	\$ 2,100	\$ 3,000
20	6	8	9	\$ 2,200	\$ 2,500	\$ 3,300
25	7	9	10	\$ 2,500	\$ 2,800	\$ 3,600
30	8	9	11	\$ 2,700	\$ 3,300	\$ 3,800
40	9	11	13	\$ 3,100	\$ 3,600	\$ 4,400
50	10	12	14	\$ 3,600	\$ 4,200	\$ 5,000
60	11	13	15	\$ 4,000	\$ 4,600	\$ 5,500
70	12	14	17	\$ 4,100	\$ 5,000	\$ 5,800
75	12	15	17	\$ 4,400	\$ 5,000	\$ 6,300
80	13	15	18	\$ 4,400	\$ 5,300	\$ 6,200
90	13	16	19	\$ 4,700	\$ 5,600	\$ 6,900
100	14	17	20	\$ 5,000	\$ 5,900	\$ 7,100
150	17	21	24	\$ 6,300	\$ 7,100	\$ 8,800
200	20	24	28	\$ 7,100	\$ 8,300	\$10,000
250	22	27	32	\$ 7,800	\$ 9,300	\$11,400
300	24	30	35	\$ 8,600	\$10,000	\$12,500
400	28	34	40	\$10,000	\$11,800	\$14,300
500	32	38	45	\$11,100	\$13,200	\$15,600
600	35	42	49	\$12,200	\$14,300	\$17,100
700	37	45	53	\$13,200	\$15,600	\$18,900
750	39	47	55	\$13,600	\$16,000	\$19,200
800	40	48	57	\$14,000	\$16,700	\$20,000
900	42	51	60	\$15,000	\$17,600	\$21,400
1,000	45	54	63	\$15,900	\$18,500	\$22,200

Number of Issues N	Degree of Diversification $1 - \frac{1}{\sqrt{N}}$
1	0%
2	29%
3	42%
4	50%
5	55%
6	59%
7	62%
8	65%
9	67%
10	68%
11	70%
12	71%
13	72%
14	73%
15	74%
16	75%
17	76%
18	76%
19	77%
20	78%
21	78%
22	79%
23	79%
24	80%
25	80%
30	82%
35	83%
40	84%
45	85%
50	86%
60	87%
75	88%
100	90%
∞	100%

### **SOME INFERENCES OF INTEREST AND ADDITIONAL OBSERVATIONS**

It is estimated that the total risk of investing in one common stock consists of about 40% market risk and 60% specific risk. If correct, then, there is the potential for eliminating 60% of the total risk inherent in owning a single common stock by broadly diversifying one's portfolio.

The benefits of diversification may be more easily achieved than many investors realize. As the previous table on the right indicates, specific risk in a portfolio is reduced in proportion to the square root of the number of issues owned. For example, relative to a portfolio of one stock, the specific risk in a portfolio can be reduced by 50% by owning equal amounts of just 4 stocks; and specific risk can be reduced by 75% by upping the number of issues owned in equal amounts to 16.

Specific risk is also reduced in proportion to the square root of the time over which a portfolio is held. For example, the specific risk of holding a portfolio for one year is reduced by 50% by holding the portfolio for 4 years, and reduced by 75% by holding it for 16 years.

Carried still further, the specific risk of owning 4 stocks in equal amounts for 4 years is only 1/4 that of owning one stock for one year; and the specific risk of owning 16 stocks in equal amounts for 16 years is only 1/16 that of owning one stock for one year.

It is a mathematical attribute of the nature of things that one usually does not require a very large sample of something to learn much about its character. Polling but a tiny fraction of the electorate, for example, produces an extremely reliable indicator of the outcome of a presidential election.

The Standard & Poor's 500 Index is the most commonly used proxy for the U. S. stock market as a whole; yet one should be able to hold far fewer than all of these 500 stocks and still closely approximate the performance of the 500 as a whole. As evidence that one can, the coefficient of correlation between the Dow-Jones-Industrial Average, which consists of just 30 stocks, and the S&P 500, over the 72-year period between 1926 and 1997, was 99.0%; and the coefficient of correlation between the total returns (meaning dividends reinvested) on the two indices was 99.8%.

### **MENTAL ACCOUNTING AND DIVERSIFICATION**

Amos Tversky, a professor of behavioral science at Stanford University, calls our attention to a "cognitive illusion," by which people perceive their finances and assess risk, known as "mental accounting."

One of the more common examples of mental accounting is the tendency of many people with money in the bank earning 6% interest to carry a credit card debt for which they are being charged 18% interest. Though withdrawing the savings to pay down the credit card debt would net them 12% per annum, it would violate their desire to see their savings as separate from, and unrelated to, their other financial transactions.

Mental accounting is at work when an investor wants to own enough of the common stock of his local electric utility so that his dividends cover his electric bills.

Professor Tversky's well-known example of mental accounting is provided by the following: Suppose you have purchased a \$50 ticket to go to the theater. When you arrive at the theater, you discover you have lost your ticket. Would you spend a second \$50 to purchase another ticket? Most people, when asked this question, say "no."

Suppose, however, that you have not yet purchased your ticket until you reach the theater. When you arrive, you realize that you have lost \$50 in cash. Would you take another \$50 to purchase the theater ticket? To this question most people say, "yes." Though we have lost \$50, it was not lost out of the mental theater money account, and so we can still justify purchasing the ticket as originally planned.

The propensity in all of us to engage in mental accounting may bear on the question of diversification in our common stock portfolios. Let us suppose we have \$50,000 to invest in common stocks and have determined that ten different issues should satisfy our overall need for diversification for this amount. Let us further assume, however, that this \$50,000 is scattered, \$5,000 each, among ten different accounts—our individual account, our spouse's account, our joint account, each of our IRAs, and custodian accounts for each of our five children. A total of ten issues, then, would allow for only one issue in each account—no diversification at all, when looked at account-by-account. We might like to put three issues in a \$5,000 account, but to deploy \$50,000 among thirty issues does seem rather many. A happy medium in this case, I suggest, is probably some number more than ten but less than thirty.

Clifford G. Dow, Sr., CFA, ChFC, CFP®  
*Chief Investment Officer*  
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