Marginal efficiency of capital and marginal efficiency of investment

Keynes, in his **General Theory**, developed the concept of the marginal efficiency of capital (**MEC**). MEC uses the expected return from investment and the supply price of capital in order to give us an idea about the way a firm should evaluate a decision to invest or not. Strictly speaking,

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MEC is that rate of discount, which, if applied to the stream of future expected returns from an investment decision, will just equal the present discounted value of such returns to the supply price for that capital stock.


Mathematically, **MEC** is that rate of discount δ that satisfies the equation:

$$C = R_1/(1 + \delta) + R_2/(1 + \delta)^2 + R_3/(1 + \delta)^3 + \ldots\ldots\ldots + R_n/(1 + \delta)^n \ldots\ldots\ldots\ldots\ldots (1)$$

In (1), C is the supply price of capital.

Firms should invest in the capital good if MEC ≻ r (the current market rate of interest) and desist from investing if r ≻ MEC. The underlying logic is quite simple: MEC is a measure of the expected return from capital, while r is a measure of the cost of capital. So, if the return (MEC) is greater than the cost(r), it makes sense to invest.

Slope of MEC: It is assumed that other things remaining equal, the MEC declines as the stock of capital (K) increases. The reasons why MEC may decline are: first, the stock of other factors (say labour) remaining constant, their remuneration (like, say, wages) might go up and reduce the net return from capital. Secondly, if all labour is employed, MP_K will go down with higher amounts of K. Also, as more of the final output is now being produced (with higher quantities of K), its price may also go down, again reducing the return for the investor. This is shown in figure 1.

Fig 1
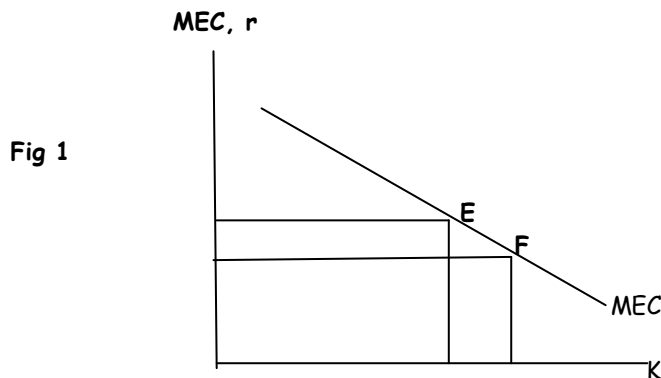
The MEC is not really a theory of investment. It is rather a theory of the determination of firm's optimal capital stock. For a theory of investment, we need to know the current actual stock of capital. Why? Because investment is a flow concept – it gives us **the addition to capital stock per unit of time.** So, we need to know the current stock of capital (say, K_1), the desired or optimum stock of capital (say K^*) and also the changes in C - the supply price of capital, as firms demand more and more of K. We make the **standard assumption** that, like other goods, the capital goods supply schedule too is positively sloped.

Now, if the price of K rises as more investment is made (to reach a certain optimum stock of capital), it is clear that the optimum stock of capital will be somewhat less than what was originally calculated. This is

because **a rise in C will reduce MEC. Therefore, what was the optimum planned stock at the current rate of r will no longer be the optimum stock at the same r (but higher C).** The concept is clarified in fig 2(a) and 2(b).

**Fig 2 (a)**

Fig 2 (b)
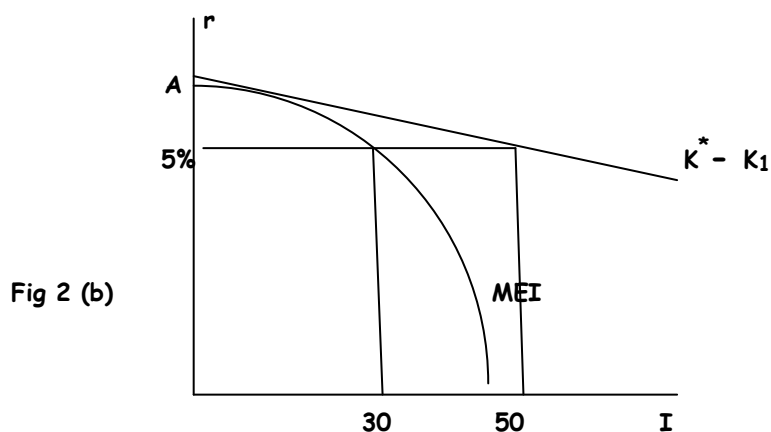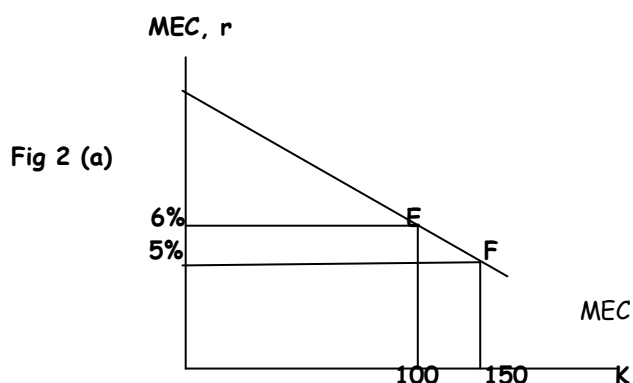
When the rate of interest falls from 6% to 5%, the desired change in optimum capital stock is 50 units (K^* goes up to 150 from 100). However, when investment is made, C goes up and the rates of return on successive capital units fall. Thus, the firm does not find it optimum to buy 50 units of capital, but stops earlier (say, at 30 units). This is reflected in fig 2(b). [**Somewhat inaccurately drawn as the $K^* - K_1$ schedule and the MEI schedule should coincide at point A, and not at any other point**].

We conclude this discussion with two further observations. First, the fundamental differences between MEC and MEI.

Point of Difference	MEC	MEI
SUPPLY PRICE OF CAPITAL	Based on a **given** supply price	Takes into account **induced changes** in supply price
RATE OF RETURN	**Does not regard the existing capital stock** while representing return on all successive capital stock	Shows rate of return on only those units of capital **over and above the existing capital stock**

Secondly, we note that the MEI schedule will shift as the existing capital stock changes. Starting from the example showed in figures 2(a) and 2(b), we noted that the firm made an investment of 30 units of K in period 1 when faced by a 5% rate of interest. So the existing stock of capital becomes 130 at the start of period 2 (at the start of period 1, it was 100), and at this value of K, the MEI must be different (lower than the earlier one). Say the new MEI is called **MEI₂**.

Fig 3
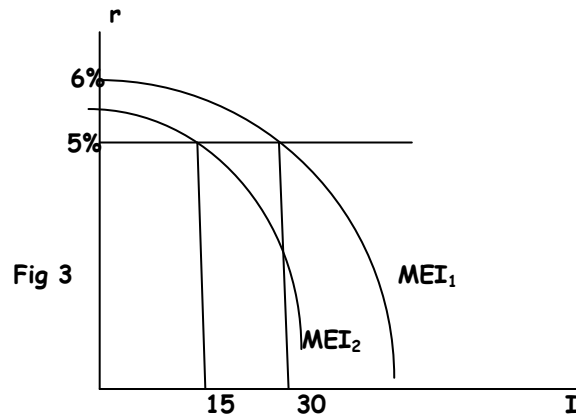
Now, at 5% interest (assuming that r does not change), optimum investment in period 2 should be 15 units and the capital stock at the start of period 3 should be 145 units. Then there will be another downward shift in the MEI schedule.

From the above discussion, we learn that investment is dependent both on the rate of interest as well as on the size of the existing capital stock. Writing this in functional form, we find:

$$I = i \, (r, \, K)$$