



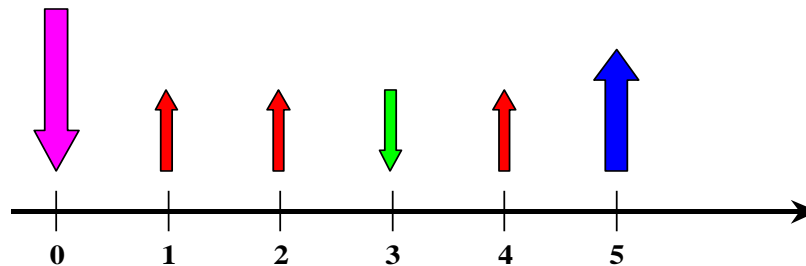
Preparations for FE Examination

# TAXATION

### Today's topics:

- How tax payments fit into the overall Cash Flow Picture
- Definition of Taxation
- Reason for Taxation
- Problems with Taxation
- Individual Income tax computation procedures
- Corporate Income tax computation procedures
- Impact of incremental income or tax rates on overall tax rate

## ■ Recall the typical cash flow diagram



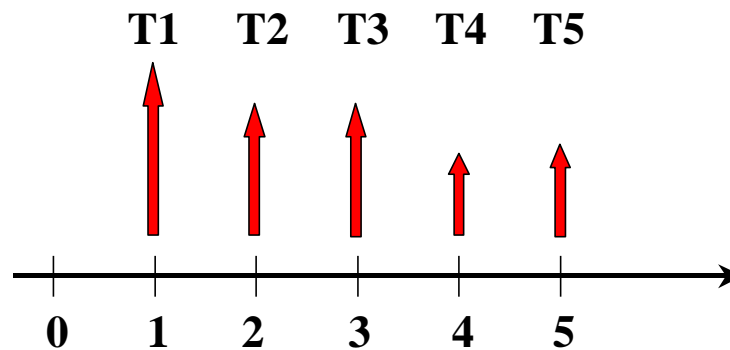
Cash flow diagrams typically involve the following:

- Initial Amount,  $P$ 
  - Initial Amount coming in
  - Initial Amount going out
- Periodic (Typically Annual) Amounts, uniform or non-uniform
  - Periodic Amounts coming in
  - Periodic Amounts going out
- Future Amounts,  $F$
- Interest rate,  $i$
- Transaction Period,  $N$

*Where do tax payments fit in?*

In cash flow diagrams for individuals and companies tax payments are periodic (annual) amounts that go out.

A cash flow diagram for tax payments only would look like this:



Note that the tax payments vary year by year.

## ■ Definition of Taxation

The process by which a government or municipal quasi-public body raises monies to fund its operation.

## Definition of Taxation (cont'd)

- Has existed in human society since the ancient times (1000's of years B.C.). Even in those times, tax collectors were very much hated.
  - In ancient times, tax was either in the form of money or a percentage of one's farm harvest. Taxes were paid to the rulers or the community or both.
  - Modern days: Taxes paid to three levels of government, through a governmental agency (Internal Revenue Service). In democratic countries, taxpayers have a say in how their tax dollars should be used.

## ■ Why Taxation?

- To generate money for social and infrastructure development
- Serves as a “vehicle” of social mobility i.e., provides a means to narrow the gap between the Haves the Have-nots.
- To pay the tax collectors? 😊

## ■ Disadvantages of Taxation

Obviously, taxation is a noble concept, but may be fraught with dangers!

- 1) May discourage people from working harder to increase their incomes
- 2) Typically involves a large bureaucracy which is expensive to maintain
- 3) May breeds discontent, frustration, anger and anti-government feelings among taxpayers who may be facing hard times



## ■ Modern Day Taxation (continued)

- Any money-making entity is taxed (working individuals, companies, etc).
- Certain selected entities are exempt from tax, whether they generate money or not, such as
  - churches (in some countries).
  - Charitable organizations (e.g., Red Cross)
  - Relief agencies (e.g., Engineers Without Borders)
- Employees of most tax-exempt organizations are exempt from income tax.

## ■ Modern Day Taxation (continued)

- The greater the income of an entity (individual or company), the greater the tax amount paid by that entity.

- The greater the income of an entity (individual or company), the greater the tax rate of that entity.

*e.g., With a \$3,500 salary, you'll pay tax of 15%*

*With a \$10,000 salary, you'll pay tax of 25%*

This is referred to as the “progressive” tax system. Opponents of this system (some Republicans, such as Steve Forbes) advocate for a flat rate tax system, e.g., 20% tax rate for everyone.

## ■ Modern Day Taxation (continued)

### - Individual Income Tax

- Gross income is not only your salary, but also includes dividends, interest on your savings, stock earnings, and other sources.

- Adjustments to gross income can be made to reduce your taxable income, such any payments to retirement plans, social security, child care, alimony, etc.

- Other deductions and exemptions designed to reduce your taxable income include medical expenses, mortgage, charity, etc.

## Individual Income Tax (cont'd)

Therefore it can be seen that Individual Income Tax (at least at the Federal level) is structured in such a way that:

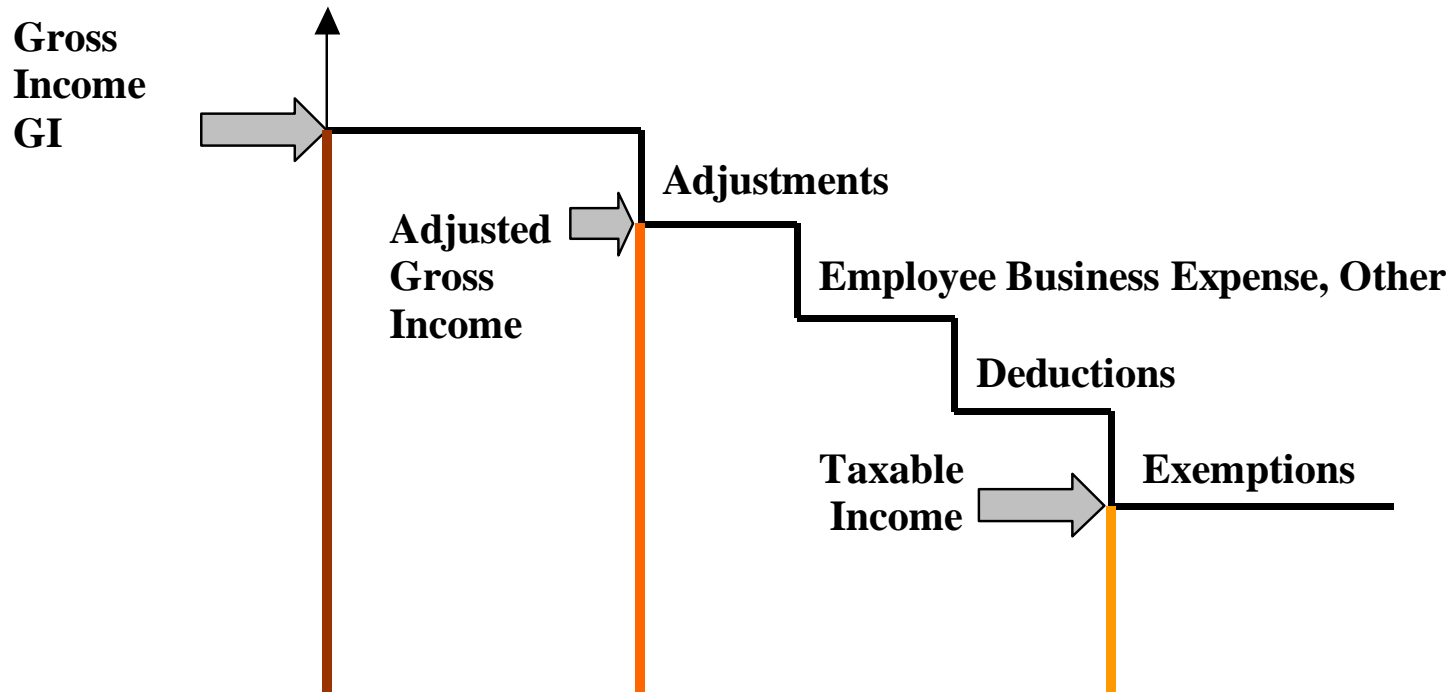
- no source of income is excluded
- individuals are encouraged to save money for their retirement, pay any alimony due,
- people encouraged to purchase their own houses, assisted to recover from theft or fire, and encouraged to give to charity.

## Individual Income Tax (cont'd)

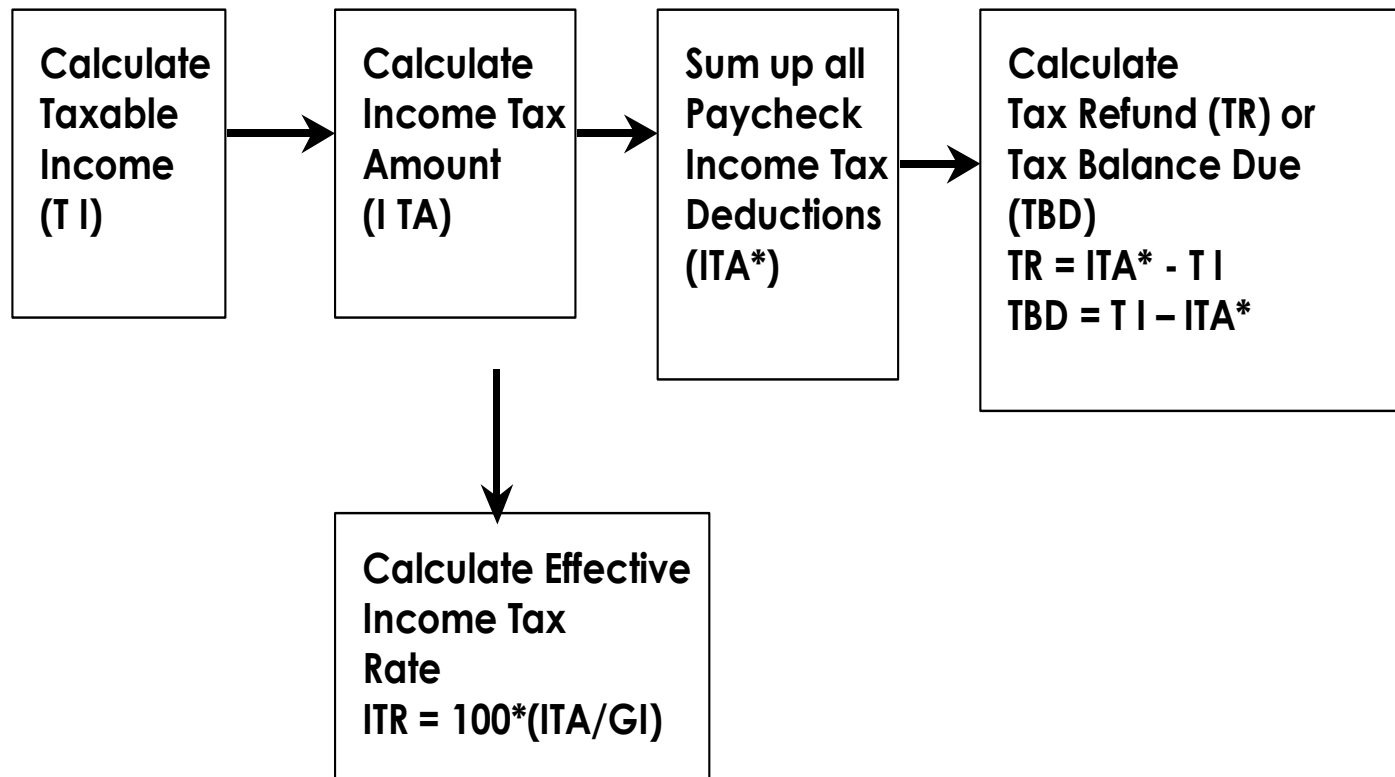
- Deductions to account for individual hardships and adversity (e.g., deduction for casualty losses) are designed to soften the impact of taxation on individuals in hard times.
- Is an attempt to give the tax collection system a humane side.

# ■ The Mechanics of Individual Income Taxation (Federal)

## (i) Mechanics of Computation of Taxable Income



## (ii) Mechanics of Computation of Effective Tax Rate, and Tax Refund or Balance due to IRS



## ■ Discussion of the Mechanics

### a) Components of Gross Income (GI)

Wages

Business Income

Salary

Annuities

Tips

Alimony Received

Interest

Social Security Benefits

Dividends

Capital Gains or Losses

Tax Refunds

Unemployment Compensation



## b) Possible Adjustments

- Qualifying Payments to Retirement Plan
- Self-employed Social Security Tax Payments
- Self-employed Health Insurance Premiums
- Alimony Paid

## ■ Calculation of Adjusted Gross Income (AGI)

Adjusted Gross Income

= Gross Income – Total Adjustments

## c) Employee Business Expense (EBE) Deductions

$$\begin{array}{l} \text{EBE} \\ \text{Deduction} \end{array} \left\{ \begin{array}{l} = \text{EBE if EBE incurred} > 0.02 * \text{AGI} \\ = 0 \text{ if EBE incurred} \leq 0.02 * \text{AGI} \end{array} \right.$$

Note: AGI is the adjusted gross income

## d) Deductions

- Itemized Deductions,
- Standard Deductions

Use the higher of the 2, as your tax deduction

## d(i) Standard Deductions

In the 1994 tax year, standard deduction was as follows:

- \$3800 for single taxpayers
- \$6350 for married taxpayers filing jointly

(If you are married and you file separately, you will obviously have a larger tax standard deduction).

## d (ii) Itemized Deductions

- State and Local Income Tax Payments
- Property Tax
- Home Mortgage Interest
- Charitable Contributions
- Casualty and Theft Losses
- Work-related Moving Expenses
- Other Miscellaneous Deductions exceeding 2% of Adjusted Gross Income
- Medical and Dental Expenses Exceeding 7.5% of Gross Income

## e) Exemptions

Is an amount deducted from your gross income if you are dependent on your gross income for your livelihood.

There is also an exemption for anyone who depends upon you, e.g., your child, non-working wife, etc.

The single person exemption in tax year 1994 was \$2450.

## (f) Computation of Taxable Income

Taxable Income = Adjusted Gross Income  
less Deductions  
less Exemptions

(g) Computation of Federal Income Tax Amount (ITA)  
(See chart below)

Taxable Income Bracket	Incremental Tax Rate (%)	Tax for Income Falling Within Bracket
<b>Single</b>		
\$0–22,750	15	\$0 + 15% of amount over \$0
\$22,750–55,100	28	\$3,412.50 + 28% of amount over \$22,750
\$55,100–115,000	31	\$12,470.50 + 31% of amount over \$55,100
\$115,000–250,000	36	\$31,039.50 + 36% of amount over \$115,000
Over \$250,000	39.6	\$79,639.50 + 39.6% of amount over \$250,000
<b>Married—Filing Jointly</b>		
\$0–38,000	15	\$0 + 15% of amount over \$0
\$38,000–91,850	28	\$5,700.00 + 28% of amount over \$38,000
\$91,850–140,000	31	\$20,778.00 + 31% of amount over \$91,850
\$140,000–250,000	36	\$35,704.50 + 36% of amount over \$140,000
Over \$250,000	39.6	\$75,304.50 + 39.6% of amount over \$250,000





(h) Computation of Effective Federal Income Tax<sup>Taxation</sup>  
Rate (ITR)

(1) Tax Rate on Gross Income  
= Income Tax Amount/Gross Income

(2) Tax Rate on Taxable Income  
= Income Tax Amount/Taxable Income

(1) Is more commonly used than (2).

### (i) Computation of Federal Income Tax Refund or Balance Due

- Find the sum of all paycheck income tax amounts deducted (ITA\*)
- $\text{Tax Refund} = \text{ITA}^* - \text{ITA}$
- If  $\text{ITA}^*$  is less than  $\text{ITA}$ ,  
then there is no tax refund. Rather,  
 $\text{balance due} = \text{ITA} - \text{ITA}^*$

## Corporate Income Tax

Is the tax paid by companies that are in the business of making profit, such as civil engineering consultants, and contractors.

## Corporate Income Tax (continued)

Taxable Income

= Gross Income + Capital Gains Net of Capital Losses –  
Current Expenses – Depreciation – Depletion Allowance

$$T I = GI + CGNCL - EXP - DEPR - DEPL$$

Or  $T I = \text{Overall Income} - \text{Deduction}$

# Taxation

or  $T I = \text{Overall Income} - \text{Total Deductions}$

where

$\text{Overall Income} = GI + \text{CGNCL}$

and  $\text{Total Deductions} = \text{EXP} + \text{DEPR} + \text{DEPL}$

## What are “Current Expenses”

- These are typically the largest category of deductions for most companies.
- They are comprised of the following:
  - Salary and Wages
  - Materials
  - Routine Maintenance
  - Utilities (Heat, light, phone, etc.)
  - Expendable Supplies

## What are “Capital Gains and Losses”

“Capital gains and losses” reflect the net gain in operating capital of the company.

It is calculated as follows:

**Sale Price – Book Value**

## Deductions due to Depreciation:

- This is calculated as the depreciation value of the company's assets using an appropriate method (SOYD, SLD, etc.).
- It is obvious that the method of depreciation used will affect the amount for depreciation deduction. Convex, concave, and straight line depreciation functions will yield different values of depreciation deduction in each year.



# Determination of Corporate Income Tax Amount

(See chart below)

Taxable Income		Incremental Tax Rate (%)	Tax on Income Falling Within a Bracket
Over	But Not Over		
0	50,000	15	\$0 + 15% of excess over \$0
50,000	75,000	25	\$7,500 + 25% of excess over \$50,000
75,000	100,000	34	\$13,750 + 34% of excess over \$75,000
100,000	335,000	39	\$22,250 + 39% of excess over \$100,000
335,000	10,000,000	34	\$113,900 + 34% of excess over \$335,000
10,000,000	15,000,000	35	\$3,400,000 + 35% of excess over \$10,000,000
15,000,000	18,333,333	38	\$5,150,000 + 38% of excess over \$15,000,000
18,333,333	—	35	\$6,416,667 + 35% of excess over \$18,333,333

## RELATIONSHIP BETWEEN THE THREE TAX LEVELS

- Taxation consists of the following levels:

- Federal Tax
- State Tax
- Local Tax

$$\text{Tax} = \text{FT} + \text{ST} + \text{LT}$$

- FT depends on ST and LT, but the reverse is not true.
- So far, we have discussed the mechanics of tax computation for the federal level, for individuals and for corporate bodies (e.g., engineering companies).
- The relationship between the three tax levels is important for investigating the effect of changing tax rates and/or changing income levels on the overall tax amount or the effective tax rate

## Reason for the Need to Study Impacts of Incremental Tax Rates and/or Incomes.

Major reason: Nature of U.S. political system:

Democrats: who generally favor higher taxes (tax rates)

Republicans: who generally favor lower taxes (tax rates)

- Whenever there is a change of power, tax rates are expected to either rise or fall depending on who comes into power.
- What is the implication of these changes on financial planning?

- It is therefore necessary to study the incremental tax amounts or incremental effective tax rates due to a small change in federal or local and state tax rates.
- Also, it is necessary to investigate the impact of increasing incomes on overall tax rates and amounts in order to determine whether the extra effort is worthwhile.

## How to Calculate the Effective Incremental Tax Rate due to Incremental Changes in Rates at the Various Levels, and/or Income changes

$$\begin{aligned}\Delta \text{Tax} &= \Delta I(1 - \Delta \text{SLTR})\Delta \text{FTR} + \Delta I(\Delta \text{SLTR}) \\ &= \Delta I [(1 - \Delta \text{SLTR})\Delta \text{FTR} + (\Delta \text{SLTR})]\end{aligned}$$

$$\begin{aligned}\text{Eff. Incremental Tax Rate} &= \Delta \text{Tax} / \Delta \text{Income} \\ &= [(1 - \Delta \text{SLTR})\Delta \text{FTR} + (\Delta \text{SLTR})]\end{aligned}$$

### Example:

An engineer is married, files jointly, and projects taxable income in the 28% federal bracket. An opportunity to earn \$1000 arises. What incremental tax rate would apply if the incremental rates for state and local tax are 5% and 2% respectively.

Ans.

In this case, we are investigating the impact of an increase in both tax rates as well as income.

$$\Delta \text{Tax rate} = (1 - 0.07)(0.28) + 0.07 = 33\%$$