

Lecture I: Introduction to Financial Economics

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Defining the Financial Question

What is Capital?

Financial Management and Financial Economics

Development of the Capital Market

Austrian Capital Theory

Neoclassical Capital Theory

Defining the Financial Question

- ▶ **Economics** – the study of the allocation of scarce resources to meet unlimited and competing human wants and desires.
- ▶ **Agricultural Economics** tends to be more applied, less concerned with the development of theory and more on the analysis of policy.
 - ▶ Also, agricultural economics tends to focus on agricultural issues – land allocation, the production of food and fiber, etc.
- ▶ Typically economic discussion deal with generalities – they do not focus on particulars.
 - ▶ Like poor writing, economic models are a little vague on actually doing things. The producer "combines" labor and capital – what does this mean.
 - ▶ Capital is broad term – what does it actually mean.

What is Capital?

- ▶ Continued
 - ▶ Most would view capital as machinery – does it include land?
 - ▶ In some sense all reproduced inputs are capital – but capital many types of capital may only last a single period (dissipated after a single use).
- ▶ The definition of capital is important to the definition of **finance**.
- ▶ In this course I will define **finance** as the analysis of the ownership of existing factors of production.
 - ▶ This ownership includes the factors people tend to think about – large machinery such as combines, and tractors.
 - ▶ It also includes natural resources such as farmland and forests.
 - ▶ However, we are also interested in the ownership of factors of production that only exist in the short-run.

- ▶ This divides the credit market into three slices (although weakly divides):
 - ▶ **Operating Credit** is typically the short-term credit market used to purchase inputs that are used up in a single production period (i.e., fertilizer, fuel, labor).
 - ▶ **Intermediate Credit** is typically associated with the purchase of factors of production who have a life greater than one year and typically less than ten (i.e., combines, tractors, and some buildings).
 - ▶ **Long-term Credit** is typically associated with the purchase of long-term assets such as farmland (**real estate debt**).
- ▶ These lines of credit are not set-in-stone – cash is typically fungible. There may be farmers who use cash generated through long-term borrowing to meet short-run capital needs.

- ▶ Another feature of finance is that there are several sources for these ownership uses:
 - ▶ The dominant source is one's own equity – basically ownership claims the sole proprietor (farmer) has against current consumption. At the present time consider the cash in your pocket or amount in your checking account.
 - ▶ The other source of equity is ownership claims of other people – the cash in their pockets. Outside equity is transferred to the farmer using two instruments – Debt (essentially a fixed claim against future income) or Equity (a ownership claim).

Financial Management and Financial Economics

- ▶ **Financial Management** – the study of an individual's financial decisions. Should the farmer buy a tractor or farmland. If the farmer purchases this tractor how should it be financed? What about operating lines of credit?
- ▶ **Financial Economics** – the study of the supply and demand for capital, including the effect of monetary and fiscal policy.

Development of the Capital Market

- ▶ The Austrian Theory – Real Capital
 - ▶ One of the primary contributions of the Austrian theory was the focus on **Real Capital**.
 - ▶ There is a tendency in most modern capital theory to abstract away from the the asset to focus on the "aggregate value of capital." We are no longer concerned with tractors, but with dollars of tractors plus dollars of combines.
 - ▶ The Austrian school contends that the focus on dollars of capital confuses or hides the value of the real capital item. For example, consider Roscher's development of capital:

Rosher

Suppose a nation of fisher-folk, with no private ownership in land or capital, dwelling naked in caves and living on fish caught by hands in pools left by the ebbing tide. All the workers here may be supposed equal, and each man catches and eats three fish per day. But now one prudent man limits his consumption to two fish per day for 100 days, lays up in this way a stock of 100 fish, and makes use of this stock to enable him to apply his whole labour-power to making a boat and a net. By the aid of this capital he catches from the first perhaps thirty fish a day (Bawerk 2007).

Rosher – Continued

Here the Physical Productivity of capital is manifest in the fact that the fisher, by aid of capital, catches more fish than he would otherwise caught - thirty instead of three. Or to put it quite correctly, a number somewhat under thirty. For the thirty fish which are now caught in a day are the result of more than one day's work.... In this surplus is manifested by the physical productivity of capital (Bawerk 2007).

- ▶ The question asked by Rosher and the other Austrians was how much value proceeds from the capital item (i.e., the fish net and boat) versus from the investment activity (i.e., the fact that the fisherman lives on less fish for a time to construct the boat and net).
- ▶ There is also a division in the capital market implicit:
 - ▶ Suppose that two other people are willing to forgo consumption while the third builds the net and boat.
 - ▶ What is the return to the physical asset versus the capital investment? The real asset has a claim on the return (in essence a portion of the return is value of the marginal product of the boat).

- ▶ In the modern context, there is a supply and demand for a physical asset – tractors.
 - ▶ A tractor has a marginal value product over time.
 - ▶ In an efficient market, the present value (we will get there) of this marginal value product should equal the cost of producing the tractor.
 - ▶ This relationship should hold no matter the source of equity.
 - ▶ The interaction of equity market (i.e., Rosher and Bowerk's turns in production or consumption) implies a price (interest rate) in the capital market.
 - ▶ This price of postponed consumption dictates the present value of capital.
 - ▶ In the limit today we have a monetary policy that has reduced the price of this postponed consumption to nearly zero – yet the entrepreneur's demand for real capital items is very low – the marginal value product of their investment is close to zero.

Neoclassical Capital Theory

- ▶ Neoclassical capital theory essentially develops the capital market as a special case of the market for goods and services.
- ▶ As a starting point, consider a consumer who is "endowed" with two goods $q_1 = 15$ and $q_2 = 20$.
 - ▶ We can derive the implicit tradeoff – the amount that consumer is willing to trade one good for the other based on this endowment (assume a Cobb-Douglass utility function)

$$\begin{aligned}
 &U(q_1, q_2) = q_1^{0.30} q_2^{0.60} \\
 &q_1 + \phi q_2 \leq Y^*
 \end{aligned}
 \Rightarrow \left\{ \begin{array}{l}
 dU^* = 0.30 \frac{U}{q_1} dq_1 + 0.60 \frac{U}{q_2} dq_2 = 0 \\
 dq_1 + \phi dq_2 \leq dy^* \\
 \left. \frac{dq_1}{dq_2} \right|_{\text{Utility}} = \left. \frac{dq_1}{dq_2} \right|_{\text{Budget}} \Rightarrow -\frac{0.60}{0.30} = \frac{dY^*}{dq_2} - \phi
 \end{array} \right. \quad (1)$$

- For the present, let $dY^* = 0$ so that

$$-\frac{0.60q_1}{0.30q_2} = -\phi \quad (2)$$

- If we assume $q_1 = 15$ and $q_2 = 20$ then $\phi = 1.5$. Implicitly, this is the price ratio for that endowment. This price implies an endowment

$$Y^* = 15 + 1.5 \times 20 = 45. \quad (3)$$

- This development supports a traditional utility maximization problem (i.e., if the income is \$ 45 and the relative price of q_2 is 1.5 then the utility maximizing solution is $q_1 = 15$ and $q_2 = 20$.)

$$\begin{aligned} \text{Max } q_1^{0.30} q_2^{0.60} \\ \text{s.t. } q_1 + 1.5q_2 \leq 45 \end{aligned}$$

$$\Rightarrow L = q_1^{0.30} q_2^{0.60} + \lambda [45 - q_1 - 1.5q_2]$$

$$\left. \begin{aligned} \frac{\partial L}{\partial q_1} &= 0.30 \frac{U}{q_1} - \lambda = 0 \\ \frac{\partial L}{\partial q_2} &= 0.60 \frac{U}{q_2} - 1.5\lambda = 0 \end{aligned} \right\} \Rightarrow \frac{0.30}{0.60} \frac{q_2}{q_1} = \frac{1}{1.5} \quad (4)$$

$$q_2 = \frac{0.60}{0.30} \frac{1}{1.5} q_1$$

- Using the budget constraint

$$\frac{\partial L}{\partial \lambda} = 45 - q_1 - 1.5 \left[\frac{0.60}{0.30} \frac{1}{1.5} q_1 \right] = 0$$

$$45 - q_1 - 2q_1 = 0 \tag{5}$$

$$3q_1 = 45 \Rightarrow q_1 = 15$$

$$q_2 = 2 \times \frac{1}{1.5} 15 = 20$$

- Next, let's redevelop the problem such that the decision maker has an initial endowment of $q_1^* = 15$ and $q_2^* = 20$, but we don't know what the relative price is:

$$\begin{aligned} &\text{Max } q_1^{0.30} q_2^{0.60} \\ &\text{s.t. } q_1 + \phi q_2 \leq q_1^* + \phi q_2^* \end{aligned}$$

$$L = q_1^{0.30} q_2^{0.60} + \lambda [q_1^* + \phi q_2^* - q_1 - \phi q_2]$$

$$\Rightarrow q_1^{0.30} q_2^{0.60} + \lambda [15 + 20\phi - q_1 - \phi q_2] \quad (6)$$

$$\left. \begin{aligned} \frac{\partial L}{\partial q_1} &= 0.30 \frac{U}{q_1} - \lambda = 0 \\ \frac{\partial L}{\partial q_2} &= 0.60 \frac{U}{q_2} - \lambda \phi = 0 \end{aligned} \right\} \Rightarrow \frac{1}{2} \frac{q_2}{q_1} = \frac{1}{\phi} \Rightarrow q_2 = \frac{2q_1}{\phi}$$

- Again, bringing in the budget constraint

$$\frac{\partial L}{\partial \lambda} = 15 + 20\phi - q_1 - \phi \left(\frac{2q_1}{\phi} \right) = 0$$

$$\Rightarrow 15 + 20\phi - 3q_1 = 0 \Rightarrow q_1 = \frac{15 + 20\phi}{3} \quad (7)$$

$$\Rightarrow q_2 = \frac{2}{\phi} \left[\frac{15 + 20\phi}{3} \right] = \frac{30 + 40\phi}{3\phi}$$

