ECS307

UNISA

By

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Chapter 3: Money

- Anything generally accepted as payment for goods & services
- Forms: currency, demand deposits,
- Money is a stock & income is a flow
- Functions: medium of exchange, store of value, unit of account
- Money is the most liquid asset of all
- During hyperinflation (inflation rate exceeds 50% per month) money demand decreases

Evolution of Payment system

- Future definition of mony depends on where the payment system is heading

1. Commodity money – e.g. precious metals like gold & silver
2. Fiat money – paper currency decreed by govt as legal tender e.g. rand, Euro, $ notes
3. Checks – instruction to your bank to pay
4. Electronic payments – internet & mobile transactions
5. E-money – money existing in electronic form e.g. debit cards, smart card, e-cash

Money Aggregates

- Money aggregates (money supply) differs across economies
- What are the monetary aggregates in SA
- M1 (narrow money) is more or less the same for most countries – currency in circulation + demand deposits + other checkable deposits.
- M2 – savings deposits is a similar component
- M3 – the broadest aggregate

Measuring Interest rates

- The concept **yield to maturity** (also called internal rate of return - IRR) is the most accurate measure of interest rates
- It equates the present value of expected cash flows (streams of cash payments) received from a debt instrument with its value today
- Before we see how interest rates are measured, we need to understand how we compare the value of one kind of debt instrument with another.
- We make use of the concept present value

Present Value

- Based on the notion that a dollar paid today is worth more than a dollar paid tomorrow. The notion is true coz of interest earnings. In what other sense can this be true **(inflation)**
- The credit market instruments that can be used to demonstrate the present value concept are:
- 1. A simple loan
- 2. A fixed-payment loan
- 3. A coupon bond
- 4. A discount bond

- What is a **simple loan**?
- What is a **fixed-payment loan** (fully amortised loan)?
- A **coupon bond** pays fixed interest payments (**coupon payment**) yearly and a final amount called **face value or par value** on **maturity**. A **coupon rate** is the coupon payment as a % of the face/par value
- A **discount bond (zero-coupon bond)** is bought at a price below its face value (bought at a discount) & the face value is paid at maturity. It does not make any interest payment but pays off the face value e.g. 1 yr discount bond with a face value of R10,000 bought for R8,000

- The 4 instruments are different and they make payments at different times
- **Simple loans** and **discount bonds** make payments only at maturity
- **Fixed-payment loans** and **coupon bonds** make periodic payments until maturity
- How would u decide which of these instruments provides you with more income?
- To solve this problem, make use of the concept of present value. PV provides a procedure for measuring interest rates on the different types of instruments.
- We use the yield to maturity as a proxy to interest rates

Simple loan

- E.g. if you loan out R10,000 @5% interest rate, what do you get after 1, 2, 3 years. That's the future value. Alternatively work backwards from future amounts to the present.
- FV or CF= principal*(1+i)^n; PV=CF/(1+i)^n

Simple present value:

1. What is the PV of R2,500 to be paid in 2 yrs if interest rate is 15%

PV=2,500*(1+0.15)^2

2. Assume that you won lottery worth R20 million which promises you R1 million for the next 20 years. Have you really won R20 million. Assume an interest of 10%.

In PV sense, only your first payment is worth R1 million. In year 2, PV=R1million/(1+0.1)^2

You have actually won R9.4 million

Yield to Maturity on a simple loan

- Use example on page 73 to demonstrate the calculation of yield to maturity on a simple loan

The Fixed Payment loan

- Follow the same strategy for the simple loan
- H/ver the fixed-payment loan involves more than 1 cash flow payment :. the PV of the fixed payments is the sum of the PVs of all cash flow payments
- E.g. if the loan is $1,000 and the yearly payment is $126 for the next 25 years, what is the PV & the yield to maturity?

- Loan value (LV) today is equal to the sum of PVs of all the yearly payments
- $1,000=$126/(1+i)^1+$126/(1+i)^2+…+$126/(1+i)^25
- More generally

$$LV = FP/(1+i)^1 + FP/(1+i)^2 + \ldots + FP/(1+i)^n$$

Where: LV=loan value

FP=fixed yearly payment

n=number of yrs until maturity

- Solving for "i" is not easy, use business oriented software and pocket calculator to find "i" given LV, FP & n
- Use example on page 75.

Coupon Bond

- To find the yield to maturity for a coupon bond, follow the same strategy
- Equate today's value of the bond with its PV
- The PV of the bond is the PVs of all the coupon payments plus the PV of the final payment of the face value of the bond
- The PV of a $1,000-face-value bond with 10 yrs to maturity and yearly coupon payments of $100 (10% coupon rate, can be calculated as follows:

$P = 100/(1+i)^1+100/(1+i)^2+...+100/(1+i)^{10}+1000/(1+i)^{10}$

More generally:

$P= C/(1+i)^1+C/(1+i)^2+...+C/(1+i)^n+F/(1+i)^n$

Where: *P=price of coupon bond*

C=yearly coupon payment

F=face value of the bond

n=number of yrs until maturity

- In the eqn: price of coupon bond, coupon payment, face value and no. of years are known. Solving for the yield "i" is not easy, use business oriented software and pocket calculator to find "i" given P, C, F & n

- A perpetuity (consol) is a special type of a coupon bond
- It makes fixed coupon payments of $C forever and has no maturity date and no repayment of principal
- The formula for the price of consol (Pc) is:
- $P_c = C / i_c$

Where: P_c=*price of the perpetuity (consol)*

C=yearly payment

i_c=*yield to maturity of the perpetuity (consol)*

- What is the yield to maturity on a bond that has a price of $2,000 and pays $100 of interest annually forever

$i_c = C/P_c$; $i_c = \$100/\$2000 = 0.005 = 5\%$

- The value of a long term coupon bond is very close to the value of a perpetuity with the same coupon rate
- Thus $i_c = C/P_c$; has been given the name **current yield** and is frequently used as an approximation to describe interest rates on long term bonds.

Discount Bond

- The yield-to-maturity calculation is similar to that of a simple loan
- Consider a discount bond which pays a face value of \$1,000 after 1 year. If the current purchase price of the bill is \$900, then equating this price to the PV of the \$1,000 received in 1 yr gives
- PV=FV/(1+i)
- \$900=\$1,000/(1+i)
- Solving for "i" ; (1+i)*\$900=\$1,000; "i"=(\$1,000-\$900)/\$900=0.111=11.1%
- More generally "ii"=(F-P)/P; where F=face value of the discount bond; current price of the discount bond