

Capital Asset Price Model (CAPM)

The Capital Asset Price Model (CAPM) is a model for analyzing the relationship between risk and return. It was developed in the mid-1960s independently and almost simultaneously by three different individuals:

William Sharpe (1964)

John Lintner (1965)

Jan Mossin (1966)

General Conclusion

The central message of CAPM is that in assessing risk, investors consider more than the expected return and variance of the individual security itself. They also consider the interrelationships between the returns on different securities.

Consequently, the risk of an investment can be broken down into two types: 1) risk that is non-systematic and diversifiable, 2) risk that is systematic and not diversifiable. The only relevant type of risk is the systematic risk. This systematic risk (or market risk) is quantified in a statistic called beta.

In other words, when an investment is placed into a well-diversified portfolio, it is only the systematic (or market) risk that will affect the risk of the portfolio as a whole. And therefore, it is only the systematic risk that truly matters.

The development of CAPM answered sometimes mysterious anomalies in the market in which very volatile and seemingly very risky companies (but companies that tended to be countercyclical to the general market) had low costs of capital; while less volatile and seemingly low-risk companies (but companies that tended to move in sync with the general market) had a high costs of capital.

Basis and Inspiration of CAPM

CAPM built on the work of Harry Markowitz and the Efficient Market Hypothesis (EMH). EMH answers the question of what return should be if the risk of an investment is zero or if the risk of an investment is equal to the market risk. But EMH provides no insight on what return should be if risk is in between zero and the market risk. CAPM provides this answer.

CAPM says that in a competitive market, the expected risk premium (or return) varies in direct proportion to beta. All investments must plot along a perfectly straight line, known as the security market line. The equation for the security market line will look something like this.

$$\text{Required Return} = \text{Risk Free Rate} + \text{Market Risk Premium} * \text{Beta}$$

In words, this security market line says the following: the required rate of return on a stock (or a security) consists of the rate of return on risk-free securities plus a risk premium that depends on the stock's beta coefficient.

Once an analyst has determined the security market line, he/she can determine an investment's expected or required return, if he/she knows three numbers: risk-free rate, market risk premium, and beta.

An Example

Stock	Risk-Free Rate	Market Risk Premium	Beta	Expected Return
A	2.0	5.0	0.5	4.5
B	2.0	5.0	1.0	7.0
C	2.0	5.0	1.5	9.5

For instance, hypothetical Stock A's expected return is:

$$4.5 = 2.0 + 5.0 * 0.50$$

At any point in time, the risk-free rate is the same for all stocks and the market risk-premium is the same for all stocks. Only beta will vary depending on the systematic risk inherent in each stock (or security).

Over time, the risk-free rate and the market risk premium do vary. Currently, the risk-free rate is near an all-time low, about 2 percent. The market risk premium is usually calculated to be between 5 – 10 percent.

For more information see:

Efficient Market Hypothesis (EMH) and beta.