M.A ECONOMICS SEM-II

CC-8 , MODULE 1

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TOBIN'S THEORY OF SPECULATIVE DEMAND FOR MONEY

OR, THE PORTFOLIO OPTIMISATION APPROACH OR TOBIN MEAN –VARIANCE MODEL:

INTRODUCTION:

James Tobin propounded the theory of Speculative demand for money in his famous work , "Liquidity Preference as Behaviour Towards Risk" in 1958. Tobin's theory of speculative demand for money is a part of his theory of Portfolio Optimisation . He stated that the demand for money depends on the risk and return (uncertainity) associated with the money and other forms of assets, not with individual expectations.

Keynes in his analysis of speculative demand for money postulated that—

a) Individual hold assets either in the form all cash or all bond .

b) Individual will hold all cash or all bonds depends on his expectations regarding future rate of interest

Tobin made 2 significant modifications in the Keynesian postulate(Gist):

1. Individual holds a combination of cash and bond in their asset portfolio, not just cash or bond.

2. Tobin has demonstrated that the individual hold not only a combination of both bond and cash in their portfolio but also they attempt to optimize the risk and return on bonds.

<u>ASSUMPTIONS:</u>

1. An individual has only money and bonds to choose fromfor his asset portfolio.

2. He prefer more wealth to less wealth.

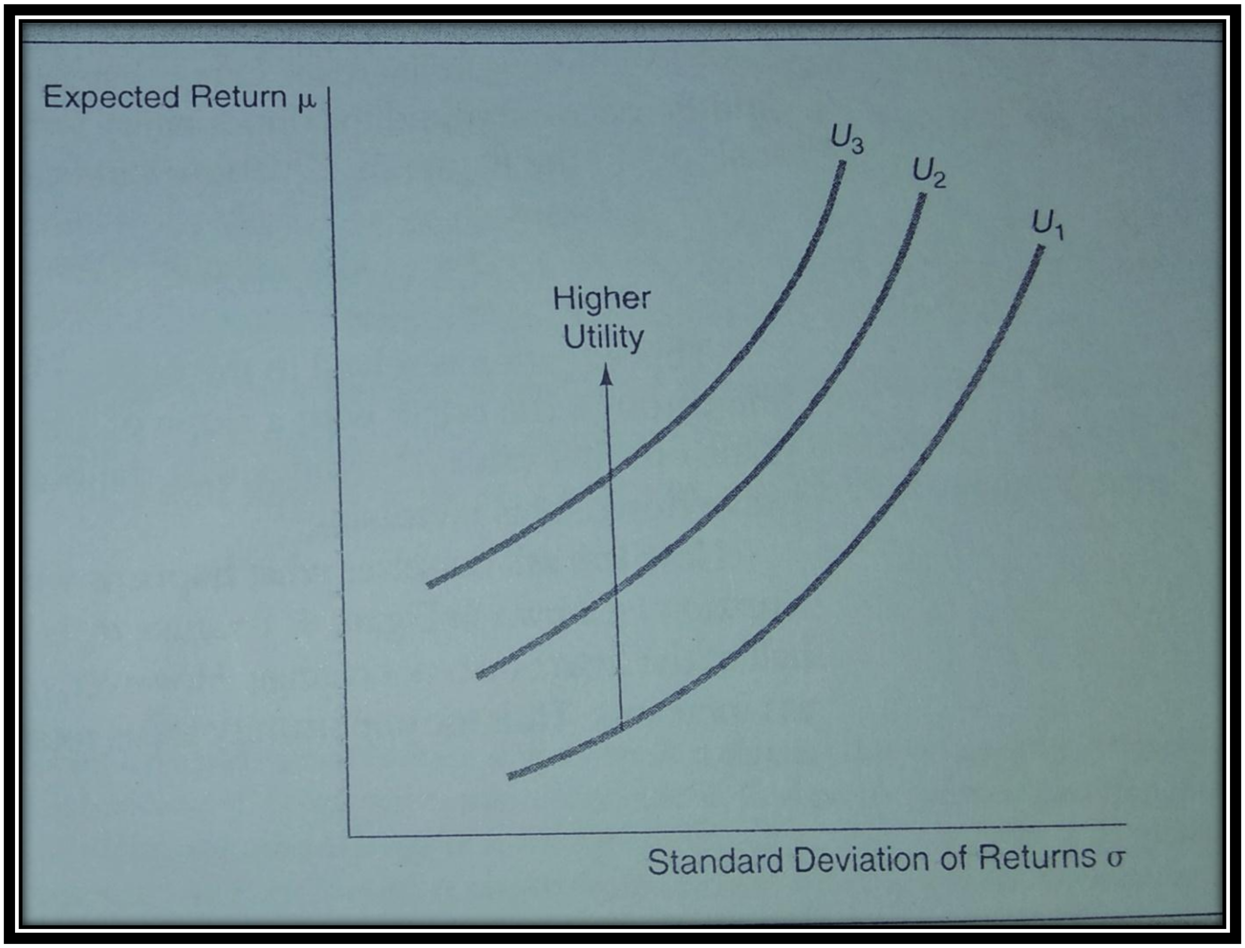
3. He prefer less risk to more risk.

4. His risk-and-return indifference curve are known to him.
5. The trade-off between risk and return is also known.

Tobin's mean – variance analysis of money demand is an application of the basic ideas in the theory of portfolio choice. Tobin assume that the utility that people derive from their assets is positively related to the expected return on their portfolio of assets and is negatively related to the riskiness of this portfolio as represented by the variance (standard deviation)of its returns.

This implies that individual has indifference curve , that slopes upward because he is willing to accept more risk if offered a higher expected returns. In addition as we go to higher indifference curve, utility is higher, because for the same level of risk, the expected return is higher. The indifference curve in the mean- variance is represented as:

DIAGRAM -1:



The Indifference Curve in a Mean – variance model

The indifference curve are upward sloping and higher indifference curve indicates that utility is higher i.e. $U_3 > U_2 > U_1$

Tobin looks at the choice of the holding money, which earns a certain zero return or bonds, whose return can be stated as:

$$R_g = i + g$$

Where , i =interest rate on bond

g = capital gain

Tobin also assume that expected capital gain is zero and its variance is $\sigma^2{}_{g,}$

That is, $E(g) = 0$ and so $E(R_g) = i + 0 = i$

$$Var(g) = E[g - E(g)]^2 = E(g^2) = \sigma^2{}_g$$

Where

E = expectation of variables inside the parentheses

Var(g)= variance of the variables inside the parenthesis

If A is the fraction of the portfolio put into bond ($0 \leq A \leq 1$) and 1-A is the fraction of the portfolio held as money , the return Ron the portfolio can be written as-

$$R = AR_B + (1-A)(0) = AR_B = A(i+g)$$

Then the mean and variance of the return on the portfolio, denoted respectively as μ and σ^2, can be calculated as follows:

$$\mu = E(R) = E(AR_B) = AE(R_B) = Ai$$

$$\sigma^2 = E(R-\mu)^2 = E[A(i+g) - Ai]^2 = E(Ag)^2 = A^2E(g^2) = A^2\sigma^2{}_g$$

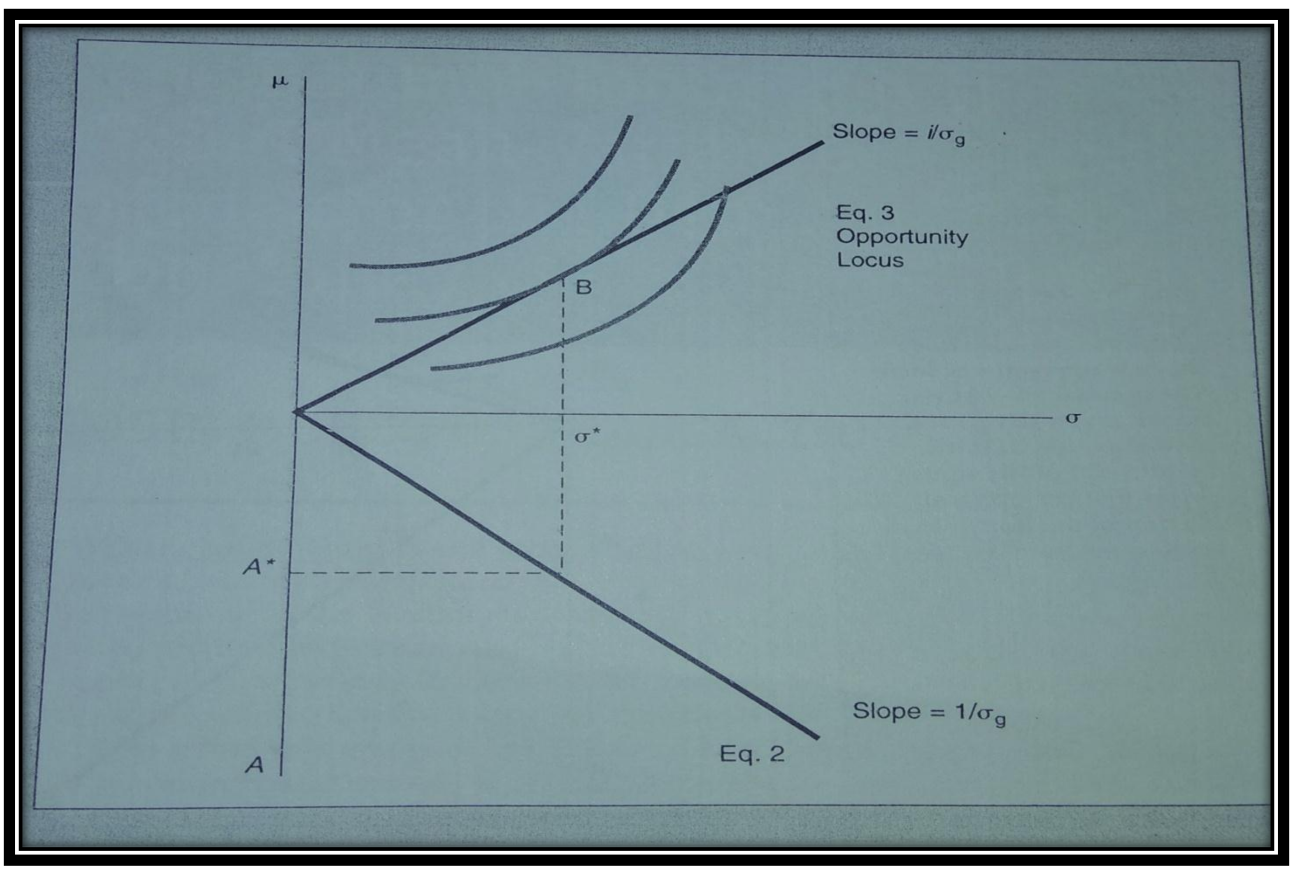
Taking the Square root of both side of the equation directly above and solving for A yields,

$$A = \frac{1}{\sigma g}\sigma \qquad \text{--------eqn (2)}$$

On substituting for A in the equation μ = Ai using the preceeding equation gives us;

$$\mu = \frac{i}{\sigma g}\sigma \qquad \text{------ eqn (3)}$$

Eqn (3) is known as the opportunity locus because it tells us the ***combinations* of μ and *σ* that are feasible for the individual. This eqn is** written in the form in which the μ variables corresponds to the Y-axis and the σ variable to the X-axis .The opportunity locus is a straight line going through the origin with a slope of i/σg It is drawn in the top half of fig. 2 along with the indifference curve from fig. 1



OPTIMAL CHOICE OF THE FRACTION OF THE PORTFOLIO IN BONDS

The highest indifference curve is reached at point B,the tangency of indifference curve with the opportunity locus. The point determines the optimal risk $\sigma *$ and using equation 2 in the bottom half of the fig, we solve for the optimal fraction of portfolio in bonds A*

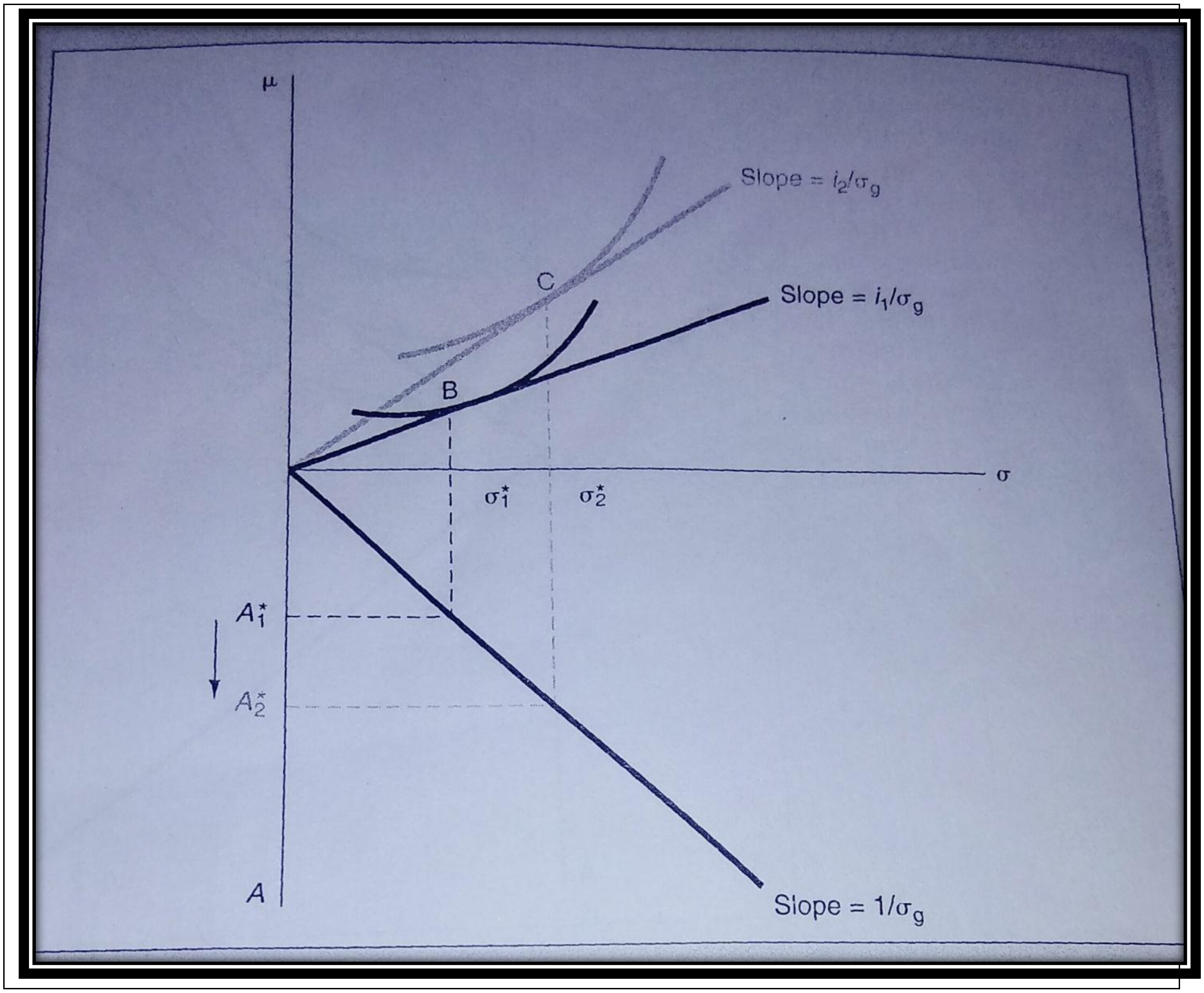
The highest indifference curve that can be reach is at point B, the tangency of the indifference curve and the opportunity locus. This point determines the optimal level of risk $\sigma *$ in the figure. As equation 2 indicates, the optimal level of A, A^*, IS:

$$A^* = \frac{\sigma *}{\sigma g}$$

This equation is solved in the bottom half of Fig 3. Equation 2 for A is a straight line through the origin with a slope of $\frac{1}{\sigma g}$. Given σ^*,the value of A read off this line is the optimal value A^*. Notice that the bottom part of the figure is drawn so that as we move down , A is increasing.

Change in interest rate and asset portfolio:

When the interest rate increases from $i_1$to i_2, the equation 2 line in the bottom half of the figure 3 does not changes because σ_g is unchanged. However, the slope of the opportunity locus does increases as increases. Thus the opportunity locus rotates up and we move to point c at the tangency of new opportunity locus and the indifference curve. The optimal level of risk increases from σ^*_1 to σ^*_2 and the optimal fraction of the portfolio in bond rises from A_1^* to A^*_2. The result is that as the interest rate on bonds rises, the demand for money falls; that is, 1-A, the fraction of the portfolio held as money, declines .Represented below---



OPTIMAL CHOICE OF THE FRACTION OF THE PORTFOLIO IN BOND AS THE INTEREST RATE RISES.

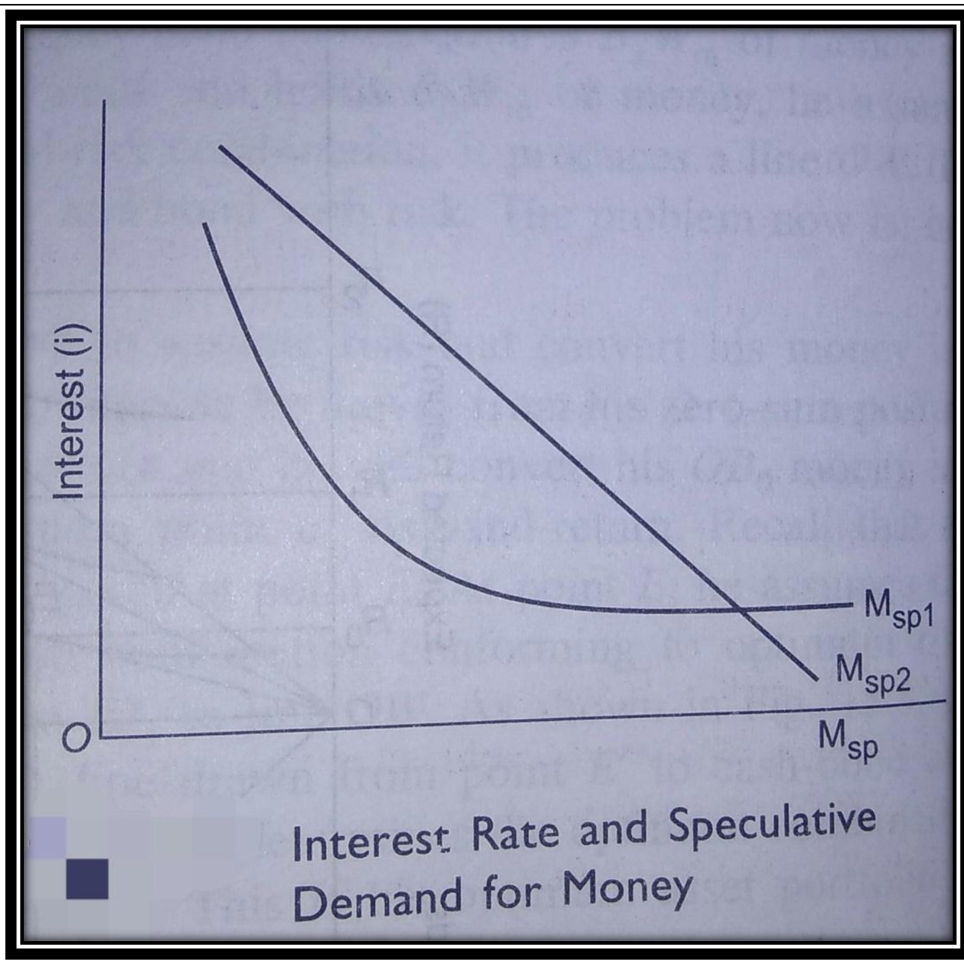
The interest rate rises on bonds from $i_1$to i_2, rotating the opportunity locus upward. The highest indifference curve is now at point C,where it is tangent to the new opportunity locus. The optimal level of risk rises from$\sigma * to\ \sigma *_2$, and then eqn 2 in the bottom half of the figure, shows that the optimal fraction of the portfolio in bond rises from $A*_1$to A_2*

The speculative demand for money and the Interest Rate

On the basis of fig-3, the demand schedule for speculative demand for money can be derived as follows:

Interest Rate	--	i_1	i_2
Fraction of portfolio put into bonds	--	A_1^*	A^*_2
Fraction of portfolio put into money	--	$1-A^*_1$	$1-A^*_2$

When this demand schedule is plotted on the graph :



Interest Rate and Speculative Demand for Money

Fig -4 shows the inverse relationship between interest rate and speculative demand for money conforming to the Keynesian liquidity preference curve. But, if (1-A) and i are assumed to be constantly related, it may take the shape of the downward sloping straight line

$(1\text{-}A)^2$.

Thus, Tobin Model yields same result as Keynes' Theory i.e..-speculative demand for money is negatively related to the rate of interest, but it is superior over Keynes' theory ---

1. It assume a more rational and realistic behavior on the part of wealth holder (money and bond) .
2. It explain why individual hold some money-- even if the expected return on bonds is greater than the and its expected return on money , because, money has store of wealth return is more certain.

THANK YOU