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FAIRFIELD

Institute of Management & Technology

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Reference Material for Three Years

Bachelor of Economics (Hons.)

Code: 216

Semester – V

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Three Years Bachelor of Economics (Hons.)

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INTERNATIONAL ECONOMICS (301)

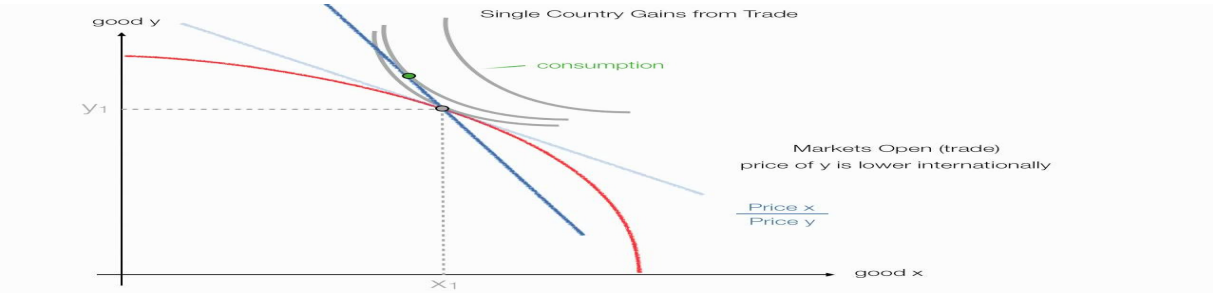
UNIT 1

The study of International Trade, which extends microeconomics to open economies, and International Finance, which employs macroeconomic analysis.
international trade involves the exchange of goods or services and other factors of production, such as labor and capital, across international borders.
On the other hand, international finance studies the flow of financial assets or investment across borders. International trade and finance became possible across nations only due to the emergence of globalization..
international economics is a field concerned with economic interactions of countries and effect of international issues on the world economic activity.

Concept of International Economics:
International economics refers to a study of international forces that influence the domestic conditions of an economy and shape the economic relationship between countries.
These two parts are discussed as follows:
(a) Theoretical International Economics:
Theoretical international economics is further grouped into two categories, which are as follows:
(i) Pure Theory of International Economics:
(ii) Monetary Theory of International Economics:
(b) Descriptive International Economics

Gains from Trade

In the case of autarky or isolation, benefits of international division of labour do not flow between nations. It is advantageous for all the countries of the world to engage in international trade. However, the gains from trade can never be same for all the trading nations. Some countries may reap a larger gain compared to others. Thus, gains from trade may be inequitable but what is true is that "some trade is better than no trade".
gain from trade refers to extra production and consumption effects that countries can achieve through international trade. These gains are, thus, of two types gain from exchange and gain from specialisation in production.
The rate at which one commodity (say, export good) is exchanged for another commodity (say, import good) is called terms of trade. Or what import the export buys is called the TOT. Of course, export (and, hence, import) varies with the change in TOT.



Static and dynamic gains from trade

The gains from trade can be clad into static and dynamic gains from trades. Static Gains means the increase in social welfare as a result of maximized national output due to optimum utilization of country's factor endowments or resources. Dynamic gains from trade, are those benefits which accelerate economic growth of the participating countries.

The major dynamic gains from international trade are as follows:

(i) Technological Development
(ii) Increased Competition
(iii) Widening of Market
(iv) Increase in Investment
(v) Efficient Use of Resources
(vi) Stimulus to Growth

Pattern of Trade

Trade is the exchange of goods and services between countries.
Goods bought into a country are called imports, and those sold to another country are called exports.
Developed countries have a greater share of global trade than developing countries.

Changes in the global economy

The main changes in the global economy are:

1. The emergence of regional **trading blocs**, where members freely trade with each other, but erect barriers to trade with non-members, has had a significant impact on the pattern of global trade. While the formation of blocs, such as the European Union and NAFTA, has led to *trade creation* between members, countries outside the bloc have suffered from *trade diversion*.
2. Like several advanced economies, the UK's trade in manufactured goods has fallen relative to its trade in commercial and financial services. Many advanced economies have experienced deindustrialisation, with less national output generated by their manufacturing sectors.
3. The collapse of communism led to the opening-up of many former-communist countries. These countries have increased their share of world trade by taking advantage of their low production costs, especially their low wage levels.
4. Newly industrialised countries like India and China have dramatically increased their share of world trade and their share of manufacturing exports. China, in particular, has emerged as an economic super-power. China's share of world trade has increased in all areas, and not just in clothing and low-tech goods.

International capital market

International capital market is that financial market or world financial center where shares, bonds, debentures, currencies, hedge funds, mutual funds and other long term securities are purchased and sold. International capital market is the group of different country's capital market. They associate with each other with Internet. They provide the place to international companies and investors to deal in shares and bonds of different countries. International capital markets are the same mechanism but in the global sphere, in which governments, companies, and people borrow and invest across national boundaries. In addition to the benefits and purposes of a domestic capital market, international capital markets provide the following benefits:

1. **Higher returns and cheaper borrowing costs.** These allow companies and governments to tap into foreign markets and access new sources of funds. Many domestic markets are too small or too costly for companies to borrow in. By using the international capital markets, companies, governments, and even individuals can borrow or invest in other countries for either higher rates of return or lower borrowing costs.
2. **Diversifying risk.** The international capital markets allow individuals, companies, and governments to access more opportunities in different countries to borrow or invest, which in turn reduces risk. The theory is that not all markets will experience contractions at the same time.

The five main changes in international capital market. The changes are: 1. Liquidity 2. Securitisation 3. Separation of Risk 4. Reduced Transparency 5. Changing Roles of Intermediaries.

International Capital Flows

International Capital Flows (Financial flows) means the inflow and outflow of capital from one nation to another nation. Following are the different types (forms) of International Capital Flows:

1. Foreign investment
2. Trade Flows
3. Invisibles
4. External assistance and external commercial borrowings
5. Private loan flows

International Economics problems

The global economy faces a number of serious challenges in the 21st Century. Globalizations has benefitted most participants, but the increasing *interconnectedness* of the global economy has created a number of problems.

Short term problems- Some global problems are short term, such as the recent recession caused by the credit crunch and related banking crisis. Most global shocks are relatively short term and may be self-correcting. Other apparently short run events can have long lasting effects, such as the oil shocks of the 1970s, which permanently altered the global market for oil.

Longer term problems - Other global problems are longer term, and may require a strategic approach to finding solutions. These problems include global inequality and unequal economic development, global poverty, the exhaustion of non-renewable resources, depletion of the environment and global warming, and systemic problems associated with inadequate regulation of financial markets.

UNIT 2

Ricardian theory :-

By David Ricardo in 1817, comparative advantage exists when a country has a 'margin of superiority' in the supply of a product i.e. the cost of production is lower.

Countries will usually specialise in and export products, which use intensively the factors inputs, which they are most abundantly endowed. For example the Canadian economy which is rich in low cost land is able to exploit this by specializing in agricultural production. The dynamic Asian economies including China has focused their resources in exporting low-cost manufactured goods which take advantage of much lower labour costs. This is now changing as China looks to move from a middle-income country by specializing in industries that use higher levels of knowledge and technology.

In the richest advanced countries, the comparative advantage is mainly in specializing in producing and exporting high-value and high-technology goods and high-knowledge services.

	Output of X	Output of Y
Country A	180	90
Country B	200	150

In this example, country B has an absolute advantage in both products. Absolute advantage occurs when a country or region can create more of a product with the same factor inputs. But Country A has a comparative advantage in the production of good X. It is 9/10ths as efficient at producing good X but it is only 3/5ths as efficient at producing good Y.
Comparative advantage exists when a country has lower opportunity cost, i.e., it gives up less of one product to obtain more of another product. In our example above, for country A, every extra unit of good Y produced involves an opportunity cost of 2 unit of good X. For country B, an additional unit of good Y involves a sacrifice of only 4.3 units of good X.
There are gains to be had from country A specializing in the supply of good X and country B allocating more of their resources into the production of good Y.

Another example of comparative advantage
Consider two countries producing two products – digital cameras and vacuum cleaners.

Pre-specialisation	Digital Cameras	Vacuum Cleaners
UK	600	600
United States	2400	1000
Total	3000	1600

Were the UK to shift more resources into higher output of vacuum cleaners, the opportunity cost of each cleaner is one digital television. For the United States the same decision has an opportunity cost of 2.4 digital cameras. Therefore, the UK has a comparative advantage in vacuum cleaners.
If the UK chose to reallocate resources to digital cameras the opportunity cost of one extra camera is still one vacuum cleaner. But for the United States the opportunity cost is only 5/12ths of a vacuum cleaner. Thus the United States has a comparative advantage in producing digital cameras.

	Digital Cameras	Vacuum Cleaners
UK	0 (-600)	1200 (+600)
United States	3360 (+960)	600 (-400)
Total	3360	1800

- The UK specializes totally in producing vacuum cleaners – doubling its output to 1200.
- The United States partly specializes in digital cameras increasing output by 960 having given up 400 units of vacuum cleaners.
- Output of both products has increased - representing a gain in economic welfare.

H-O Theory

H-O analysis is based on a number of assumptions:

1.2 x 2 x 2 Case

2. Identical Technology

3. Constant Return

4. Different Factor Intensities

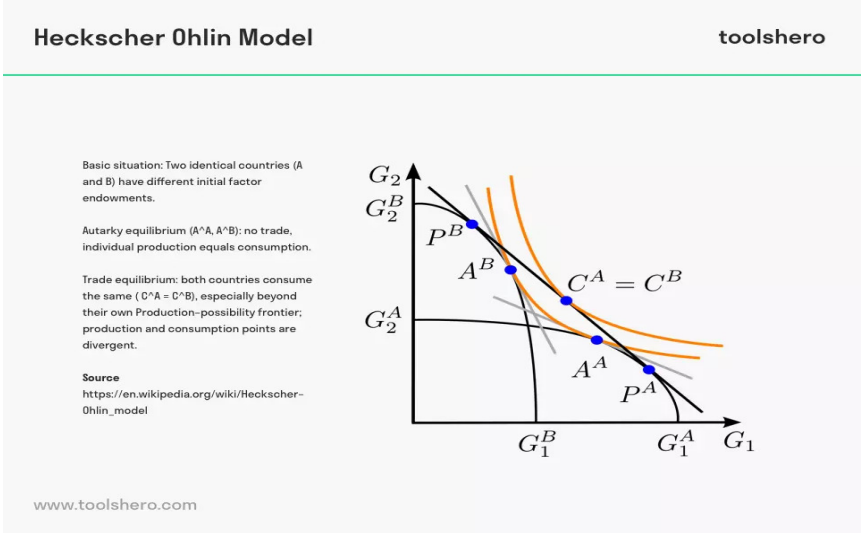
In symbolic terms:

Since $(K/L)_A > (K/L)_B$

Since $(PK/PL)_A < (PK/PL)_B$

country A which has a relative abundance of capital and relative scarcity of labour will have a comparative advantage in specialising in the production of capital-intensive commodities and in return will import labour-intensive goods. This is because $(PK/PL)_A < (PK/PL)_B$.

On the other hand, a labour-abundant country B with a scarcity of capital will have a comparative advantage in specialising in the production of labour-intensive commodities and export some quantities of them and in exchange for import capital-intensive commodities. This is because in this country $(PL/PK)_B < (PL/PK)_A$.



Despite the above merits of Heckscher-Ohlin theory, it has shortcoming

Leontief Paradox:

In the Heckscher-Ohlin theory it has been assumed that relative factor prices reflect the relative supplies of factors. That is, a factor which is found in abundance in a country will have a lower price and vice versa. This means that in the determination of factor-prices supply outweighs demand.

But if demand for factors prevails over supply, then factor prices so determined would not conform to the supplies of factors. Thus, if in a country there is abundance of capital and scarcity of labour in physical terms but there is relatively much greater demand for capital, then the price of capital would be relatively higher to that of labour.

Then, under these circumstances, contrary to its factor-endowments, the country many exportlabour-intensive goods and import capital-intensive goods. Perhaps it is this which lies behind the empirical findings by Leontief that though America is a capital abundant and labour-scarce country, in the

structure of its imports capital-intensive goods are relatively greater whereas in the structure of its exports labour- intensive goods are relatively greater. As this is contrary to the popularly held view, this is known as Leontief Paradox.

Specific Factor Model

The specific factor (SF) model was originally discussed by Jacob Viner, and it is a variant of the Ricardian model. The model was later developed and formalized mathematically by Ronald Jones (1971). The model's name refers to its distinguishing feature—that one factor of production is assumed to be "specific" to a particular industry. A *specific* factor is one that is stuck in an industry or is immobile between industries in response to changes in market conditions. A factor may be immobile between industries for a number of reasons. Some factors may be specifically designed (in the case of capital) or specifically trained (in the case of labor) for use in a particular production process. In these cases, it may be impossible, or at least difficult or costly, to move these factors across industries.

Mobile vs Specific Factors- There are two types of factors. Labor is the mobile factor that can move between the two sectors. Each of the other two factors is assumed to be specific to a particular industry. That is, the quantity of a specific factor is fixed. Specific factors cannot move between industries.

Assumptions:

2 goods × 3 factors

K is used in industry 1 only. (K = Kapital in German)

T is used in industry 2 only. (T = Terra = land in Latin)

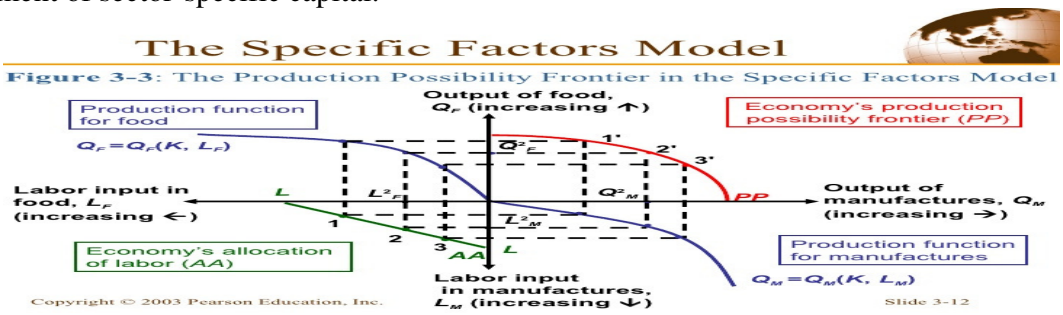
Labor is mobile.

The economy produces two goods using three factors of production, capital, land and labor in a perfectly competitive market. Labor is the mobile factor, and there are two specific factors, K and T.

In this sense, Jones calls it a 2-good, 3-factor model. We do not use L to denote land because it is reserved for labor, and the lower case l looks like "one." It is best to avoid confusing symbols.)

The SF model assumes that an economy produces two goods using two factors of production, capital and labor, in a perfectly competitive market. One of the two factors of production, typically capital, is assumed to be specific to a particular industry—that is, it is completely immobile. The second factor, labor, is assumed to be freely and costlessly mobile between the two industries. Because capital is immobile, one could assume that capital in the two industries is different, or differentiated, and thus is not substitutable in production. Under this interpretation, it makes sense to imagine that there are really three factors of production: labor, specific capital in Industry 1, and specific capital in Industry 2

There is a fixed endowment of sector-specific capital in each industry as well as a fixed endowment of labor. Full employment of labor is assumed, which implies that the sum of the labor used in each industry equals the labor endowment. Full employment of sector-specific capital is also assumed; however, in this case the sum of the capital used in all the *firms* within the industry must equal the endowment of sector-specific capital.

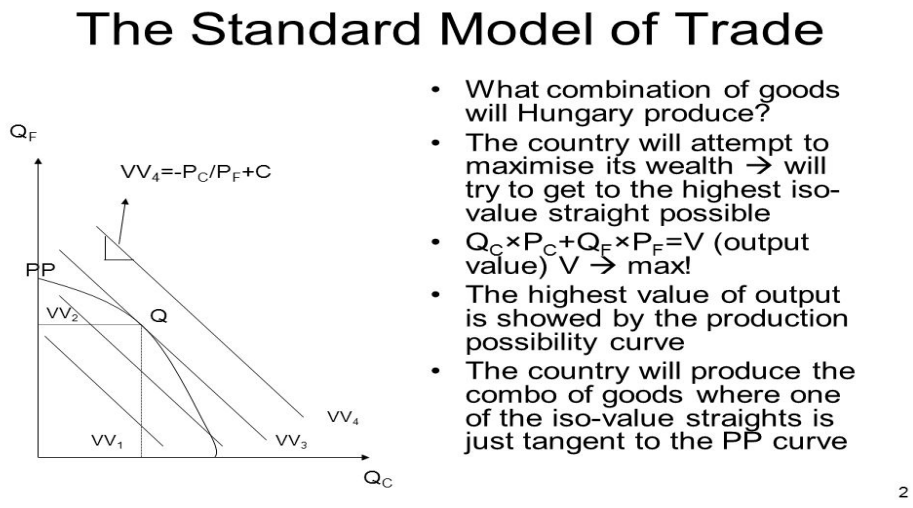


Heckscher-Ohlin

Specific Factors model vs Heckscher-Ohlin

In a Heckscher-Ohlin model, both factors, capital and labor, are assumed to be mobile. Recall that in production decisions, some factors are fixed (and hence specific) in the short run, but all factors are variable inputs in the long run. Hence, the HO model is a long-run model, whereas the specific factors model is a short run model in which capital and land inputs are fixed but labor is a variable input in production. In an immobile factor model, all the factors of production are specific to an industry and cannot be moved. In an H-O model, both factors are assumed to be freely mobile—that is, neither factor is specific to an industry. Since the mobility of factors in response to any economic change is likely to increase over time, we can interpret the immobile factor model results as short-run effects, the SF model results as medium-run effects, and the H-O model results as long-run effects.

Standard trade model



Offer curve

offer curve shows the different quantities of a particular commodity demanded by one country from the other at the different relative prices of their products.

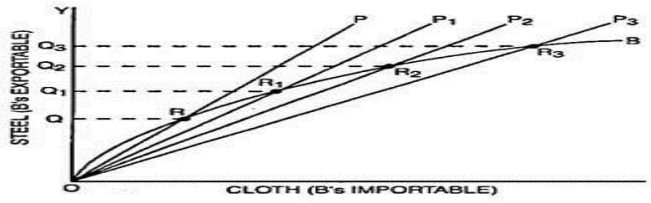


Fig. 4.6

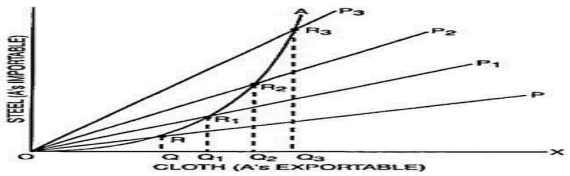
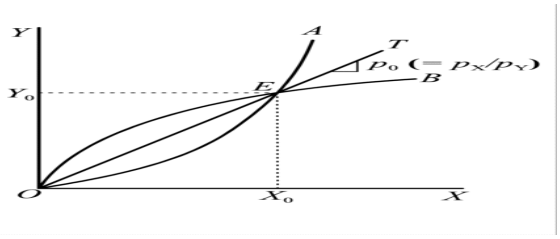


Fig. 4.5



Economies of scale in international economics

Economies of scale means that production at a larger scale (more output) can be achieved at a lower cost (i.e., with economies or savings). When production within an industry has this characteristic, specialization and trade can result in improvements in world productive efficiency and welfare benefits that accrue to all trading countries.

I. Internal Economies:

As a firm increases its scale of production, the firm enjoys several economies named as internal economies. Basically, internal economies are those which are special to each firm. For example, one firm will enjoy the advantage of good management; the other may have the advantage of specialisation in the techniques of production and so on.

"Internal economies are those which are open to a single factory, or a single firm independently of the action of other firms. These result from an increase in the scale of output of a firm and cannot be achieved unless output increases." Cairncross

Prof. Koutsoyannis has divided the internal economies into two parts:

A. Real Economies

B. Pecuniary Economies

A. Real Economies:

Real economies are those which are associated with the reduction of physical quantity of inputs, raw materials, various types of labour and capital etc.

These economies are of the following types:

1. Technical Economies:

Technical economies are of three kinds:

(i) Economies of Dimension:

(ii) Economies of Linked Process:

(iii) Economies of the Use of By-Products:

2. Marketing Economies:

3. Labour Economies:

4. Managerial Economies:

5. Economies of Transport and Storage:

B. Pecuniary Economies:

These economies occur to a large firm in the following:
(i) The firms producing output on a large scale purchase raw material in bulk quantity. As a result of this, the firms get a special discount from suppliers. This is a monetary gain to the firms.
(ii) The large-scale firms are offered loans by the banks at a low interest rate and other favourable terms.
(iii) The large-scale firms are offered concessional transportation facilities by the transport companies because of the large-scale transportation handling.
(iv) The large-scale firms advertise their products on large scales and they are offered advertising facilities at lower prices by advertising firms and newspapers.

II. External Economies:
External economies refer to all those benefits which accrue to all the firms operating in a given industry. Generally, these economies accrue due to the expansion of industry and other facilities expanded by the Government. According to Cairncross, "External economies are those benefits which are shared in by a number of firms or industries when the scale of production in any industry increases." Moreover, the simplest case of an external economy arises when the scale of production function of a firm contains as an implicit variable the output of the industry. A good example is that of coal mines in a locality.

Prof. Cairncross has divided the external economies into the following parts as:
1. Economies of Concentration:
As the number of firms in an area increases each firm enjoys some benefits like, transport and communication, availability of raw materials, research and invention etc. Further, financial assistance from banks and non-bank institutions easily accrue to firm.
We can, therefore, conclude that concentration of industries lead to economies of concentration.
2. Economies of Information:
When the number of firms in an industry expands they become mutually dependent on each other. In other words, they do not feel the need of independent research on individual basis. Many scientific and trade journals are published. These journals provide information to all the firms which relates to new markets, sources of raw materials, latest techniques of production etc.
3. Economies of Disintegration:
As an industry develops, all the firms engaged in it decide to divide and sub-divide the process of production among themselves. Each firm specializes in its own process. For instance, in case of moped industry, some firms specialize in rims, hubs and still others in chains, pedals, tires etc. It is of two types-horizontal disintegration and vertical disintegration.

Significance of Economies of Scale:
The significance of economies of scale is discussed as under:
(a). Nature of the Industry:
The foremost significance of economies of scale is that it plays an important role in determining the nature of the industry i.e. increasing cost industry, constant cost industry or decreasing cost industry.
(b). Analysis of Cost of Production:

Economies of scale and market structure
In the presence of a fixed costs (R&D, training, advertising, marketing….) is a natural source of economies of scale:
$C = F + c\,Q$

C: total cost
F: fixed cost
c: marginal cost (salary for example)
Q: production

Imperfect competition in international economics
Monopolistic competition models are used under the rubric of imperfect competition in International Economics. This model is a derivative of the monopolistic competition model that is part of basic economics. Here it is tailored to international trade.
Most of the traditional theories of trade have been developed on the assumptions of perfect competition and constant returns to scale. Typical examples are the Ricardian and Heckscher–Ohlin models of trade. In the Ricardian model, trade is due to technological differences between countries. In the Heckscher–Ohlin model, technologies are assumed identical between countries, and trade is due to differences in relative factor endowments. Both models succeed in explaining the determinants of interindustry trade. However, they are not capable of explaining the phenomenon of intra-industry trade, which is a major component of world trade. This is chiefly due to the two traditional key assumptions of perfect competition and constant returns to scale.

Product differentiation and monopolistic competition: we tum to the literature on international trade in industries which are monopolistically competitive, containing fmns that each produce a different variety of product.The analytical structure is that of 'Spence-Dixit-Stiglitz' product differentiation in which theindustry has a large number of symmetric varieties. (See Dixit and Stiglitz (1977), Spence(1976)). Firms gain market power from the fact that they are monopolists in their ownvariety, and research ers typical1y make the sirnplifying assumption that this is the only sourceof market power: finns ignore the effects of their actions on industry aggregate variables, sothat there is no strategic interaction between firms. The distinctions that were so important inthe preceding sections cease to be applicable.
Trade costs and market access. The Helpman and Krugman analysis is an elegant synthesis of factor endowment and i**ntra-industry trade,** but the assumption of completely free trade means that each importing finn has exactIy the same market share as each domestic finn, implying that the volume of trade may be as large as half the volume of output in a two-country model, or fraction (N-I)/N the volume of output if there are N identical countries. This is an order of magnitude larger than trade flows actually observed.

If there are trade barriers, then we have to pay attention to supply and demand in each market Expenditure levels in each market then also have a role in determining the location of production -- other things being equal, countries with a large expenditure on the x-sector industry will have a large volumn of production in this industry.

International trade and imperfection competition:
Three main problems with theoretical model of Ricardo, HOS, Standard:
- Based on perfect competition: trade does not increase competition
- No economies of scale so market size does not matter
- Predict that trade will take place between countries which are different and trade different goods
-intra-industrial trade
- trade that goes both ways inside a sector or industry
- example: France exports and imports cars to and from Germany
- Decrease of the share of inter-industry

Theorytheories international trade; end of 1970s (Krugman, Helpman)
Apply to international trade imperfect competition models from industrial organization literature
-Imperfect competition, logical corollary of economies of scale
- New types of gains from international trade; rationalization (mergers and acquisition), variety effect
Also allows to analyse the impact of economic integration on the location (delocation) of economic activities
If free entry of firms in long terms (competition element)
- firms enter on market if profits > 0
- firms exit market if profits < 0 long term equilibrium such that p = AC determines number of firms on market and their size Monopolistic competition model
Economies of scale and comparative advantage Two countries : Germany-France
Two factors of production: capital and labour Germany is relatively abundant in capital two industries: automobile and textile automobile intensive in capital textile intensive in labour automobile industry is not perfectly monopolistic competition: concurrence
If automobile industry produces differentiated goods in monopolistic competition
-Germany has a comparative advantage in automobile sector and will be net exporter in this sector-but will still import some varieties produced by France
- France has a comparative advantage in textile and willexport textile
Two types of trade:
- intra-industrial (car against cars): the more so the moresimilar countries areinter-industrial (cars against textile): reflects comparativeadvantages
- Dumping: Extreme example : domestic firm has monopoly on domestic market and is in perfect competition on foreign markets; perfect segmentation between markets (no arbitrage) More generally producers have an advantage on domestic markets (biased preferences, retail networks, influence national regulations via lobbying etc…)
Optimal strategy of a firm: - equate marginal cost and marginal income on both markets:
MR* = P* = MC determines total production
MR*= MR (dom) Otherwise would increase production on domestic (if
MR*< MR (dom)) or foreign market (if MR*> MR (dom)) : dumping
Decreasing arbitrage constraints helps against the domestic monopoly power

UNIT 3

Instruments of trade policy

Tariff is a tax levied when a good is imported: specific tariff: fixed charge per unit ad valorem tariff: percentage of the price- two countries: home and foreign, one good: wheat, if the pretrade price of wheat in home and foreign is different, then there is trade main purpose of a tariff: protect domestic producers from import competition

• assume that the price of wheat is lower at foreign, so that foreign exports wheat from the point of view of the exporter, a tariff is like a cost of transportation

• an exporter in foreign will have incentives to export only if: price in foreign + tariff < price at home

• let PW be the world price of wheat: the effect of a tariff is to drive a wedge between the prices in home and foreign: price home: PT >PW , price foreign: P* = PT– t < PW

Costs and benefits of tariffs-losers from a tariff imposed at home: consumers athome and producers in foreign- winners from a tariff imposed at home: producers , at home, consumers in foreign, and government athome- changes in the welfare of consumers and, producers can be measured respectively by theconsumer surplus and the producer surplus

Other instruments of trade policy

• other trade policy instruments are: (1) export subsidies; (2) import quotas; (3) voluntary export restraints; (4) local content requirements
• export subsidy is a payment to a firm or individual that ships a good abroad
• shippers at home will have incentive to export the good up to the point where: domestic price – subsidy = foreign price
an export subsidy will unambiguously have costs that exceed the benefits: net cost of a subsidy = consumer loss + government payment – producer gain
cost of a subsidy = efficiency loss + terms of trade loss
• import quota is a direct restriction on the quantity of some good that may be imported
• import quotas always rise the domestic price of the imported good
• main difference between tariff and quota: government does not receive income with quotas

quota rents: profits received by the importing firm holding a license to import (since imports are restricted, the firm can buy imports and resell at a higher price in the domestic market), the cost of an import quota is highest when the licenses to import are assigned to the government of the exporting country: in this case the quota rents go to foreigners

• a **voluntary export restraint (VER)** is a quota on trade imposed from the exporting country's side instead of the importer's
• a VER is generally imposed at the request of the importer
• a VER is exactly like an import quota where the licenses are assigned to foreign governments
• therefore, a VER is very costly for the importing country
• a local content requirement is a regulation that requires that some specified fraction of a final good be produced domestically
• local content regulations protect the domestic producers of parts in the same way an import quota does

Effective rate of protection
Concept of Effective Rate of Protection:
Until the early 1960's, the official rate of tariff was intended to discourage the import of final product and to promote the domestic production in the protected industry. The rate of tariff ad valorem on the import of final product was called as the nominal rate of tariff. A ten percent tariff on a finished imported good was supposed to have a ten percent protection to the domestically produced import substitute.
Higher the rate of nominal tariff, it was assured, higher would be the degree of protection and vice-versa. In other words, the nominal rate of tariff was used to be regarded as a measure of the degree of protection.
The writers like B. Balassa, W. Corden and H.G. Johnson suggest that the nominal rate of tariff was not the appropriate measure of the degree of protection. According to them, the concept of nominal rate of tariff had a serious flaw that it considered only the effect of tariff on final imported product.
It did not recognise the structure of duties applied to the imported raw materials and intermediate goods required in the processing of the import substitutes. A country, many often, imports a raw material either duty-free or imposes a very low tariff rate on the imports of inputs than on the import of final commodity.
Assumptions of Effective Rate of Protection:
Corden's theory of effective rate of protection rests upon the following main assumptions:
(i) There is constancy of physical input- output co-efficients.
(ii) The primary inputs are available in fixed quantities.

(iii)The primary inputs are immobile between the countries.

(iv) The elasticity co-efficients related to demand for all exports and supply of all imports are infinite.

(v) Trade takes place in case of all the inputs.

(vi)The economic system is maintained in the state of full employment through appropriate monetary and fiscal policies.

(vii) All tariffs and other measures like taxes or subsidies are applied on a non-discriminatory basis

(viii) All tradable goods continue to remain tradable even after tariff and other measures are adopted so that the domestic price of each importable good is given by the foreign price plus tariff.

Given the above assumptions, the distinction between the nominal and effective rate of protection can be understood through an illustration. Suppose imported special steel worth Rs. 10,000 is required for producing domestically a machine. The free trade price of machine is Rs. 16,000. If 25 percent nominal tariff is imposed on each imported machine, its price for domestic consumer will be Rs. 20,000. Out of this, Rs. 10,000 represent imported steel, Rs. 6,000 is the domestic value added and Rs. 4,000 is the tariff.

The nominal tariff rate can be expressed through the following formula:

$H = (P' - P) / P$

Where h is the nominal tariff rate. P is the world price in the absence of tariff and P' is the domestic price of the final commodity including tariff. In the illustration given above, the nominal tariff rate is 0.25 or 25 percent.

$$h = \frac{P' - P}{P}$$

$$= \frac{20,000 - 16,000}{16,000} = \frac{4,000}{16,000}$$

$$= 0.25 \text{ or } 25 \text{ percent.}$$

The effective rate of protection, on the other hand, is measured by the following expression

$$g = \frac{V' - V}{V} \qquad \ldots(i)$$

where g is the effective rate of protection. V is the domestic value added under free trade and V' is the value added after duty is imposed. According to the above illustration

$$g = \frac{V' - V}{V} = \frac{10,000 - 6,000}{6,000} = \frac{4,000}{6,000}$$

$$= 0.667 \text{ or } 66.7 \text{ percent}$$

Importance of Effective Rate of Protection:

The concept of effective rate of protection has much importance as discussed below:

(i) Importance for Producers:

While the concept of nominal rate of tariff is important from the point of view of the consumers because of their concern with the rise in the price of the final product after tariff, the concept of effective rate of protection or tariff has significance from the viewpoint of the producers.

When a tariff is imposed on the primary inputs or raw materials, the production decisions are likely to get affected. The tariff policies are often intended to bring about an increase in the domestic value added.

(ii) Impact on Resource Allocation:

It cannot be controverted that the tariff structure can affect the direction of resource allocation. To quote Corden, "Ordinary nominal tariffs apply to commodities but resources move as between economic activities. Therefore, to discover the resource allocation effects of a tariff structure, one must calculate the protective rate for each activity that is the effective protective rate."

(iii) Nature of Tariff Structure:
The concept of effective rate of protection also sheds light upon the nature of tariff structure in a country. A widely observed feature of tariff structure in many a country is that the nominal rates tend to be low or even zero for raw materials and rise or escalate with the degree of processing. For instance, the nominal tariff rates may be the lowest in the case of raw cotton but may tend higher and higher in case of yarn, cloth and apparels respectively.
(iv) Expansion of Trade:
The concept of effective rate of protection signifies that a reduction in nominal rates of tariff on the imported raw materials needed for the domestic processing seems to be a concession for the foreign country intended to expand the volume of trade. In fact, it results in a rise in effective rate of protection of the user industry. The increase in protected production may actually have opposite consequences for the volume of trade.
(v) Expansion of Infant Industries: The concept of effective rate of protection brings home the fact how a greater degree of protection can be afforded for rapid expansion of infant industries. It suggests that the countries need not impose high nominal tariff rates for protecting their infant industries. A significantly higher rate of protection can be achieved by lowering down the structure of tariff rates on intermediate products to be used in the infant industry.

Multiple Exchange System: The concept of effective rate of protection can be used to analyse the multiple exchange rate system. Any exchange rate, official or market rate, assumed as a base rate may initially be taken. Then all exchange rates applicable to imports and exports may be converted into nominal tariff rates, import subsidies, export taxes or export subsidies. Suppose the exchange rate of capital goods imports is Rs. 50 per dollar and the base rate is Rs. 45 per dollar.
It implies an import tariff of 11.1 percent. It can be converted into an effective rate according to the procedure. Given sets of nominal rates, effective rates and elasticity coefficients, a single rate of exchange can be estimated that can achieve the same balance of payments equilibrium as can be possible through a system of multiple exchange rates.
Impact of Foreign Tariff:- This concept can be employed also for analysing the effects of foreign tariff upon the trade and growth of the home country and necessary actions that can be taken for off-setting any adverse effect of the foreign tariffs.

Limitations of Effective Rate of Protection:
The theory of effective rate of protection has certain theoretical and practical limitations, which are pointed out below:
(i) Faulty and Restrictive Assumptions:
The concept of effective rate of protection rests upon a series of faulty, restrictive and unrealistic assumptions such as fixity of input-output co-efficients, fixed supply of primary inputs, infinite elasticity co-efficients and full employment of resources. The faulty theoretical structure of this concept greatly limits its practical applicability.
(ii) Partial Equilibrium Analysis:
A major limitation of the concept is that it is based upon the partial equilibrium analysis or particular product analysis. When import tariff raises the price of imported input, the domestic producers are likely to substitute cheaper domestic or imported inputs in products. Such effects have been overlooked. A more realistic explanation of it can be made in a general equilibrium setting.
(iii) Difficulties in International Comparisons of Effective Rates of Production:
There are real problems in the exact measurement of heights of tariffs and comparison of tariff rates in one country with the other in the view of the presence or absence of certain groups of commodities

or their varieties. If the weighted average of tariff rates is to be computed, the difficulty can arise when the tariff rate is so high that the imports get completely stopped. On the opposite, if the un-weighted average is computed, major and minor items of imports are given equal importance that is not realistic.

(iv) Neglect of Indirect Effects:

The concept of effective rate of protection attempts to measure the rate of protection in case of specified home industries by taking into account only the direct effects of tariff upon those industries. The tariffs also have certain indirect effects including the counterveiling measures adopted by foreign countries. As these effects remain neglected, the effective rate of protection cannot measure precisely the degree of protection.

(v) Neglect of Non-Traded Inputs:

This concept rests upon the assumption that the inputs are internationally traded. In fact, some inputs are not traded. However their values are included in the total values of inputs and output. Consequently, the measurement of effective rate of protection is rendered faulty.

(vi) Misallocation of Resources:

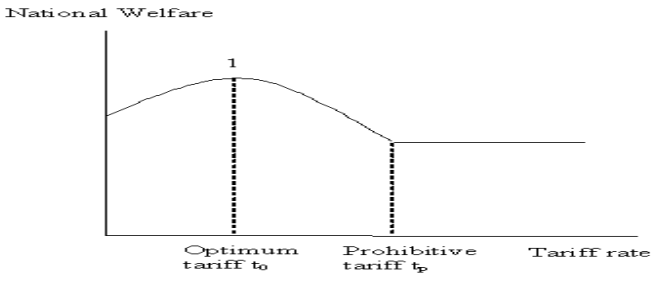
The tariffs certainly influence the allocation of resources. There is a danger that the primary or intermediate inputs flow into such industries, as have the highest protective rates and away from such industries in case of which the protective rates are the lowest or negative. This clearly amounts to a misallocation of resources.

Despite its deficiencies, the concept of effective rate of protection has vital importance because it measures the extent to which the home market of a country is sheltered.

Optimum Tariff

A tariff which maximizes a country's welfare, trading off improvement in the terms of trade against restriction of trade quantities. For a small economy which cannot affect world prices in the markets in which it trades, the optimum tariff is zero. For a country with monopoly power in its export markets or monopsony power in import markets, the optimum tariff is positive, but not so large as to eliminate trade entirely.

Figure 9-2 The Optimum Tariff



For a large country, there is an optimum tariff t_0 at which the marginal gain from an improved terms of trade just equals the marginal efficiency loss from production and consumption distortion.

In case the cost of tariffs for the society is more than the gain from tariffs, there may be reduction in the level of economic welfare and the worsening of the terms of trade.

In such a situation, it is appropriate for the tariff-imposing country to reduce tariff. The point of optimum tariff is reached when tariff does not further increase the net benefit to the given country and a level of economic welfare has become maximum. In the words of Sodersten, "…. the tariff that maximises a country's welfare is called the optimum tariff."

The point of optimum tariffs is determined where the trade indifference curve of the tariff-imposing home country becomes tangent to the offer curve of the foreign country. This can be shown through

Fig. 15.9.

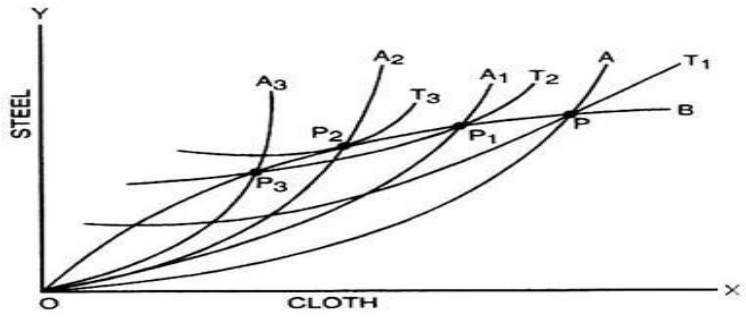


Fig. 15.9

In Fig. 15.9 originally OA is the offer curve of home country A and OB is the offer curve of foreign country B. T1, T2 and T3 are the trade indifference curves of country A. Before the imposition of tariff, the exchange takes place at P. This point lies on the trade indifference curve T1. As tariff is imposed, the offer curve of county A shifts to OA1 and exchange takes place at P1. This point occurs at the higher trade indifference curve T2.

Optimum Tariff with Retaliation:

In the above analysis, the home country continues to raise tariffs and improve its terms of trade. It has been implicitly assumed that foreign country does not retaliate. In actual reality, the possibility of retaliation cannot be ruled out. The impact of imposition of tariffs by the two trading countries upon their terms of trade and the level of welfare can be shown through Fig. 15.10.

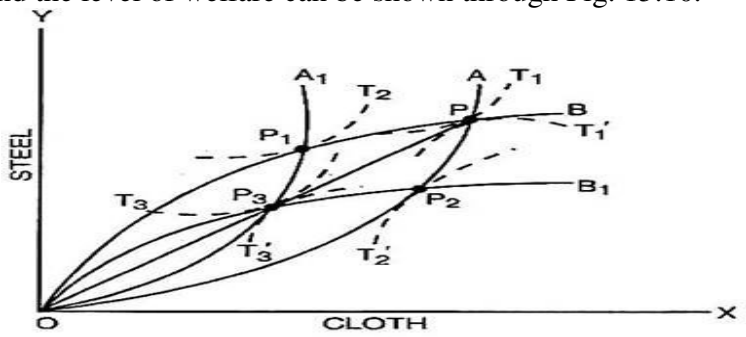


Fig. 15.10

In Fig. 15.10, OA and OB are the free trade offer curves of countries A and B respectively. P is the point of exchange and the terms of trade for the home country A are measured by the slope of line OP. This point lies on the trade indifference curves T1 and T1' of countries A and B respectively. So point P also indicates the respective welfare levels in these countries in the pre-tariff situation.

If country A imposes tariff so that its offer curve shifts to OA1 while country B does not enforce any retaliatory tariff, P1 is the point of optimum tariff for A. At this point of exchange, the higher trade indifference curve T2 of country A is tangent to the offer curve OB of country B. There is an improvement in terms of trade as well as an increase in welfare of the tariff-imposing home country.

If country B had imposed tariff first without provoking country A to retaliation, the point of exchange would have shifted from P to P2. This would have been the point of optimum tariff for B because of tangency between its higher trade indifference curve T2 and the offer curve OA of country A. The point P2 shows an improvement in terms of trade and increase in the level of welfare for B.

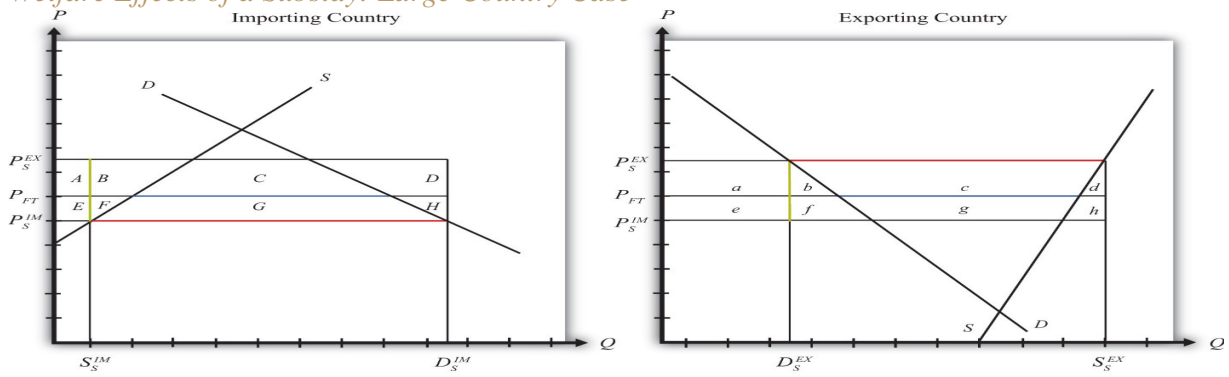
In case the tariff action of A is followed by the retaliatory tariff action of country B, their respective offer curves OA1 and OB1 intersect each other at P3. The terms of trade for both the countries are

exactly the same as at the pre-tariff position P. The point P3 is the optimum tariff situation because the trade indifference curves T3 and T3‘ are tangent to the offer curve of each other at this point. However, the point P3 lies on the lower trade indifference curves of the two countries, compared with the tariff situations (P1 and P2) in the absence of retaliation. So tariff has left their terms of trade unchanged but has worsened the level of welfare in both the countries. The above analysis shows that both the countries in the ultimate analysis are likely to lose due to tariff. Johnson has, however, not supported such a general conclusion.

Export Subsidies

Suppose that there are only two trading countries: one importing country and one exporting country. The supply and demand curves for the two countries are shown in Figure 7.32 "Welfare Effects of a Subsidy: Large Country Case". PFT is the free trade equilibrium price. At that price, the excess demand by the importing country equals the excess supply by the exporter.

Welfare Effects of a Subsidy: Large Country Case



provides a summary of the direction and magnitude of the welfare effects to producers, consumers, and the governments in the importing and exporting countries. The aggregate national welfare effects and the world welfare effects are also shown.

Table 7.10 Welfare Effects of an Export Subsidy

	Importing Country	Exporting Country
Consumer Surplus	+ (*E* + *F* + *G*)	− (*a* + *b*)
Producer Surplus	− (*E* + *F*)	+ (*a* + *b* + *c*)
Govt. Revenue	0	− (*b* + *c* + *d* + *f* + *g* + *h*)
National Welfare	+ *G*	− (*b* + *d* + *f* + *g* + *h*)
World Welfare	− (*F* + *H*) − (*b* + *d*)	

Export subsidy effects on the exporting country. The aggregate welfare effect for the country is found by summing the gains and losses to consumers and producers. The net effect consists of three components: a negative terms of trade effect (f + g + h), a negative consumption distortion (b), and a

negative production distortion (d).
Since all three components are negative, the export subsidy must result in a reduction in national welfare for the exporting country. However, it is important to note that a redistribution of income occurs—that is, some groups gain while others lose. The likely reason governments implement export subsidies is because they will benefit domestic exporting firms. The concerns of consumers must be weighed less heavily in their calculation since the sum of their losses exceeds the sum of the producers' gains.
Export subsidy effects on the importing country's consumers. Consumers of the product in the importing country experience an increase in well-being as a result of the export subsidy. The decrease in the price of both imported goods and the domestic substitutes increases the amount of consumer surplus in the market.
Export subsidy effects on the importing country's producers. Producers in the importing country suffer a decrease in well-being as a result of the export subsidy. The decrease in the price of their product on the domestic market reduces producer surplus in the industry. The price decrease also induces a decrease in the output of existing firms, a decrease in employment, and a decrease in profit, payments, or both to fixed costs.

Export subsidy effects on the importing country's government. There is no effect on the importing country's government revenue as a result of the exporter's subsidy.
Export subsidy effects on the importing country. The aggregate welfare effect for the country is found by summing the gains and losses to consumers, producers, and the government. The net effect consists of three components: a positive terms of trade effect (F + G + H), a negative production distortion (F), and a negative consumption distortion (H).
Although there are both positive and negative elements, the net national welfare effect reduces to area G, which is positive. This means that an export subsidy implemented by a large exporting country in a perfectly competitive market will raise national welfare in the importing country.

This result has inspired some economists to argue that the proper response for an importing country when its trading partner implements an export subsidy is simply to send along a thank you note.
It is worth noting here that the World Trade Organization (WTO) allows countries to impose countervailing duties to retaliate against its trading partners when it can be shown that an exporting country's government has used export subsidies.
It is also important to note that not everyone's welfare rises when there is an increase in national welfare. Instead, there is a redistribution of income. Consumers of the product will benefit, but producers and payers of government taxes will lose. A national welfare increase, then, means that the sum of the gains exceeds the sum of the losses across all individuals in the economy. Economists generally argue that, in this case, compensation from winners to losers can potentially alleviate the redistribution problem.

Export subsidy effects on world welfare. The effect on world welfare is found by summing the national welfare effects on the importing and exporting countries. By noting that the terms of trade gain to the exporter is equal to the terms of trade loss to the importer, the world welfare effect reduces to four components: the importer's negative production distortion (B), the importer's negative consumption distortion (D), the exporter's negative consumption distortion (f), and the exporter's negative production distortion (h). Since each of these is negative, the world welfare effect of the export subsidy is negative. The sum of the losses in the world exceeds the sum of the gains. In other words, we can say that an export subsidy results in a reduction in world production and consumption efficiency.

Political economy of trade policy

a political-economy model of trade policy must have four elements. Much of the trade theory is devoted to analyzing the consequences of trade policy for individuals who derive their incomes from different factors of production or sectors. First, it must contain a description of individual preferences over the domain of policy choices available to policymakers. Given an underlying economic model of the Heckscher–Ohlin or Ricardo–Viner type and the presumption that preferences for policy depend only on self-interest, individuals' policy rankings can be deuced on the basis of their factor endowments or sector-specific skills. Second, the model must contain a description of the way these individual preferences are aggregated and channeled, through pressure groups, political parties, or grass-roots movements, into political demands for a particular policy or another. This step involves a characterization of the modes of political organization, as well as of the forms that political influence takes.

Unit4

Balance of Payment Account:

A Balance of Payment Account is a systematic record of all economic transactions between residents of a country and the rest of the world carried out in a specific period of time. 'Balance of Payment Account is a summary of international transactions of a country for a given period' (i.e., financial year). It records a country's transactions with the rest of the world involving inflow and outflow of foreign exchange. In short BOP Account is a summary statement of transactions in foreign exchange in a year.

Features of Balance of Payment Account:

(i) It is a systematic record of all economic transactions between residents of one country and rest of the world.

(ii) It includes all transactions in goods (visible items), services (invisible) and assets (flow of capital) during a period of time.

(iii) It is constructed on double entry system of accounting. Thus, every international transaction will result in credit entry and debit entry of equal size.

(iv) All economic transactions that are carried out with the rest of world are either credited or debited.

(v) In accounting sense total debit will always be equal to total credits, i.e., balance of payments will always be in equilibrium. But in economic sense, if receipts are larger than payments, there is surplus in BOR Similarly, if payments are larger than receipts, there is deficit in BOP

$C + S + T = C + I + G + (X-M)$

or $Y = C + I + G + (X-M)$ ($Y = C + S + T$)

Where C represents consumption expenditure,

S domestic saving,

T tax receipts,

I investment expenditures,

G government expenditures,

X exports of goods and services and

M imports of goods and services.

In the above equation C + S + T is GNI or national income (Y), and
C + I+G = A,
Where A is called 'absorption'
In the accounting sense, total domestic expenditures (C + I + G) must equal current income (C + S + T) that is A = Y. Moreover, domestic saving (Sd) must equal domestic investment (Id). Similarly, an export surplus on current account (X > M) must be offset by an excess of domestic saving over investment (S > Id).
Components of Balance of Payment Account:
The various items which make up country's Balance of Payment Account are listed in a simplified consolidated form in the above table. They are explained as under:
1 Export and import of goods (Merchandise)The most straightforward way in which a country can acquire foreign currency is by exporting goods. These are called visible items because goods can be seen, touched and measured. This is shown by Row (1) which indicates that the country has exported goods to a value of Rs 550 crore. In an analogous (similar) way Row (5) shows that the country has imported goods to a value of Rs 800 crore. These two rows describe the country's visible trade. Movement of goods between countries is known as visible trade because the movement is open and can be verified by Customs officials.
2 Services rendered and received:(Shipping, banking, insurance, tourism, interest, dividendetc) Under this head, following types of earnings are included.
(a) Non-factor income:Income from shipping, banking, insurance, tourism, software services is called non-factor income. All such payments are listed under Row (2) as export of services or invisible exports.
(b) Investment income (Factor income):Interest and dividends which citizens of a country earn on investment abroad are investment income and treated as factor income. Remember, citizens of the country own land, bonds, shares, etc. in foreign countries for which the foreigners who enjoy the services of this capital will have to pay for them. These payments will be registered under Row (2) as export of services or invisible exports.
In a completely analogous way, Row(6) covers payments which residents of the country m question make to foreigners for similar services, i.e., shipping, banking, insurance payments made by residents as tourists abroad, payments in the form of interest, dividends, profits/or capital services on foreign owned capital
3.Unilateral transfers:(Gifts, remittances, indemnities, etc. from foreigners) The items in Row (3) are called unrequited receipts because residents of a country receive 'for free. Nothing has to be paid in return at present or in future for these receipts. These are like transfer payments. Examples of this head are gifts received by residents from foreigners, remittances sent by emigrants to relatives, war indemnities paid by a defeated country, etc. Note: In India unrequited or unilateral transfers are treated as a part of invisible trade.
4Capital receipts and Payments: [Borrowings, capital repayments, sale of assets, changes in foreign exchange reserve):It records international transactions which affect assets and liabilities of domestic country with rest of the world. Items (4) and (8) of the table indicate changes in stock magnitudes and refer to capital receipts and payments .Government of a country may borrow (get loan) from another government; a firm may issue stocks abroad or a bank may float a loan in a foreign country.
In all these instances, the country in question will acquire foreign currency and these transactions will be entered as credit items in Row (4). Similarly foreigners may acquire assets in the country with whose balance of payments they are concerned.

Foreign exchange market
Foreign exchange market is the market in which foreign currencies are bought and sold. The buyers

and sellers include individuals, firms, foreign exchange brokers, commercial banks and the central bank.

Functions of Foreign Exchange Market:

Foreign exchange market performs the following three functions:

1. Transfer Function:It transfers purchasing power between the countries involved in the transaction. This function is performed through credit instruments like bills of foreign exchange, bank drafts and telephonic transfers.
2. 2. Credit Function:It provides credit for foreign trade. Bills of exchange, with maturity period of three months, are generally used for international payments. Credit is required for this period in order to enable the importer to take possession of goods, sell them and obtain money to pay off the bill.
3. Hedging Function:When exporters and importers enter into an agreement to sell and buy goods on some future date at the current prices and exchange rate, it is called hedging. The purpose of hedging is to avoid losses that might be caused due to exchange rate variations in the future.

Kinds of Foreign Exchange Markets:

Foreign exchange markets are classified on the basis of whether the foreign exchange transactions are spot or forward accordingly, there are two kinds of foreign exchange markets:

(i) Spot Market,

(ii) Forward Market.

(i) Spot Market:Spot market refers to the market in which the receipts and payments are made immediately. Generally, a time of two business days is permitted to settle the transaction. Spot market is of daily nature and deals only in spot transactions of foreign exchange (not in future transactions). The rate of exchange, which prevails in the spot market, is termed as spot exchange rate or current rate of exchange.The term 'spot transaction' is a bit misleading. In fact, spot transaction should mean a transaction, which is carried out 'on the spot' (i.e., immediately). However, a two day margin is allowed as it takes two days for payments made through cheques to be cleared.

(ii) Forward Market:

Forward market refers to the market in which sale and purchase of foreign currency is settled on a specified future date at a rate agreed upon today. The exchange rate quoted in forward transactions is known as the forward exchange rate. Generally, most of the international transactions are signed on one date and completed on a later date. Forward exchange rate becomes useful for both the parties involved in the transaction.

Determinants of Exchange Rates

Numerous factors determine exchange rates. Many of these factors are related to the trading relationship between the two countries. Remember, exchange rates are relative, and are expressed as a comparison of the currencies of two countries. The following are some of the principal determinants of the exchange rate between two countries. Note that these factors are in no particular order; like many aspects of economics, the relative importance of these factors is subject to much debate.

1. Differentials in Inflation- Typically, a country with a consistently lower inflation rate exhibits a rising currency value, as its purchasing power increases relative to other currencies. During the last half of the 20th century, the countries with low inflation included Japan, Germany, and Switzerland, while the U.S. and Canada achieved low inflation only later. Those countries with higher inflation typically see depreciation in their currency about the currencies of their trading partners. This is also usually accompanied by higher interest rates.

2. Differentials in Interest Rates- Interest rates, inflation, and exchange rates are all highly correlated.

By manipulating interest rates, central banks exert influence over both inflation and exchange rates, and changing interest rates impact inflation and currency values. Higher interest rates offer lenders in an economy a higher return relative to other countries. Therefore, higher interest rates attract foreign capital and cause the exchange rate to rise. The impact of higher interest rates is mitigated, however, if inflation in the country is much higher than in others, or if additional factors serve to drive the currency down. The opposite relationship exists for decreasing interest rates – that is, lower interest rates tend to decrease exchange rates.

3. Current Account Deficits -The current account is the balance of trade between a country and its trading partners, reflecting all payments between countries for goods, services, interest, and dividends. A deficit in the current account shows the country is spending more on foreign trade than it is earning, and that it is borrowing capital from foreign sources to make up the deficit. In other words, the country requires more foreign currency than it receives through sales of exports, and it supplies more of its own currency than foreigners demand for its products. The excess demand for foreign currency lowers the country's exchange rate until domestic goods and services are cheap enough for foreigners, and foreign assets are too expensive to generate sales for domestic interests.

4. Public Debt- Countries will engage in large-scale deficit financing to pay for public sector projects and governmental funding. While such activity stimulates the domestic economy, nations with large public deficits and debts are less attractive to foreign investors. The reason? A large debt encourages inflation, and if inflation is high, the debt will be serviced and ultimately paid off with cheaper real dollars in the future.

In the worst case scenario, a government may print money to pay part of a large debt, but increasing the money supply inevitably causes inflation. Moreover, if a government is not able to service its deficit through domestic means (selling domestic bonds, increasing the money supply), then it must increase the supply of securities for sale to foreigners, thereby lowering their prices. Finally, a large debt may prove worrisome to foreigners if they believe the country risks defaulting on its obligations. Foreigners will be less willing to own securities denominated in that currency if the risk of default is great. For this reason, the country's debt rating (as determined by Moody's or Standard & Poor's, for example) is a crucial determinant of its exchange rate.

5. Terms of Trade- A ratio comparing export prices to import prices, the terms of trade is related to current accounts and the balance of payments. If the price of a country's exports rises by a greater rate than that of its imports, its terms of trade have favorably improved. Increasing terms of trade shows' greater demand for the country's exports. This, in turn, results in rising revenues from exports, which provides increased demand for the country's currency (and an increase in the currency's value). If the price of exports rises by a smaller rate than that of its imports, the currency's value will decrease in relation to its trading partners.

6. Strong Economic Performance- Foreign investors inevitably seek out stable countries with strong economic performance in which to invest their capital. A country with such positive attributes will draw investment funds away from other countries perceived to have more political and economic risk. Political turmoil, for example, can cause a loss of confidence in a currency and a movement of capital to the currencies of more stable countries

What models can predict how exchange rates behave?

a short run model and a long run model that highlighted movements in the money supply. develop two more models, building on the long run approach from last chapter.“Long run” means that prices of goods and services, and of the factors of production that build those goods and services, adjust to supply and demand conditions so that their markets and the money market all reflect full employment. Because prices are allowed to change, they will influence interest rates and exchange rates in the long run models.

1 Section 1-2: Uncompensated and Compensated Elas- ticities; Static and Dynamic Labor Supply

In this section, we will briefly review the concepts of substitution (compensated) elasticity and uncom- pensated elasticity. Compensated and uncompensated labor elasticities play a key role in studies of optimal income taxation. In the second part of the section we will study the context of labor supply choices in a static and dynamic framework.

Uncompensated Elasticity and the Utility Maximization Problem

The utility maximization problem: We start by defining the concept of *Walrasian demand* in a standard *utility maximization problem (UMP)*. Suppose the agent chooses a bundle of consumption goods $x_1,\ldots, x_N$ with prices $p_1,\ldots, p_N$ and her endowment is denoted by w. The optimal consumption bundle solves the following:

$$\max_{x_1,\ldots,x_N} u(x_1,\ldots, x_N)$$

s.t.

$$\sum_{i=1}^{N} p_i x_i \leq w$$

We solve the problem using a Lagrangian approach and we get the following optimality condition (if an interior optimum exists) for every good i:

$$u_i(\mathbf{x}^*) - Z^* p_i = 0$$

Solving this equation for Z^* and doing the same for good **j** yields:

$$\frac{u_i(\mathbf{x}^*)}{u_j(\mathbf{x}^*)} = \frac{p_i}{p_j}$$

This is an important condition in economics and it equates the relative price of two goods to the *marginal rate of substitution (MRS)* between them. The MRS measures the amount of good **j** that the consumer must be given to compensate the utility loss from a one-unit marginal reduction in her consumption of good i. Graphically, the price ratio is the slope of the budget constraint, while the ratio of marginal utilities represents the slope of the indifference curve.[1]

We call the solution to the utility maximization problem *Walrasian* or *Marshallian demand* and we represent it as a function $\mathbf{x}(\mathbf{p}, w)$ of the price vector and the endowment. The Walrasian demand has the following two properties:

- *homogeneity of degree zero*: $x_i(\lambda\mathbf{p}, \lambda w) = x_i(\mathbf{p}, w)$
- *Walras Law* : for every $\mathbf{p}$ 0 and $w > 0$ we have $p \cdot \mathbf{x}(\mathbf{p}, w) = w$

[1]Notice that in a two goods economy by differentiating the indifference curve $u(x_1, x_2(x_1)) = k$ wrt x_1 you get:

$$\frac{dx_1}{} \quad u_2$$

which shows that the ratio of marginal utilities is the slope of the indifference curve at a point (x_1, x_2).

We define *uncompensated elasticity* as the percentage change in the consumption of good i when we raise the price p_k. Using the Walrasian demand we can write the uncompensated elasticity as:

$$\varepsilon_{i,p_k}^{u} = \frac{\frac{\partial x_i(\mathbf{p}, w)}{\partial p_k}}{\frac{p_k}{x_i(\mathbf{p}, w)}}$$

Elasticities can also be defined using logarithms such that:

$$\varepsilon_{i,p_k}^{u} = \frac{\partial \log x_i(\mathbf{p}, w)}{\partial \log p_k}$$

Indirect utility: We introduce the concept of indirect utility that will be useful throughout the class. It also helps interpreting the role of the Lagrange multiplier. The indirect utility is the utility
that the agent achieves when consuming the optimal bundle **x** (**p**, w). It can be obtained by plugging the Walrasian demand into the utility function:

$$v(\mathbf{p}, w) = u(\mathbf{x}(\mathbf{p}, w))$$

The indirect utility has the following properties:

- *homogeneity of degree zero*: since the Walrasian demand is homogeneous of degree zero, it follows that the indirect utility will inherit this property
- $@v(\mathbf{p}, w)/@w > 0$ and $@v(\mathbf{p}, w)/@p_k \quad 0$

Roy's Identity and the multiplier interpretation: Using the indirect utility function, the value of the problem can be written as follows at the optimum:

$$v(\mathbf{p}, w) = u(\mathbf{x}^{\leftarrow}(\mathbf{p}, w)) + Z^{\leftarrow}(w - \mathbf{p} \cdot \mathbf{x}^{\leftarrow}(\mathbf{p}, w))$$

Applying the Envelope theorem, we can study how the indirect utility responds to changes in the agent's wealth:

$$\frac{@v(\mathbf{p}, w)}{Z^{\leftarrow} @w} =$$

The value of the Lagrange multiplier at the optimum is the shadow value of the constraint. Specif- ically, it is the increase in the value of the objective function resulting from a slight relaxation of the constraint achieved by giving an extra dollar of endowment to the agent. This interpretation of the Lagrangian multiplier is particularly important in the study of optimal Ramsey taxes and transfers. You will see more about it in the second part of the PF sequence.

The Envelope theorem also implies that:

$$\frac{@v(\mathbf{p}, w)}{@p_i} = -Z^{\leftarrow} x_i(\mathbf{p}, w)$$

Using the two conditions together we have:

$$-\frac{@p_i}{@v(\mathbf{p}, w)/@w} = x_i(\mathbf{p}, w)$$

This equation is know as the *Roy's Identity* and it derives the Walrasian demand from the indirect utility function.

Substitution Elasticity and the Expenditure Minimization Problem

In this section we aim to isolate the substitution effect of a change in price. An increase in the price of good i typically generates two effects:

- *substitution effect*: the relative price of x_i increases, therefore the consumer substitutes away from this good towards other goods,
- *income effect*: the consumer's purchasing power has decreased, therefore she needs to reoptimize her entire bundle. This reduces even more the consumption of good i.

We define *substitution or compensated elasticity* as the percentage change in the demand for a good in response to a change in a price that ignores the income effect. In order to get at this new concept, we focus on a problem that is "dual" to the utility maximization problem: the *expenditure minimization problem (EMP)*. The consumer solves:

$$\min_{x_1,\ldots,x_N} \sum_{i=1}^{N} p_i x_i$$

s.t.

$$u(x_1, \ldots, x_N) \leq \bar{u}$$

The problem asks to solve for the consumption bundle that minimizes the amount spent to achieve utility level $\bar{u}$. The solution delivers two important functions: the *expenditure function* $e(\mathbf{p}, \bar{u})$, which measures the total expenditure needed to achieve utility $\bar{u}$ under the price vector $\mathbf{p}$, and the *Hicksian* (or *compensated*) *demand* $\mathbf{h}(\mathbf{p}, \bar{u})$, which is the demand vector that solves the minimization problem.

The Walrasian and Hicksian demands answer two different but related problems. The following two statements establish a relationship between the two concepts:

1. If $\mathbf{x}^*$ is optimal in the UMP when wealth is w, then $\mathbf{x}^*$ is optimal in the EMP when $\bar{u} = u(\mathbf{x}^*)$. Moreover, $e(\mathbf{p}, \bar{u}) = w$.
2. If $\mathbf{x}^*$ is optimal in the EMP when $\bar{u}$ is the required level of utility, then $\mathbf{x}^*$ is optimal in the UMP when $w = \mathbf{p} \cdot \mathbf{x}^*$. Moreover, $\bar{u} = u(\mathbf{x}^*)$.

The Hicksian demand allows us to isolate the pure substitution effect in response to a price change. We call it compensated since it is derived following the idea that, after a price change, the consumer will be given enough wealth (the "compensation") to maintain the same utility level she experienced before the price change. Suppose that under the price vector $\mathbf{p}$ the consumer demands a bundle $\mathbf{x}$ such that $\mathbf{p} \cdot \mathbf{x} = w$. When the price vector is $\mathbf{p}^0$, the consumer solves the new expenditure minimization problem and switches to $\mathbf{x}^0$ such that $u(\mathbf{x}) = u(\mathbf{x}^0)$ and $\mathbf{p}^0 \cdot \mathbf{x}^0 = w^0$. The change $\Delta w = w^0 - w$ is the compensation that the agent receives to be as well off in utility terms after the price change as she was before. Thanks to the compensation there is no income effect coming from the reduction in the agent's purchasing power.

We call the elasticity of the Hicksian demand function *compensated elasticity* and it reads:

$$\varepsilon^c_{i,p_k} = \frac{\partial h_i(\mathbf{p}, \bar{u})}{\partial p_k} \frac{p_k}{h_i(\mathbf{p}, \bar{u})}$$

Relating Walrasian and Hicksian Demand: The Slutsky Equation

We now establish a relationship between the Walrasian and the Hicksian demand elasticities. We know that $u(x_i(\mathbf{p}, w)) = \bar{u}$ and $e(\mathbf{p}, \bar{u}) = w$. Start from the following identity:

$$x_i(\mathbf{p}, e(\mathbf{p}, \bar{u})) = h_i(\mathbf{p}, \bar{u})$$

and differentiate both sides wrt p_k to get:

$$\frac{\partial h_i(\mathbf{p}, \bar{u})}{\partial p_k} = \frac{\partial x_i(\mathbf{p}, e(\mathbf{p}, \bar{u}))}{\partial p_k} + \frac{\partial x_i(\mathbf{p}, e(\mathbf{p}, \bar{u}))}{\partial e(\mathbf{p}, \bar{u})} \frac{\partial e(\mathbf{p}, \bar{u})}{\partial p_k}$$

$$\bar{w})_h \quad \frac{\partial x_i(\mathbf{p}, w)}{\partial p_k} + \frac{\partial x_i(\mathbf{p}, \bar{w})}{\partial w}_k (\mathbf{p}, \bar{u})$$

$$\bar{w})_x \quad \frac{\partial x_i(\mathbf{p}, w)}{\partial p_k} + \frac{\partial x_i(\mathbf{p}, \bar{w})}{\partial w}_k (\mathbf{p}, , e(\mathbf{p}, \bar{u}))$$

$$\bar{w})_x \quad \frac{\partial x_i(\mathbf{p}, w)}{\partial p_k} + \frac{\partial x_i(\mathbf{p}, \bar{w})}{\partial w}_k (\mathbf{p}, w)$$

Rearranging, we derive the following relation:

$$\underbrace{\frac{\partial x_i(\mathbf{p}, w)}{\partial p_k}}_{\text{uncompensated change}} \quad \bar{\bar{u}}) \quad \underbrace{\frac{\partial h_i(\mathbf{p}, \bar{\bar{u}})}{\partial p_k}}_{\text{substitution effect}} \quad \underbrace{\frac{\partial x_i(\mathbf{p}, w)}{\partial w} x_k}_{\text{income effect}} (\mathbf{p}, w)$$

we have thus decomposed the uncompensated change into income and substitution effect. Notice also how the income effect is the product of two terms: $\frac{@x_i(\mathbf{p},w)}{@w}$ is the response of the Walrasian
demand for good i to a change in wealth; $x_k(\mathbf{p}, w)$ is the *mechanical effect* of an increase in p_k on the agent's purchasing power: an agent whose demand for k was $x_k(\mathbf{p}, w)$ experiences a mechanical reduction of her purchasing power amounting to $x_k(\mathbf{p}, w)$ when p_k increases by 1. J. R.

Static Labor Supply Choice

In this paragraph we study a simple framework of labor supply choice and we derive uncompensated labor elasticities. Assume an agent derives utility from consumption, but disutility from labor. Her preferences are represented by the utility function u (c, n) where $@u/@c > 0$ and $@u/@n < 0$. The agent
has **I** amount of wealth and earns salary w. We normalize the price of consumption to 1.[2] The utility maximization problem now is:

$$\max_{c,n} u(c, n)$$

s.t.

$$c = wn + \mathbf{I}$$

Taking FOCs and rearranging we get the following:

$$-\frac{u_n}{u_c} = w$$

This condition is similar to the one we derived above. It equates the cost of leisure w to the marginal rate of substitution between labor and consumption. Dividing the marginal disutility of labor by the marginal utility of consumption we get the marginal utility cost of labor in consumption units. The condition therefore equates the marginal utility cost of labor to the salary.

We now want to study the labor supply response to a change in salary. Suppose that the wage increases. Since the consumer gets paid more for every hour she works, she will tend to work more (which implies that she will consume less leisure). This is the *substitution*

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effect. However, since the agent earns more for every hour of work, she gets paid more for the amount of hours she were already

Notice that we can normalize the price of consumption in a two goods economy and interpret salary w as the relative price of leisure over consumption.

working. Since the consumer is wealthier, if leisure is a normal good, she will tend to work less and consume more leisure. This is the *income effect*. Notice that, even if the cost of leisure has increased, the income and substitution effects do not go in the same direction unlike in standard consumer problems where an increase in the price of good i generates a negative income and substitution effect for good i. The reason is that this is an endowment economy where we think about leisure l as the difference between total time endowment T

and labor. We have $l = T - n$. In this setup the agent is a net seller of leisure and therefore the income effect is positive for leisure when the salary increases.

Now we get a little more formal and we study analytically the response of labor supply to changes in the wage rate. Totally differentiating the optimality condition wrt w we get:

$$\frac{\partial n}{\partial w} = -\frac{u_c + n(u_{nc} + wu_{cc})}{w^2 u_{cc} + 2wu_{nc} + u_{nn}}$$

Notice that the denominator of the expression is the second order condition of the problem and can therefore be signed. If we assume the problem is concave (in order to get an interior solution), the denominator is negative. This implies that:

$$\frac{\partial n}{\partial w} \gtrless 0 \Leftrightarrow u_c + n(u_{nc} + wu_{cc})$$

This expression captures the intuition provided above. The first term is the substitution effect, which is always positive and proportional to the marginal utility of consumption: the extent to which the consumer substitutes labor and consumption depends on how attractive consumption is. The second term measures the income effect. It depends on the cross-derivative of consumption and labor and the concavity of the utility function in consumption. The cross-derivative measures how changes in consumption affect the labor disutility. Faster decreasing marginal returns to consumption imply lower incentive to consume when the agent becomes wealthier (remember that $u_{cc} < 0$). The income effect is scaled by n, which is the mechanical effect on endowment of a one unit increase of w.

Example: We now study a functional form for preferences that is particularly convenient for the study of optimal tax problems. Suppose the agent has the following utility:

$$u(c, n) = c - \frac{n^{1+\frac{1}{\varepsilon}}}{1+\frac{1}{\varepsilon}}$$

This is a quasi-linear utility function whose property is to rule out income effects. We will come back to this point later.

The optimality condition reads:

$$n^{\frac{1}{\varepsilon}} = w$$

Taking logs we get:

$$\frac{1}{\varepsilon} \log n = \log w$$

Since $\varepsilon^u_{n,w} = \partial \log n / \partial \log w$ we can write:

$$\varepsilon^u_{n,w} = \partial \log n / \partial \log w = \varepsilon$$

Therefore, this utility function has a constant elasticity of labor supply. Also, given the absence of income effects, we know that $\varepsilon^{u}_{n,w} = \varepsilon^{c}_{n,w}$.

Compensated Labor Supply Elasticity: We can derive the compensated response of labor supply by using the Slutsky equation. We already know the uncompensated response to wage changes and we therefore need to find $@n/@\mathbf{I}$. Totally differentiating the FOC wrt $\mathbf{I}$ we get:

$$\frac{@n}{@\mathbf{I}} = -\frac{u_{nc} + wu_{cc}}{w^2 u_{cc} + 2wu_{nc} + u_{nn}}$$

The Slutsky equation is the following:

$$\frac{@n}{@w} = \frac{@n^c}{@w} + \frac{@n}{@\mathbf{I}} n$$

Notice that the sign of the income effect is flipped since w is the price of leisure, while we are studying the response of labor. We therefore conclude:

$$\frac{@n^c}{@w} = -\frac{u_c}{w^2 u_{cc} + 2wu_{nc} + u_{nn}}$$

By comparing the compensated and uncompensated response we clearly see why quasi-linear pref- erences imply no income effect: they are separable and linear in consumption. Therefore, $u_{nc} = 0$ and $u_{cc} = 0$.

Z-constant Elasticity: We introduce a concept that will be useful later in the analysis of intertem- poral elasticites. The first order conditions for the static labor supply model solved with a Lagrangian approach are:

$$u_c = Z$$
$$u_n = -Zw$$

Define the Z-constant or Frisch elasticity the elasticity that is computed assuming Z does not change. Totally differentiating we get:

$$\begin{bmatrix} u_{cc} & u_{cn} \\ u_{nc} & u_{nn} \end{bmatrix} \begin{bmatrix} @c^F/@w \\ @n^F/@w \end{bmatrix} = \begin{bmatrix} 0 \\ -Z \end{bmatrix}$$

By inverting the 2×2 matrix we can solve the system. The sultions are:

$$\begin{bmatrix} @c^F/@w \\ @n^F/@w \end{bmatrix} = \begin{bmatrix} u_c & u_c \\ c & n \\ u_{nc} & u_{nn} \end{bmatrix}^{-1} \begin{bmatrix} 0 \\ -Z \end{bmatrix} = \frac{1}{u_{cc} u_{nn} - u_{cn}^2} \begin{bmatrix} Zu_{cn} \\ \end{bmatrix}$$

$$
{}_{cn} \qquad -Z
$$

$$
\begin{matrix} u_{nn} & -u_{cn} \\ & 0 \\ u_{nc} & u_{cc} \\ & Z \end{matrix} \qquad [\;- \qquad [\;-
$$

$$
\# = \frac{u_{cc}u_{nn} - u^2_{cc}}{u_{cc}u_{nn} - u^2}
$$

A Comparison Among Elasticities: We now draw a comparison among the three elasticities presented so far. We already know that $\varepsilon^u_{l,w} \leq \varepsilon^c_{l,w}$ since the income effect is negative on labor supply.

We therefore need to compare compensated and Z-constant elasticity. We will prove that $\varepsilon^c_{l,w} \leq \varepsilon^F_{l,w}$.

Start by writing the following:

$$\varepsilon^{c}_{l,w} - \varepsilon^{F}_{l,w} = -\frac{w^2 u_{cc} + 2wu_{nc} + u_{nn}}{u_c} + \frac{u_{cc}u_{nn} - u_{cn}^2}{u_c u_{cc}}$$

$$= \frac{1}{u_c}\left(-w^2 u_{cc} - 2wu_{nc} - \frac{u_{cn}^2}{u_{cc}}\right)$$

The definition of Z-constant elasticity implies that $u_{nn} \leq \frac{u_{cn}^2}{u_{cc}}$. It follows that:

$$-w^2 u_{cc} - 2wu_{nc} - \frac{u_{cn}^2}{u_{cc}} \leq -w^2 u_{cc} - 2wu_{nc} - u_{nn}$$

$$= -SOC$$

$$\leq 0$$

Where the last inequality uses the fact that the second order condition must be negative. Hence, we established that $\varepsilon^{c}_{l,w} - \varepsilon^{F}_{l,w} \leq 0$, which implies $\varepsilon^{F}_{l,w} \leq \varepsilon^{c}_{l,w}$. Keeping the marginal utility of consumption constant implies that there are no income effects: higher wealth given the same amount of hours of work does not change preferences towards consumption. Thus, the Z-constant elasticity is at least as big as the compensated one.

We therefore conclude that the following is always true:

$$\varepsilon^{F}_{l,w} \leq \varepsilon^{c}_{l,w} \leq \varepsilon^{u}_{l,w}$$

Dynamic Labor Supply

In the previous paragraph we studied the static labor supply choice. Now we will switch to a dynamic setting that allows us to study labor supply responses to over time changes in salaries. Agents make labor supply decisions in view of their lifetime. Current labor supply depends on current and future wages and income. Compared to static labor supply models, the substitution effect is similar, but the income effect differs since the agent faces a lifetime budget constraint. MaCurdy (1981) provides a useful framework to study labor supply elasticities over the lifecycle. In order to achieve our goal, we need to separate exogenous static changes (such as the ones studied above) from evolutionary changes, due to shifts in the life-cycle wage profile. In this analysis we need to distinguish between expected and unexpected wage changes. While expected changes do not lead to wealth effects, permanent unexpected changes generate strong wealth effects.

We distinguish among three dimensions of labor supply:

1. the pure *lifecycle dimension*. Usually, wages have a hump-shaped pattern over the lifecycle. Agents adjust the hours of work in response to the different salaries they observe along their lifetime.
2. the *macro dimension*. Hours of work vary over the business cycle following unexpected shocks.
3. the *idiosyncratic dimension*. A person may have temporarily higher wages in some period.

In order to isolate the labor supply response to expected changes in wage we need to rule out wealth effects. We will employ the concept of Frisch elasticity, which allows us to keep the marginal utility of consumption constant.

We study intertemporal labor supply in the same framework as before, but we introduce the time dimension. Preferences are now:

$$\sum_{s=t}^{T} \beta^{s} u(c_s, n_s)$$

The consumer faces the following period-by-period budget constraint:

$$A_{t+1} = (1 + r_t)(A_t + y_t + w_t n_t - c_t)$$

The Bellman equation for the problem is:

$$V(A_t) = \max_{c_t, n_t} u(c_t, n_t) + \beta V((1 + r_t)(A_t + y_t + w_t n_t - c_t))$$

The FOCs for the problem read:

$$\begin{aligned} Z_t &= \beta(1 + r_t) V'_{t+1}(A_{t+1}) \\ u_n(c_t, n_t) &= w Z_t \end{aligned}$$

By envelope $Z_t = V'(A_t)$. Therefore, the conditions become:

$$\begin{aligned} Z_t &= \beta(1 + r_t) V'_{t+1}(Z_{t+1}) \\ u_n(c_t, n_t) &= Z_t w_t \end{aligned}$$

Since $Z_t = u_c(c_t, n_t)$ the static labor supply choice is the same as in the previous paragraph:

$$-\frac{u_n(c_t, n_t)}{u_c(c_t, n_t)} = w_t$$

Rearranging the budget constraint we have:

$$c_t = w_t n_t + y_t + \left[\frac{A_{t+1}}{1+r_t} - A_t\right]$$

Notice that the problem is identical to the previous one where income $I_t = y_t + \left[\frac{A_{t+1}}{1+r_t} - A_t\right]$. In order to assess the Frisch elasticity, we need to compute the labor responses to changes in w when we keep the Z constant avoiding any wealth effect. The Frisch demands are defined as follows:

$$\begin{aligned} c_t &= c_t^F(w_t, Z_t) \\ n_t &= n^F{}_t(w_t, Z_t) \end{aligned}$$

Since the model is identical to the static labor supply choice and we already derived the Frisch elasticity for the latter, we can write:

$$\varepsilon^F = \frac{\partial n_t^F}{\partial w_t} \frac{w_t}{n_t} = \frac{-Zu_{cc}(c_t, n_t)}{u_{cc}(c_t, n_t)\, u_{nn}(c_t, n_t) - [u_{cn}]^2 (c_t, n_t)}$$

2 Section 2: Introduction to Optimal Income Taxation

In this section we will introduce the problem of optimal income taxation. We will set up the government problem and derive optimal taxes. We will study optimal linear tax rate, optimal top tax rate and the revenue maximizing tax rate.

The Income Taxation Problem

Our goal for most of this class is to derive the properties of optimal taxes in different context. We will define the tax in a flexible way using the mathematical object $T(z)$, where z is the income reported by the agent. The tax $T(z)$ generates the *retention function* $R(z) = z - T(z)$. $R(z)$ measures how much the agent can retain out of total income z. We denote transfers to income z with $T(z)$ so that the transfer $T(0)$ to non-working individuals is the intercept of the retention function.

If $T(z)$ is differentiable, $T'(z)$ represents the *marginal tax rate*. It measures how much the agent gets taxed out of one additional dollar of income.

In order to study the extensive margin decision between working and remaining unemployed, we need to know the *participation tax rate* $\tau_p = \frac{T(z) - T(0)}{z}$. It is the fraction of income that an agent pays in taxes when she moves from 0 income to z.

Taxation in a Model With No Behavioral Responses

We start with a simple version of an optimal income taxation problem that ignores the labor supply response to taxation. Suppose the agent has utility $u(c)$ such that $u'(c) \geq 0$ and $u''(c) \leq 0$. Labor does not enter the utility function and it is supplied inelastically. The agent consumes everything that is left after taxes so that $c = z - T(z)$. The economy is populated by several agents and their income is distributed according to $h(z)$ with support $[0, \infty]$.

We study the problem of a government, whose goal is to maximize the total utility of the economy. Every agent in the economy is equally weighted such that:

$$\int_0^{\infty} u(z - T(z))\, h(z)\, dz$$

We call this type of social welfare function *utilitarian*. The government targets a level of revenues E and its budget constraint is:

$$\int_0^{\infty} T(z)\, h(z)\, dz \geq E$$

The Lagrangian for the problem reads:

$$L = [u(z - T(z)) + ZT(z)]\, h(z)$$

Where Z is constant across individuals and measures the value of government revenues in equilib- rium. The optimal choice of T (z) delivers the following first order condition:

$$\frac{@L}{@T(z)} = [-u'(z\ T(z)) + Z]\, h(z) = 0$$

$$u'(z - T(z)) = Z$$

Notice that since Z is constant and all agents have the same preferences, the equilibrium condition implies that consumption is equalized across all individuals. This is a direct consequence of the utilitarian social welfare function and the concavity of the utility. Suppose that we taxed a rich individual who would otherwise have a high level of consumption to redistribute to a poor who would otherwise have low consumption. The marginal utility gain of the poor would be higher that the marginal utility loss of the rich if the utility has decreasing marginal returns (implied by the concavity of the utility function). This implies that until all consumption levels are equalized across the economy the government can increase social welfare through "redistribution" from rich to poor individuals. Since every agent has the same weight in the government social welfare function, the optimal policy will treat all individuals equally. There is no gain for the government from guaranteeing a higher level of consumption to a particular group of individuals.

Taxes will serve the purpose of collecting the revenues needed to meet the requirement E. Each individual consumes $c = \bar{z} - E$, where $\int_0^1 zh(z)\,dz$ is the average income. Therefore, we have a $\bar{z} = 100\%$ marginal tax rate above $\tilde{z} = \bar{z} - E$.

Towards the Mirrlees Optimal Income Tax Model

The main limitation of the model presented in the previous paragraph is the absence of behavioral responses. Agents were not allowed to respond to fiscal incentives and adjust the labor supply according to the tax schedule. We showed that an extreme case of 100% marginal tax rate can be optimal without causing a loss of revenues due to lower labor supply. We now relax the assumption of inelastic labor supply and study a more flexible model.

Suppose the agent has preferences over consumption and labor represented by the utility function u (c, l). Each agent earns income wl when supplying l hours of labor and consumes c = wl T (wl) after taxes. Individuals are heterogeneous in the salary w that we will interpret as a measure of ability. Salaries are distributed according to f (w).

Changes in taxes have labor supply effects that depends on the characteristics of the change. A lump-sum change in the level of taxes at a given income changes labor supply through an income effect. On the other hand, a shift in the marginal tax rate causes a distortion in the labor supply through a substitution effect.

Social Welfare Functions: The general problem in Mirrlees (1971) assumes that individual welfare is aggregated through a social welfare function G( ). We typically assume that G( ) is concave in order to represent redistributive preferences of the government. We define the following a social marginal welfare weight:

$$g_i = \frac{\partial G}{\partial u_i} \frac{\partial u_i}{\partial z_i}$$

It measures the government marginal utility from giving a dollar to individual i. The expression is scaled by the marginal value of revenues to the government (Z), that converts the marginal utility in money metric. The concavity of the utility implies that g_i is decreasing in z_i. The social welfare effect of giving \$1 to all the individuals in the economy is therefore $\sum_i g_i$.

Optimal Linear Tax Rate

In this paragraph we study the optimal income tax when we restrict the instruments that the govern- ment can use to tax income. We focus on *linear taxes* τ . The revenues of the tax are rebated through lump-sum transfers. The individual therefore consumes:

$$c_i = (1 - \tau) w_i l_i + \tau Z$$

where Z represents the total income level in equilibrium and therefore τZ is the total tax revenue from the tax.

The government sets the linear tax to maximize the following:

$$\max_{\tau} \sum_i G[u_i((1-\tau) w_i l_i + \tau Z, l_i)]$$

Notice that we do not have any government budget constraint since the entire revenue is rebated. Applying the Envelope theorem we get:

$$\hat{G}_i^0(u_i)u_i^0\left[-w_i l_i + Z - \tau\frac{dZ}{d(1-\tau)}\right] = 0$$
$$G_i^0(u_i)u_i^0\left[-z_i + Z - \frac{\tau}{(1-\tau)}Z''_{z,1-\tau}\right] = 0$$

Where the second line exploits the definition of uncompensated elasticity. Unlike z_i, we implicitly differentiate Z since the individual does not maximize over Z, but takes the transfer as given. In other words the agent does not internalize the effect of her labor supply choice on aggregate revenues and transfers. This is why the Envelope theorem does not apply to Z.

The two terms in the expression above are central in the optimal taxation literature:

- $Z - z_i$ is the mechanical effect of the tax. Suppose we keep labor supply unchanged, an increase in τ generates a drop in income of z_i and a mechanical increase in transfers of Z due to higher revenues.
- $(1-\tau)Z''_{z,1-\tau}$ is the behavioral effect of the tax. If we allow individuals to adjust their labor supplies we have to take into account the fiscal externality on revenues: when people work less the government collects lower revenues.

We could expect to see in the formula the utility consequence of a change in labor supply. However, any welfare effect related to the behavioral response of the individual is excluded. The reason is that although the agent changes the labor supply, if the tax change is small enough we can neglect the utility effect invoking the envelope theorem. Remember that the logic of the envelope theorem is that after we shift a parameter (the tax in this case) the agent is moving to a new bundle on the same indifference curve.

Rearranging the optimality condition we find:

$$Z\sum_i \hat{g}_i - \sum_i \hat{g}_i z_i = \frac{\tau}{(1-\tau)}Z''_{z,1-\tau}\sum_i \hat{g}_i$$
$$1 - \frac{\sum_i \hat{g}_i z_i}{Z\sum_i \hat{g}_i} = \frac{\tau}{(1-\tau)}\varepsilon_{z,1-\tau}$$

We define $\bar{g}_i = \frac{\hat{g}_i}{z_i}$ and rewrite the condition above to get the optimal tax rate:

$$\overline{Z_i g_i}$$

$$\tau^{*} = \frac{1 - \bar{g}}{1 - \bar{g} + \varepsilon_{z,1-\tau}}$$

The optimal tax is decreasing in $\varepsilon_{z,1-\tau}$ and $\bar{g}$. When income is very elastic to taxes, the government will tax less to avoid negative effects on revenues and transfers coming from distortions to the labor supply. This is the efficiency part of the formula. On the other hand, $\bar{g}$ is a measure of inequality in the economy. It is low when income is extremely polarized. Therefore, the government increases taxes
at the optimum when inequality is high. This is the equity part of the formula.

Optimal Top Income Taxation

We now derive taxes as in Saez (2001). Instead of specifying a model, we consider the different effects of a tax change and derive the tax by imposing that their sum is zero in equilibrium. Suppose the government wants to optimally set a constant marginal tax rate τ above an income threshold z^{*}.
The average income above z^{*} is denoted by $z(1-\tau)$ and it depends on the tax rate in place. The uncompensated elasticity of z for top earners is constant and denoted by $\varepsilon_{z,1-\tau}$.

When tax τ is raised we have no effects on individuals with income below z^{*}, while all income above z^{*} are affected by the change. We will study three different effects of the tax.

Mechanical Effect Suppose labor supply was inelastic, when τ increases we would see a mechanical increase in revenues of the following form:

$$dM = d\tau\,(z - z^{*})$$

The mechanical effect is proportional to the difference between the average income above z^{*} and z^{*}. It measures the mechanical increase in revenues that is generated by the tax change.

Behavioral Effect Top earners react to the tax increase by adjusting their labor supply. The behavioral response triggers a fiscal externality and a reduction in revenues. The behavioral effect is:

$$\begin{aligned} dB &= \tau dz = -\tau \frac{dz}{d(1-\tau)} d\tau \\ &= -\frac{\tau}{1-\tau} \frac{1-\tau}{z} \frac{dz}{d(1-\tau)} d\tau \\ &= -\frac{\tau}{1-\tau} \varepsilon_{z,1-\tau} z\, d\tau \end{aligned}$$

It is proportional to the elasticity of labor supply since the more elastic is labor the higher is the revenue loss.

Welfare Effect Denote with $\bar{g}$ the (assumed) constant social marginal welfare weight for earners above z^{*}. The tax change mechanically raises revenues on top income individuals generating the following welfare effect:

$$dW = d\tau\,\bar{g}\,(z - z^{*})$$

We also showed that the tax increase triggers a behavioral response. The reason it is not

included in the welfare effect is that if the tax change is small people reoptimize at the margin and their utility level is unaffected. Again, this is an Envelope theorem argument.

Optimal Tax In equilibrium the three effects must sum to zero. If they did not the government would have margin to adjust the tax rate and achieve a higher social welfare. We therefore have:

$$dM + dB + dW = d\tau \left[(1 - \bar{g})[z - z^{*}] \right]$$

Rearranging:

$$\tau^{*} = \frac{1 - \bar{g}}{1 - g}$$

with $a = \frac{z^*}{z^* - z}\alpha$ measuring the thinness of the right tail in the income distribution. The optimal tax is decreasing in the social marginal welfare weight of top earners $\bar{g}$: the more the government cares

op income individuals, the less they will be taxed. As we could expect, the optimal tax is also decreasing in the elasticity of labor supply. Higher elasticity implies larger efficiency costs. Finally, τ^* decreases in a. The shape of the income distribution matters: the government sets lower top income taxes when earners above z^* are mostly concentrated around z^*. If instead there is a thicker tail, the top income tax is higher.

3 Section 3-4: Mirrlees Taxation

In this section we will solve the Mirrlees tax problem. We will and derive optimal taxes introducing the concept of wedges and study the model with and without income effects.

The Model Setup

Suppose the agent has preferences over consumption and labor represented by the utility function $u(c, l)$ that we assume separable and quasi-linear such that $u(c, l) = c - v(l)$. We assume that $v'(l) \geq 0$ and $v''(l) > 0$. Each agent earns income $z = nl$ when supplying l hours of labor and consumes $c = nl - T(nl)$ after taxes. Individuals are heterogeneous in the salary n that represents their type and we will interpret as a measure of ability. Salaries are distributed according to $f(n)$, with $n \in [\underline{n}, \bar{n}]$. Individual welfare is aggregated through a social welfare function $G(\cdot)$, that we assume differentiable and concave.

Revelation Principle Throughout all of the tax problems that we study we will assume that the government cannot observe the labor choice of the agent and her type. Income is the only observed choice that the government can target. We solve the model using a revelation mechanism. Our goal is to define an optimal tax schedule that delivers an allocation $z(n)$, $c(n)$ to each agent n. The *Revelation Principle* claims that if an allocation can be implemented through some mechanism, then it can also be implemented through a direct truthful mechanism where the agent reveals her information about n.

We imagine that each agent reports to the government her type n' and that allocations are a function of n' such that we can write $c(n')$, $l(n')$, $z(n')$ and $u(n')$. By revelation principle, the government cannot do better than defining functions $c(n)$, $z(n)$ such that the agent finds optimal to reveal her true productivity:

$$c(n) - v\left(\frac{z(n)}{n}\right) \geq c(n') - v\left(\frac{z(n')}{n}\right)$$

for every n and n' where n is the true type of the agent. Notice that since n is continuous we have an infinity of constraints. In order to reduce the dimensionality of the problem, we assume that the marginal rate of substitution between consumption and before-tax income is decreasing in n:

$$-MRS_{cz} = \frac{v'(z(n)/n)}{nu'(c(n))} \text{ decreases in } n$$

This is the so called *single-crossing condition* (or *Spence-Mirrlees condition*). Single-crossing and incentive compatibility imply the monotonicity of allocations (i.e. $c(n)$, $z(n)$ are increasing in n). If monotonicity and single-crossing are satisfied, we can replace the

incentive constraint with the first-
order necessary conditions of the agent that provide a local incentive condition. Under monotonicity and single-crossing the local conditions are also sufficient. While solving these problems we will only impose local incentive constraints and ignore the monotonicity of allocations, which is then verified ex-post.

Incentive Compatibility We reduce the dimensionality of the problem by taking a *first order approach* that replaces the infinity of constraints for each individual with a local condition relying on the optimal revelation choice. When reporting, the individual of type n solves the

following problem: $\max_{n} c(n) - v\left(\frac{z(n)}{n}\right)$

the first order necessary condition for this problem is:

$$c'(n') - \frac{z'(n')}{n} v'\left(\frac{z(n')}{n}\right) = 0$$

If the government wants the agent to reveal her true type, it must be:

$$c'(n) = \frac{z'(n)}{n} v'\left(\frac{z(n)}{n}\right)$$

Under the concavity assumption on the preferences, this is a global incentive constraint condition. Suppose we study local utility changes by totally differentiating the utility wrt n, we get:

$$\frac{du(n)}{d} = c'(n) - \frac{z'(n)}{n} v'\left(\frac{z(n)}{n}\right) + \frac{z(n)}{n^2} v'\left(\frac{z(n)}{n}\right)$$

Notice that the term in the first bracket is the first order condition of the agent. We can thus write $du(n)/dn = z(n)/n^2 \; v'(z(n)/n)$. This equation pins down the slope of the utility assigned to the agent at the optimum. By convexity of $v(\,)$, the slope is always positive: the government assigns higher utility to higher types at the optimum. Higher types have a lower marginal disutility of labor

for a given level of hours worked and they get *informational rents* in the equilibrium.

Labor Supply and Labor Wedge The individual solves the following optimization problem:

$$\max_{z} z - T(z) - v\left(\frac{z}{n}\right)$$

The first order condition is:

$$T'(z) = 1 - \frac{v'(l)}{n}$$

The second term on the right-hand-side of the equation is the marginal rate of substitution between consumption and income and we can always write that $T'(n) = 1 - MRS(n)$. When the agent is not distorted, the MRS is equal to 1 implying $T'(z) = 0$. We can interpret $T'(z)$ as a *wedge* on the optimal labor supply: whenever it is different from zero, labor supply is distorted. Wedges are a

central concept in the optimal taxation literature and we will encounter them throughout the class.

From the optimality condition, we can derive the elasticity of labor wrt the net of tax wage. Rewrite the optimality condition as:

$$v'\left(\frac{z}{n}\right) = (1 - T'(z))\, n$$

Totally differentiating wrt $(1 - T'(z))\, n$, we have:

$$\frac{dl}{d(1-T^{0}(z))n} \quad v^{00}(1) = 1$$

Which implies the following elasticity:

$$" = \frac{dl}{(1-T^{0}(z))n} \frac{(1-T^{0}(z))n}{} = \frac{v^{0}(z)}{}$$

$\int z(n) f(n)\,dn \le E$ This is the resource constraint for this economy. Notice that unlike incentive constraint, this constraint is unique.

Optimal Income Tax

We now solve the constrained maximization problem using optimal control theory. Instead of having taxes as a choice variable, we assume that the government chooses an allocation for each agent. Given the individual's budget constraint, this is equivalent to choosing a tax level. The government problem is:

$$\max_{c(n),u(n),z(n)} \int_{\underline{n}}^{\hat{n}} G(u(n)) f(n)$$

s.t.

$$\frac{du(n)}{d} = \frac{z(n)}{n^2} \vee 0 \quad \checkmark \quad \frac{z(n)}{n} \quad \blacklozenge$$

We solve the problem with a Hamiltonian where we interpret n as the continuous variable and choose u (n) as state variable and z (n) as control. The incentive constraint becomes the law of motion of the state variable: it measures how utility changes across types in equilibrium. In order to setup
the Hamiltonian, we need to replace consumption in the resource constraint with a function of state and control variables. Using the definition of indirect utility, we can write c (n)= u (n)+ v (z (n) /n). We replace this condition into the resource constraint and setup the following Hamiltonian:

$$H = G\left[u(n)) + Z\left(z(n) - u(n) - v\left(\frac{z(n)}{n}\right)\right)\right]f(n) + \mu(n)\frac{z(n)}{n^2}v'\left(\frac{z(n)}{n}\right)$$

μ (n) denotes the multiplier on the incentive constraint of type n and Z is the multiplier on the resource constraint.

The first order conditions of the optimal control problem are:

$$\frac{\partial H}{\partial z} = Z\left[1 - \frac{v'(l(n))}{n}\right]f(n) + \frac{\mu(n)}{n^2}\left[v'\left(\frac{z(n)}{n}\right) + \frac{z(n)}{n}v''\left(\frac{z(n)}{n}\right)\right] = 0 \quad (1)$$

$$\frac{\partial H}{\partial u(n)} = [G'(u(n)) - Z]f(n) = \mu'(n) \quad (2)$$

The transversality (boundary) conditions read:

$$\mu(\underline{n}) = \mu(\bar{n}) = 0$$

The Hamiltonian solution requires $\mu(\bar{n})\, u(\bar{n}) = 0$. However, if we want to provide positive utility to type $\bar{n}$ we must require $\mu(\bar{n}) = 0$. At the same time, since at the optimum the incentive constraints will be binding downwards, we require $\mu(\underline{n}) = 0$. As it is standard in this kind of problems the lowest type does not want to imitate any other agent in equilibrium implying that her incentive constraint
is slack, while everyone else is indifferent between her allocation and the allocation provided to the immediately lower type.

If we integrate equation (2) over the entire type space and use transversality conditions we find:

$$Z = \int_{\underline{n}}^{\bar{n}} G'(u(n))f(n)\,dn$$

This is an expression for the marginal value of public funds to the government. It states that the value of public funds depends on the marginal social welfare gains across the entire type space and it is equal to the welfare effect of transferring $1 to every individual in the economy. In other words, public funds are more valuable the higher are the social welfare gains achievable in the economy.

We can also integrate equation (2) to find the value of μ (n):

$$-\mu(n) = \int_{n}^{\bar{n}} [Z - G'(u(m))]f(m)\,dm \quad (3)$$

Using the definition of labor elasticity, we rearrange the following:

$$v'\left(\frac{z(n)}{n}\right) + \frac{z(n)}{n}v''\left(\frac{z(n)}{n}\right) = v'\left(\frac{z(n)}{n}\right)\left[1 + \frac{1}{\varepsilon}\right]$$

Exploiting the definition of the tax wedge, we simplify equation (1) to get:

$$ZT^{0}(z(n)) = \frac{\mu(n)}{f(n)}(1 - T^{0}(z(n)))\left(1+\frac{1}{\varepsilon}\right)$$

Using the expression for μ derived in equation (3) we get:

$$\frac{T^{0}(z(n))}{1 - T^{0}(z(n))} = \left(1+\frac{1}{\varepsilon}\right)\frac{\int_{n}^{\bar{n}}[1 - g(m)]f(m)\,dm}{nf(n)} \qquad (4)$$

The optimal tax is decreasing in the elasticity of labor supply. We define $g(n) = \frac{G^{0}(u(n))}{Z}$ the relative social welfare weight of individual n such that $\int_{\underline{n}}^{n} g(n)f(n)\,dn = 1$. Remember that Z aggregates the social welfare weights across the entire economy. Thus, a higher $g(n)$ means that the government cares relatively more about individual n and will tax her less.

A Rawlsian government would have $g(n) = 0$ for any $n > \underline{n}$ and the formula would reduce to:

$$\frac{T^{0}(z(n))}{1 - T^{0}(z(n))} = \left(1+\frac{1}{\varepsilon}\right)\frac{1 - F(n)}{nf(n)}$$

The second part of the expression captures the ratio of the mass above type n and the density at n. It is a measure of thickness and the lower it is the higher marginal tax rate will be.

Diamond ABC Formula

In this paragraph we derive a tax formula presented in Diamond (1998). We change our assumption about welfare weights and assume that they are distributed according to a function (n) with cdf (n). The government objective function becomes:

$$\int_{\underline{n}}^{\bar{n}} u(n)\ \ (n)dn$$

By assumption $\int_{\underline{n}}^{\bar{n}} (n)\,dn = 1$ implies $Z = 1$. First order conditions can be derived exactly as before. We therefore have:

$$-\mu^{0}(n) = \ \ (n) - Zf(n)$$

and after integration:

$$-\mu(n) = \int_{n}^{\bar{n}} (f(n) - (n))\,dn$$
$$= \ \ (n) - F(n)$$

Using the expression above the tax formula reads:

$$\frac{T'(z(n))}{1-T'(z(n))} = \left(1+\frac{1}{\varepsilon}\right)\frac{(n)-F(n)}{nf(n)}$$

To write the ABC formula we divide and multiply by 1 — F (n) to get:

$$\frac{T'(z(n))}{1-T'(z(n))} = \underbrace{\left(1+\frac{1}{\varepsilon}\right)\frac{(n)-F(n)}{1-F(n)}}_{A(n)} \underbrace{\frac{1-F(n)}{nf(n)}}_{B(n)} \underbrace{\frac{z}{z}}_{C(n)}$$

A (n) captures the standard elasticity and efficiency argument. B (n) measures the desire for redistribution: if the sum of weights below n is high relative to the mass above n, the government will tax more. Finally, C (n) measures the thickness of the right tail of the distribution. A thicker tail will be associated to higher tax rates.

Notice that in the Rawlsian case (n)= 1 for every n > n and the formula converges to the one presented in the previous paragraph.

Optimal Taxes With Income Effects

We now relax the assumption of no income effects. Suppose the utility of the agent takes the form $\tilde{u}(c,l) = u(c) - v(l)$ where $u'(c) > 0$ and $u''(c) \leq 0$.

Elasticity of Labor Supply The optimality condition for the labor supply choice becomes:

$$\frac{v'(l)}{u'(c)} = (1-T'(z))n$$

The uncompensated response of labor supply to the net of tax wage is:

$$\frac{\partial l^u}{\partial (1-T'(z))n} = \frac{u'(c)+l(1-T'(z))nu''(c)}{v''(l)-(1-T'(z))^2 n^2 u''(c)}$$

implying the following uncompensated elasticity:

$$\varepsilon^u = \frac{u'(c)/l + \frac{v'(l)}{u'(c)^2}u''(c)}{v''(l) - \frac{v'(l)^2}{u'(c)^2}u''(c)}$$

The response of labor to income changes is given by:

$$\frac{\partial l}{\partial I} = \frac{(1-T'(z))nu''(c)}{v''(l)-(1-T'(z))^2 n^2 u''(c)}$$

Using the Slutsky equation (as we did in Section notes 1):

$$\frac{\partial l^c}{\partial} \quad \frac{u'(c)+l(1-T'(z))nu''(c)}{} \quad \frac{l(1-T'(z))nu''(c)}{}$$

$$\frac{}{@\,(1 - T^{0}(z))} = n$$

$$=$$

$$"c = \frac{v^{0}(l)/l}{v^{00}(l) - (1 - T^{0}(z))^{2} n^{2} u^{00}(c)}$$

Optimal Tax Everything is similar to the previous case except for the fact that now we cannot replace the variable c (n) in the resource constraint using the definition of indirect utility. We will define consumption as an expenditure function $\tilde{c}(\tilde{u}(n), z(n), n)$ and implicitly differentiate it wrt to $\tilde{u}(n)$ and z (n). Start from the definition of indirect utility:

$$\tilde{u}(n) = u(\tilde{c}(n)) - v(z^{*}(n)/n)$$

It follows that the following two conditions will hold at the optimum:

$$d\tilde{u}(n) = u^{0}(\tilde{c}(n))\, d\tilde{c}(n)$$

$$0 = u^{0}(\tilde{c}(n))\, d\tilde{c}(n) - \frac{1}{n} v^{0}(z^{*}(n)/n)\, dz^{*}(n)$$

Rearranging :

$$\frac{d\tilde{c}(n)}{d\tilde{u}(n)} = \frac{1}{u^{0}(\tilde{c}(n))}$$

$$\frac{d\tilde{c}(n)}{dz^{*}(n)} = \frac{v^{0}(z^{*}(n)/n)}{n u^{0}(\tilde{c}(n))}$$

The Hamiltonian for the problem is:

$$H = [G(u(n)) + Z(z(n) - \tilde{c}(\tilde{u}(n), z(n), n))]\, f(n) + \mu(n) \frac{z(n)}{n^{2}} v^{0}\left(\frac{z(n)}{n}\right)$$

and FOCs are:

$$\frac{@H}{@z} = Z\left[1 - \frac{v^{0}(z(n)/n)}{n u^{0}(c}\right] f(n) + \frac{\mu(n)}{n^{2}}\left[v^{0}\left(\frac{z(n)}{n}\right) + \frac{z(n)}{n} v^{00}\left(\frac{z(n)}{n}\right)\right] = 0$$

$$\frac{@H}{@u} = \left[G^{0}(u(n)) - \frac{Z}{u^{0}(c^{*}(n))}\right] f(n) = -\mu^{0}(n)$$

In order to find the equilibrium value of the multiplier, we can integrate the second FOC:

$$\mu(n) = \int_{n}^{\bar{n}} \left[G^{0}(u(m)) - \frac{Z}{u^{0}(c(m))}\right] f(m)\, dm$$

We exploit the definition of the two elasticities to write:

The optimal tax formula will then become:

$$\frac{T'(z(n))}{nf(n)} \quad 1+ \quad \frac{\Theta(n)}{} \qquad (5)$$

where $\Theta(n) = \frac{}{u'(c(n))\mu(n)} \frac{z}{(z(n))}$.

Pareto Efficient Taxes

We now ask the question of whether a tax system $T_0(z)$ in place is Pareto-optimal, meaning that there exists no feasible adjustment in the tax schedule such that all individuals in the economy are weakly better off.

We can characterize the Pareto frontier of the previous problem by solving the following:

$$\max \int_{\underline{n}}^{\hat{n}} u(n)\,\phi(n)\,dn$$

s.t.

$$u(c(n)) - h(z(n)/n) \leq u(c(n^0)) - h(z(n^0)/n) \quad \forall n, n^0$$

$$\int_{\underline{n}}^{\hat{n}} [z(n) - c(n)]\, f(n)\, dn \leq E$$

By varying the social marginal welfare weights, we can trace out every point on the Pareto frontier. However, there might be points on the Pareto frontier that can be improved upon increasing the utility of all the agents in the economy.

Werning (2007) develops a test for the Pareto optimality of a tax schedule. The first important result of the paper is the following:

Proposition 1: A tax code fails to be constrained Pareto optimal *if and only if* there exists a feasible tax reform that (weakly) reduces taxes at all incomes.[3]

Proof: *(if)* suppose we weakly reduce taxes all over the entire economy, then every individual is at least as well off.

(only if) suppose there exists a Pareto improving feasible tax reform $T_1(z)$. Then we have:

$$\begin{aligned} U(z_1(n) - T_1(z_1(n)), z_1(n), n) &\leq U(z_o(n) - T_0(z_0(n)), z_0(n), n) \\ &\leq U(z_1(n) - T_0(z_1(n)), z_1(n), n) \end{aligned}$$

where the first inequality comes from the assumption of Pareto-improvement and the second from the assumption that under $T_0(z)$ the agent truthfully reveals her type and chooses $z_0(n)$. The chain of inequalities implies that $T_1(z_1(n)) \leq T_0(z_1(n))$ for every n.

Proposition 1 implies that since the resource constraint is satisfied and both tax systems raise revenues at least equal to E, a Pareto improvement can only occur through a tax reduction that does not generate a drop in revenues. This can be interpreted as a Laffer effect: although the government lowers taxes, the behavioral response (increase in labor supply) is strong enough to more than compensate the revenue loss.

A Test of the Pareto Optimality of the Tax Schedule

In order to implement the test, Werning takes a dual approach to the optimal taxation problem that we studied in the previous paragraphs. We rewrite the problem such that instead of maximizing the social welfare function, the government maximizes the resources to provide a minimum level $\bar{v}(n)$ of indirect utility to every agent in the economy. We write the problem as follows:

$$\int_{\underline{n}}^{\hat{n}}$$

$$\max_{u(n),z(n)}$$

[3]Feasible means that it satisfies the resource constraint.

s.t.

$$\frac{dv}{dn}(n) = U_n(\tilde{c}(v(n),z(n),n),z(n),n) \quad (6)$$

$$v(n) \leq \bar{v}(n) \ \forall n \quad (7)$$

Notice that $\tilde{c}(v(n),z(n),n)$ is the expenditure function that we introduced to study optimal taxes with income effects. The problem would also have a monotonicity constraint that we relax for the moment, as we usually do. Notice that by changing the levels of $\bar{v}(n)$ we can characterize the entire Pareto frontier.[4]

We solve the problem with a Lagrangian by attaching multiplier $\psi(n)f(n)$ to (7) and $\mu(n)$ to the local incentive constraint:

$$L = \int_{\underline{n}}^{\bar{n}} (z(n) - \tilde{c}(v(n),z(n),n))f(n)dn + \int_{\underline{n}}^{\bar{n}} \psi(n)v(n)f(n)dn + \int_{\underline{n}}^{\bar{n}} \mu(n)v'(n)dn - \int_{\underline{n}}^{\bar{n}} \mu(n)U_n(\tilde{c}(v(n),z(n),n),z(n),n)dn$$

Notice that this is identical to the Lagrangian that we would obtain in a classical optimal tax problem with welfare weights $\psi(n)f(n)$.[5] We integrate $\int_{\underline{n}}^{\bar{n}} \mu(n)v'(n)dn$ by parts to obtain:

$$\int_{\underline{n}}^{\bar{n}} \mu(n)v'(n)dn = \mu(\bar{n})v(\bar{n}) - \mu(\underline{n})v(\underline{n}) - \int_{\underline{n}}^{\bar{n}} \mu'(n)v(n)dn$$

and rewrite the Lagrangian as follows:

$$L = \int_{\underline{n}}^{\bar{n}} (z(n) - \tilde{c}(v(n),z(n),n))f(n)dn + \int_{\underline{n}}^{\bar{n}} \psi(n)v(n)f(n)dn + \mu(\bar{n})v(\bar{n}) - \mu(\underline{n})v(\underline{n}) - \int_{\underline{n}}^{\bar{n}} \mu'(n)v(n)dn - \int_{\underline{n}}^{\bar{n}} \mu(n)U_n(\tilde{c}(v(n),z(n),n),z(n),n)dn$$

The FOC wrt $z(n)$ is:

$$1 - \frac{d\tilde{c}(v(n),z(n),n)}{dz(n)}f(n) - \mu(n)\left[U_{nc}(n)\frac{d\tilde{c}(v(n),z(n),n)}{dz(n)} + U_{nz}\right] + \psi(n) = 0 \quad (8)$$

and the FOC wrt $v(n)$ is:

[4]The first order conditions for this problem will be sufficient. We can rewrite

the problem in terms of $\tilde{u}(n) = u(c(n))$ and $\tilde{h}(n) = h(z(n)/n)$ so that the objective function becomes $nh^{-1}\ \tilde{h}(n)\ -u^{-1}(\tilde{u}(n))$ and is concave in $\tilde{u}(n)$ and $\tilde{h}(n)$ that become the new control and state variables.

[5]The problem would be:

$$\int_{\underline{n}}^{\hat{n}} v(n)\,(n)\,f(n)\,dn$$

s.t.

$$\frac{dv}{dn}(n) = U_n(\tilde{c}(v(n), z(n), n), z(n), n)$$

$$\int_{\underline{n}}^{\bar{n}} [z(n) - \tilde{c}(v(n), z(n), n)] f(n)\, dn \leq E$$

$$-\frac{d\tilde{c}(v(n), z(n), n)}{dv(n)} f(n) - \mu'(n) - \mu(n) U_{cc}(n) \frac{d\tilde{c}(v(n), z(n), n)}{dv(n)} + \lambda(n) f(n) = 0 \quad (9$$

We know from the paragraph about optimal taxation with income effects that we can write:

$$\frac{d\tilde{c}(v(n), z(n), n)}{dz(n)} = -\frac{U_z(n)}{U_c(n)} = MRS(n)$$

Also, since $T'(n) = 1 - MRS(n)$ (see the discussion about wedges) we have that:

$$1 - \frac{d\tilde{c}(v(n), z(n), n)}{dz(n)} = 1 - MRS(n) = T'(n)$$

The term in square brackets in equation (8) can be written as follows:

$$U_{nc}(n) + U_{nz}(n) \frac{d\tilde{c}(v(n), z(n), n)}{dz(n)} = -U_{nc}(n) \frac{U_z(n)}{U_c(n)} + U_{nz}(n)$$

$$= U_c(n) \frac{U_{zn}(n) U_c(n) - U_{cn}(n) U_z(n)}{U_c(n)^2}$$

$$= -U_c(n) \frac{\partial}{\partial n}\left[-\frac{U_z(n)}{U_c(n)}\right]$$

$$= -U_c(n) \frac{\partial MRS(n)}{\partial n}$$

Therefore, euqation (8) becomes:

$$\frac{T'(n)}{U_c(n)} f(n) = -\mu(n) \frac{\partial MRS(n)}{\partial n}$$

Using $MRS(n) = 1 - T'(n)$, we can rewrite the condition as:

$$\frac{T'(n)}{1 - T'(n)} f(n) = -\mu(n) \frac{\partial \log MRS(n)}{\partial n}$$

Now, we move to the second FOC. We know from before that:

$$\frac{d\tilde{c}(v(n), z(n), n)}{dv(n)} = \frac{1}{U_c(n)}$$

We can therefore rewrite (9) as:

$$-\frac{\mathbf{f}(n)}{U_c(n)} - \mu'(n) - \mu(n)\frac{U_{nc}(n)}{U_c(n)} + \quad (n)\,\mathbf{f}(n) = 0$$

Any Pareto Efficient allocation must satisfy (7) and provide at least utility $v(\bar{n})$ to every agent n. By the complementarity-slackness condition, this is equivalent to ask that $(n)\,f(n)$ 0 , which is that the multipliers associated to the constraints are never negative. We rewrite the FOC imposing
the following inequality:

$$-U_c\mu'(n) - \mu(n)\,U_{nc}(n) \qquad \mathbf{f}$$

(n) (10) If we change variables and

define $\hat{\mu}(n) \equiv U_c(n)\,\mu(n)$, we have:

$$\hat{\mu}'(n) = U_c(n)\,\mu'(n) + \mu(n)\,[U_{cn}(n) + U_{cc}(n)\,c'(n) + U_{cz}(n)\,z'(n)]$$

Substituting into (10) we find:

$$-\hat{\mu}'(n) + \hat{\mu}(n)\frac{U_{cc}(n)\,c'(n) + U_{cz}}{U_c(n)} \leq \mathbf{f}(n)$$

The local incentive constraint of the agent (FOC for optimal reporting) implies that $c'(n)/z'(n) = -U_z(n)/U_c(n)$. It follows that:

$$\begin{aligned}
\frac{U_{cc}(n)\,c'(n) + U_{cz}}{(n)\,U_c(n)} &= \frac{U_c(n)\,c'(n) + U_{cz}(n)\,z'(n)}{(n)\,U_c(n)} \\
&= \frac{-U_{cc}(n)\,U_z(n) + U_{cz}(n)\,U_c(n)}{U_c(n)^2}z'(n) \\
&= -\frac{\partial}{\partial c}\left[\frac{U_z(n)}{U_c(n)}\right]z'(n) \\
&= -\frac{\partial MRS(n)}{\partial c}z'(n)
\end{aligned}$$

We finally establish two conditions for Pareto efficiency:

$$\frac{T'(n)}{1+T'(n)}\mathbf{f}(n) = -\hat{\mu}\,\frac{\partial \log MRS(n)}{\partial n} \qquad (11)$$

$$-\hat{\mu}'(n) \quad \hat{\mu}(n)\frac{\partial MRS(n)}{\partial c}z'(n) \leq \mathbf{f}(n) \qquad (12)$$

Using the tax schedule in place, the preferences and the skill distribution we can derive the $\hat{\mu}$ from equation (11). We can then use equation (12) to test for the Pareto efficiency of the tax schedule.

Applying the Test and Interpreting the Conditions Suppose the agent has preferences $U(c, z, n) = c - \frac{1}{\varsigma}(z/n)^{\varsigma}$ with elasticity $" = 1/(\mu - 1)$. The FOCs of the dual problem read:

$$\mu'(n) = \quad (n)\,\mathbf{f}(n) - \mathbf{f}(n) \qquad (13)$$

$$\frac{T^0(n)}{1 - T^0(n)} f(n) = \frac{\mu(n)}{n} \frac{1 + "}{"} \quad (14)$$

The tax schedule is Pareto-optimal if and only if $\mu(n) \leq f(n)$ 0, which implies $\mu^0(n) \leq f(n)$. This inequality is the same as the one derived in (12) since $U_c(n) = 1$ and $@MRS(n)/@c = 0$. Equation (14) is the same as (11) when we notice that $@MRS(n)/@n = (1 + 1/")/n$.[6]

Suppose that the marginal tax rate is linear and equal to ☒ , when we put the two conditions together we get:

$$-\frac{"}{1+"} \frac{@}{@n} \left[\frac{☒}{1 - ☒} n f(n) \right] = \mu^0(n) \leq f(n) \, 8n$$

Taking the derivative wrt n the condition becomes:

[6] Notice that $MRS(n) = z(n)^{ç-1} n^{-ç}$

Therefore:

$$\frac{@ \log MRS(n)}{@n} = \frac{@MRS(n)}{@n} \frac{1}{MRS(n)} = -\frac{ç}{n}$$

where ç = 1 + 1/".

$$1 \quad \frac{nf^{0}(n)}{f(n)} \quad 1 \quad n \qquad \qquad (15) \quad 8 \quad \leq$$

First, the condition in (15) shows that for any ☒ and " there exists a set of f (n) such that ☒ is Pareto efficient and a set of f (n) such that it is not Pareto efficient. At the same time, for any " and f (n) we can find flat tax schedules ☒ that are efficient and set of ☒s that are inefficient. It follows that it is crucial to know the distribution of skills. The test can also be written in terms of income distributions that are easier to infer from the data. Higher " makes the condition harder to be satisfied:

when individuals are reacting more to changes in taxes, a tax reduction is more likely to lead to a Pareto improvement. When taxes are locally lowered at some n, the individuals below n will tend to increase their labor supply and individuals above will reduce the labor supply. The term $nf^{0}(n)/f(n)$ measures the elasticity of the skill distribution and captures how fast the skill distribution is decreasing at some n. Highly negative elasticity of skill distribution at n means that the distribution decreases fast and that the mass of individuals below n is significantly larger than above n, implying a local Laffer effect from the increase in labor supply of individuals below n. In other words, by locally decreasing taxes at n the government can increase revenues by incentivizing the labor supply of the large mass of individuals below n. For this reason, when the elasticity of the skill distribution is highly negative the test is harder to pass.

[7] In the second part of the sequence you will study how to run the same test in the inequality deflator framework using the concept of fiscal externality.

4 Section 5:Optimal Taxation with Income Effects and Bunching

In this section we will see the derivation of optimal income taxes proposed by Saez (2001). We will also introduce a way to estimate the elasticity of reported income that exploits the degree of bunching at the kinks of the existing tax schedule (Saez, 2010).[8]

Optimal Taxes with Income Effects

In this paragraph we derive optimal income taxes with income effects following the experiment in Saez (2001). Suppose individuals in the economy are heterogeneous in ability n and work l_n hours earning income z_n. We can write the labor supply as a Walrasian (uncompensated) demand such that $l_n(w_n, R_n)$ where $w_n = n(1 \quad T^{0})$ is the net of tax wage that the agent earns in equilibrium and R_n is the virtual (non-labor) income. Define R_n under the assumption that the tax is linear and tangent to the tax schedule at z_n such that $c = (1 \quad T^{0})\, nl_n + R_n$. Using the fact that $c = nl_n \quad T(nl_n)$ we can write $R_n = nl_n \quad T(nl_n) \quad nl_n(1 \quad T^{0})$. Using the Walrasian demand we can define uncompensated elasticity and the income parameter as follows:

$$\dot{\iota}^{u}_{n} = \frac{@l_n}{@(1-T^{0})} \frac{(1-T}{l_n} \qquad (16)$$

$$\text{⌘}_n = \frac{@ln}{@R_n}(1\,T^{0}) \qquad (17)$$

Using the definitions above and the Slutsky equation, we can write the compensated elasticity as:

$$\dot{\iota}^{c}_{n} = \dot{\iota}^{u}_{n} - \text{⌘} \qquad (18)$$

We now derive a result that will be useful later. Totally differentiating l_n we get:

$$dl_n = \frac{\partial l_n}{\partial w_n}\left[1 - T' - n\frac{dl_n}{dn}\right]dw_n + \frac{\partial l_n}{\partial R_n}\left[\frac{dl_n}{dn}T'' + dl_n(1 - T')\right]$$

rearranging

$$\frac{dl_n}{l_n}\frac{w_n}{dw_n} = \frac{w_n}{l_n}\frac{\partial l_n}{\partial w_n}\frac{l_n}{dw_n} + \left[\frac{\partial l_n}{\partial R_n}\frac{w_n}{l_n}\frac{dl_n}{dn}T'' - \frac{w_n}{l_n}\frac{\partial l_n}{\partial R_n}\frac{l_n}{(1 - T')}\right]\left[1 + n\frac{dl_n}{dn}\right]$$

Notice that $z_n = l_n + nl_n$ and apply the definitions in (16) and (17) to get:

$$\frac{dl_n}{dw_n} = \frac{l_n}{n}\frac{\partial l_n}{\partial w_n} - z_n\frac{l_n T''}{n(1 - T')} \tag{19}$$

Using (19) we can write:

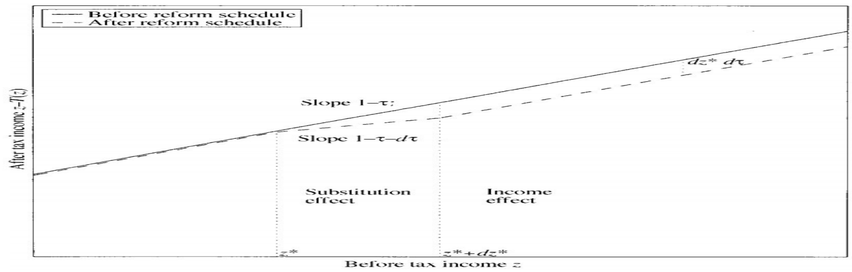
$$\frac{dz_n}{z_n} = \frac{l_n + nl_n}{nl_n}\left[\frac{1 + \varepsilon^u}{\varepsilon^c} - z_n\frac{T''}{1 - T'}\right] \tag{20}$$

In order to derive the optimal tax, we follow the experiment in Saez (2001). Suppose we introduce a perturbation around the optimal tax schedule such that we raise the marginal tax rate by $d\tau$ in a small interval $[z^*, z^* + dz^*]$.[9] As we have already seen in previous Sections, the tax has three main effects: mechanical, welfare and behavioral. While the mechanical and welfare effects are similar to the ones we have previously studied, the behavioral effect now consists of two components: an elasticity effect for people in the interval $[z^*, z^* + dz^*]$ and an income effect for taxpayers above z^*.

[8] The bunching paragraph is based on previous notes by Simon Jager.

[9] The experiment also assumes that $d\tau$ is second order relative to dz^* to avoid any bunching at kink.

Figure 1: Tax Reform Experiment



Mechanical and Welfare Effects Every taxpayer above z^* will pay an extra $dz^* d\tau$ of taxes, which for welfare purposes are valued according to the social marginal welfare weights g (z). The net-of- welfare mechanical effect for pre-tax income z is $(1 - g(z))\, dz^* d\tau$. Summing up over all incomes above z^* we get:

$$M = dz^* d\tau \int_{z^*}^{\infty} (1 - g(z))\, h(z)\, dz$$

Social marginal welfare weights g (z) represent the value for the government of giving one dollar to some level of income z. In particular, the government is indifferent between giving $1/g(z_1)$ dollars to individual 1 and $1/g(z_2)$ dollars to individual 2. The social marginal welfare weights are expressed in government money. Going back to the fully specified problem, we can interpret the weights as being normalized by Z, the multiplier on the resource constraint. The Z measures the value of transferring one dollar to every individual in the economy and captures the value of government funds. Higher Z means that the government can significantly raise welfare by transferring money to the individuals in the economy, a low Z on the other hand implies that the gain from transfers is low and public funds are less valuable.

Elasticity Effect The increase in the marginal tax rate has an effect on individuals' labor supply that is denoted by dz. The effect consists of two parts. First, there is the direct consequence of the increase in taxes that depends on the compensated elasticity of labor supply. Second, since the taxpayer changes her labor supply by dz shifting on the tax schedule, she will face an additional change in the tax. We write the change in the marginal tax rate induced by the shift dz as $dT' = T'' dz$. The behavioral response is proportional to the total tax change $d\tau + dT'$:

$$dz = \frac{\partial z^c}{\partial (1 - T')} (d\tau + dT') = -\zeta^c z^* \frac{d\tau + dT'}{1 - T'}$$

Rearranging :

$$dz = -\zeta z^{*} \frac{d\tau}{1 - T' + \zeta z^{*} T''} \tag{21}$$

Income Effect All individuals above z^{*} face a parallel shift of the tax schedule and pay additional taxes for $dz^{*} d\tau$. The mechanical increase in taxes paid has a direct income effect that depends on the income parameter $\eta = (dz/dR)(1 - T')$. Moreover, since the individual shifts along the tax schedule we must take into account a further change in the tax rate. The two effects combined are:

$$dz = \zeta z \frac{T''}{dz} \left(d\tau dz^{*} - \eta \frac{dz}{1 - T'} \right)$$

rearranging

$$dz = -\eta \frac{d\tau dz^{*}}{1 - T' - z\zeta T''}$$

In order to compute the total revenue effect we then need to sum over all taxpayers above z^{*} and account for the marginal tax rate T':

$$-\int_{z^{*}}^{\infty} \eta \frac{d\tau dz^{*}}{1 - T' - z\zeta T''} T' h(z)\, dz \tag{22}$$

Virtual and Actual Income Density Saez (2001) introduces the concept of virtual density in order to simplify the tax formulas. The virtual density is closely related to the virtual income in that it is the income density that would arise if the tax system was linear and tangent to the tax schedule $T(z)$ at every z. We denote the virtual density with $h^{*}(z)$. The mapping between virtual density and the type distribution $f(n)$ is given by the following:

$$h^{*}(z) \dot{z}^{*} = f(n)$$

where $\dot{z}^{*}$ is the derivative of earnings wrt n when the linear tax schedule is in place. A similar relation holds for $h(z)$ and we have $h(z) \dot{z} = f(n)$. Using the definition in (27) and the fact that $T'' = 0$ when a linear tax schedule is in place we can write:

$$h(z_n) \frac{1 - T'}{1 - T' + z_n \zeta T''} \frac{1 + \zeta n}{n} z_n = h^{*}(z_n) \frac{1 + \zeta n}{n} z_n$$

It follows that:

$$\frac{h^{*}(z)}{1 - T'(z)} = \frac{h(z)}{1 - T'(z) + \zeta z T''(z)} \tag{23}$$

Optimal Income Taxes Starting from (21) and using equation (23) we can write the elasticity effect as follows:

$$E = -h(z)\, dz^{*} T' \zeta z^{*} \frac{d\tau}{dz} = -\zeta z^{*} \frac{T'}{dz} h^{*}(z)\, d\tau dz^{*} \tag{24}$$

$$1 - T^0 + \dot{c}_{z^*} T^{00} \qquad 1 - T^0$$

Notice that in order to get the revenue effect that the elasticity effect should measure, we multiplied the expression in (21) by the marginal tax rate T^{0} and by $h(z)\,dz^*$, which is the share of taxpayers affected by the tax reform. Using (23) we can write the income effect as follows:

$$\mathbf{I} = -d\,dz^* \int_{z^*}^{\hat{}} \mathbf{1}$$

$$\frac{T^0}{1 - T^0} \int h^*(z)\,dz \qquad (25)$$

At the optimum, the sum of the three effects must be zero. We thus impose:

$$M + E + I = 0$$

and find $\int_{z^*}^{\infty} (1 - g(z)) h(z)\, dz \left[\frac{T'}{1 - T'} h^*(z)\, dz^* - dz^* \right] + \int_{z^*}^{\infty} \frac{T'}{1 - T'} h^*(z)\, dz = 0$

Rearranging:

$$\frac{T'}{1 - T'} = \frac{1}{\varepsilon^c} \frac{1}{h^*(z^*)} \left[\int_{z^*}^{\infty} (1 - g(z)) h(z)\, dz - \int_{z^*}^{\infty} \frac{T'}{1 - T'} h^*(z)\, dz \right]$$

$$= \frac{1}{\varepsilon^c} \frac{1 - H(z^*)}{h^*(z) z^*} \left[\int_{z^*}^{\infty} \frac{h(z)}{1 - H(z^*)} (1 - g(z)) \frac{z}{z^*} \frac{h^*(z)}{h^*(z)} dz - \int_{z^*}^{\infty} \frac{T'}{1 - T'} \frac{h^*(z)}{h^*(z)} dz \right] \quad (26$$

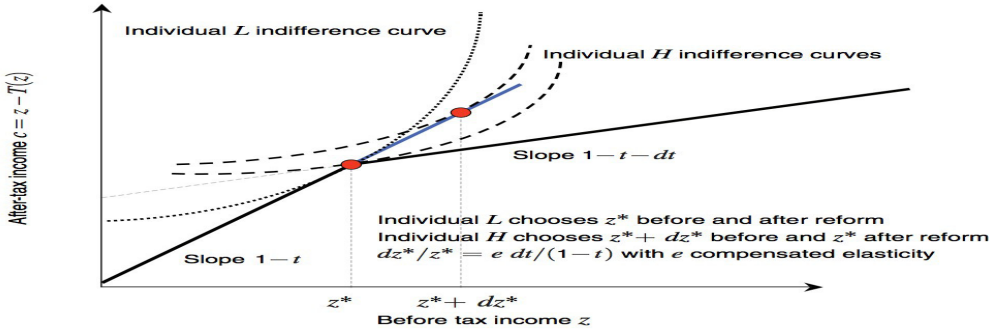
As we have already seen in the previous Sections the formula consists of different terms. $1 - H(z^*)/h^*(z) z^*$ captures the shape of the income distribution and measures how many people are above z^* relative to how much income is accumulated at z^* (i.e. $z^* h(z^*)$). The former is proportional to the mechanical increase in revenues, while the second measures the total income that is distorted by the tax. The marginal tax is also decreasing in the compensated elasticity ε^c following a classical efficiency argument, and increases the larger the income effect is (in absolute value): a stronger income effect means that the negative fiscal externality from higher taxes is reduced.

Bunching Estimator

In this paragraph we will study a way to derive income elasticity that was introduced by Saez (2010). The methodology exploits the degree of bunching at the kinks that characterize the tax schedule. Suppose that individual incomes z are distributed according to a smooth density distribution h(z).

There is a constant marginal tax rate t at income z^* and a reform introduces an increase in marginal taxes such that it becomes t + dt for all incomes above z^*. The kink will induce people that were falling in the interval $[z^*, z^* + dz^*]$ before the reform to bunch at z^*. Denote with **L** an individual who is exactly indifferent between the pre and post-reform tax schedule and does not change her income in equilibrium. This individual's indifference curve has slope 1 t at z^*. There is also an individual H who represents the highest pre-reform income bunching at z^*. The indifference curve of H has slope 1 — t — dt at z^* and is tangent to the slope of the retention function above z^*.

Figure 2: Bunching



The response of income to the tax reform for individual H is:

$$dz^* = \frac{dz}{d(1-t)}\Big|_{z=z^H} d(1-t) = e\frac{z^*}{1-t} d(1-t) = +dz^* \frac{dt}{1-t}$$

Where e is the compensated elasticity of income. Notice that the dz^* is proportional to the ratio between the change in the tax rate and the net-of-tax rate $1 - t$. It follows that, everything else being equal, a change in marginal tax rates from 0 percent to 10 percent should produce the same amount of bunching as a change from 90 percent to 91 percent. Rearranging:

$$dz^* \left(\frac{1-t+edt}{1-t} \right) = e\frac{z^*}{1-t} dt$$

which implies:

$$dz^* = e\frac{z^*}{1-t+edt} dt \qquad (27)$$

It is not surprising that dz^* is increasing in the elasticity of income, implying that if income is more elastic more people will bunch.

Suppose the income distribution is locally continuous, the share of people bunching at the kink is:

$$s(z^*) = h(z^*)\, dz^*$$

Using the definition in (27):

$$\frac{s(z^*)}{h(z^*)} = e\frac{z^*}{1-t+edt} dt$$

where we assumed that $s(z^*)/\hat{z}^* \neq 0$. The formula shows that using the share of people bunching at kink and the income distribution that would arise under the no reform scenario we can estimate the elasticity of labor supply.

5 Section 6: Optimal Income Transfers

In this Section we study the optimal design of income transfers. We start from a formal model where we specify individuals' preferences and a government's social welfare function. We then take the approach by Saez (2002) to derive optimal transfers using an "experiment" where we introduce a perturbation around the optimal tax schedule for a generic "occupation" and derive a formula for the optimal tax.

Optimal Income Transfers in a Formal Model

We introduce in this paragraph a model of discrete choices where we will derive optimal taxes. Suppose agents choose an occupation i among a set of occupations $\{1, 2, \ldots, I\}$ and earn income w_i at occupation i. Each individual is indexed by $m \in M$ being a multidimensional set of measure one. The measure of individuals on M is denoted by $dv(m)$. The agents maximize $u^m(c_i, i)$ differentiable in consumption. Individual consumption after taxes is $c_i = w_i - T_i$. A tax schedule defines a vector $(c_0, \ldots, c_I)$ such that the set M will be partitioned in subsets $M_1, M_2, \ldots, M_I$. Denote with $h_i(c_0, c_1, \ldots, c_I)$ the fraction of individuals choosing occupation i such that $\sum_i h_i = 1$. h_i is differentiable under the assumption that tastes for work captured by $u^m(\,)$ are regularly distributed. We define the elasticity of participation for occupation i as follows:

$$\zeta_i = \frac{c_i - c_0}{h_i} \frac{\partial h_i}{\partial (c_i - c_0)} \tag{28}$$

Suppose the government weights individual utilities through linear welfare weights μ^m and that the social welfare function is:

$$W = \int_M \mu^m u^m(w_i - T_i, i)\, dv(m) \tag{29}$$

The government has some revenue requirement H such that the budget can be written as:

$$\sum_i h_i T_i = H \tag{30}$$

We solve the problem with a Lagrangian where we attach multiplier Z to the government constraint. The FOC wrt T_i reads:

$$-\int_{M_i} \frac{\mu^m \partial u^m(c_i - , i^*)}{\partial c} dv(m) + Z\left[h_i + \sum_j T_j \frac{\partial h_j}{\partial c}\right] = 0 \tag{31}$$

For the usual envelope argument equation (31) ignores the welfare effect of a change in c_i.

A social marginal welfare weight is:

$$g_i = \frac{1}{Z h_i} \int_{M_i} \mu^m \frac{\partial u^m(c - ,}{\partial c_i} dv(m) \tag{32}$$

Using the definition of g_i we can rewrite (31) as:

$$(1 - g_i)h_i = \sum_{j=0}^{T} \frac{@h_j}{@c_i} \tag{33}$$

This formula is very similar to the one you will see in the spring studying Ramsey taxation.[10] Take

[10] The formula implies that the following is true for every i:

$$\sum_{j=0}^{J} h_j(1-g_j)\frac{\partial c_j}{\partial T_i} = \sum_{j=0}^{J} T_j \frac{\partial h_j}{\partial T_i}$$

a benchmark case of no income effects such that $h_j(c_0,\ldots,c_I) = h_j(c_0+R,\ldots,c_I+R)$, the formula implies that $(1-g_i)\,h_i = 0$. Summing over all is:

$$\sum_i h_i g_i = \sum_i h_i = 1 \tag{34}$$

Optimal Tax/Transfer with Extensive Margin Only

Suppose each individual only chooses between some occupation i and being unemployed. This can be rationalized by a utility function where $u^m(c_j, j) = -\infty$ for any $j \neq i$. The assumption implies that $\partial h_i/\partial c_i + \partial h_0/\partial c_i = 0$ and we can rewrite (33) as:

$$(1-g_i)\,h_i = T_i\frac{\partial h_i}{\partial c_i} + \frac{\partial h_0}{\partial c_0}(T_0 - T_i)\frac{\partial h_i}{\partial c_i}$$

using the definition of the elasticity of participation:

$$\frac{T_i - T_0}{c_i - c_0} = \frac{1}{\varepsilon_i}(1-g_i) \tag{35}$$

The level of taxation at occupation i decreases in the elasticity of taxation for the usual efficiency argument.

Redistributive preferences imply $g_0 \leq g_1 \leq \ldots \leq g_I$. Suppose there are no income effects, we know from (34) that the weighted average of the g_is is 1 and therefore there is a $i^* \geq 1$ such that $g_j \leq 1$ for $j \leq i^*$ and $g_j > 1$ for $j > i^*$. This implies that $T_i - T_0 \leq 0$ for $i \leq i^*$, meaning that the government is providing a higher transfer to workers with low income relative to unemployed. Therefore, we established that it
is optimal for the government to implement negative marginal tax rates at the bottom of the income distribution.

If the government was Rawlsian, we could have that g_0 only is higher than 1. When this is the case, the tax schedule does not display negative marginal tax rates and we have a classical negative income tax. On the other hand, a utilitarian government would have constant g_is such that the budget constraint is satisfied. We therefore have two cases. First, if every individual can pay H, the government will charge a constant lump-sum tax equal to H to every taxpayer and $g_i = 1$ for every
i. Second, if low incomes cannot afford the tax the government will only impose the tax on higher income setting their social marginal welfare weights below 1 and having positive marginal tax rates throughout occupations.

Tax Experiment The same formula for optimal taxes can be derived through the following exper- iment. Suppose taxes increase by dT_i for occupation i. The mechanical increase in tax revenues is $h_i dT_i$ and it will be valued $(1 - g_i)\,h_i dT_i$ by the government taking into

account the welfare effect of the change. The government must also account for the fiscal externality generated by the behavioral response of agents in occupation i. Using the elasticity of participation, the share of people leaving occupation i is:

$$dh_i = -\frac{h_i}{c_i - c_{0\,i}} dT$$

Each worker leaving occupation i generates a loss in revenues equal to $T_i \quad T_0$. The total behavioral effect of the tax increase is:

$$dh\,(T - T) = -\frac{T_i - T_0}{h} dT$$

can interpret the lhs as an index of how much labor supply is discouraged. The formula holds for every i and implies that discouragement is equalized across all occupations.

Summing the mechanical and behavioral effects at the optimum we get:

$$(1 - g_i) h_i dT_i - \sum_i h_i \frac{T_i - T_0}{c_i - c_0} dT = 0$$

Rearranging we can derive (35). The decomposition of the formula in mechanical and behavioral effects provides further intuition for why marginal tax rates can be negative at the optimum. For very low incomes the mechanical effect of providing an extra dollar is positive ($g_i > 1$) and at the same time a decrease in taxes at i provides incentives for unemployed workers to enter the labor force. The sum of the two effects is unambiguously positive.

Optimal Tax/Transfer with Intensive Margin Responses

Suppose that agents' preferences are such that they can only work in two adjacent occupations and that we can write the share of workers in occupation i as $h_i(c_{i+1} - c_i, c_i - c_{i-1})$ when we assume there are no income effects.[11] The behavioral elasticity is defined as follows:

$$\zeta_i = \frac{c_i - c_{i-1}}{h_i} \frac{\partial h_i}{\partial (c_i - c_{i-1})} \quad (36)$$

Equation (33) becomes:

$$(1 - g_i) h_i = -\left[\frac{\partial h_{i+1}}{\partial (c_{i+1} - c_i)} - T_i \frac{\partial h_i}{\partial (c_{i+1} - c_i)} + T_i \frac{\partial h_i}{\partial (c_i - c_{i-1})} + T_{i-1} \frac{\partial h_{i-1}}{\partial (c_i - c_{i-1})} \right]$$

By assumption on agent's preferences $\partial h_{i+1} / \partial (c_{i+1} - c_i) = \partial h_i / \partial (c_{i+1} - c_i)$ and rearranging we find:

$$(1 - g_i) h_i = -\left[(T_{i+1} - T_i) \frac{\partial h_{i+1}}{\partial (c_{i+1} - c_i)} + (T_{i-1} - T_i) \frac{\partial h_i}{\partial (c_i - c_{i-1})} \right]$$

Summing over $i, i+1, \ldots, I$ and using the definition in (36) we can derive the optimal tax formula:

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\bar{h}_i}\left[(1-g_i)h_i + (1-g_{i+1})h_{i+1} + \ldots + (1-g_I)h_I\right] \quad (37)$$

Non-increasing social marginal welfare weights imply that $(1-g_i)h_i + (1-g_{i+1})h_{i+1} + \ldots + (1-g_I)h_I \geq 0$ for any $i > 0$. Thus, the tax T_i is increasing in i and it is not optimal to set negative marginal tax rates. Using (34), (37) and computing the formula for the tax rate at the bottom of the income distribution we get:

$$\frac{T_1 - T_0}{c_1 - c_0} = \frac{1}{\bar{h}_1}\left[\frac{(g_0 - 1)h_0}{h_1}\right] \quad (38)$$

A higher social marginal welfare weight g_0 implies a higher tax rate at the bottom. The reason is that if the government cares more about the unemployed individual it should set the lump-sum transfer T_0 as large as possible by imposing large phasing-out tax rates at the bottom. Negative marginal tax rates at the bottom can still occur for $g_0 < 1$, but this would imply that the unemployed worker has a lower welfare weight than the average taxpayer in the economy, meaning that the government has unusual redistributive tastes.

[11] We can write the share of people working in occupation i as $h_i(c_i, c_{i+1})$. No income effects imply $h(c_0, c_1, \ldots, c_I) = h(c_0 + R, c_1 + R, \ldots, c_I + R)$. It follows that $h(c_i, c_{i+1}) = h(c_i + c_i - c_{i-1}, c_i + c_{i+1} - c_i) = h(c_i - c_{i-1}, c_{i+1} - c_i)$.

Tax Experiment The formula in (37) can be derived through an experiment where taxes increase by dT for any occupation i, $i+1, \ldots, I$. This change decreases $c_i - c_{i-1}$ by dT and leaves any other difference unaltered. The mechanical increase in revenues is $[h_i + h_{i+1} + \ldots + h_I]\,dT$ and net-of-welfare it is valued $[h_i(1-g_i) + h_{i+1}(1-g_{i+1}) + \ldots + h_I(1-g_I)]\,dT$. The behavioral effect of the tax change arise from individuals in occupation i only when we assume income effects away. The impact on revenues is $dh_i = -h_i \bar{h}_i dT/(c_i - c_{i-1})$ and it must be scaled by the loss in revenues $T_i - T_{i-1}$ generated by each worker switching to occupation $i-1$. Summing the two impacts:

$$[h_i(1-g_i) + h_{i+1}(1-g_{i+1}) + \ldots + h_I(1-g_I)]\,dT - h_i \bar{h}_i (T_i - T_{i-1})\,dT/(c_i - c_{i-1}) = 0$$

Rearranging we get the formula in (37). The mechanical and behavioral effects help providing intuition for why negative marginal tax rates are not optimal with intensive margin only. Suppose the government raised taxes at i when there is a negative marginal tax rate in the interval [i 1, i]. Individuals would respond by shifting their labor supply to i 1 and, given the higher tax rate, would pay more taxes. At the same time the tax change would mechanically increase revenues. Therefore, the government could always improve welfare by increasing taxes as long as the marginal tax rate is negative.

Optimal Tax/Transfer with Intensive and Extensive Margin Responses

We present for the sake of simplicity only the tax experiment derivation of the formula. Suppose taxes are raised by dT for everyone in occupation $i, i+1, \ldots, i_I$. The mechanical effect is the same as the one observed in the previous paragraph. However, we have to add the participation effect of an increase in the tax for all the occupations above i. The share of

people who become unemployed leaving a generic occupation i is $h_i \zeta_i dT/(c_i - c_0)$, generating a revenue loss equal to $h_i \zeta_i (T_i - T_0) dT/(c_i - c_0)$. Summing this effect over every occupation $j \neq i$ and setting the sum of behavioral and mechanical effects equal to 0, we can derive the following formula:

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i \eta_i} \sum_{j=i}^{} h_j \left[1 - g_j - \frac{T_j - T_0}{c_j - c_0} \right] \quad (39$$

When a tax is lowered in the pure extensive margin model, labor supply unambiguously increases. On the other hand, if a tax is decreased in a pure intensive margin model individuals will have incentives to lower their labor supply. The formula shows how to optimally trade-off the two effects.

Notice that (39) can be rewritten as (37) where we employ augmented social welfare weights $\hat{g}_i = g_i + \zeta_i (T_i - T_0)/(c_j - c_0)$. When the participation elasticity is high enough, the augmented welfare weights are not necessarily decreasing in w_i if g_is are. This explains why an earning income tax credit could be optimal in a mixed model.

6 Section 7: Optimal Top Income Taxation

In this Section we study the optimal design of top income taxes.[12] We have already covered optimal top income taxation in a simple Mirrlees framework in Section 2. Today, we will start from the "trickle down" model with endogenous wages introduced by Stiglitz (1982). We then analyze an example of optimal taxation in a general equilibrium model where workers choose between different occupations/sectors (Rothschild Scheuer, 2016). Finally, we present a model where top earners respond to taxes on three margins: labor supply, tax avoidance, and compensation bargaining (Piketty Saez Stantcheva, 2014).

Trickle Down: A Model With Endogenous Wages

Stiglitz (1982) studies a model with two unobservable types and endogenous wages. Suppose there are two types of workers: H (high skill) and L (low skill). For simplicity we assume they have equal mass and work l_i hours. The utility for a generic type i is $u(c_i, l_i)$. Work is the only input in the constant return to scale (CRS) production function $F(l_L, l_H)$. With competitive labor markets wages are equal to the marginal product of labor:

$$w_i = \frac{\partial F(l_L, l_H)}{\partial l_i} \tag{40}$$

The standard Mirrlees model implicitly assumes a linear production $F(l_L, l_H) = \theta_L l_L + \theta_H l_H$ where θ_i is the ability of agent i so that wages are $w_i = \theta_i$. The resource constraint of this economy is:

$$\sum_i c_i \leq F(l_L, l_H)$$

The government assigns linear welfare weights α_L and α_H to the two types. If $\alpha_H < \alpha_L$ the government wants to redistribute to low types and we know that in equilibrium the incentive constraint for the high type is binding:

$$u(c_H, l_H) = u\left(c_L, \frac{w_L l_L}{w_H}\right) \tag{41}$$

We solve the problem with the following Lagrangian:

$$\mathcal{L} = \pi_L u(c_L, l_L) + \pi_H u(c_H, l_H) + Z\left[F(l_L, l_H) - \sum_i c_i\right] \quad (42)$$
$$+\mu\left[u(c_H, l_H) - u\left(c_L, \frac{w_L l_L}{w_H}\right)\right] + \sum_i \omega_i (w_i l_i - F_i(l_1, \ldots, l_n))$$

Z is the marginal value of public funds, μ is the value of relaxing the incentive constraint for type H and ωs are the multipliers on the constraints in (40).

We derive the optimal marginal tax rate for the high type by optimally choosing c_H and l_H. The FOCs are respectively:

$$[\pi_H + \mu]\, u_c(c_H, l_H) = Z \quad (43)$$

$$[\pi_H + \mu]\, u_l(c_H, l_H) = -ZF_H(l_H, l_L) + \sum_i \omega_i F_{iH}(l_L, l_H) \quad (44)$$

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[12] The first two paragraphs of this section are based on notes by Florian Scheuer

optimal labor supply choice implies the following labor wedge:

$$T'(z_H) = 1 + \frac{u_l(c_H, l_H)}{u_c(c_H, l_H)\, w_H}$$

Using (43) and (44) we can rewrite the labor wedge as follows:

$$T'(z_H) = 1 + \frac{-ZF_H(l_H, l_L) + \sum_i \omega_i F_{iH}(l_L, l_H)}{\pi_H \omega_i F_{iH}(l_L, l_H)} = \frac{\sum_i \omega_i F_{iH}(l_L, l_H)}{ZF_H(l_L,} \quad (45)$$

The sign of (45) depends on ω_L and ω_H. In order to sign them, we exploit the government optimal choice of w_i characterized by the following FOCs:

$$-\mu u_l\left(c_L, \frac{w_L l_L}{w}\right)\frac{l_L}{w} + \omega = 0$$

$$\mu u_l\left(c_L, \frac{w_L l_L}{w}\right)\frac{w_L l_L}{w_H^2} + \omega = 0$$

Since $u_l < 0$, they imply $\omega_L < 0$ and $\omega_H > 0$. The CRS technology and concavity imply $F_{HL} > 0$ and $F_{HH} < 0$, which means complementarity between the two factors of production. Therefore, $\sum_i \omega_i F_{iH}(l_L, l_H) < 0$ and we conclude that $T'(z_H) < 0$. Top earners are subsidized at the margin because their labor raises the wages of lower earners. By closing the gap between the two wages the government can relax the incentive constraint for the high type and allow for additional redistribution. The result is entirely driven by the complementarity of the two factors in the production function, which generates a "positive externality" of the high type on the low type. In the classical Mirrlees model with linear technology there is no complementarity and top incomes are not subsidized.

Taxation in the Roy Model and Rent-Seeking

In this paragraph we study a more general model introduced by Rothschild and Scheuer (2013, 2016) where individuals can choose the sector where they work, how much they work and have a multidimen- sional vector of skills (one for each sector). We present a simple example with two activities and a two dimensional skill vector. Workers can choose between two activities: a traditional productive activity where the wage reflects the social marginal product of labor and rent-seeking where the marginal prod-
uct of labor is zero and workers compete for a fixed rent μ such that wages are proportional to μ/E, with E being the total effort in the rent-seeking sector. Every individual has a skill vector $(✓, ▾)$ such that $✓$ is the ability in the productive sector and $▾$ is ability in the rent-seeking sector. Suppose there are only two types of workers in the economy: productive workers with $✓ = ▾ = 1$ and rent-seekers with $✓ = 0$ and $▾ = ▾_R$.

The total rent-seeking effort is:

$$E = ▾_R e_R + Z_P e_P$$

where Z_P is the fraction of productive workers working in the rent-seeking sector. Productive workers are indifferent between the two sectors when the wage in the rent-seeking sector is equal to 1 (the marginal product of labor in productive sector) and we have $\mu/E = 1$ implying $\mu = E$. If instead
$E > \mu$ they would all work in the traditional sector; while when $E < \mu$ they would all choose the rent-seeking activity.

Suppose that preferences are quasi-linear $u(c, e) = c\ h(e)$. It can be shown that the optimal allocation involves an interior equilibrium where productive workers are indifferent between the two occupations. If Z_P is the share of productive workers working in the rent-seeking sector, we have:

$$E = ▾_R e_R + Z_P e_P = \mu$$

$$P \quad R \quad P \qquad eP$$

Given that the share of productive workers employed in the productive sector is $1 - Z_P$, total output produced in the economy is:

$$Y = \mu + (1 - Z_P(e_R, e_P))e_P = e_P + \omega_R e_R$$

Suppose the government is utilitarian, the welfare function is:

$$W = e_P + \omega_R e_R - h(e_P) - h(e_R)$$

If the government can observe and tax income through a non-linear tax schedule but cannot tax occupational choices, we can solve the problem by choosing an optimal effort level for each type. The FOCs for effort are:

$$h'(e_P) = 1$$

$$h'(e_R) = \omega_R$$

Notice that the two conditions imply zero wedge on labor income for both types. Although rent- seekers are not productive at all they are not taxed in equilibrium. The reason is that in this model rent-seekers are "indirectly productive" by crowding out productive workers from the rent-seeking sector. If rent-seekers were taxed, productive workers would be attracted into the rent-seeking sector
(e_R would fall but $E = \mu$, and Z_p would have to increase to balance the change) and would decrease total production. Notice that the result is not dependent on the assumption of utilitarian social
preferences, but would hold for any other combination of social welfare weights.

This example shows how general equilibrium considerations might be extremely important in shap- ing optimal marginal tax rates. Even under the extreme assumption that all top earners are rent- seekers, general equilibrium considerations would put downward pressure on marginal tax rates at the top to avoid attracting productive workers into rent-seeking.

The model with occupational choices can also be employed to study the "trickle down" effects in Stiglitz (1982) (see Rotschild Scheuer, 2013). Allowing for occupational choices still pushes towards lower top marginal tax rate than in a standard Mirrlees model with linear production, but less so than in a world without occupational choice (as in Stiglitz 1982). The reason is that, unlike in the Stiglitz's model, if the government subsidizes high types, effort increases in the high skill sector decreasing wages in the high sector and increasing wages for the low sector. In a Roy model this would attract to the low-skilled sector some workers who were indifferent between the two sectors, reducing the increase in the low-skilled wage. This effect works against the standard general equilibrium effect presented in the previous paragraph, making trickle down less effective.

Wage Bargaining and Tax Avoidance

In this paragraph we study a standard Mirrlees model with a linear production function where indi- vidual income can depart from actual output. We present two potential

departures: wage bargaining and tax avoidance.

Wage Bargaining Suppose top earners have measure 1 and after bargaining get a fraction ⌘ of their output z (where we allow for ⌘ > 1) such that y = ⌘z. Bargained earnings are b = (⌘ 1) y and average bargained earnings in the economy are E (b). In the aggregate, it must be the case that total product is equal to total compensation. Hence, if E (b) > 0, so that there is overpay on average,

E (b) must come at the expense of somebody. The opposite is true if E (b) < 0. For simplicity, we assume that any gain made through bargaining comes uniformly at the expense of everybody else in the economy. Hence, individual incomes are all reduced by a uniform amount E (b) if E (b) > 0.[13] We further assume that individuals can exert effort to increase ⌘ and their preferences are:

$$u_i (c, ⌘, y) = c — h_i (y) — k_i (⌘)$$

When the cost of bargaining E (b) is uniformly distributed across all agents, the government can offset it with the demogrant —T (0). It follows that earnings can be written as z = ⌘y = y + b. Each individual chooses ⌘ and z to maximize $u_i (c, ⌘, y) = ⌘y — T (⌘y) — h_i (y) — k_i (⌘)$ and FOCs are:

$$(1 — ⌧) ⌘ = h_i' (y)$$

$$(1 — ⌧) y = k_i' (⌘)$$

with ⌧ = T ^{0} (z). Let us denote the average reported income, output and bargaining as Walrasian demands z (1 — ⌧), y (1 — ⌧) and b (1 — ⌧). The implied elasticities are:

$$e_1 = \frac{1 — ⌧}{y} \frac{dy}{d(1 — ⌧)}$$

$$e = \frac{1 — ⌧}{z} \frac{dz}{d(1 — ⌧)}$$

$$e_2 = \frac{1 — ⌧}{z} \frac{db}{d(1 — ⌧)} = s \cdot e$$

with

$$s = \frac{db/d(1 — ⌧)}{dy/d(1 — ⌧)}$$

The definitions imply that $(y/z) e_1 = (1 s) e$ and that $e = (y/z) e_1 + e_3$.

When the social welfare weight on top incomes is zero, the government chooses the top tax rate to maximize total revenues:

$$\max_{⌧} ⌧ [z (1 — ⌧) — \bar{z}] — N \cdot E (b)$$

and the FOC is:

$$[z — \bar{z}] — ⌧ \frac{dz}{d(1 — ⌧)} = z — \bar{z}$$

rearrangin g

$$[⌧ — s] \frac{dz}{} = z — \bar{z} \quad \frac{⌧ — s}{} \cdot e = \frac{z — \bar{z}}{} = 1$$

using $e_2 = s \cdot e$ we get:

$$\frac{d(1-\tau)}{\tau} = \frac{1-\tau}{\tau}\, a \quad \Rightarrow \quad \tau^{*} = \frac{1+e_2}{1+ae} \tag{46}$$

If top earners are overpaid relative to their productivity $s > 0$ and $e_2 > 0$ implying that the optimal tax rate is higher than the one maximizing revenues in the standard model ($\tau^{*} > 1/(1+ae)$). This is because of a *trickle up* effect that arise when a higher tax on high incomes reduces the cost of bargaining for low incomes. On the other hand, if $z < y$ and $e_2 < 0$ we would have a *trickle down* situation where a lower tax on top incomes shifts

Tax Avoidance Responses to tax rates can also take the form of tax avoidance. Define tax avoidance as changes in reported income due to changes in the form of compensation, but not in the total level of compensation. We observe tax-avoidance if taxpayers can shift part of their taxable income into another form that is treated more favorably from a tax perspective. Denote with x total sheltered income such that ordinary taxable income is z = y x. Sheltered income is taxed at a constant marginal tax rate t. Suppose that the individual faces a utility cost for sheltering taxes and utility is $u_i(c, y, x) = c$ $h_i(y)$ $d_i(x)$ where $c = y - z$ $tx + R = (1$ $)y + ($ $t)x + R$ and $R =$ $\bar{z}$ $T(\bar{z})$ is virtual income. We can write Walrasian demands $z(1 -, t) = y(1$ $)$ $x($ $t)$. Let us define e_3 the elasticity of sheltered income:

$$e_3 = \frac{1 - \quad dx}{z \quad d(1 -)} = s \cdot e$$

wher

e

$$s = \frac{dx/d(- t)}{dy/d(1 -) + dx/d(- t)} = \frac{dx/d(- t)}{@z/@(1 -)}$$

and $e = (y/z)\, e_1 +$ e_3.

The government problem is:

$$\max_{,t} \; [z(1 -, t) - \bar{z}] + tx(\quad t)$$

Suppose the government could only optimally set given some t, the FOC would be:

$$\begin{aligned} 0 &= [z - \bar{z}] - \frac{@z}{@(1 -)} + t\frac{dx}{d(- t)} \\ &= [z - \bar{z}] - \frac{@z}{@(1 -)} + ts\frac{}{@(1 -)} \\ &= [z \_ \bar{z}] \quad ez\frac{ - ts}{1 - } \end{aligned}$$

rearranging :

$$= \frac{1 + t \cdot a \cdot}{e_2} \qquad (47)$$

$$1 + a \cdot e$$

Notice how the tax is proportional to t a e_2 that captures the fiscal externality of tax avoidance. If t = 0 and the government cannot do anything to prevent income shifting, it is irrelevant whether e is due to real response or tax avoidance response (see Feldstein, 1999).

If instead the government could also optimally set t, we would have an extra optimality condition:

$$\begin{aligned} 0 &= \frac{@z}{@t} + x - t\frac{dx}{d(- t)} \\ &= x + (- t)\frac{dx}{d(- t)} \end{aligned}$$

since $x \leq 0$ and $dx/d(- t) \leq 0$ the first order condition can only hold if $= t$. If this is the case $x(- t) = x(0) = 0$ and $z = y$ so that $e - e_3 = e_1$. If we replace this in (47) we obtain:

Intuitively, the government finds optimal to close any tax avoidance opportunity at the optimum. When this is the case the elasticity of income is the only one that matters.

8: Optimal Minimum Wage and Introduc- tion to Capital Taxation

In this Section we develop a theoretical analysis of optimal minimum wage policy in a perfectly com- petitive labor market following Lee and Saez (2012).

Optimal Minimum Wage

We study a model with extensive and intensive margin labor supply responses where wages are endogenous. Suppose output is produced through a constant return to scale production function $F(h_1, h_2)$ where h_1 and h_2 are low and high-skilled workers respectively. Profits are given by $\Pi = F(h_1, h_2) - w_1 h_1 - w_2 h_2$ and wages are equal to the marginal product of labor:

$$w_i = \frac{\partial F(h_1, h_2)}{\partial h_i} \tag{49}$$

A mass 1 of individuals has three labor supply options: i) not work and earn zero income, ii) work in occupation 1 and get w_1, iii) work in occupation 2 and earn w_2. Individuals are heterogeneous in their tastes for work. Every individual faces a vector $\varepsilon = (\varepsilon_1, \varepsilon_2)$ of work costs that is smoothly distributed across the entire population according to $H(\varepsilon)$ with support $\mathcal{E}$. The government perfectly observes the wage w_i, but does not observe the cost of working. There are no savings and after tax income equals consumption such that $c_i = w_i - T_i$. Suppose there are no income effects and utility is linear in consumption:

$$u_i = c_i - \varepsilon_i$$

The subset of individuals choosing occupation i is $\mathcal{E}_i = \{\varepsilon \in \mathcal{E} : u_i \geq u_j\} = \max_j u_j$. The fraction of the population working in occupation i is $h_i(c) = \pi_i$ and is a function of $c = (c_0, c_1, c_2)$. The tax system defines a competitive equilibrium (h_1, h_2, w_1, w_2).

Equation (49) implies that $w_2/w_1 = F_2(1, h_2/h_1)/F_1(1, h_2/h_1)$. Constant returns to scale along with decreasing marginal productivity along each skill implies that the right- hand-side is a decreasing function of h_2/h_1. Therefore, the function is invertible and the ratio h_2/h_1 can be written as a function of the wage ratio w_2/w_1: $h_2/h_1 = \varphi(w_2/w_1)$ with $\varphi(\cdot)$ a decreasing function. Constant returns to scale also imply that there are no profits in equilibrium. Hence $\Pi = F(h_1, h_2) - w_1 h_1 - w_2 h_2 = 0$ so that $w_1 + w_2 \varphi(w_2/w_1) = F(1, \varphi(w_2/w_1))$, which defines a decreasing mapping between w_1 and w_2 so that we can express w_2 as a decreasing function of w_1: $w_2(w_1)$.

Labor supply and demand for the low-skilled labor market are $D_1(w_1)$ and $S_1(w_1)$ with $D_1'(w_1) \leq 0$ and $S_1'(w_1) \geq 0$ and are defined assuming that the market clears in the high-skilled labor market. The low-skilled labor demand elasticity is:

$$\zeta_{D_1}(w_1) = -\frac{w_1}{h_1}$$

The resource constraint of the economy is:

$$h_0 c_0 + h_1 c_1 + h_2 c_2 \leq h_1 w_1 + h_2 w_2 \tag{50}$$

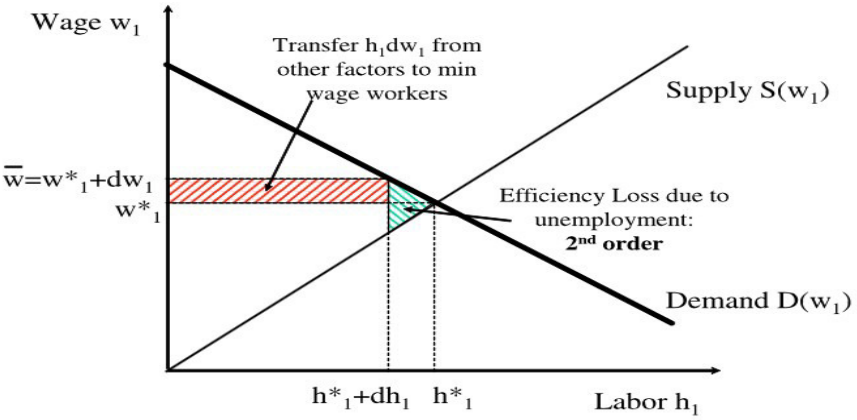
The government weights individual utilities through a social welfare function $G(\cdot)$ and we can write the social welfare of the economy as:

$$SW = (1 - h_1 - h_2) G(c_0) + \int_{\mathcal{E}_1} G(c_1 - \varepsilon_1) dH(\varepsilon) + \int_{\mathcal{E}_2} G(c_2 - \varepsilon_2) dH(\varepsilon) \tag{51}$$

We define social marginal welfare weights as usual $g_0 = G'(c_0)/Z$ and $g_i = \int_{\nu} G'(c_i - \nu_i)\, dH(\nu)/(Zh_i)$, where Z is the marginal value of public funds. The concavity of the SWF implies $g_0 > g_1$ and $g_1 > g_2$. Since there are no income effects the value of transferring \$1 to everyone in the economy is \$1 and we have $Z = g_0h_0 + g_1h_1 + g_2h_2 = 1$.

Figure 3:

Desirability of Small Minimum Wage



Minimum Wage with No Taxes Suppose there are no taxes and transfers, we have $c_0 = 0$, $c_1 = w_1$ and $c_2 = w_2$. Suppose the economy is at the equilibrium and the government introduces a small minimum wage above the equilibrium wage of the low-skilled market such that $\bar{w} = w^*_1 + d\bar{w}$. The change will generate a drop in employment h_1. The workers who drop out of the low-skilled sector will move either to unemployment or to the high-skilled sector depending on their preferences.

We will assume *efficient rationing* : the workers who involuntarily lose their low-skilled jobs due to the minimum wage are those with the least surplus from working in the low-skilled sector.[14] This is clearly the most favorable case to minimum wage policy. We establish the first result of the paper:

Proposition 1: *With no taxes/transfers, if (i) efficient rationing holds; (ii) the government values redistribution from high-skilled workers toward low-skilled workers* ($g_1 > g_2$)*; (iii) the demand elasticity* ε_1 *for low-skilled workers is finite; and (iv) the supply elasticity of lows-killed workers is positive, then introducing a minimum wage increases social welfare.*

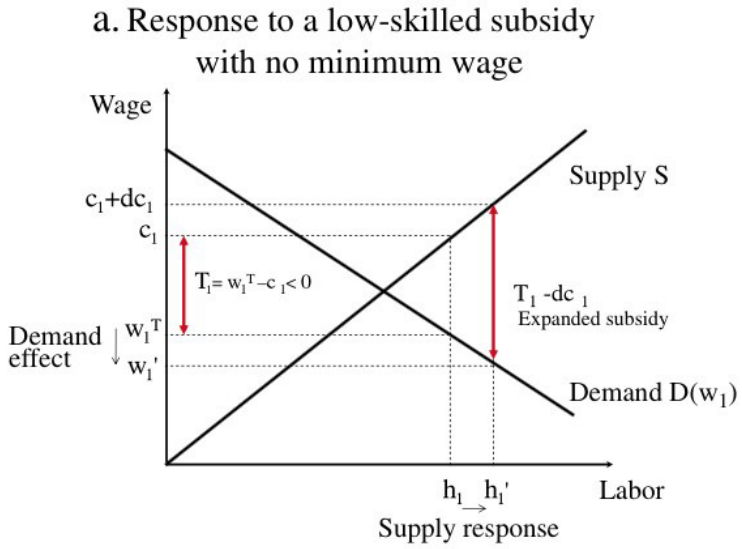
Consider the changes dw_1, dw_2, dh_1 and dh_2 following the increase in the minimum wage, we have $d\Pi = \sum_i [(\partial F/\partial h_i)\, dh_i - w_i dh_i - h_i dw_i] = -h_1dw_1 - h_2dw_2$ and the no profit condition implies:

$$h_1dw_1 + h_2dw_2 = 0 \qquad (52)$$

Therefore, the earnings gain for low-skilled people $h_1dw_1 > 0$ is compensated by a loss in the earn- ings of high-skilled workers $h_2dw_2 < 0$. The government values the transfer of resources $[g_1 \; g_2]\, h_1dw_1$. Under efficient rationing, positive supply elasticity and finite demand elasticity, the welfare loss due to low-skilled individuals moving to unemployment is second-order (see Figure 3).

More formally, the first order condition wrt $d\bar{w}$ is:

Figure 4:



$$+ \int_{\rightarrow_1} G^{0}(c_1 - \checkmark_1)\, dH(\checkmark_1) \frac{dw_2}{d\bar{w}} + \int_{\rightarrow_2} G^{0}(c_2 - \checkmark_2)\, dH(\checkmark_2)$$

The second and third terms come from the assumption of perfect rationing: the workers moving to unemployment from the two occupations are those with zero surplus from working therefore the welfare loss associated to the change of occupation is zero. Also, those who drop out of occupation 1
and move to 2 are indifferent between the two and we can ignore the welfare effect associated to the change by envelope theorem. Using (52) we have $dw_2/d\bar{w} = -h_1/h_2$ and the FOC becomes:

$$\frac{dSW}{dw} = h_1 Z [g_1 - g_2] > 0$$

which proves Proposition 1.

Minimum Wage with Taxes and Transfers We now assume that the government can use taxes and transfers jointly with the minimum wage policy.

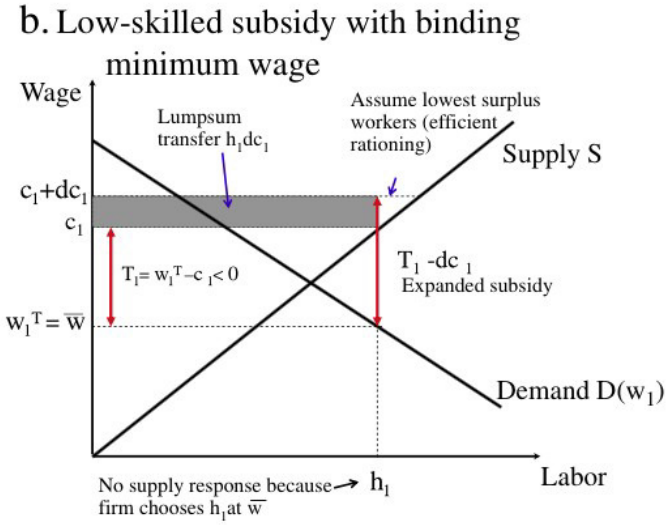
Proposition 2: *Under efficient rationing, assuming* $\varepsilon_1 < \infty$, *if* $g_1 > 1$ *at the optimal tax allocation (with no minimum wage), then introducing a minimum wage is desirable. Furthermore, at the joint minimum wage and tax optimum, we have: (i)* $g_1 = 1$ *(Full redistribution to low-skilled workers); (ii)* $h_0 g_0 + h_1 g_1 + h_2 g_2 = 1$ *(Social welfare weights average to one).*

Suppose there was no minimum wage, an attempt to increase c_1 by dc_1 while keeping c_0 and c_2 constant through an increased work subsidy provides incentives for some of the non-workers to start working in occupation 1 (extensive labor supply response) and for some of workers in occupation 2 to switch to occupation 1 (intensive labor supply response). This leads to a reduction in w_1 through demand side effects (as long as $\varepsilon_1 < \infty$). See Figure 4.

Consider the same increase in c_1 when the minimum wage was initially set at $\bar{w} = w_1^T$, where w_i^T, c_i^T is the the optimal tax and transfer system which maximizes social welfare absent the wage. Since w_1 cannot fall, labor supply responses are effectively blocked (Figure 5). Efficient rationing guarantees that individuals willing to leave occupation 1 are precisely those with the lowest surplus

from working in occupation 1 relative to their next best option. Therefore, the dc_1 change is like a lump-sum tax reform and its net welfare effect is simply $[g_1 - 1] h_1 dc_1$. If $g_1 > 1$, the introduction of the minimum wage improves upon the tax/transfer optimum allocation. This result shows that under the minimum wage policy, redistribution to low-skilled workers can be made lump-sum. Furthermore, raising the lump-sum transfer to occupation 1 improves welfare as long as $g_1 > 1$ and therefore the government will find optimal to do it until $g_1 = 1$. With no behavioral responses an increase of \$1 has a welfare effect of $h_0 g_0 + h_1 g_1 + h_2 g_2$ and at the optimal the two are equal.

Figure 5:



To prove it formally, rewrite consumption in occupation i as $Oc_i = c_i - c_0$ and the resource constraint as $h_1 \cdot (w_1 - Oc_1) + h_2 \cdot (w_2 - Oc_2) \leq c_0$. The Lagrangian of the problem is:

$$L = SW + Z [h_1 \cdot (w_1 - Oc_1) + h_2 \cdot (w_2 - Oc_2) - c_0]$$

Suppose there is a minimum wage and the government introduces a change dc_1, the wage of oc- cupation 1 does not change because of the minimum wage and so does w_2 given that w_2 (w_1) (as we showed above). As a consequence, there is no change in $h_1/h_2 = \dashrightarrow (w_2/w_1)$ and no change in the levels of h_1 and h_2 since they cannot increase simultaneously. Therefore:

$$\frac{dL}{dc_1} = \int_{\rightarrow 1} G^{0}(c_0 + Oc_1 - \checkmark_1)\, dH(\checkmark) - Z h_1 = Z [g_1 - 1]\, h_1$$

At the optimum it must be $g_1 = 1$. Taking the FOC wrt c_0 we have:

$$\frac{dL}{dc_0} = (1 - h_1 - h_2) G^{0}(c_0) + \int_{\rightarrow 1} G^{0}(c_0 + Oc_1 - \checkmark_1)\, dH(\checkmark) + \int_{\rightarrow 2} G^{0}(c_0 + Oc_2 - \checkmark_2)\, dH(\checkmark) - Z$$

$= Z [h_0 g_0 + h_1 g_1 + h_2 g_2 — 1]$

which proves Proposition 2.

Pareto Improving Reform In this section we review the last result in Lee and Saez (2012) that shows how minimum wage and low-skilled labor subsidies can be complementary. Suppose

ere are extensive margin responses only, the participation tax rate of low-skilled workers τ_1 is $1 — \tau_1 = (c_1 — c_0)/w_1$, such that $c_1 = c_0 + (1 — \tau_1) w_1$.

Proposition 3: *In a model with extensive labor supply responses only, a binding minimum wage associated with a positive tax rate on minimum wage earnings ($\tau_1 > 0$) is second-best Pareto inefficient. This result remains a-fortiori true when rationing is not efficient.*

Suppose the government reduces the minimum wage by $d\bar{w} < 0$ while keeping c_0, c_1 and c_2 constant. The change incentivizes unemployed individuals to enter occupation 1 generating a change $dh_1 > 0$ and increasing revenues since $\tau_1 > 0$. The change $dh_1 > 0$ induces a change $dw_2 > 0$. However, since $h_1 d\bar{w} + h_2 dw_2 = 0$ the mechanical effect of changes in wages is zero. Since c_0, c_1 and c_2 are constant the total effect of the government policy is only given by the increase in revenues, which is positive.

Proposition 3 implies that, when labor supply responses are concentrated along the extensive margin, a minimum wage should always be associated with low-skilled work subsidies such as the EITC.

To prove it formally notice that since consumption does not change at any occupation, the utility of those who do not switch jobs is not affected. From the demand side, we have $w_2 — (w_1)$ with $dw_2/dw_1 = h_1/h_2 < 0$ and hence $dw_2 > 0$. This implies that relative demand for high-skilled work $h_2/h_1 = \dashrightarrow (w_2/w_1)$ decreases as $\dashrightarrow ( )$ is decreasing. Because c_2 c_0 remains constant, and labor supply is only along the extensive margin, the supply of high-skilled workers is unchanged so that $dh_2 = 0$, which then implies that $dh_1 > 0$. The dh_1 individuals shifting from no work to low-skilled work are weakly better-off because they were by definition rationed by the minimum wage (strictly better off in case of inefficient rationing). The government budget is $h_1 (w_1 \; Oc_1) + h_2 (w_2 \; Oc_2) \; c_0 \leq 0$. Therefore, the net effect of the reform on the budget is: $dh_1 (w_1 \quad Oc_1) + h_1 dw_1 + h_2 dw_2 = dh_1 \tau_1 w_1 > 0$. Thus, with $\tau_1 > 0$, the reform creates a budget surplus which can be used to increase c_0 and improve everybody's welfare (with no behavioral response effects), a Pareto improvement.

7 Section 9: Linear Capital Taxation

In this section we introduce a framework to study optimal linear capital taxation. We first focus on a two-period model, define the concept of intertemporal wedge and derive optimal capital taxes using the Atkinson Stiglitz result. We then move to an infinite horizon model with aggregate uncertainty and derive optimal taxes. Finally, we study a model with capitalists and workers and show that only under some assumption about preferences we can recover a zero capital tax in steady state.[15]

A Two-Period Model

We introduce a two-period model with capital accumulation that will be useful to study the problem of capital taxation. The two time periods are t = 0 and t = 1. The preferences for individual i are $U^i(c_0, c_1, y_0)$. The individual can save period 0 income and earn gross interest rate R on savings. We start by constraining the government's instruments and focusing on a linear consumption tax, while keeping a non-linear tax on income. The budget constraints for the two periods read:

$$(1+\tau_0)c_0 \leq y_0 - T(y_0) - k_1$$

$$(1+\tau_1)c_1 \leq Rk_1$$

Combining the two we get:

$$(1+\tau_1)c_1 \leq R(y_0 - T(y_0) - (1+\tau_0)c_0) \tag{53}$$

Rearranging we have:

$$c_0 + \frac{1}{R}\left[\frac{1+\tau_1}{1+\tau_0}\right]c_1 \leq \frac{y_0 - T(y_0)}{1+\tau_0}$$

Let us denote $1+\tilde{\tau}_1 = (1+\tau_1)/(1+\tau_0)$ and $\tilde{T}(y) = (\tau_0 y + T(y))/(1+\tau_0)$. The budget constraint can be written:

$$c_0 + \frac{1}{R}[1+\tilde{\tau}_1]c_1 \leq y - \tilde{T}(y)$$

When the budget constraint holds with equality we can write consumption at time 1 as:

$$c1 = \frac{R}{1 + \tau_1} s0$$

where $s_0 = y_0 - T(y_0) - c_0$ is the total level of savings when there are no distortions in the economy. We can interpret τ as a capital income tax. It distorts inter-temporal consumption decisions by changing the relative price of c_0 and c_1. It can be interpreted as a wedge on the optimal savings decision. Notice that whenever $\tau_1 = 0$ we have no distortion in the inter-temporal choice of the agent.

Suppose the agent has separable preferences in consumption and labor of the form:

$$U(c_0, c_1, y_0) = u(c_0) + u(c_1) - h(y_0/w)$$

We can rewrite the preferences as $U(g(c_0, c_1), y_0)$ so that the utility is weakly separable in $g(\,)$ and y_0. It follows that Atkinson-Stiglitz applies: if non-linear income taxation is available the government finds optimal to set a flat zero tax on c_0 and c_1.[16]

Infinite Horizon Model - Chamley (1986)

In this section we introduce a model where capital returns and wages are endogenous. We focus on linear capital and labor taxes in an infinite horizon economy. There is aggregate uncertainty in the economy and each period t a state s_t is realized so that the history of aggregate uncertainty is a sequence $s^t = (s_0, s_1, \ldots, s_t)$. Output is produced according to a constant return to scale production function:

$$F\left(K\left(s^{t-1}\right), L\left(s^t\right), s^t, t\right) \tag{54}$$

the productive capital at time t is the stock that was chosen at time t 1. The firm solves the following profit maximization problem:

$$\max_{K,L} F\left(K\left(s^{t-1}\right), L\left(s^t\right), s^t, t\right) - w\left(s^t\right) L\left(s^t\right) - r\left(s^t\right) K\left(s^t\right)$$

Competitive labor and capital markets imply that input prices are equal to their marginal product:

$$w\left(s^t\right) = F_L\left(K\left(s^{t-1}\right), L\left(s^t\right), s^t, t\right)$$

$$r\left(s^t\right) = F_K\left(K\left(s^{t-1}\right), L\left(s^t\right), s^t, t\right)$$

The economy is populated by a representative agent whose utility is:

$$\sum_{s^t} \beta^t \Pr\left(s^t\right) u\left(c\left(s^t\right), L\left(s^t\right)\right)$$

where $\Pr(s^t)$ is the probability of history s^t. The aggregate resource constraint of the economy is:

$$c\left(s^t\right) + g\left(s^t\right) + K\left(s^t\right) - (1 - \delta) K\left(s^{t-1}\right) \leq F\left(K\left(s^{t-1}\right), L\left(s^t\right), s^t, t\right) \tag{55}$$

The output produced is employed to finance consumption, public spending and investments. The resource constraint implicitly assumes that aggregate uncertainty results from technology or govern- ment spending shocks. The government optimally chooses taxes on labor income $\tau^1(s^t)$ and taxes on

capital income $\tau^k(s^t)$ and starts with initial debt B_0.

We assume complete markets where the price of an Arrow-Debreu security is $p(s^t)$.[17] The government budget constraint is:

$$\sum_{t,s^t} p(s^t)\left[g(s^t) - \tau^l(s^t)w(s^t)L(s^t) - \tau^k(s^t)r(s^t)\left[K(s^{t-1}) - \delta K(s^{t-1})\right]\right] \leq -B_0$$

Taxes on consumption and capital are employed to finance government layouts $g(s^t)$. Notice that the capital tax is levied on the capital gain net of the capital depreciation.

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separable preferences $V(g(\mathbf{x}), y)$, where $\mathbf{x}$ is a vector of commodities. Suppose we start from a situation where there are positive taxes on commodities and we implement a policy such that $\mathbf{t} = \mathbf{0}$: zero flat tax on all commodities. Suppose the government offsets the utility change of the agent with non-linear income taxes such that labor supply is unchanged at the optimum and $V(g(\mathbf{x}'), y') = V(g(\mathbf{x}), y)$. By definition every agent has the same utility as before and no one is willing to imitate another individual (if they were not willing to imitate before the tax change). By revealed preference

we know that $\sum_k p_k x_k > y - T(y)$: the agent cannot afford the old bundle under the current income taxation. Under the old policy scenario the agent could afford the bundle and we had $\sum_k (p_k + \tau_k) x^0 \leq y - T(y)$. Combining the two inequalities we find that $\sum_k \tau_k x_k < T(y) - T(y)$ and the total revenue raised after the tax change is strictly higher than total revenues before the tax change. Since incentive compatibility holds and we have no welfare effect by construction, the new policy is welfare improving since it raises more revenues.

[17] An Arrow-Debreu security is a financial instrument that provides one unit of consumption in a state s_t and zero units in any other state. We talk about complete markets whenever we can price such an asset in every state of the world.

The household budget constraint reads:

$$\sum_{t,s^t} p(s^t)\left[c(s^t) + K(s^t) - w(s^t)(1-\tau^l(s^t))L(s^t) - R(s^t)K(s^{t-1})\right] \leq B_0 \quad (56)$$

where $R(s^t) = 1 + (1-\tau^k(s^t))(r(s^t) - \delta)$ is the gross interest rate net of taxes. We can set up the Lagrangian for the consumer problem:

$$\mathcal{L} = \sum_{s^t} \beta^t \Pr(s^t) u(c(s^t), L(s^t)) + \lambda\left[B_0 - \sum_{t,s^t} p(s^t)\left[c(s^t) + K(s^t) - w(s^t)(1-\tau^l(s^t))L(s^t) - R(s^t)K(s^{t-1})\right]\right]$$

The first order conditions are:

$$\beta^t \Pr(s^t) u_c(c(s^t), L(s^t)) - \lambda p(s^t) = 0 \quad (57)$$

$$\beta^t \Pr(s^t) u_L(c(s^t), L(s^t)) + \lambda p(s^t)(1-\tau^l(s^t)) w(s^t) = 0 \quad (58)$$

$$-\lambda p(s^t) + \lambda \sum_{s_{t+1}} p(s^{t+1}) R(s^{t+1}) = 0 \quad (59)$$

On top of the FOCs, a non-arbitrage condition must hold between capital and Arrow-Debreu securities:

$$p(s^t) = \sum_{s_{t+1}} p(s^{t+1}) R(s^{t+1}) \quad (60)$$

We can define a competitive equilibrium as follows:

Definition: *A competitive equilibrium is a policy* $\{g(s^t), \tau^k(s^t), \tau^l(s^t)\}$*, an allocation* $\{c(s^t), K(s^t), L(s^t)\}$ *and prices* $w(s^t), r(s^t), p(s^t)$*, such that households maximizes utility s.t. budget constraint, firms maximize profits, the government budget constraint holds and markets clear*

Combining (57) and (58) we get the standard intratemporal condition for labor supply:

$$\frac{\beta^t \Pr(s^t) u_c(c(s^t), L(s^t))}{p(s^t)} = \frac{\beta^t \Pr(s^t) u_L(c(s^t), L(s^t))}{p(s^t)(1-\tau^l(s^t))w(s^t)}$$

$$(1-\tau^l(s^t))w(s^t) = -\frac{u_L(c(s^t), L(s^t))}{u_c(c(s^t), L(s^t))}$$

From (57) and (59) we derive the so called Euler equation that pins down the slope of the con- sumption path of the agent:

Starting from (56), we can rewrite it using the optimality conditions and the no-arbitrage condition:

$$\sum_{t,s^t} p(s^t) c(s^t) = w(s^t)(1-\tau^l(s^t)) L(s^t) + B_0 + R_0 K_0$$

$$\sum_{t,s^t} \beta^t \Pr(s^t) u_c(c(s^t), L(s^t)) c(s^t) + \sum_{t,s^t} \beta^t \Pr(s^t) \frac{u_L(c(s^t), L(s^t))}{u_c(c_0, L_0)} (1-\tau^l(s^t)) L(s^t) \leq B_0 + \sum_{t,s^t} \beta^t \Pr(s^t) \frac{u_c(c(s^t), L(s^t))}{u_c(c_0, L_0)} (1-\tau^l(s^t)) w(s^t) L(s^t)$$

$$\sum_{t,s^t} \beta^t \Pr(s^t) u_c(c(s^t), L(s^t)) c(s^t) + \sum_{t,s^t} \beta^t \Pr(s^t) u_L(c(s^t), L(s^t)) L(s^t) \leq u_c(c_0, L_0)[B_0 + R_0 K_0] \quad (63)$$

We call the constraint in (63) implementability constraint since it captures the agent's optimal choices subject to their feasibility.

Optimal Taxes The government chooses taxes to maximize the welfare of the representative agent subject to the resource constraint and the implementability constraint. The problem reads:

$$\max_{c(s^t), L(s^t), K(s^t), K_0} \sum_{s^t} \beta^t \Pr(s^t) u(c(s^t), L(s^t))$$

s.t.

$$c(s^t) + g(s^t) + K(s^t) - (1-\delta) K(s^{t-1}) \leq F(K(s^{t-1}), L(s^t), s^t), t^t)$$

$$\sum_{t,s^t} \beta^t \Pr(s^t) u_c(c(s^t), L(s^t)) c(s^t) + u_L(c(s^t), L(s^t)) L(s^t) \leq u_c(c_0, L_0)[B_0 + R_0 K_0]$$

We assume K_0 is fixed, we denote with μ the multiplier on the implementability constraint and define:

$$W(c(s^t), L(s^t)) = u(c(s^t), L(s^t)) + \mu [u_c(c(s^t), L(s^t)) c(s^t) + u_L(c(s^t), L(s^t)) L(s^t)]$$

The government problem

$$\max_{c(s^t), L(s^t), K(s^t)} \sum_{s^t} \beta^t \Pr(s^t) W(c(s^t), L(s^t)) - \mu u_c(c_0, L_0)[B_0 + R_0 K_0]$$

s.t.

$$c(s^t) + g(s^t) + K(s^t) - (1-\delta)K(s^{t-1}) \leq F(K(s^{t-1}), L(s^t), s^t, t)$$

For any period $t \neq 0$ the FOCs are:

$$\beta^t \Pr(s^t) W_c(c(s^t), L(s^t)) - \mu(s^t) = 0$$

$$\beta^t \Pr(s^t) W_L(c(s^t), L(s^t)) + \mu(s^t) F_L(K(s^{t-1}), L(s^t), s^t, t) = 0$$

$$-\mu(s^t) + \sum_{s^{t+1}} \mu(s^t, s_{t+1}) \left[F_k(K(s^{t-1}), L(s^t), s^t, t) + (1-\delta)\right] = 0$$

Combining the FOCs we get an intratemporal condition:

$$\frac{W_L(c(s^t), L(s^t))}{W_c(c(s^t), L(s^t))} = -F_L(K(s^{t-1}), L(s^t), s^t, t)$$

Using the household FOC in (58), we can rewrite the optimality condition as a function of the tax:

$$1 + \tau_L(s^t) = \frac{u_L(c(s^t), L(s^t))}{W_c(c(s^t), L(s^t))}$$

From the government FOCs we can also derive an intertemporal condition:

$$W_c(c(s^t), L(s^t)) = \beta \sum_{s^{t+1}} \Pr(s^{t+1}|s^t) W_L(c(s^{t+1}), L(s^{t+1})) R(s^{t+1})$$

where $R(s^t) = 1 + F_K(K(s^{t-1}), L(s^t), s^t, t) - \delta$ is the untaxed gross return on capital net of depreciation. Again, exploiting the household's Euler equation we can derive:

$$R(s^{t+1}) = \frac{W_c(c(s^t), L(s^t))}{\beta W_c(c(s^{t+1}), L(s^{t+1}))} \frac{u_c(c(s^{t+1}), L(s^{t+1}))}{u_c(c(s^t), L(s^t))}$$

Proposition 1: *Suppose that (i) there is no uncertainty (ii) there is a steady state. Then in the steady state* $\tau^k = 0$ *is optimal.*

It is easy to see that in a steady state when there is no uncertainty $R(ss) = R(ss)$, which implies:

$$1 + (1-\delta)\tau^k(ss)\left(F_k(K(ss), L(ss)) - \delta\right) = 1 + F_K(K(ss), L(ss), ss) - \delta$$

and that $\tau^k(ss) = 0$.

Now consider a special case with separable preferences and constant intertemporal elasticity of substitution:

$$u(c, L) = \frac{c^{1-a}}{1-a} - v(L)$$

then we have:

$$W(c, L) = \left(\frac{c^{1-a}}{1-a}\right)^{\frac{1}{1-a}} - v(L)$$

$$-v(L)+\mu\left[c^{-a}c-v'(L)L\right]$$

$$=\frac{1}{(L)L}\left[\mu\frac{c^{1-a}}{a}\right]\left[v(L)+\mu v'\right]$$

therefore :

$$W_c = (1+\mu(1-a))\,c^{-a}$$
$$= (1+\mu(1-a))\,u_c$$
$$\frac{W_c}{u_c} = 1+\mu(1-a)$$

$$\sum$$

Equation (65) reduces to $R\ s^{t+1} = R^{*}\ s^{t+1}$. Hence, we established that for separable preferences with constant intertemporal elasticity of substitution we have zero capital taxation even out of the steady state and in a model with uncertainty.

Tax Smoothing Take now the special case where v (L)= $\lambda L^{\varsigma}/\mu$ is isoelastic, we have:

$$W(c, L) = \left(\frac{1}{1-a} + \mu\right) c^{1-a} - \lambda \left(\frac{1}{\mu} + \mu\right) L^{\varsigma}$$

it follows that

$$\frac{W_L}{u_L} = 1 + \mu\mu$$

the optimal linear labor tax becomes:

$$\tau_{l,t} = 1 - \frac{1+\mu(1-a)}{1+\mu\mu}$$

Therefore, labor taxes are constant across states and over time. The government finds optimal to smooth distortions to labor supply. This result depends on the possibility of setting state-contingent capital taxes. If the labor elasticity is constant and shocks can be offset using capital taxes, there is no residual reason to differentially tax labor.

Infinite Horizon - Judd (1985)

We now introduce the model by Judd (1985) where the famous "zero steady state capital tax" result arise. We then show that the result is not general and depends on the agent's preferences as shown in Werning Straub (2015). Suppose there are two agents: capitalists and workers. The former save, get the return to capital and do not work; the latter supply one unit of labor inelastically and consume
everything they earn. The government taxes return to capital and pays transfers to workers. Output is produced according to a constant return to scale technology with production function $F(k_t, n_t)$. Aggregate labor is $n_t = 1$ so that we can rewrite $f(k_t) = F(k_t, 1)$. Capitalists have utility $U(C_t)$ and workers' utility is $u(c_t)$. The resource constraint of the economy is:

$$c_t + C_t + g + k_{t+1} \leq f(k_t) + (1 - 6)k_t$$

Under the assumption of perfectly competitive labor markets, wages are:

$$w_t = F_L(k_t, n_t) = f(k_t) - k_t f'(k_t)$$

The after-tax return to capital is:

$$R_t = 1 + (1 - \tau_t)(R_t^k - 1)$$

where $R^k = f'(k_t) + 1 - 6$.

Capitalists solve the following maximization problem:

$$C_t + a_{t+1} = R_t a_t$$

The optimality condition delivers the standard Euler equation $U'(C_t) = \beta R_{t+1} U'(C_{t+1})$. Since total wealth must equal total capital stock in equilibrium, using the Euler equation:

$$C_t + k$$

$$= \frac{U'(C_{t-1})}{\beta U'(C_t)} k_t \qquad \text{———}$$

rearranging :

$$\beta U'(C_t)(C_t + k_{t+1}) = U'(C_{t-1})k_t \tag{66}$$

Equation (66) is the implementability constraint. The government maximizes the following objec- tive function, where μ is the Pareto weight on capitalists:

$$\max_{c_t, C_t, k_{t+1}} \sum_{t=0}^{1} \beta^t (u(c_t) + \mu U(C_t))$$

The Lagrangian of the problem is:

$$\begin{aligned} L = & \sum_{t=0}^{1} \beta^t (u(c_t) + \mu U(C_t)) \\ & + \sum_{t=0}^{1} \beta^t Z_t (f(k_t) + (1-\delta)k_t - c_t - C_t - g - k_{t+1}) \\ & + \sum_{t=0}^{1} \beta^t \mu_t (\beta U'(C_t)(C_t + k_{t+1}) - U'(C_{t-1})k_t) \end{aligned}$$

with $\mu_0 = 0$ since there is no implementability in the first period (k_0 is taken as given). The first order conditions wrt to c_t, k_{t+1} and C_t are respectively:

$$u'(c_t) = Z_t \tag{67}$$

$$\frac{Z_{t+1}}{Z_t}(f'(k_{t+1}) + 1 - \delta) = \frac{1}{\beta} + \frac{U'(C_t)}{Z_t}(\mu_{t+1} - \mu_t) \tag{68}$$

$$\mu_{t+1} = \frac{\mu_t}{k_{t+1}}\left(C_{t+1} + k_{t+1} + \frac{U'(C_t)}{U''(C_t)}\right) + \frac{1}{\beta k_{t+1}}\left(\frac{U'(C_t)}{U''(C_t)} - \frac{Z_t}{U''(C_t)}\right) \tag{69}$$

It is straightforward from equation (68) that whenever a steady state exists it involves zero capital taxes and $R(ss) = f'(k_t) + 1 - \delta = R^*$. This result is extremely powerful since it is independent of the welfare weight attached to capitalists. However, the result does not hold for the case where $a = 1$. Rewrite the FOCs (68) and (69) using the inverse intertemporal elasticity of substitution $a_t = -U''(C_t)C_t/U'(C_t)$ and defining the ratio $v_t = U'(C_t)/u'(c_t)$:

$$(68) \Rightarrow \frac{u'(c_{t+1})}{u'(c_t)}(f'(k_{t+1}) + 1 - \delta) = \frac{1}{\beta} + \frac{(\mu_{t+1} - \mu_t)}{v_t}$$

$$(69) \Rightarrow \mu_{t+1} = \mu_t\left(\frac{1 - 1/a_{t+1}}{k_{t+1}} + 1\right) + \frac{1}{\beta k_t a_t}(1 - \mu_t v_t)$$

Take the case where $a = 1$ (log preferences) and the allocation converges to a steady state, then:

$$\mu_{t+1} - \mu_t = \frac{R^* - \frac{1}{\beta}}{v}$$

$$\frac{\mu_{t+1} - \mu_t}{\mu_t} = \frac{1 - \mu v}{\beta k v}$$

$$\Rightarrow R^{*} - \frac{1}{\beta} = \frac{1-\mu\nu}{\beta}$$

As long as there is a low enough weight on capitalists, capital is taxed in steady state. For a long time we thought that this was simply an anomaly for the logarithmic case. However, Werning and Straub (2015) show that the result does not hold for any $a > 1$ by noticing that the steady state does not necessarily exist.

Proposition 2: *If* $a > 1$ *and* $\mu = 0$*, then for any initial* k_0 *the solution to the planning problem does not converge to the zero-tax steady state, or any other interior steady state.*

Suppose capital taxes are raised in the future, capitalists will decrease savings today for the substi- tution effect. A capital tax increase will also reduce agent's wealth and lower capitalists' consumption through the income effect. When $a > 1$ the income effect prevails and capitalists save more. The in- crease in the capital stock increases wages and is beneficial for workers. For this reason the government wants to set positive capital taxes in the long-term. The opposite is true when $a < 1$: the substitution effect is larger than the income effect and zero taxes in the future increase savings in the short term increasing wages and workers' consumption.

9 Section 10: Education Policies and Simpler Theory of Capital Taxation

In this section we study education policies in a simplified version of framework analyzed by Stantcheva (2016). We then review a simpler theory of capital taxation proposed by Saez and Stantcheva (2016) in a continuous time model.

Education Policies

We study a static model with human capital investments based on Bovenberg and Jacobs (2005, 2011) and Stantcheva (2016). Suppose individuals are heterogeneous in ability θ distributed according to $f(\theta)$. Agents can invest in education paying a monetary cost $M(e)$ such that $M'(e) > 0$ and $M''(e) \geq 0$. Wages are a function of ability and human capital that we can write as $w(\theta, e)$. Denote with $\rho_{\theta e}$ the Hicksian coefficient of complementarity between ability and education defined as:

$$\rho_{\theta e} = \frac{w_{\theta e} w}{w_{\theta} w_e}$$

Consider two special cases for the wage function: (i) multiplicative $w(\theta, e) = \theta e$ implies $\rho_{\theta e} = 1$; (ii) constant elasticity of substitution $w(\theta, e) = \left(\alpha\theta^{\frac{\rho-1}{\rho}} + (1-\alpha)e^{\frac{\rho-1}{\rho}}\right)^{\frac{\rho}{\rho-1}}$ implies $\rho_{\theta e} = \rho$. The elasticity of the wage to ability is $\varepsilon_{w,\theta} = \partial \log(w)/\partial \log(\theta)$.

Suppose utility is quasi-linear in consumption such that:

$$u(c, l) = c - h(l)$$

The agent consumes everything that is left after taxes and education investments such that $c(\theta) = w(\theta, e(\theta))l(\theta) - M(e(\theta)) - T(w(\theta, e(\theta))l(\theta), e(\theta))$. Solving the individual maximization problem we can define income and education wedges as:

$$\tau_y(\checkmark) = 1 - \frac{h'(l(\checkmark))}{w(\checkmark, e(\checkmark))} \tag{70}$$

$$\tau_e(\checkmark) = w_e(\checkmark, e(\checkmark))\, l(\checkmark)\,(1 - \tau_y(\checkmark)) - M'(e(\checkmark)) \tag{71}$$

) The elasticity of labor to the net of tax wage is:

$$\varepsilon = \frac{h'(l)}{h''(l)\, l}$$

We can write the indirect utility as $u(\checkmark) = c(\checkmark) \quad h(l(\checkmark))$. Using the Envelope we can derive the local incentive constraint:

$$\frac{\partial u(\checkmark)}{\partial \checkmark} = l(\checkmark)\frac{w_{\checkmark}(\checkmark, e(\checkmark))}{w(\checkmark, e(\checkmark))} h'(l(\checkmark)) \tag{72}$$

It differs from the one derived in the standard problem by the term $w_{\checkmark}(\checkmark, e(\checkmark))$, that takes into account the effect of ability on the wage. In the stardard problem we normalized it to 1.

The resource constraint is:

$$\int (w(\checkmark, e(\checkmark))\, l(\checkmark) - u(\checkmark) - h(l(\checkmark)) - M(e(\checkmark)))\, f(\checkmark)\, d\checkmark \leq E \tag{73}$$

The government assigns welfare weight $\hat{}(\checkmark)$ to each $\checkmark$ and solves:

$$\max_{c(\theta),l(\theta),e(\theta),u(\theta)} \int \psi(\theta)\, u(\theta)\, f(\theta)\, d\theta$$

subject to (72) and (73).

The first order conditions wrt $u(\theta)$, $l(\theta)$ and $e(\theta)$ are respectively:

$$\psi(\theta) f(\theta) - Z f(\theta) = -\mu'(\theta) \quad (74)$$

$$\mu(\theta) \left[\frac{w_\theta}{w} h'(l) + l \frac{w_\theta}{w} h''(l) \right] + Z\left[w - h'(l)\right] f(\theta) = 0 \quad (75)$$

$$\mu(\theta) \left[-\frac{1}{w^2} w_e w_\theta h'(l) + \frac{1}{w} w_{\theta e} h' \right] + Z\left[\ldots - M'(e)\right] f(\theta) \quad (76)$$

Taking the integral over (74) we derive $\mu(\theta) = -(\Psi(\theta) - F(\theta))$. Using (75), (70) and the definition of the elasticity of labor supply we get:

$$\frac{-\mu(\theta)}{Zw} \frac{w_\theta}{w} h'(l) \left[1 + l\frac{h''(l)}{h'(l)} \right] = \tau_y(\theta)\, f(\theta)$$

$$\frac{-\mu(\theta)\, w_\theta\, (1 - \tau_y(\theta))}{Zw} \left[1 + l\frac{h''(l)}{h'(l)} \right] = \tau_y(\theta)\, f(\theta)$$

$$\frac{\tau_y(\theta)}{1 - \tau_y(\theta)} = \frac{\Psi(\theta) - F(\theta)}{f(\theta)} \frac{w_\theta}{w} \left(\frac{1 + \varepsilon}{\varepsilon} \right) = \frac{\Psi(\theta) - F(\theta)}{f(\theta)} \frac{\varepsilon_{w,\theta}}{\theta} \left(\frac{1 + \varepsilon}{\varepsilon} \right) \quad (77)$$

The optimal income wedge is similar to the one we studied in Section 3. The formula has an extra term proportional to the elasticity of the wage to ability. Labor distortions are higher at the optimum when income is highly elastic to ability: the government distorts labor more when income is mostly explained by ability and less by effort or investment in education.

Notice that:

$$w_e l - M'(e) = \frac{\tau_e + M'(e)\tau_y}{1 - \tau_y}$$

Rearranging (76) and using (70) and (71) we get:

$$\mu(\theta) l \frac{w_e w_\theta}{w^2} h'(l) \left[-1 + \frac{w_{\theta e} w}{w_\theta w_e} \right] + Z \frac{\tau_e + M'(e)\tau_y}{1 - \tau_y} f(\theta) = 0$$

$$\frac{\tau_e(\theta) + M'(e)\tau_y(\theta)}{(1 - \tau_y)} = \frac{\Psi(\theta) - F(\theta)}{\ldots} l \frac{w_\theta w_e}{\ldots} \ldots \quad (78)$$

The optimal education wedge decreases in the Hicksian coefficient of complementarity. When education and ability are complements (i.e. $\rightarrow_{\checkmark e} > 0$) the government wants to discourage human capital investments in order to redistribute income more. On the other hand, if the coefficient is negative or low, education benefits low ability individuals more and a government subsidy to education helps redistribution. Suppose the wage function is $w(\checkmark, e) = \checkmark e$ and the monetary cost is linear in e, the optimal wedge is $\mathbb{T}_e(\checkmark) = \mathbb{T}_y(\checkmark)$. This is the special case studied by Bovenberg and Jacobs (2005) whose result is that income and education taxes are "Siamese Twins" and both margins should be distorted the same way. They also prove that the optimal linear education subsidy is equal to the optimal linear income tax rate, which is equivalent to making human capital expenses fully tax deductible.

A Simpler Theory of Capital Taxation

We introduce in this paragraph a continuous time model with wealth in the utility function. We study the case where utility is quasi-linear in consumption that allows us to transofrm the problem in a static taxation problem.

Suppose individual i has utility $u_i(c, k, z) = c + a_i(k)\, h_i(z)$ where $a_i(\,)$ is increasing and concave and $h_i(\,)$ is the standard disutility from labor. Agents have heterogeneous discount rates 6_i. The discounted utility is:

$$V_i(\{c_i(t), k_i(t), z_i(t)\}) = 6_i \int_0^{\hat{}} 1\, [c_i(t) + a_i(k_i(t)) - h_i(z(t))]\, e^{-6it} dt \qquad (79)$$

Capital accumulates according to:

$$\frac{dk_i(t)}{d} = rk_i(t) + z_i(t) - T_i(z(t), rk(t)) - c(t) \qquad (80)$$

where $T(z_i(t), rk_i(t))$ is the tax paid by individual i and is dependent on income and capital returns. Wealth accumulation depends on the heterogeneous individual preferences, as embodied in the taste for wealth $a_i(\,)$ and in the impatience 6_i. It also depends on the net-of-tax return $\bar{r} = r(1 - T_k)$: capital taxes discourage wealth accumulation through a substitution effect (there are no income effects).

The Hamiltonian for the individual maximization problem is:

$$H_i(c_i(t), k_i(t), z_i(t), Z(t)) = [c_i(t) + a_i(k_i(t)) - h_i(z(t))]\, e^{-6it} + Z_i(t)[rk_i(t) + z_i(t) - T(z_i(t), rk_i(t)) - c_i(t)]$$

Taking first order conditions we have:

$$\frac{@H_i}{@} = e^{-6it} - Z(t) = 0$$

$$\frac{@H_i}{@z_i} = -h'(z(t))\, e^{-6it} + Z(t)\, [1 - T_i(z(t), rk(t))] = 0$$

$$\frac{@H_i}{(1 -} = a'(k(t))\, e^{-6it} + Z(t)\, r(z(t), rk(t))) = -Z'(t)$$

Rearranging:

$$@k_i(t) \quad i \; i \quad i \quad k \; i \quad i \quad i$$

$$Z_i(t) = e^{-6it},\ h_i^{0}(z(t)) = 1 - T_z(z_i(t), rk_i(t)),\quad a_i^{0}(k_i(t)) = 6_i - r(1 - T_k(z_i(t), rk_i(t)))$$

Since utility is quasi-linear in consumption, the model converges immediately to a steady state. Denote (c_i, z_i, k_i) the steady state allocation, the problem collapses to a static optimization of the following objective function:

$$V_i(\{c_i(t), k_i(t), z_i(t)\}) = [c_i + a_i(k_i) - h_i(z)] + 6_{ii}\,\hat{}\,k^{init} - k_i^{\Sigma}$$

where k_i^{init} is the inherited level of capital and $\hat{}\,k^{init} - k_i^{\wr}$ is the utility cost of going from k_i^{init} to the steady-state level.

The government maximizes the following:

$$SWF = \int_i !_i U_i(c_i, k_i, z_i)\,di$$

with $\omega_i \leq 0$ is the Pareto weight on individual i. The social marginal welfare weight is $g_i = \omega_i U_{ic}$.

Optimal Linear Taxes Suppose the government sets linear income and capital taxes τ_L and τ_K. The individual chooses labor and capital according to $a_i'(k_i) = \theta_i - \bar{r}$ and $h_i'(z_i) = 1 - \tau_L$ with $\bar{r} = r(1-\tau_K)$. The government balances the budget through lump-sum transfers for a total of $G = \tau_K r k^m(\bar{r}) + \tau_L \cdot z^m(1-\tau_L)$, where $z^m(1-\tau_L) = \int z_i di$ is the aggregate labor income and $k^m(\bar{r}) = \int k_i$ is aggregate capital. Total consumption is $c_i = (1-\tau_K) r k_i + (1-\tau_L) z_i + \tau_K r k^m(\bar{r}) + \tau_L z^m(1-\tau_L)$ and the government maximizes:

$$SWF = \int_i \omega_i \left[(1-\tau_K) r k_i + (1-\tau_L) z_i + \tau_K r k^m + \tau_L \cdot z^m + a_i(k_i) - h_i(z_i) + \theta_i \cdot \left(k^{init} - k_i \right) \right] di$$

Using the Envelope theorem we get:

$$\frac{dSW}{d\tau_K} = \int \omega_i \left[-r k_i + r k^m + \tau_K r \frac{\partial k^m}{\partial \tau_k} \right] di$$

$$= r k^m \left[\int_i \omega_i \left(1 - \frac{k_i}{k^m} \right) di \right] \frac{\tau_K}{1-\tau_K} e_K$$

where e_K is the elasticity of aggregate capital with respect to the net of tax return $\bar{r}$. At the optimum $dSWF/d\tau_K = 0$ and the optimal linear tax is:

$$\tau_k = \frac{1 - \bar{g}_K}{1 - \bar{g}_K + e_K}$$

where $\bar{g}_K = \int_i g_i k_i / \int_i k_i$. This is the standard formula for optimal linear taxes that we studied in Section 2 applied to capital. Notice that whenever capital accumulation is uncorrelated with social marginal welfare weights (i.e. $\bar{g}_K = 1$) the optimal tax is zero. The reason is that if capital has no tag value the government does not find optimal to tax capital for redistributive purposes. We also know from previous sections that the revenue maximizing tax rate corresponds to the case of $\bar{g}_K = 0$ and it is $\tau_K = 1/1 + e_K$.

Optimal Non-Linear Separable Taxes Suppose the government optimally sets $T_K(rk)$ and $T_L(z)$. The individual budget constraint is:

$$c_i = rk_i - T_K(rk_i) + z_i - T_L(z_i)$$

Define with $\bar{G}_K(rk)$ the average relative welfare weight on inviduals with capital income higher than rk. We have:

$$\bar{G}_K(rk) = \frac{\int_{\{i: rk_i \leq rk\}} g_i di}{}$$

$$P(rk_i \leq rk)$$

Let $h_K(rk)$ be the distribution of capital income so that the Pareto parameter associated to the capital income distribution is:

$$\zeta_K(rk) = \frac{rk \cdot h_K(rk)}{1 - H_K(rk)}$$

Denote $e_K(rk)$ the elasticity of capital income with respect to the net of tax return $r(1 - T_K'(rk))$. Suppose the government introduces a small reform $dT_K(rk)$ where the marginal tax rate is increased by dt_K in a small interval of capital income from rk to rk + d(rk). The mechanical effect associated to the reform is:

$$d(rk)\, dt_K\, [1 - H_K(rk)]$$

The welfare effects just weights the mechanical effect by $\bar{G}(rk)$, the social marginal welfare weight associated to capital incomes above rk. Individuals who face the increase in the tax rate change
their capital incomes by $db(rk) = -e_K dt_K / (1 - T_K'(rk))$. There are $h_K(rk)\, d(rk)$ individuals in the window affected by the tax change. Therefore, the total behavioral effect is:

$$-h_K(rk)\, d(rk)\, rk \frac{T_K'(rk)}{1 - \zeta_K(rk)} e_K(rk)\, dt_K$$

Summing up the three effects and rearranging we find:

$$\frac{1 - T_K'(rk)}{T_K'(rk)} = \frac{1}{e_K(rk)} \cdot \frac{1 - H_K(rk)}{rk \cdot h_K(rk)} \left[1 - \bar{G}(rk)\right]$$

Using the definition of the Pareto parameter we derive:

$$T_K'(rk) = \frac{1 - \bar{G}_K(rk)}{1 - \bar{G}_K(rk) + \zeta_K(rk) \cdot e_K(rk)}$$

which looks like the standard optimal non-linear tax formula.

10 Section 11: Non-Linear Capital Taxation

In this section we first introduce a framework to study non-linear capital taxes and establish the inverse Euler equation relation at the optimum. We then discuss implications of the inverse Euler equation, the effect of skill shocks on consumption and the trend in consumption inequality required by a Pareto-optimal allocation.[18]

Non-Linear Capital Taxation: Two-Periods Model

We introduce in this paragraph a two-period model with idiosyncratic uncertainty that unfolds over time. The agent chooses savings and consumption today without knowing the realization of a stochastic variable s in period 1 that can be interpreted as the agent's skills. Preferences are represented by $U(c_0, c_1, y(s)/s)$. Notice that the two periods model we saw in section 9 had a time-0 shock, while in the current model uncertainty unfolds in period 1. We will show that in the current model when preferences are weakly separable, the Atkinson-Stiglitz result does not hold.

Individuals save through a linear storage technology with rate of return $R^* = 1/q$ and the aggregate resource constraint is:

$$c_0 + q \sum_s c_1(s)\, p(s) \leq q \sum_s y(s)\, p(s) \qquad (81)$$

The individual maximizes utility:

$$\sum_s U(c_0, c_1(s), y(s)/s)\, p(s)$$

subject to (81).

First-Best The first-best allocation is characterized by the following two first-order conditions:

$$E[U_{c0}(c_0, c_1(s), y(s)/s)] = Z$$

$$U_{c1(s)}(c_0, c_1(s), y(s)/s) = Zq$$

which imply:

$$E[U_{c0}(c_0, c_1(s), y(s)/s)] = R^* U_{c1(s)}(c_0, c_1(s), y(s)/s) \qquad 8s \qquad (82)$$

Since the condition holds for every realization of s and E $[U_{c0}(c_0, c_1(s), y(s)/s)]$ is constant, it follows that in the first best the marginal utility of consumption across all states is equalized. This implies we have full insurance and consumption is the same in every state of the world. Assuming
separability in consumption and labor and taking expectations on both sides of (82) we obtain the standard Euler equation:

$$u'(c_0) = \beta R E[u'(c_1(s))]$$

and $c_1(s) = c_1$ for every s.

[18] Part of these notes is based on the Lecture notes by Florian Scheuer.

Second-Best Suppose now that s is private information of the agent. We know that we can solve the problem by invoking the revelation principle. We assume the agent reports $r = a(s)$, where a is the reporting strategy and truthtelling implies $a^{-1}(s) = s$. We denote consumption and income under the reporting strategy a with $c^a(s) = c_1(a(s))$ and $y^a(s) = y(a(s))$. Incentive compatibility requires:

$$E[U(c_0, c_1(s), y(s)/s)] \geq E[U_1(c_0, c^a(s), y^a(s)/s)] \quad \forall a, s$$

which is equivalent to:

$$U(c_0, c_1(s), y(s)/s) \geq U(c_0, c_1(r), y(r)/s) \quad \forall r, s \qquad (83)$$

An allocation is feasible whenever it satisfies (81) and (83).

Given that an allocation is feasible we can ask whether free savings is feasible, meaning that extra O savings in period 0 leave the incentive compatibility unchanged. Suppose that preferences are quasi-linear in consumption such that:

$$U(c_0, c_1(s), y(s)/s) = \hat{U}(c_0, c_1(s) - h(y(s)/s))$$

the incentive compatibility condition holds if:

$$\hat{U}(c_0 - O, c_1(s) + R O - h(y(s)/s)) \geq \hat{U}(c_0 - O, c_1(r) + R O - h(y(r)/s))$$

this is true if and only if:

$$c_1(s) + R O - h(y(s)/s) \geq c_1(r) + R O - h(y(r)/s)$$

therefore, only if $c_1(s) - h(y(s)/s) \geq c_1(r) - h(y(r)/s)$ that is implied by the feasibility of the original allocation. This is always true when there are no income effects. However, if there were income effects a change in savings in period 0 would have a negative effect on the labor supply in period 1.

We study the case with income effects assuming separable preferences in consumption and labor. Consider the following preferences:

$$U(c_0, c_1(s), y(s)/s) = u(c_0) + \beta u(c_1(s)) - h(y(s)/s)$$

Consider the variation:

$$(c_0 - O, c_1(s) + \delta(O, s), y(s))$$

such that

$$u(c_0 - O) + \emptyset u(c_1(s) + 6(O,s)) = u(c_0) + \emptyset u(c_1(s)) + A(O) \quad 8s, O \quad (84)$$

for some A (O) such that the variation is resource neutral:

$$-O + q \sum_s 6(O,s)\, p(s) = 0 \quad 8O \quad (85)$$

Incentive compatibility after the variation holds if:

$$u(c_0 - O) + \emptyset u(c_1(s) + 6(O,s)) - h(y(s)/s) \leq u(c_0 - O) + \emptyset u(c_1(r) + 6(O,r)) - h(y(r)/s)$$

Using (84), we have:

$$u(c_0) + \emptyset u(c_1(s)) + A(O) - h(y(s)/s) \leq u(c_0) + \emptyset u(c_1(r)) + A(O) - h(y(r)/s)$$
$$u(c_0) + \emptyset u(c_1(s)) - h(y(s)/s) \leq u(c_0) + \emptyset u(c_1(r)) - h(y(r)/s)$$

which holds since the original allocation was incentive compatible. It follows that the total utility from consumption is everything that matters for incentive compatibility when it is changed indepen- dently from s.

Inverse Euler Equation Suppose a feasible allocation solves the second-best problem, the variation that we just studied should not improve the welfare of the agent. We have:

$$0 = \arg\max_O \sum_s p(s)\,[u(c_0 - O) + \emptyset u(c_1(s) + 6(O,s)) - h(y(s)/s)]$$
$$= \arg\max_O \sum_s p(s)\,[u(c_0) + \emptyset u(c_1(s)) + A(O) - h(y(s)/s)]$$
$$= \arg\max_O A(O)$$

where the FOC is $A'(0) = 0$. Differentiating (84) at $O = 0$ we have:

$$-u'(c_0) + \emptyset u'(c_1(s)) \frac{@6(O,s)}{@O}\Big|_{O=0} = A'(0)$$

That we can rearrange to get:

$$\frac{@6(O,s)}{@O}\Big|_{O=0} = \frac{u'(c_0) + A'(0)}{\emptyset u'(c_1(s))} = \frac{u'(c_0)}{\emptyset u'(c_1(s))} \quad (86)$$

using equation (85) that requires that the variation is neutral in terms of resources we find:

$$-1 + q \sum_s p(s) \frac{@6(O,s)}{@O}\Big|_{O=0} = 0$$

Combining this equation with (86) we get:

$$\frac{1}{u'(c_0)} = \frac{1}{\emptyset R} \sum_s \frac{p(s)}{u'(c_1(s))}$$

(87)

This is the so called inverse Euler equation. Notice that we can rewrite the expression above as:

$$E\left[\frac{1}{u'(c_0)}\right] = \frac{1}{\beta R} E\left[\frac{1}{u'(c_1(s))}\right]$$

Using the Jensen's Inequality we obtain:

$$E(u'(c_0)) = \left[\frac{1}{u'(c_0)}\right]^{-1} \leq \left[\frac{1}{\beta R} \frac{1}{u'(c_1(s))}\right]^{-1}$$

$$\left[\qquad = \emptyset R^{-} E\,(u^{0}\,(c_1$$

Since $u^{0}(c_0) < \emptyset R^{-} E\,(u^{0}(c_1(s)))$ we established that in the second-best the government will distort savings downwards such that there is a positive intertemporal wedge. The reason is that savings change the incentives to work in period 1 whenever there are income effects. By transferring money to period 1 the agent is less willing to work and more prone to imitate lower-skilled agents. By taxing savings
the government can partially prevent this behavior. Therefore, it is impossible to achieve a Pareto optimal allocation when agents are allowed to undertake unlimited trading of bonds.

Dual Approach Consider the allocation in terms of utils:

$$\begin{aligned} u_0 &= u(c_0) \\ u_1(s) &= u(c_1(s)) \end{aligned}$$

Suppose we change the allocation so that the agent is indifferent and we have:

$$u_0 + \emptyset u_1(s) = \tilde{u}_0 + \emptyset \tilde{u}_1(s) \;\; 8s \tag{88}$$

We can write:

$$\tilde{u}_0 = u_0 - \emptyset O$$

$$\tilde{u}_1(s) = u_1(s) + O \;\; 8s$$

and

Then the new allocation satisfies incentive compatibility only if the labor disutility under the new allocation is such that:

$$u_0 - \emptyset O + \emptyset\,(u_1(s) + O) - h\,(y(s)/s) \leq u_1(r) - \emptyset O + \emptyset\,(u_1(r) + O) - h\,(y(r)/s) \;\; 8r, s$$

this is true if and only if:

$$u_0 + \emptyset u_1(s) - h\,(y(s)/s) \leq u_1(r) + \emptyset u_1(r) - h\,(y(r)/s) \;\; 8r, s$$

which is true only if the initial allocation was feasible. The dual problem rewrites the objective function of the government so that at the optimum the total resource cost of the allocation is minimized:

$$\min_{O} \left(C(u_0 - \emptyset O) + q \sum_{s} p(s)\, C(u_1(s) + O) \right)$$

where C (u) is the inverse function of u (c). If an allocation is optimal, then O = 0 must solve the problem. The first order condition evaluated at O = 0 is:

$$-C^{0}(u_0)\,\emptyset + q \sum_{s} p(s)\, C^{0}(u_1(s)) = 0$$

Since C (u) is the inverse function of u (c), then $C^{0}(u) = 1/u^{0}(c)$ (we also know it from Section 3). It follows that:

$$\frac{1}{u^{0}(c_0)} = \frac{q}{\emptyset} \qquad u^{0}\,(c_1$$

We can interpret $1/u'(c)$ as the resource cost of providing some incentives and therefore the inverse Euler equation is equalizing the expected resource cost of providing incentives across the two periods.

10.2 Infinite Horizon Model

The dual approach goes through very easily in an infinite horizon setting with separable preferences. The individual utility is:

$$\sum_{t,s^t} \beta^t u(c(s^t)) - h(y(s^t)/s^t)\Pr(s^t)$$

and s^t is the history of shocks up to time t. We implement a revelation mechanism where each agent must report her type through reporting strategies:

$$r_t = a_t(s^t)$$

and truth-telling implies:

$$a_t(s^t) = s^t \quad \forall s^t, t$$

The history of reports is:

$$a^t(s^t) = (r_0, r_1, \ldots, r_t) = a_0(s_0), a_1(s^1), \ldots, a_t(s^t)$$

The dynamic incentive constraint is:

$$\sum_{t,s^t} \beta^t u(c(s^t)) - h(y(s^t)/s^t)\Pr(s^t) \geq \sum_{t,s^t} \beta^t u(c(a(s^t))) - h(y(a(s^t))/s^t)\Pr(s^t)$$

for every a. Start from a node s^t and set the following perturbation:

$$\tilde{u}(s^\tau) = u(s^\tau)$$

for any $s^\tau \neq s^t$ and $s^\tau = (s^t, s_{t+1})$ so that consumption utilities are unchanged at any node that is not s^t or any other of its direct successors. We therefore have:

$$\tilde{u}(s^t) = u(s^t) - \beta\Omega$$

and

$$\tilde{u}(s^t, s_{t+1}) = u(s^t, s_{t+1}) + \Omega \quad \forall s_{t+1}$$

The perturbation is incentive compatible is the starting allocation was incentive compatible. More- over, the total expected utility after the perturbation is unchanged. At the optimal allocation we know that $\Omega = 0$ must solve the following problem:

$$\min \left\{ C(u(s^t) - \beta\Omega) + q \sum \Pr(s^{t+1} \mid s^t) C(u_1(s^{t+1}) + \Omega) \right\}$$

$$O \qquad s^{t+1}|s^t$$

The FOC is:

$$-\beta C^{0} u\left(s^t\right) + q \sum_{s^{t+1}|s^t} \Pr\left(s^{t+1} \mid s^t\right) C^{0} u_1\left(s^{t+1}\right) = 0$$

which can be rearranged to get the inverse Euler equation:

$$\frac{1}{u^0(c(s^t))} = \frac{1}{\beta R}\mathbf{E}\left[\frac{1}{u^0(c(s^{t+1}))} \mid s^t\right]$$

History Dependence When there is private information it is not Pareto-efficient to fully insure the agent in equilibrium. The government must provide the agent with the incentive to produce higher output by allowing her to receive a higher level of consumption in case of a positive skill shock. Suppose that $\beta\mathbf{R} = 1$. Define as follows the innovation in agent's information about $1/u^0(c_{t+1})$:

$$O_{t+1} = \frac{1}{u^0(c_{t+1})} - E_t\left[\frac{1}{u^0(c_{t+1})}\right] \tag{90}$$

Define the change in future forecasts as:

$$E_{t+1}\left[\frac{1}{u'(c_{t+s+T})}\right] - E_t\left[\frac{1}{u'(c_{t+s})}\right] \tag{91}$$

The inverse Euler equation is a Martingale when ØR = 1 and together with the Law of iterated expectations imply:

$$\frac{1}{u'(c_t)} = E_t\left[\frac{1}{u'(c_{t+1})}\right] = E_t\left[\frac{1}{u'(c_{t+s})}\right] \quad s \tag{92}$$

Therefore the lhs of (91)
becomes:

$$E_{t+1}\left[\frac{1}{u'(c_{t+s+1})}\right] = E_{t+1}\left[\frac{1}{u'(c_{t+2})}\right] = \frac{1}{u'(c_{t+1})}$$

while using (92) the rhs becomes:

$$E_t\left[\frac{1}{u'(c_{t+s})}\right] = \frac{1}{u'(c_t)} = E_t\left[\frac{1}{u'(c_{t+1})}\right]$$

Therefore
:

$$E_{t+1}\left[\frac{1}{u'(c_{t+s+T})}\right] - E_t\left[\frac{1}{u'(c_{t+s})}\right] = O_{t+1} \tag{93}$$

The change in future forecasts equals the the innovation in agent's information at $t+1$. Any shock that generates a change O_{t+1} in $1/u'(c)$ leads to a change O_{t+1} in agent's forecasts of $1/u'(c)$ at any future date. This implies that skill shocks have a permanent effect on the reciprocal of marginal
utilities. When utility is logarithmic permanent changes reflect directly in the level of consumption. The reason is that if an agent receives a positive skill shock, it is efficient for the government to require a higher level of output. However, since there is private information, the government must reward higher output with a lifetime increase in consumption to provide the right incentive to the agent. The inverse Euler equation governs how the increase is spread over time. In the special case of ØR = 1 the increase is evenly spread over time.

Consumption Inequality Suppose that ØR = 1, the inverse Euler equation implies:

$$\frac{1}{u'(c_t)} = E_t\left[\frac{1}{u'(c_{t+1})}\right]$$

$$\frac{1}{u'(c_t)} + \varepsilon_{t+1} = \frac{1}{u'(c_{t+1})}$$

where ε_{t+1} has mean zero and is uncorrelated with $1/u'(c_t)$. Taking the varianc

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FISCAL POLICY: INDIAN SCENARIO

Fiscal policy deals with the taxation and expenditure decisions of the government. Monetary policy, deals with the supply of money in the economy and the rate of interest. These are the main policy approaches used by economic managers to steer the broad aspects of the economy. In most modern economies, the government deals with fiscal policy while the central bank is responsible for monetary policy. Fiscal policy is composed of several parts. These include, tax policy, expenditure policy, investment or disinvestment strategies and debt or surplus management. Fiscal policy is an important constituent of the overall economic framework of a country and is therefore intimately linked with its general economic policy strategy.

Fiscal policy also feeds into economic trends and influences monetary policy. When the government receives more than it spends, it has a surplus. If the government spends more than it receives it runs a deficit. To meet the additional expenditures, it needs to borrow from domestic or foreign sources, draw upon its foreign exchange reserves or print an equivalent amount of money. This tends to influence other economic variables. On a broad generalisation, excessive printing of money leads to inflation. If the government borrows too much from abroad it leads to a debt crisis. If it draws down on its foreign exchange reserves, a balance of payments crisis may arise. Excessive domestic borrowing by the government may lead to higher real interest rates and the domestic private sector being unable to access funds resulting in the „crowding out" of private investment.

Sometimes a combination of these can occur. In any case, the impact of a large deficit on long run growth and economic well-being is negative. Therefore, there is broad agreement that it is not prudent for a government to run an unduly large deficit. However, in case of developing countries, where the need for infrastructure and social investments may be substantial, it sometimes argued that running surpluses at the cost of long-term growth might also not be wise (Fischer and Easterly, 1990). The challenge then for most developing country governments is to meet infrastructure and social needs while managing the government's finances in a way that the deficit or the accumulating debt burden is not too great. This essay examines the trajectory of India's fiscal policy with particular focus on historical trends, the development of fiscal discipline frameworks, the recent experience of fiscal response to the global financial crisis and subsequent return to a fiscal consolidation path. The initial years of India's planned development strategy were characterised by a conservative fiscal policy whereby deficits were kept under control.

The tax system was geared to transfer resources from the private sector to fund the large public sector driven industrialization process and also cover social welfare schemes. Indirect taxes were a larger source of revenue than direct taxes. However, growth was anaemic and the system was prone to inefficiencies. In the 1980s some attempts were made to reform particular sectors and make some changes in the tax system. But the public debt increased, as did the fiscal deficit. Triggered by higher oil prices and political uncertainties, the balance of payments crisis of 1991 led to economic liberalisation. The reform of the tax system commenced with direct taxes increasing their share in comparison to indirect taxes. The fiscal deficit was brought under control. When the deficit and debt situation again threatened to go out of control in the early 2000s, fiscal discipline legalisations were instituted at the central level and in most states. The deficit was brought under control and by 2007-08 a benign macro-fiscal situation with high growth and moderate inflation prevailed. The global financial crisis tested the fiscal policy framework and it responded with counter-cyclical measures including tax cuts and

increases in expenditures. The post-crisis recovery of the Indian economy is witnessing a correction of the fiscal policy path towards a regime of prudence. In the future, the focus would probably be on bringing in new tax reforms and better targeting of social expenditures.

Basic concepts

At the outset, it is important to clarify certain basic concepts. The most elementary is perhaps the difference between revenue and capital flows, be they receipts or expenditures. While there are various complex legal and formal definitions for these ideas, presenting some simplified and stylised conceptual clarifications is deemed appropriate. A spending item is a capital expenditure if it relates to the creation of an asset that is likely to last for a considerable period of time and includes loan disbursements. Such expenditures are generally not routine in nature. By the same logic a capital receipt arises from the liquidation of an asset including the sale of government shares in public sector companies (disinvestments), the return of funds given on loan or the receipt of a loan. This again usually arises from a comparatively irregular event and is not routine. In contrast, revenue expenditures are fairly regular and generally intended to meet certain routine requirements like salaries, pensions, subsidies, interest payments, and the like. Revenue receipts represent regular "earnings", for instance tax receipts and non-tax revenues including from sale of telecom spectrums.

There are various ways to represent and interpret a government's deficit. The simplest is the revenue deficit which is just the difference between revenue receipts and revenue expenditures.

Revenue Deficit = Revenue Expenditure – Revenue Receipts (that is Tax + Non-tax Revenue)

A more comprehensive indicator of the government's deficit is the fiscal deficit. This is the sum of revenue and capital expenditure less all revenue and capital receipts other than loans taken. This gives a more holistic view of the government's funding situation since it gives the difference between all receipts and expenditures other than loans taken to meet such expenditures.

Fiscal Deficit = Total Expenditure (that is Revenue Expenditure + Capital Expenditure) – (Revenue Receipts + Recoveries of Loans + Other Capital Receipts (that is all Revenue and Capital Receipts other than loans taken))

"The gross fiscal deficit (GFD) of government is the excess of its total expenditure, current and capital, including loans net of recovery, over revenue receipts (including external grants) and non-debt capital receipts." The net fiscal deficit is the gross fiscal deficit reduced by net lending by government (Dasgupta and De, 2011). The gross primary deficit is the GFD less interest payments while the primary revenue deficit is the revenue deficit less interest payments.

India's fiscal policy architecture

The Indian Constitution provides the overarching framework for the country's fiscal policy. India has a federal form of government with taxing powers and spending responsibilities being divided between the central and the state governments according to the Constitution. There is also a third tier of government at the local level. Since the taxing abilities of the states are not necessarily commensurate with their spending responsibilities, some of the centre's revenues need to be assigned to the state governments. To provide the basis for this assignment and give medium term guidance on fiscal matters, the Constitution provides for the formation of a Finance Commission (FC) every five years. Based on the report of the FC the central taxes are devolved to the state governments. The Constitution also provides that for every financial year, the government shall place before the legislature a statement of its proposed taxing and spending provisions for legislative debate and approval. This is referred to as the Budget. The central and the state governments each have their own budgets. The central government is responsible for issues that usually concern the country as a whole like national defence, foreign policy, railways, national

highways, shipping, airways, post and telegraphs, foreign trade and banking. The state governments are responsible for other items including, law and order, agriculture, fisheries, water supply and irrigation, and public health. Some items for which responsibility vests in both the Centre and the states include forests, economic and social planning, education, trade unions and industrial disputes, price control and electricity. There is now increasing devolution of some powers to local governments at the city, town and village levels. The taxing powers of the central government encompass taxes on income (except agricultural income), excise on goods produced (other than alcohol), customs duties, and inter-state sale of goods. The state governments are vested with the power to tax agricultural income, land and buildings, sale of goods (other than inter-state), and excise on alcohol. Besides the annual budgetary process, since 1950, India has followed a system of five year plans for ensuring long-term economic objectives. This process is steered by the Planning Commission for which there is no specific provision in the Constitution. The main fiscal impact of the planning process is the division of expenditures into plan and non-plan components. The plan components relate to items dealing with long-term socioeconomic goals as determined by the ongoing plan process. They often relate to specific schemes and projects. Furthermore, they are usually routed through central ministries to state governments for achieving certain desired objectives. These funds are generally in addition to the assignment of central taxes as determined by the Finance Commissions.

In some cases, the state governments also contribute their own funds to the schemes. Non-plan expenditures broadly relate to routine expenditures of the government for administration, salaries, and the like. While these institutional arrangements initially appeared adequate for driving the development agenda, the sharp deterioration of the fiscal situation in the 1980s resulted in the balance of payments crisis of 1991, which would be discussed later. Following economic liberalisation in 1991, when the fiscal deficit and debt situation again seemed to head towards unsustainable levels around 2000, a new fiscal discipline framework was instituted. At the central level this framework was initiated in 2003 when the Parliament passed the Fiscal Responsibility and Budget Management Act (FRBMA).
Taxes are the main source of government revenues. Direct taxes are so named since they are charged upon and collected directly from the person or organisation that ultimately pays the tax (in a legal sense).

Taxes on personal and corporate incomes, personal wealth and professions are direct taxes. In India the main direct taxes at the central level are the personal and corporate income tax. Both are till date levied through the same piece of legislation, the Income Tax Act of 1961. Income taxes are levied on various head of income, namely, incomes from business and professions, salaries, house property, capital gains and other sources (like interest and dividends).3 Other direct taxes include the wealth tax and the securities transactions tax. Some other forms of direct taxation that existed in India from time to time but were removed as part of various reforms include the estate duty, gift tax, expenditure tax and fringe benefits tax. The estate duty was levied on the estate of a deceased person. The fringe benefits tax was charged on employers on the value of in-kind non-cash benefits or perquisites received by employees from their employers. Such perquisites are now largely taxed directly in the hands of employees and added to their personal income tax. Some states charge a tax on professions. Most local governments also charge property owners a tax on land and buildings.

Economic theory indicates that the incidence of a tax depends on various factors. In the case of commodity taxes these include the respective elasticties of supply and demand. A capital gain (or loss) arises when a person sells off a capital asset. The gain (or loss) is the difference between the price at which the asset was purchased and the price at which it is sold and represents an appreciation (or fall) in value. Often an adjustment to the basic value of the asset is made to include factors like cost inflation or

economic depreciation due to wear and tear.
Indirect taxes are charged and collected from persons other than those who finally end up paying the tax (again in a legal sense). For instance, a tax on sale of goods is collected by the seller from the buyer. The legal responsibility of paying the tax to government lies with the seller, but the tax is paid by the buyer. The current central level indirect taxes are the central excise (a tax on manufactured goods), the service tax, the customs duty (a tax on imports) and the central sales tax on inter-state sale of goods. The main state level indirect tax is the post-manufacturing (that is wholesale and retail levels) sales tax (now largely a value added tax with intra-state tax credit).

Evolution of Indian fiscal policy till 1991

India commenced on the path of planned development with the setting up of the Planning Commission in 1950. That was also the year when the country adopted a federal Constitution with strong unitary features giving the central government primacy in terms of planning for economic development (Singh and Srinivasan, 2004). The subsequent planning process laid emphasis on strengthening public sector enterprises as a means to achieve economic growth and industrial development. The resulting economic framework imposed administrative controls on various industries and a system of licensing and quotas for private industries. Consequently, the main role of fiscal policy was to transfer private savings to cater to the growing consumption and investment needs of the public sector. Other goals included the reduction of income and wealth inequalities through taxes and transfers, encouraging balanced regional development, fostering small scale industries and sometimes influencing the trends in economic activities towards desired goals (Rao and Rao, 2006).
In terms of tax policy, this meant that both direct and indirect taxes were focussed on extracting revenues from the private sector to fund the public sector and achieve redistributive goals. The combined centre and state tax revenue to GDP ratio increased from 6.3 percent in 1950-51 to 16.1 percent in 1987-88.4
For the central government this ratio was 4.1 percent of GDP in 1950-51 with the larger share coming from indirect taxes at 2.3 percent of GDP and direct taxes at 1.8 percent of GDP. Given their low direct tax levers, the states had 0.6 percent of GDP as direct taxes and 1.7 percent of GDP as indirect taxes in 1950-51 (Rao and Rao, 2006).
The government authorised a comprehensive review of the tax system culminating in the Taxation Enquiry Commission Report of 1953. However, the government then invited the British economist Nicholas Kaldor to examine the possibility of reforming the tax system. Kaldor found the system inefficient and inequitable given the narrow tax base and inadequate reporting of property income and taxation. He also found the maximum marginal income tax rate at 92 percent to be too high and suggested it be reduced to 45
The Indian financial year commences on the 1st of April of a calendar year and ends on the 31st of March of the next calendar year. In view of his recommendations, the government revived capital gains taxation, brought in a gift tax, a wealth tax and an expenditure tax (which was not continued due to administrative complexities) (Herd and Leibfritz, 2008).
Despite Kaldor‟s recommendations income and corporate taxes at the highest marginal rate continued to be extraordinarily high. In 1973-74, the maximum rate taking in to account the surcharge was 97.5 percent for personal income above Rs. 0.2 million. The system was also complex with as many as eleven tax brackets. The corporate income tax was differential for widely held and closely held companies with the tax rate varying from 45 to 65 percent for some widely held companies. Though the statutory tax rates were high, given a large number of special allowances and depreciation, effective tax rates were much lower. The Direct Taxes Enquiry Committee of 1971 found that the high tax rates encouraged tax evasion. Following its recommendations in 1974-75 the personal income tax rate was brought down to 77 percent but the wealth tax rate was increased.

The next major simplification was in 1985-86 when the number of tax brackets was reduced from eight to four and the highest income tax rate was brought down to 50percent (Rao and Rao, 2006).
In indirect taxes, a major component was the central excise duty. This was initially used to tax raw materials and intermediate goods and not final consumer goods. But by 1975-76 it was extended to cover all manufactured goods. The excise duty structure at this time was complicated and tended to distort economic decisions. Some commodities had specific duties while others had ad valorem rates.
The tax also had a major, cascading effect' since it was imposed not just on final consumer goods but also on inputs and capital goods. In effect, the tax on the input was again taxed at the next point of manufacture resulting in double taxation of the input. Considering that the states were separately imposing sales tax at the post-manufacturing wholesale and retail levels, this cascading impact was considerable. The Indirect Tax Enquiry Report of 1977 recommended introduction of input tax credits to convert the cascading manufacturing tax into a manufacturing value added tax (MANVAT). Instead, the modified value added tax (MODVAT) was introduced in a phased manner from 1986 covering only selected commodities (Rao and Rao, 2006).
The other main central indirect tax is the customs duty. Given that imports into India were restricted, this was not a very large source of revenue. The tariffs were high and differentiated. Items at later stages of production like finished goods were taxed at higher rates than those at earlier stages, like raw materials. Rates also differed on the basis of perceived income elasticity with necessities taxed at lower rates than luxury goods. In 1985-86 the government presented its Long-Term Fiscal Policy stressing on the need to reduce tariffs, have fewer rates and eventually remove quantitative limits on imports.
Some reforms were attempted but due to revenue raising considerations the tariffs in terms of the weighted average rate increased from 38 percent in 1980-81 to 87 percent in Specific duties are levied in terms of a certain amount for every unit, for instance a tax amount per litre of alcohol or per hundred cigarettes. Ad valorem taxes are based on the value of the article or service to be taxed at a certain rate. For instance a ten percent ad valorem sales or consumption tax rate would mean that if a good worth Rs. 100 were purchased, a tax of Rs. 10 would be paid. By 1990-91 the tariff structure had a range of 0 to 400 percent with over 10 percent of imports subjected to tariffs of 120 percent or more. Further complications arose from exemptions granted outside the budgetary process (Rao and Rao, 2006).
In 1970-71, direct taxes contributed to around 16 percent of the central government's revenues, indirect taxes about 58 percent and the remaining 26 percent came from nontax revenues. By 1990-91, the share of indirect taxes had increased to 65 percent, direct taxes shrank to 13 percent and non-tax revenues were at 22 percent. Its gross fiscal deficit also showed a slow growth with certain episodes of downward movements. The state governments also ran revenue surpluses from 1974-75 to 1986-87, barring only 1984-85. Thereafter, limited reforms in specific areas including trade liberalisation, export promotion and investment in modern technologies were accompanied by increased expenditures financed by domestic and foreign borrowing. The central revenue deficit climbed from 1.4 percent of GDP in 1980-81 to 2.44 percent of GDP by 1989-90. Across the same period the centre's gross fiscal deficit (GFD) climbed from 5.71 percent to 7.31 percent of GDP. Though the external liabilities of the centre fell from 7.16 percent of GDP in 1982-83 to 5.53 percent of GDP by 1990-91, in absolute terms the liabilities were large. Across the same period the total liabilities of the centre and the states increased from 51.43 percent of GDP to 64.75 percent of GDP.
This came at the cost of social and capital expenditures. The interest component of aggregate central and state government disbursements reflects this quite clearly. The capital disbursements decreased from around 30 percent in 1980-81 to about 20 percent by 1990-91. In contrast, the interest component increased from around 8 percent to about 15 percent across the same period. Within revenue expenditures, in 1970-71, defence expenditures had the highest share of 34 percent, interest component was 19 percent while subsidies were only 3 percent. However, by 1990-91, the largest component was the interest share of 29 percent with subsidies constituting 17 percent and defence only 15 percent.

Therefore, besides the burden of servicing the public debt, the subsidy burden was also quite great.
While India's external debt and expenditure patterns were heading for unsustainable levels, the proximate causes of the balance of payments crisis came from certain unforeseen external and domestic political events. The First Gulf War caused a spike in oil prices leading to a sharp increase in the government's fuel subsidy burden. Furthermore, the assassination of former Prime Minister Rajiv Gandhi increased political uncertainties leading to the withdrawal of some foreign funds. The subsequent economic reforms changed the Indian economy forever.

Liberalization, growth, inclusion and fiscal consolidation (1991-2008)
Following the balance of payments crisis of 1991, the government commenced on a path of economic liberalisation whereby the economy was opened up to foreign investment and trade, the private sector was encouraged and the system of quotas and licences was dismantled. Fiscal policy was re-oriented to cohere with these changes. The Tax Reforms Committee provided a blue print for reforming both direct and indirect taxes. Its main strategy was to reduce the proportion of trade taxes in total tax revenue, increase the share of domestic consumption taxes by converting the excise into a VAT and enhance the contribution of direct taxes to total revenue. It recommended reducing the rates of all major taxes, minimizing exemptions and deductions, simplifying laws and procedures, improving tax administration and increasing computerisation and information system modernisation (Rao and Rao, 2006).

As a part of the subsequent direct tax reforms, the personal income tax brackets were reduced to three with rates of 20, 30 and 40 percent in 1992-93. Financial assets were removed from the imposition of wealth tax and the maximum rate of wealth tax was reduced to 1 percent. Personal income tax rates were reduced again to 10, 20, and 30 percent in 1997-98. The rates have largely remained the same since with the exemption limit being increased and slab structure raised from time to time. A subsequent 2 percent surcharge to fund education was later made applicable to all taxes. The basic corporate tax rate was reduced to 50 percent and the rates for different closely held companies made uniform at 55 percent. In 1993-94, the distinction between the closely held and the widely held companies was removed and the uniform tax rate was brought down to 40 percent. The rate was further reduced to 35 percent with a 10 percent tax on distributed dividends in 1997-98 (Rao and Rao, 2006).

Despite these reforms, the tax system continued to have preferential exemptions and deductions as tax incentives for various socio-economic goals including location of industries in backward areas, export promotion and technology development. This led to the phenomenon of "zero-tax companies" whereby imaginative arrangements were use to leverage all these tax incentives with an intent to minimise tax liabilities. To counter this trend, the Minimum Alternative Tax (MAT) was introduced in 1996-97. It required a company to pay a minimum of 30 percent of book profits as tax. Further attempts to expand the tax base and increase revenues were the introduction of the securities transaction tax (STT) in 2004 and the fringe benefit tax (FBT) in the budget of 2005-06 (Rao and Rao, 2006).

In indirect taxes, the MODVAT credit system for excise was expanded to cover most commodities and provide a comprehensive credit system by 1996-97. The eleven rates were merged into three with a few luxury items subject to additional non-relatable tax in 1999-2000. In 2000-01, the three rates were merged in to a single rate and renamed as central VAT (CENVAT). There remained three additional excises of 8, 16 and 24percent. In case of custom duties, in 1991-92 all duties on non-agriculture goods that were above 150 percent were brought down to this rate. The "peak rate" was brought down to 40 percent in 1997-98, 30 percent in 2002-03, 25 percent in 2003-04, and 15 percent in 2005-06. The number of major duty rates was also brought down from 22 in 1990-91 to 4 in 2003-04. These four rates covered almost 90 percent of customs collected from items. This period also saw the introduction of the

service tax in 1994-95, which was subsequently expanded to cover more and more services. Given that the Indian economy was having an increasingly large service component this increasingly became a major source of revenue. Eventually, provisions were made for allowing input tax credits for both goods and services at the central indirect tax level (Rao and Rao, 2006).

Despite the reforms in central taxes, even after the economic reforms of 1991, state government tax reforms were inadequate and sporadic. A major move in this direction was the coordinated simplification of the state sales tax system in 1999. This eventually led to the introduction of a VAT in 21 states in 2005. The value added tax gives credit to taxes paid on inputs and provides relief from cascading. Implemented at the retail level this replaced the cascading sales tax providing great relief to consumers and traders alike while enhancing the revenues of the state government. The administrative design of the VAT ensures reporting of inputs and outputs resulting in substantial reduction in tax evasion. The basic features of the tax include two rates of 4 percent for common consumption commodities and inputs and 12.5 percent for the others. Some essential items are exempted and precious metals are taxed at 1 percent. The credit system covers inputs and purchases as also capital goods for manufacturers as well as dealers. Credit for capital goods taxes can be availed over three years of sales. The tax credit operates fully only for intra-state sales (Rao and Rao, 2006). This is a major hindrance to the formation of a smooth nationwide market and is to be addressed by the proposed Goods and Services Tax (GST).

In consonance with the tax reform plans, the sources of central government revenue shifted from indirect taxes towards direct taxes. In 1995-96, about 54 percent of revenues came from indirect taxes while around 20 percent were from direct taxes. In 2000-01, the share of indirect taxes had gone down dramatically to around 45 percent while the contribution from direct taxes had increased to about 26 percent. By 2005-06, indirect taxes accounted for approximately 43 percent while the direct taxes share was about 35 percent.

The post 1991 expenditure strategy focussed on reducing subsidies and cutting down on non-capital expenditures. However, the large debt burden meant that the interest component would take a long time to ebb. In 1995-96, of the central government's revenue expenditures, 9 percent went to subsidies, 13 percent to defence and 36 percent to interest.
Five years later in 2000-01, defence and interest remained at 13 percent and 36 percent, respectively, while subsidies increased slightly to 10 percent (Figure 12). This reveals that the composition of government expenditure generally does not change very fast. By 2005-06, the interest component had come down to 30 percent and defence and subsidies each took up 11 percent. As a component of aggregate disbursements of the central and state governments, the interest component continued to rise till around 2002-03 and then started to decline. Capital disbursements showed just the opposite trend falling till around 2002-03 and then rising till 2007-08.

The rising revenues from tax administration reforms and expenditure control resulted in the deficits being brought under control. The central government's revenue deficit went down to 2.37 percent of GDP in 1996-97 while the GFD was 4.84 percent. The government was also more prudent about its external debt. The debt to GDP ratio went down to 4.3 percent of GDP in 1995-96 and reached a further low point of 2.99 percent in 1999-00. However, government debt and fiscal discipline again seemed to give way in the early 2000s. The central government's revenue deficit climbed up to 4.4 percent of GDP in 2002-03 while the GFD was at 5.91 percent of GDP. By 2003-04 the combined liabilities of the centre and the states were up at 81.09 percent of GDP from 70.59 percent in 2000-01. The external liabilities were however kept under control at only 1.67 percent of GDP in 2003-04. It was obvious that a new

fiscal discipline framework was urgently required. After around three years of discussions, the FRBMA was adopted in 2003. This Act gave a medium term target for balancing current revenues and expenditures and set overall limits to the fiscal deficit at 3 percent of GDP to be achieved according to a phased deficit reduction roadmap. The FRBMA enhanced budgetary transparency by requiring the government to place before the Parliament on an annual basis reports related to its economic assessments, taxation and expenditure strategy and three-year rolling targets for the revenue and fiscal balance. It also required quarterly progress reviews to be placed in Parliament. A large number of state governments also brought out their own fiscal discipline legislations (Herd and Leibfritz, 2008).

These fiscal discipline legislations seemed to have had good impact at both the central and state levels. The year before the global financial crisis in 2007-08, the central government's revenue deficit came down to 1.06 percent of GDP while the GFD was 3.33 percent (Figure 14). The state governments achieved a revenue surplus of 0.58percent of GDP and a GFD of 1.81 percent of GDP by 2006-07. Even in the year of the crisis, in 2008-09 they had a small revenue surplus of 0.19 percent of GDP and a GFD of3.2 percent of GDP. This fiscal discipline fed into other economic variables in a positive manner. The aggregate disbursements of the central and state governments showed an increase in capital outlays from 11.87 percent in 2002-03 to 18.59 percent 2007-08. Inflation was moderate and growth was buoyant at 9.6 percent in 2006-07. This benign macroeconomic environment was disturbed by the global financial crisis.

Crisis and return to fiscal consolidation: The maturing of Indian fiscal policy?

The global financial crisis that erupted around September 2008 saw Indian fiscal policy being tested to its limits. The policymakers had to grapple with the impact of the crisis that was affecting the Indian economy through three channels; contagion risks to the financial sector; the negative impact on exports; and the effect on exchange rates (Kumar and Soumya, 2010). Somewhat serendipitously, the government already had an expansionary fiscal stance in view of a rural farm loan waiver scheme, the expansion of social security schemes under the National Rural Employment Guarantee Act (NREGA) and the implementation of revised salaries and compensations for the central public servants as per the recommendations of the Sixth Pay Commission. Furthermore, the parliamentary elections of 2008 also resulted in further government expenditures (Kumar and Soumya, 2010).

As the crisis unfolded, the government activated a series of stimulus packages on 7thDecember 2008, 2nd January 2009 and 24th February 2009. Actions included an overall central excise duty cut of 4 percent, ramping up additional plan expenditure of about Rs.200 billion, further state government borrowings for planned expenditure amounting to around Rs. 300 billion, interest subsidies for export finance to support certain export oriented industries, a further 2 percent reduction of central excise duties and service tax for export industries (that is a total 6 percent central excise reduction). The impact of these measures is estimated to be around 1.8 percent of GDP in 2008-09. If the increase in public expenditure across the budgets of 2007-08 and 2008-09 is taken together it amounted to about 3 percent of GDP (Kumar and Soumya, 2010).

Given its inherent strengths like a strong and prudently regulated financial sector, a well-managed capital account policy, large foreign exchange reserves, strong domestic consumption and effective fiscal policy interventions, the Indian economy weathered the financial crisis rather well. GDP growth declined to 5.8 percent (year-on-year) in the second half of 2008-09 compared to 7.8 percent in the first half. By 2009-10 India's GDP was growing at 8 percent (quick estimates (QE)). This increased to 8.5 percent in 2010-11.

It was now important that the process of fiscal consolidation be reinstated. This was a delicate process

where the fiscal tightening had to be achieved without prematurely choking off the growth process. The Thirteenth Finance Commission (13th FC) in its report was keenly conscious of the need to return to the path of fiscal prudence and provided a road map charting a set of desired fiscal deficit targets. The budget of 2010-11 adopted a calibrated exit policy targeting a fiscal deficit of 5.5 percent of GDP in 2010-11 from a level of 6.5 percent (inclusive of bonds in lieu of securities) in 2009-10 (Ministry of Finance, 2011).

In course of 2010-11 the non-tax revenues from auction of telecom spectrum (3G and broadband) resulted in higher than anticipated receipts. A conscious decision was taken to increase allocation to priority sectors while adhering to the fiscal deficit target. Ultimately the fiscal deficit for 2010-11 declined to a better than targeted 5.1 percent of GDP. This was also an improvement over the 13th FC roadmap target of 5.7 percent. The government's medium term fiscal policy statement as mandated by the FRBMA for the annual Budget 2011-12 projected continuing on a path of gradual adjustment at a pace faster than that prescribed by the 13th FC. The 2011-12 fiscal deficit target was set at 4.6 percent of GDP as against the 13th FC target of 4.8 percent. The rationale for this was that reducing the debt to GDP ratio at an accelerated pace would unlock more resources for use in developmental programmes instead of debt servicing (Ministry of Finance, 2011).

By 2009-10, direct taxes were contributing around 48 percent of revenues while the indirect taxes share was about 32 percent. In the Budget of 2011-12, the share of direct taxes was about 47 percent of the central government's projected revenue while the indirect taxes contribution was around 37 percent. The move to increase the share of direct taxes as envisaged in 1991 had therefore been achieved. The government's expenditure management initiatives also seemed to have gathered momentum with a focus on outcomes rather than allocations. For this select departments are mandated to develop their "Result Framework Document" with an emphasis on tracking measurable outcomes. In 2009-10, defence expenditures made up around 10 percent, subsidies 16 percent and interest 23 percent of revenue expenditures. The situation remained more or less the same in the Budget of 2011-12, revealing once again the largely slow changing nature of the composition of government expenditures. Of the government's projected revenue expenditures for 2011-12, defence constitutes 9 percent, subsidies 13 percent and interest 24 percent. It now appears that fiscal prudence and the desire to limit the public debt through better revenue and expenditure outcomes has been fairly institutionalised in the Indian policy matrix. This is probably partly attributable to the anchoring role played by the FRBMA and the deficit reduction roadmaps put forward by the 13th FC. Despite the temporary deviation from stringent fiscal consolidation targets necessitated by the global financial crisis, Indian fiscal policy is being steered rapidly back to the path of prudence. The determination displayed by policymakers to set for themselves strict deficit reduction targets, often exceeding those mandated by the 13th FC appear to demonstrate that fiscal discipline is here to stay. Recent developments indicate that policymakers have come to accept strict budgetary constraints, while attempting to maximise resources for developmental activities.

The Planning Commission abundantly reveals this in its preparatory reports for the 12th Five Year Plan (2012-17). The approach paper to the plan while projecting the centre's fiscal resources assiduously envisages an average fiscal deficit of 3.25 percent of GDP for the entire plan period with the fiscal deficit projected to come down from 4.1 percent in 2012-13 to 3.5 percent in 2013-14.It is then expected to remain at 3 percent of GDP for the next three financial years. The gross budgetary support for the plan is kept realistic. It is projected to increase from 4.92 percent of GDP in 2011-12 to 5.75 percent by the end of the 12th Plan. Similarly, revenue targets are projected at conservative levels. Net tax revenue for the centre is expected to increase from 7.4 percent of GDP in 2011-12 to 8.91 percent in 2016-17. The gross tax to GDP ratio is projected to be 10.36 percent of GDP in 2011-12 rising to 12.3 percent by

2016-17. This is somewhat optimistic given that this ratio previously peaked at 11.9 percent in 2007-08. It appears that the planners are relying on critical tax reforms, especially the GST to deliver the much needed revenue boost. Since chances of large non-tax revenues like spectrum auctions are unlikely, such revenues are expected to fall from 1.4 percent of GDP in 2011-12 to 0.88 percent of GDP in 2016-17. Similarly, non-debt capital receipts (mainly proceeds from disinvestment) are expected to fall (Planning Commission, 2011). Rather than rely on revenue performance alone, expenditure reforms with effective targeting of subsidies appears to be a major policy strategy. For the 12th Plan with regard to non-plan expenditure, defence expenditure is projected to fall from 1.83 percent of GDP in the base year (2011-12) to 1.56 percent in the final year (2016-17). Subsidies are forecast to decline from 1.6 percent of GDP in 2011-12 to 1.24 percent of GDP in 2016- 17. They would still account for 18.8 percent of total projected non-plan expenditure 25 during the 12th Plan. The ability to control subsidies would hinge critically on global oil prices and the success of planned measures to target subsidies through improved delivery mechanisms. While the former is beyond the control of policymakers, the latter would then be a key focus area (Planning Commission, 2011). Looking ahead, the government would probably focus on reforms on both the tax and expenditure fronts. With regard to tax policy, changes can be expected in terms of legislation as well as administrative reforms to improve efficiency. The main legislative proposals are the DTC and the GST both of which are in various stages of legislative consultation. The DTC seeks to simplify the tax code, revamp the system of tax deductions and remove ambiguities of law. The GST aims at bringing a fairly unified system of input tax credits across the value chain and at an interstate level. Currently the central excise and service taxes have limited credit facilities up to the manufacturing stage. The state VAT is not geared to provide interstate input tax credits. It is proposed to institute a dual GST structure with separate central and state GSTs. This would require a constitutional amendment to allow both the central and state governments to have concurrent jurisdiction over the entire value chain. Interstate GST credit and full credit for the central GST is envisaged. This would also require an advanced information technology (IT) infrastructure (Empowered Committee, 2009). IT is also likely to be further leveraged for improving the direct tax administration. Moves in this direction include increasing the number of Centralised Processing Centres (CPCs) that carry out bulk processing functions from one to four. The number of taxpayer help centres and web-based taxpayer interface facilities are also to be increased substantially (Ministry of Finance, 2011). It also appears that there are moves to improve social expenditure outcomes and target subsidies in a better manner. With respect to energy related subsidies in particular, given the Integrated Energy Policy of 2009, the basic principle would be to equalise the prices of domestic energy with that of imported energy while targeting subsidies to the poor and needy (Planning Commission, 2011). Much of this would hinge on the adoption of new techniques and technologies including IT based identification systems as proposed by the Aadhar Unique Identification system.

Conclusion

The major developments in India's fiscal policy from the early stages of planned development in the 1950s, through the country's balance of payments crisis of 1991, the subsequent economic liberalisation and rapid growth phase, the response to the global financial crisis of 2008 and the recent post-crisis moves to return to a path of fiscal consolidation. India's fiscal policy in the phase of planned development commencing from the 1950s to economic liberalisation in 1991 was largely characterised by a strategy of using the tax system to transfer private resources to the massive investments in the public sector industries and also achieve greater income equality. The result was high maximum marginal income tax rates and the consequent tendency of tax evasion. The public sector investments and social expenditures were also not efficient. Given these apparent inadequacies, there were limited attempts to reform the system in the 1980s. However, the path of debt-induced growth that was pursued partly contributed to the balance of payments crisis of 1991. Following the crisis of 1991, the

government charted out a path of economic liberalisation. Tax reforms focussed on lowering of rates and broadening of the tax base. There were attempts to curb subsidies and disinvest the government holdings in the public sector industries. While initially the fiscal deficit and public debt were brought under control, the situation again started to deteriorate in the early 2000s. This induced the adoption of fiscal responsibility legislations at the central and state levels. There were also reforms in the state level tax system with the introduction of VAT. Consequently there were major improvements in the public finances. This probably contributed to the benign macro-fiscal environment of high growth, low deficits and moderate inflation that prevailed around 2008. The global financial crisis brought an end to this phase as the government was forced to undertake sharp counter-cyclical measures to prop up growth in view of the global downturn. Measures included, excise duty cuts, fiscal support to selected export industries and ramping up public expenditure. The Indian economy weathered the global crisis rather well with growth going down to 5.8 percent in the second half of 2008-09 and then bouncing back to 8.5 percent in 2009- 10. In view of the recovery, a slow exit from the fiscal stimulus was attempted in a manner whereby fiscal consolidation was achieved without hurting the recovery process. Recent policy documents like the 12th Plan Approach Paper and the government's Fiscal Policy Strategy Statement of 2011-12 appear to indicate that the fiscal consolidation mind-set is fairly well institutionalised in the country's policy establishment (Planning Commission, 2011; Ministry of Finance, 2011). This is partly reinforced by institutional structures like fiscal responsibility legislations and the regular Finance Commissions that mandate the federal fiscal transfer regime. In the future, it appears that the government would focus on tax reforms and better targeting of social expenditures to achieve fiscal consolidation while maintaining the process of inclusive growth.

TRADE & INVESTMENT POLICY:

The integration of the domestic economy through the twin channels of trade and capital flows has accelerated in the past two decades which in turn led to the India's GDP reaching Rs 167.73 trillion (US$ 2.30 trillion) in 2017-18*. Simultaneously, the per capita income also nearly trebled during these years. India's trade and external sector had a significant impact on the GDP growth as well as expansion in per capita income. Provisional estimates of India's GDP during the 2018-19 stood at Rs 190.10 trillion (US$ 2.72 trillion). As per the estimates of Gross Domestic Product (GDP) for the first quarter (Q1) of 2019-20, the growth of real GDP for Q1 of 2019-20 is estimated at 5 percent.

Total exports from India (Merchandise and Services) registered a growth of 1.51 per cent year-on-year during April-October 2019 to US$ 310.23 billion, while total imports estimated to be US$ 359.68 billion, exhibiting a negative growth of 4.61 per cent according to data from the Ministry of Commerce & Industry.

The merchandise export stood at Rs 13,04,149.06 crore (US$ 185.95 billion) during April-October 2019 and imports reaching Rs 19,67,625.73 crore (US$ 280.67 billion) for the same period.

The estimated value of services export for April-September 2019 stood at US$ 107.06 billion and import is US$ 68.10 billion.

Thus, the overall trade deficit for April-October 2019 is estimated at US$ 49.45 billion.

According to Mr Piyush Goyal, Minister for Commerce and Industry, the Government of India is keen to grow exports and provide more jobs for the young, talented, well-educated and even semi-skilled and unskilled workforce of India.

Capital Inflows

India's foreign exchange reserves were Rs 31,39,068 crore (US$ 442.58 billion) in the week up to October 25, 2019, according to data from the RBI.

External Sector

- In November 2019, All India Institute of Ayurveda (AIIA) signed a Memorandum of Understanding (MoU) with Western Sydney University, Australia at New Delhi.
- In November 2019, the Memorandum of Understanding (MoU) signed between India and Finland approved by Cabinet in order to strengthen the cooperation in the field of Tourism.
- In September 2019, four Memorandum of Understanding (MoUs) were signed between India and Mongolia focusing on cultural exchange protocol, disaster management, space exploration and in field of animal health and dairy.
- In September 2019, Liquefied Natural Gas (LNG) importer Petronet entered into agreement with US LNG developer Tellurian Inc. and invest US$ 2.5 billion.
- In August 2019, four Memorandum of Understanding (MoUs) were signed between India and France focusing on skill development and vocational training, renewable energy, IT services and space research.
- In June 2019, India and Kyrgyzstan signed 15 agreements in main areas, including defence, trade and investment and health.
- In April 2019, India signed a memorandum of understanding (MoU) with the National Bank for Agriculture and Rural Development Consultancy Service (NABCONS) for establishing the India-Africa Institute of Agriculture and Rural Development (IAIARD) in Malawi, South Africa.
- In December 2018, India and the UAE signed currency swap agreement to boost trade and investment ties between the two countries.
- In November 2018, India and Iran had signed a bilateral agreement to settle oil trades in Indian currency through public sector bank United Commercial Bank (UCO) Bank.
- In June 2018, a Memorandum of Understanding (MoU) was signed between the Governments of India and China to export non-basmati rice to China. As of October 2018, total 24 mills got clearance to export the same.
- In August 2018, US upgraded India's status as a trading partner on par with its North Atlantic Treaty Organization (Nato) allies.

Foreign Trade Policy

- In the Mid-Term Review of the Foreign Trade Policy (FTP) 2015-20 the Ministry of Commerce and Industry has enhanced the scope of Merchandise Exports from India Scheme (MEIS) and Service Exports from India Scheme (SEIS), increased MEIS incentive raised for ready-made garments and made- ups by 2 per cent, raised SEIS incentive by 2 per cent and increased the validity of Duty Credit Scrips from 18 months to 24 months.
- In August 2019, Ministry of Commerce plans to introduce new foreign trade policy aimed at providing incentives and guidelines for increasing export in next five financial years 2020-25.
- As of December 2018, Government of India is planning to set up trade promotion bodies in 15 countries to boost exports from Small and Medium Enterprises (SME) in India.

- In September 2018, Government of India increased the duty incentives for 28 milk items under the Merchandise Export from India Scheme (MEIS).
- All export and import-related activities are governed by the Foreign Trade Policy (FTP), which is aimed at enhancing the country's exports and use trade expansion as an effective instrument of economic growth and employment generation.
- The Department of Commerce has announced increased support for export of various products and included some additional items under the Merchandise Exports from India Scheme (MEIS) in order to help exporters to overcome the challenges faced by them.
- The Central Board of Excise and Customs (CBEC) has developed an 'integrated declaration' process leading to the creation of a single window which will provide the importers and exporters a single point interface for customs clearance of import and export goods.
- As part of the FTP strategy of market expansion, India has signed a Comprehensive Economic Partnership Agreement with South Korea which will provide enhanced market access to Indian exports. These trade agreements are in line with India's Look East Policy. To upgrade export sector infrastructure, 'Towns of Export Excellence' and units located therein will be granted additional focused support and incentives.
- RBI has simplified the rules for credit to exporters, through which they can now get long-term advance from banks for up to 10 years to service their contracts. This measure will help exporters get into long-term contracts while aiding the overall export performance.
- The Government of India is expected to announce an interest subsidy scheme for exporters in order to boost exports and explore new markets.

Road Ahead

India is presently known as one of the most important players in the global economic landscape. Its trade policies, government reforms and inherent economic strengths have attributed to its standing as one of the most sought-after destinations for foreign investments in the world. Also, technological and infrastructural developments being carried out throughout the country augur well for the trade and economic sector in the years to come.

Boosted by the forthcoming FTP, India's exports are expected reach US$ 750 billion by 2018-2019 according to Federation of India Export Organisation (FIEO). Also, with the Government of India striking important deals with the governments of Japan, Australia and China, the external sector is increasing its contribution to the economic development of the country and growth in the global markets. Moreover, by implementing the FTP 2014-19, by 2020, India's share in world trade is expected to double from the present level of three per cent.

Monetary and Fiscal Policy of India

The Monetary and Credit Policy is the policy statement, traditionally announced twice a year, through which the Reserve Bank of India seeks to ensure price stability for the economy.

These factors include - money supply, interest rates and the inflation. In banking and economic terms money supply is referred to as M3 - which indicates the level (stock) of legal currency in the economy. Besides, the RBI also announces norms for the banking and financial sector and the institutions which are governed by it.

How is the Monetary Policy different from the Fiscal Policy?

• The Monetary Policy regulates the supply of money and the cost and availability of credit in the economy. It deals with both the lending and borrowing rates of interest for commercial banks.
• The Monetary Policy aims to maintain price stability, full employment and economic growth.
• The Monetary Policy is different from Fiscal Policy as the former brings about a change in the economy by changing money supply and interest rate, whereas fiscal policy is a broader tool with the government.
• The Fiscal Policy can be used to overcome recession and control inflation. It may be defined as a deliberate change in government revenue and expenditure to influence the level of national output and prices.
What are the objectives of the Monetary Policy?
The objectives are to maintain price stability and ensure adequate flow of credit to the productive sectors of the economy. Stability for the national currency (after looking at prevailing economic conditions), growth in employment and income are also looked into. The monetary policy affects the real sector through long and variable periods while the financial markets are also impacted through short-term implications.

INSTRUMENTS OF MONETARY POLICY

- Bank Rate of Interest
- Cash Reserve Ratio
- Statutory Liquidity Ratio
- Open market Operations
- Margin Requirements
- Deficit Financing
- Issue of New Currency, 8. Credit Control

Inflation

Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the price level rises, each unit of currency buys fewer goods and services. A chief measure of price inflation is the inflation rate. When Prices rise the Value of Money falls.

- CREEPING INFLATION (0%-3%)
- WALKING INFLATION (3% - 7%)
- RUNNING INFLATION (10% - 20 %)
- HYPER INFLATION (20% and above)

Inflation can have positive and negative effects on an economy. Negative effects of inflation include loss in stability in the real value of money and other monetary items over time; uncertainty about future inflation may discourage investment and saving, and high inflation may lead to shortages of goods if consumers begin hoarding out of concern that prices will increase in the future. Positive effects include a mitigation of economic recessions, and debt relief by reducing the real level of debt.

Deficit Financing

• It means printing of new currency notes by Reserve Bank of India .If more new notes are printed it will increase the supply of money thereby increasing demand and prices.
• Thus during Inflation, RBI will stop printing new currency notes thereby controlling inflation.
• During Inflation the RBI will issue new currency notes replacing many old notes.
• This will reduce the supply of money in the economy.

Fiscal Policy

Fiscal policy refers to the government's choices regarding the overall level of government purchases or taxes. Fiscal policy influences saving, investment, and growth in the long run. In the short run, fiscal policy primarily affects the aggregate demand. It refers to the Revenue and Expenditure policy of the Govt. which is generally used to cure recession and maintain economic stability in the country.

Instruments:

- Reduction of Govt. Expenditure
- Increase in Taxation
- Imposition of new Taxes
- Wage Control
- Rationing
- Public Debt
- Increase in savings
- Maintaining Surplus Budget

Other measures

- Increase in Imports of Raw materials
- Decrease in Exports
- Increase in Productivity
- Provision of Subsidies
- Use of Latest Technology
- Rational Industrial Policy

Labour Market Regulations:

India has a federal government and the Constitution has demarcated law making authority between the centre and the states through the Union list, State List and the Concurrent List. Regulation of labour is on the Union List but certain aspects such as industrial disputes and social security also figure on the Concurrent List. As a result, both the Parliament and state legislatures have been enacting labour laws and there is multiplicity of such laws. State amendments provide mostly for minor variations, but sometimes for more significant ones, without departing from the main thrust of the central enactment. According to the list given in the Annual Report of the Ministry of Labour and Employment for 2013-14, there are at present 44 extant enactments of the central government. In addition, there are some 160 state level enactments containing supplementary provisions (Papola, 2013). A general comment is that the uncertainty caused by complex, overlapping and out-dated laws is influencing 'labour market outcomes' in India (Dougherty et.al 2009). In order to eliminate the widely perceived deficiencies in labour regulations, the National Commission on Labour (2002) had recommended the clubbing of the laws into five or more groups relating to industrial relations, wages, social security, safety, welfare and working conditions etc. One of the consequences of multiple legislations is that a large number of registers have to be maintained and periodic returns have to be submitted by enterprises and this raises the cost of 4 compliance and becomes burdensome for medium, small and micro enterprises (MSMEs). Recognising the problem, the central government has enacted the Labour Laws (Exemption from Furnishing Returns and maintaining Registers by Certain establishments) Act, 1988, which simplifies the procedure for returns and registers under nine Labour Acts for enterprises employing up to 19 workers. This Act has been amended in 2014 increasing the coverage of exemptions from nine to 16 Acts. Likewise the exemptions have been made applicable to establishments employing 10-40 workers, against 10-19 in the 1988 Act. The 2014 Act also reduces the number of returns and registers to be maintained by the MSMEs from five to three. Small-scale enterprises have a persistent grievance of

harassment by labour enforcement agencies but the fact is that lack of compliance of most of the labour laws by these enterprises is a big problem (ILO 2014). The response of many state governments to complaints of 'inspector raj' has been to move away from periodic inspections and require that inspections may be undertaken only on the basis of complaints of non-compliance. Some states have even added the additional safeguard of permission by a senior civilian official such as the District Magistrate before an inspection is undertaken. Altering regulations through legislative action is difficult because of opposition by labour unions. So the state governments have taken these initiatives to make the environment more investor friendly, even if the fallout is poorer compliance of labour regulations.

Introduction to Labour Policy:

Labour has a vital role in increasing productivity and management has to help create conditions in which workers can make their maximum contribution towards this objective.

In free India, the labour movement and trade unions should be in a position to assume larger responsibilities in the context of new scenario and challenges which are coming up on the advent of 21st century. One of the main tasks in the Five Year Plans is to evolved practical ways in which they can make an increasing contribution to national development and national policy.

Economic progress of a country is bound up with industrial place. Industrial relations are, therefore, not a matter between employers and employees alone, but a vital concern of the community which may be expressed in measures for the protection of its larger interests.

The National Commission on Labour, however, preferred to describe its approach as one in quest of industrial harmony rather than industrial peace as according to it the concept of industrial peace is somewhat negative and restrictive. It emphasises absence of strife and struggle.

A quest for industrial harmony is indispensable when a country plans to make economic progress. It may sound platitudinous but it is nevertheless true that no nation can hope to survive in the modern technological age, much less become strong, great and prosperous, unless it is wedded to industrial development and technological advance.

Economic progress is bound up with industrial harmony for the simple reason that industrial harmony inevitably leads to more cooperation between employers and employees, which results in more productivity and thereby contributes to all round prosperity of the country. Healthy industrial relations, on which industrial harmony is founded, cannot therefore, be regarded, as a matter in which only the employers and employees are concerned; it is of vital significance to the community as a whole.

That is how the concept of industrial harmony involves the cooperation not only of the employers and employees but also of the community at large. This cooperation stipulates that employees and employers recognise that though they are fully justified in safeguarding their respective rights and interests, they must also bear in mind the interests of the community.

If this be the true scope of the concept of industrial harmony, it follows that industrial harmony should and ought to emphasise the importance or raising productivity but the resulting accelerated rate of growth will lead to the good of the community as a whole. That is the true significance of the doctrine of industrial harmony in its three dimensional aspect.

The term Labour Law is used to denote that body of laws which deal with employment and non-employment, wages, working conditions, industrial relations, social security and labour welfare of industrially employed, persons.

The need for labour legislation arises because of:

(i) The relationship between the workers and employers, is one of partnership in the maintenance of the production and building up of the national economy,

(ii) The community as a whole as well as individual employers are under an obligation to protect the well-being of workers and to secure to them their due share in the gains of economic development.

The object of Labour Legislation, therefore, is two-fold namely:
(i) To improve the service conditions of industrial labour so as to provide for them the ordinary amenities of life.
(ii) To bring about industrial peace which could in its turn accelerate productive activity of the country resulting in its prosperity?

Labour Legislation is necessary for the following reasons:
(i) The individual workers are economically weak. They cannot bargain with the employers for the protection of their rights and even for subsistence wages. As such legislation for protection of labour against long hours of work, unhygienic working conditions, low wages and exploitation is needed.
(ii) In order to increase the bargaining power of labour, legislation is necessary to encourage the formation of trade unions.
(iii) In order to avoid industrial disputes which lead to strikes and lockouts, labour legislation is needed.
(iv) The workers are exposed to certain risks in factories, mines and other establishments. As such in order to make provision for their health, safety and welfare, legislation is needed.
(v) To protect children and women from taking to work under hazardous conditions and at odd hours and in hazardous process, laws are necessary.
Labour Legislation has grown up as one of the most important social institution in India. A quest for industrial harmony is indispensable when a country plans to make economic progress. It may should platitudinous but it is nevertheless true that no nation can hope to survive in the modern technological age, much less become strong, great and prosperous.
Unless it is wedded to industrial development and technological advance. Economic progress is bound up with industrial harmony for the simple reason that industrial harmony inevitably leads to more cooperation between employers and employees, which results in more productivity and thereby contributes to all round prosperities of the country.
Healthy industrial relations, therefore on which industrial harmony is founded, cannot be regarded as a matter in which only the employers and employees are concerned; it is of vital importance to the community as a whole. That is how the concept of industrial harmony involves the cooperation not only of the employers and the employees, but also of the community at large.
Industrial harmony is a product of goodwill and understanding between labour and management and if for whatever reasons, one or the other side fails to observe the rules of the game, the laws should be such as to take care of the offenders impartially.

Salient Features of Labour Legislation:
Labour legislation is based on certain fundamental principles:
1. Social Equity:
Another principle on which labour legislation is based on social equity. Legislation based on social justice fixes a definite standard for adoption for the future, taking into consideration the events and circumstances of the past and the present. But with the change of circumstances and ideas there may be a need for the change in the law. This power of changing the law is taken by the Government by making provisions for rule making powers in the Acts in regard to certain specified matters.
2. Social Justice:
In an industrial set up, social justice means an equitable distribution of profits and benefits accruing from industry between industrialists and workers and affording protection to the workers against harmful

effect to their health, safety and morality.

3. International Uniformity:

International uniformity is another principle on which labour laws are based. The important role played the International Labour Organisation (I.L.O) is praiseworthy. The main aims of the I.L.O. are to remove injustice, hardship and privation of large masses of toiling people all over the world and to improve their living and working conditions and thus establish universal and lasting peace based upon social justice.

The basic principles of the Labour Policy of I.L.O. are as follows:

(a) Labour is not a commodity.

(b) Freedom of expression and of association is essential to continued progress.

(c) Poverty anywhere constitutes a danger to prosperity everywhere.

(d) War against want requires to be carried on with unending vigour within each nation and by continuous effort is which the representatives of workers and employers enjoying equal status with those of Governments; join with them in free discussion and democratic decisions with a view to promoting of common welfare.

4. National Economy:

In enacting labour legislation, the general economic situation of the country has to be borne in mind lest the very objective of the legislation be defeated. The state of national economy is an important factor in influencing labour legislation in the country.

Legislation is essential to safeguard the interests of the labouring classes. In the absence of legislation, factory worker is bound to be exploited by the employer. Labour legislation provides essential safeguard to workers in matters of conditions of work, hours of work, safety in the factories, minimum wages, bonus, and equal wages for men and women for the same work.

The first enactment to be framed was Apprentices Act 1850. The object of this Act was to better enable children, especially orphans and poor children brought up by public charity, to learn trades, crafts, and employment, by apprenticing them to livelihood.

However, at that time the policy of the Government was to protect workers from the social system, and so legislation was acted in 1859 and 1860 making workmen liable to criminal penalties for branches of contract.

Public attention was drawn to the unsatisfactory working conditions in Indian factories and the need for regulating or by law them the first time in 1874, when Major Moore, the Chief Inspector of Bombay Cotton Department, pointed out in his report, that in Bombay Cotton factories women and children were employed in large numbers, that many of the children were hardly eight years old, all of them had to work from sunrise to sun set with only half an hour's recess and they had no periodically recurring day of rest.

Labour policy in India derives its philosophy and content from the Directive Principles of the Constitution and has been evolving in response to specific needs of the situation to suit requirements of planned economic development and social justice.

It has been envisaged that growth of the economy would not only increase production but also absorb the backlog of unemployment and under-employment and a substantial proportion of additional labour force. Seventh Plan laid emphasis on harnessing country's abundant human resources and improving their capabilities for development.

Different Plan Periods & Development of Labour Policy:

In the First Five Year Plan, the approach to labour problems rested on two considerations namely the welfare of the working class and the country's economic stability and progress, workers' right to form association, organisation and collective bargaining were recognised.

In order to govern relations between employers and workers, the Planning Commissions recommended for certain norms, and standards. Works Committees were recommended for the settlement of

differences. During Second Five Year Plan, a code of discipline in industry was accepted voluntarily by all the organisation of employers and workers which has been in operation since the middle of 1958.
The code has laid down specific obligations for the management and workers with the object of promoting constructive cooperation between their representatives all levels. As a result of this new concept of such far-reaching aims, there has been considerable improvement in the sphere of industrial relations.
The number of man-days lost declined significantly from 47 lacks during Jan-June 1958 to 19 lacks during July-December 1960. Besides, the inter-union rivalry has been mitigated to some extent by the code of conduct which was drawn up and accepted by the representatives of worker's organisation. The code provides that every employee shall have the freedom and right awards to join a union of his own choice.
During Second Five Year Plan, two significant steps were undertaken. Firstly a form of workers' participation in management was evolved. Joint management councils were established on experimental basic. The Council has to bring about mutual consultation between employers and workers over many important issues which affect industrial relations.
Secondly a scheme of workers' education has been implemented. The scheme comprises training of teacher- administration and worker teachers. This scheme has helped to raise the self-confidence of workers and has increased their ability to take advantage of protective labour laws.

Third Five Year Plan:
Under the Third Five Year Plan, labour policy was designed according to immediate and long term need of a planned economy. India's present labour policy is directed towards that attainment of full employment and assisting standard of living of the people. The concept of socialist society was kept in mind. Hence, as pointed out in the Third Five Year Plan, the fruits of progress should be shared in an equitable manner.
The surplus that are generated a social product to which neither the employer not the working class can lay an exclusive claim, their distribution has to be according to the worth of the contribution of each, subject to the requirements of further development and his interest of all the sections of society, in particular, the satisfaction of the basic needs of all its members.

Fourth Five Year Plan:
The labour policy in the Fourth Five Year Plan was evolved with reference to two basic concepts:
(1) The relationship between workers and employers is one of partnership.
(2) The employees are under obligation to protect the well-living of employees. Greater emphasis was placed on collective bargaining.

Fifth Five Year Plan:
The labour supply projections contained in the Fifth Plan imply an increase in the labour force about 18.26 million Hence the plan is oriented towards substantial employment opportunities.

Sixth and Seventh Five Year Plan:
The labour policy adopted in the Sixth Plan was oriented towards the achievement of the following objectives:
(i) To establish harmonious relations between employers and workers.
(ii) To accelerate the rate of industrial development and to create expanding opportunities for employment.
(iii) To rise the living standard of workers in general and the weaker section in particular.

From time to time, suggestions have been made to review the working of labour policy. Since independence the industrial scene has undergone radical changes. The structure of working class has changed in several respects. Important changes are likely to take place in the future and composition of labour movement in the years to come.

Having regard to those considerations in December 1966, the Government of India set up a National Commission on Labour to study and make recommendations on various aspects of labour including wages, working conditions, welfare, trade union development and labour-management relations. The Commission submitted its report in August 1969. It made 300 recommendations. The Government accepted 200 recommendations out of 300 made by the Commission.

A Tripartite Committee constituted under the scheme- Workers Participation in Management and comprising representatives of some Central Ministries/State Governments, major public sector undertakings and Central Trade Union Organisations, reviews progress of the scheme from time to time and suggests remedial measures.

So far, 8 meetings of this committee have been held. A monitoring cell has also been created in the Ministry of Labour to assist the Committee. Out of 203 Operational Central Public Sector Enterprises, 109 have implemented the 1983 scheme at shop floor/plant levels.

As the Third Plan stated, "Labour policy in India has been evolving in response to the specific needs of the situation in relation to industry and the working class and has to suit the requirements of a planned economy".

As a result of consultation between the representatives of the Government, the employers and employees, a body of principles and practices has grown up and the legislation and other measures adopted by the Government in this field represent the consensus of opinion of the parties vitally concerned and thus acquire the strength and character of a national policy.

In the formulation of policies and in their implementation, the Government has set up joint committees consisting of the representatives of the Government, the employers and the employees and at the apex of this tripartite machinery is the Labour Conference.

Recent Developments of Labour Legislation:

The structure of industrial relations has been designed to secure industrial peace in industry, promote production and labour productivity and give a fair deal to the workers. Conciliation of disputes and adjudication through tribunals has been tried.

The system has helped in reducing industrial unrest and promoting security to working classes but it has also created the spirit of litigation among the parties concerned. During the Second Plan, the Government tried a new approach, viz. the Code of Discipline voluntarily accepted by the parties concerned.

The stress was on the prevention of unrest by timely action in the appropriate stages. Besides, the Code of Discipline makes it obligatory on the management and labour to promote constructive co-operation between them, to avoid litigation, settle disputes and grievances by mutual negotiations, conciliation and voluntary arbitration, facilitate free growth of trade unions and eliminate all forms of coercion and violence in industrial relations. This new concept of industrial relations with such far-reaching aims will take some time to be fully implemented in practice.

Two aspects of labour policy evolved during the Second Plan deserve special mention, because they hold great promise for the future. One was the workers' participation in management which was meant to give the workers a sense of belonging and to stimulate their interest in higher productivity. This was done in an experimental fashion in 23 industries in the form of Joint Management Councils.

Its main function was to bring about mutual consultation between employers and employees over many

important issues which affect industrial relations. The second was the programme of workers' education which was widely welcomed. The scheme was to train teacher-administrators and worker-teachers. The latter, when they return to their industrial establishments, would start unit-level classes for the rank and file of the workers.

Labour Policy and Third Plan:

Industrial relations during the Third Plan were based on the Code of Discipline which was evolved during the Second Plan. The Third Plan aims at extending an awareness of the Code to all constituents of the Central Employers' and Employees' organisations, so that the Code would become more and more of a living force in the day-to-day conduct of industrial relations.

The sanctions on which the Code of Discipline is based were reinforced, relying on the consent of the parties concerned. The Third Plan also aimed at increased application of the principles of voluntary arbitration in resolving differences between workers and employers.

Policy Regarding Trade Unions:

Trade unions have to be accepted as an essential part of the apparatus of the industrial and economic administration of the country. For this, there has to be considerable re-adaptation in the outlook, functions and practices of trade unions according to the changed conditions and circumstances in which India is placed now. The Government looks that at present trade unions are handicapped by insufficient resources and a non-progressive leadership.

According to the Code of Discipline, a trade union will have to be recognised by the management, provided the former has at least 15 per cent of the workers engaged in the establishment enrolled as members for a continuous period of six months. In case there are several unions, the union with the largest membership will be recognised. Once a union is recognised as such, there should be no change in its position for a period of two years.

Policy Regarding Wages:

A just or even an economically sound wage policy should encourage increase of national income and secure to the wage earner a legitimate share in that increase. The purpose of the Government's wage policy, as clearly stated by the Second Plan, is **"to bring wages into conformity with the expectations of the working class in the future pattern of society."**

The First Plan:

The First Plan stated that all wage adjustments should conform to the broad principles of social policy and the disparities of income should be reduced to the utmost extent. The immediate aim was to restore the pre-war real wage level, as the first step towards the living wage.

The First Plan insisted on avoiding any wage rise which would raise the cost of production and set in motion wage-price spiral; for in such a case, gains to the workers would prove illusory since they would, in all probability, get cancelled by a rise in the price level.

But soon after Independence, the Government assumed responsibility for securing a minimum wage for certain sections of workers—both in industry and in agriculture—who were economically weak and who stood in need of protection. Towards this end, the Minimum Wages Act was passed in 1948 to provide for the fixation and revision of wage rates in certain occupations. But the Government was aware that the Act was not effective in many cases.

The Second Plan:

The Second Plan proposed to give labours a fair wage. Fair wage was distinguished from minimum and living wage. For instance, minimum wage must provide to the worker and his family not only

sustenance but also something more to preserve his efficiency. Living wage should enable the worker to provide for himself and for his family not only the bare essentials of food, clothing and housing but also a measure of comfort, etc.

On the other hand, fair wage was somewhere midway between the minimum and the living wage and it would be determined with reference to the capacity of the industry to pay the wage and the prevailing rate of wages in the same or similar industry.

Government's policy was to link the wage-rise with the rise in productivity. The Second Plan specifically stated: **"Earnings beyond the minimum wage should be necessarily related to results."**

Third Five Year Plan:

The Government is continuing the wage policy as enunciated by the Second Plan. The Third Plan has accepted the system of wage boards and also proposes that the unanimous recommendations of a wage board in an industry should be implemented fully. In the determination of wages, the need-based minimum wage should be used.

Apart from the minimum wages, adequate incentives should be provided for the acquisition and development- of skills and for improvements in output and quality. The Third Plan proposed to appoint a Commission to study the problems connected with bonus claims and to evolve guiding principles and norms for the payment of bonus.

Working Conditions Safety and Welfare:

The Government has evolved a comprehensive code to ensure satisfactory working conditions, safety of persons and the provision of a variety of facilities to promote the welfare of the workers. But the implementation of the statutory provisions has not been effective.

The Third Plan calls upon all State Governments to strengthen the inspectorates provided for the administration of factory laws. Emphasis is placed on the safety of persons in factories and mines and appropriate machinery is being devised. Special Welfare funds are being constituted for financing welfare measures for workers in coal and other mines.

The Government is interested in encouraging workers' cooperatives in the field of credit, housing, distribution of consumer goods, etc. The Government feels that trade unions and voluntary organisations should take initiative and evince interest in starting and running such cooperatives.

The Third Plan points out that despite the operation of the subsidised Industrial Housing Scheme, for some years, housing of industrial workers has not made much progress and in many cases it has actually deteriorated. The Third Plan calls for a new approach to the problem of industrial housing so that workers would have decent living conditions within a reasonable period of time.

Employment and Training Schemes:

In a developing economy, the demand for skilled workers would increase continuously and the Government has various schemes to meet such demand. By the end of the Second Plan, there were 166 industrial training institutes with 42,000 training seats. The Third Plan has proposed to increase the number of these institutes to a total of 318 with an additional 58,000 training seats.

The annual training capacity would be raised to 1 lakh. The Government has also made adequate provisions for "in-plant training" facilities. It has also introduced a voluntary apprentice training scheme; the Third Plan has proposed to convert this voluntary scheme into a compulsory one.

The Third Plan has set a target of 14,000 seats for apprentice training scheme. It has also set a target of 15,000 seats in the programme of evening classes for industrial workers. One hundred employment exchanges would be set up during the Third Plan period and the objective is to open one employment exchange in each district.

UNIT II: TRENDS, POLICIES AND PERFORMANCE IN AGRICULTURE SECTOR:

Agriculture continues to be the mainstay of the Indian economy. Agriculture is described as the backbone of Indian economy mainly because of the three reasons. One, agriculture constitutes large share of country's national income though the share has declined from 55 percent in early 1950s to about 25 percent in early 2000s. Two, more than 213rd of workforce of the country were employed in agricultural sector until 1971. Recent census data for the year 2001 indicates that agriculture workers (cultivators and agricultural labourers) account for 58.4 percent of workforce of India. Three, growth of other sectors and overall economy depends on the performance of agriculture to a considerable extent. Agriculture has also played important role as foreign exchange earner. Because of its backward and forward linkages with other economic sectors, changes in agricultural performance have a multiplier effect on the entire economy. Its performance, therefore, is crucial in the task of reduction and eventual elimination of poverty in India. This chapter gives an overview of the agricultural sector in India. It also reviews policies and initiatives in agricultural sector in the light of the New Economic Policy and the WTO Agreement on Agriculture. 3.2 Place of agriculture in the national economy National Income statistics provide a wide view of the country's entire economy, as well as of the various groups of the population who participate as producers and income receivers, and that, if available over a substantial period , they reveal the basic changes in the country's economy in the past and suggest, if not fully reveal, trends for the future. (National Income Committee, 1951)'. The composition and structure of India's National Income have been changing during the plan period.

Agricultural growth since 1950-51 India has made a lot of progress in agriculture since independence in terms of growth in output, yields and area under many crops. It has gone through a green revolution, a white revolution, a yellow revolution and a blue revolution. Today, India is the largest producer of milk, fruits, cashew nuts, coconuts and tea in the world, the second largest producer of wheat, vegetables, sugar and fish and the third largest producer of tobacco and rice. Separate estimates for GDP of crop sector and livestock sector are not available, because, due to dominance of mixed crop plus livestock farming system, it is considered impossible to distinguish between inputs used in crop activity and livestock activity. However, separate estimates for value of output of these two activities are available.

Among the three sub sectors, output of fishery has grown at the highest rate during all the five decades since 1950-51. In the last three decades, output of livestock sector has been growing at a faster rate compared to crop sector. Growth rates in different sub sectors of agriculture indicate that Indian agriculture is diversifying towards livestock and fishery products away from crop products. Outputs of crop sector showed best growth during the period from 1980-81 to 1990- 91.

Capital formation in Indian agriculture Investment is one of the crucial factors determining the growth rate of agricultural sector. The government plays a very significant role in boosting agricultural growth through its increased investment in this field as also inducing the private investment in agriculture. The figures published by the Government in the economic survey reveal the mutual role of the two parties. Though the overall growth of the Indian economy has depended much upon the performance of agriculture, over the years, not much public investment has been made on its development. There is a steady deceleration in public investment in gross capital formation in agriculture. At the same time, private investment has been increasing over the years. During 1960-6 1, the total investment in the agricultural sector was 1670 crores of which the public sector contributed 590 crores and the public sector, 1070 crores. However, during 1980-81, the total investment increased to 4640 with 2840 and 1800 crores by the private and the public sectors respectively (Economic Survey, 1998-99)' However, during the 1990s the capital formation in agriculture as percentage of GDP declined as shown in table 3.3. The investment in agriculture as percentage of GDP declined from 1.6 per cent in 1993-94 to 1.3 per

cent in the subsequent years i.e., during early 2000s. This declining trend was mainly due to near stagnation or fall of public investment in agriculture since the early nineties. The year 2001-02 is likely to be a turning point as public investment in agriculture has touched Rs. 4794 crores, which was significantly higher than that of the previous five years. If this trend were maintained, then it would be an indication of some success resulting from the Government's recent efforts in diverting higher flow of resources to agriculture.

Foreign trade of agricultural commodities Foreign trade plays a crucial role in the economic development of a country that the underdeveloped countries have launched on a massive scale especially after Second World War. For a country of its size, India is a minor participant in world trade. At present, India accounts for less than 1 per cent of overall world exports and imports (Mattoo and ~ubramanian2003)~. Subsequent to the economic reforms initiated in 1991, removing the restrictions and protective licensing regime, free trade in a large number of items has become the order of the day. With the removal of Quantitative Restrictions on agricultural items and urea, the Indian farmer community has been placed to face stiff competition from the developed nations.
Agricultural Exports from India are broadly classified into several categories like agriculture and allied products, oils and minerals, manufactured goods, mineral fuel etc. Among them, agriculture and allied products occupied significant place in the total export earning of the country. Agriculture and allied products alone contributed 31.7 per cent of the total export earning of India in 1970-71, which fell down to 30.6 per cent in 1980-8 1 (Ruddar Datt and K P M ~undhararn)'

India has been a consistent but small net exporter of agricultural products since 1980. The major devaluation of the Indian rupee that followed the balance of payment crisis in 1991 has had a much greater impact on the value of exports of clothing, textiles and other manufactured goods than on exports from the agricultural sector. The share of agricultural exports in total Indian exports has been declining in recent years. In 2003-04, agricultural products made-up around 12 per cent of the total value of Indian exports compared with 18 per cent in 1990-91. No one agricultural product dominated export trade. Agricultural share fluctuated during the reference period and registered the highest value during 1996-97 i.e., 20.33%. It started declining further from 1996-97 onwards thereby showing 12.62 % during 2003-04~. The declining trend in the relative share of agriculture is primarily due to increased non-agricultural exports from the country and hence agricultural sector plays major role in earning a good sum of foreign exchange. 3.5.2 Agricultural imports Import of agricultural as well as non- agricultural commodities registered sharp increase in the recent past. Data given in table 3.5 show the trend of India's total as well as agricultural imports since 1990-91. Regarding the percentage share of agriculture in the total imports, the share was too narrow in the early 1990's; say 2.79% in 1990-91 and 3 -09 % in 199 1-92. However, the share increased to 6.6 in 1994-95 and thereafter after a slight slop in the share for the next three financial years, it recorded the highest share of 8.17 % during 1998-99 for the first time in the decade.
During 2001 -02, agricultural commodity imports were valued at $2.3 billion, two-third of which was accounted for by a single commodity, namely edible oil. In recent years, edible oil accounting for nearly 60 to 65 per cent of the value of total agricultural imports has become the single largest import item. Raw cashew nuts, nuts (almonds from USA) and pulses are among the other dominant agricultural imports, each of which accounts for nearly 5 to 10 per cent of the total agricultural imports in recent years. There was a substantial increase in the import of pulses during 2001-02 with its share in the total agricultural imports rising by over 28 per cent. Agricultural imports in 2003-04 constituted only a small proportion (6.19 per cent) of the country's total imports.

Agricultural sector under the new economic policy:
The implementation of the Uruguay Round Agreement on Agriculture (AoA) that major reforms were

introduced in the agricultural sector. 3.6.1 Agreement on Agriculture (AoA) The liberalization process in the agricultural sector had to wait until the formation of the WTO to gather momentum. The GATT was a failure in promoting free trade in agricultural products (Bernad and Michel, 1995)". Agricultural trade was practically kept out of free trade regime until the formation of WTO. The AoA necessitated far reaching measures of liberalization in Indian agriculture. The inward oriented policies were systematically replaced by outward oriented policies. The AoA establishes a number of generally applicable rules with regard to trade-related measures, primarily in the areas of market access, domestic support and export subsidies. These rules relate to country specific commitments to improve market access and reduce trade-distorting subsidies.

Market access Under market access commitments in the AoA, member countries were required to replace all types of non-tariff barriers with tariffs, and to reduce tariff levels under a time-bound program. In addition to these commitments, this measure also called for maintaining current access opportunities and establishing minimum access tariff quotas. For countries such as India, where Quantitative Restrictions (QRs) covered all agricultural imports for Balance of Payment (BoP) reasons, only ceiling bindings had to be submitted. For these ceiling bindings, there was no upper limit, provided the tariffs had not been bound in earlier rounds of negotiations. The process of tariffication of non-tariff barriers was a central element of the Uruguay Round Agreement on Agriculture. Under this agreement, non-tariff measures were to be converted to tariff equivalents. Developing countries were given the flexibility to offer 'ceiling bindings' (agreed maximum Tariffs) on products that were subject to previously unbound tariffs or subject to some form of qualitative restriction. These ceiling bindings could be higher than the September 1986 applied tariffs (the rate at which developing countries were required to limit tariffs under the General Agreement on Tariffs and Trade then in place). In addition, there was no obligation to reduce these ceiling bindings during the implementation period (FAO, 2003)" Domestic support Countries use a number of policy instruments such as support prices and input subsidies, which affect incentives that farmers receive in terms of prices and hence influence resource allocation. In the AoA, the impact of price support and related policies is captured through the AMS. India has a product price support system in -. the form of minimum support prices announced by the government for different commodities, based on the recommendations of the Commission for Agricultural Costs and Prices. Our analysis shows that for 18 major commodities, the product specific support, as defined under the AoA during the base period, was (-) US$18.11 billion. As a percentage of the value of agricultural output (crop sector), the product-specific AMS is (-) 26.1 percent during this period. During 1995-96, the estimated product specific AMS turned out to be (-) 34.36 percent of the value of agricultural output, and during 2000-2001, the same was estimated to be (-) 28.6 percent of the value of agricultural output.

The negative product specific support to Indian agriculture shows that various controls on domestic as well external trade have kept domestic prices of major crops below world prices. In the case of domestic trade, these controls included restrictions on the movement of agricultural commodities, compulsory procurement levies, licensing and stocking requirements and credit controls. The controls on external trade comprised export prohibitions, quantitative restrictions, minimum export prices and canalization. The net result of these policies has been that the negative product specific support outweighs the positive non-product specific support. Export competition Export subsidies included in reduction commitments are direct subsidies paid by the government or any other agency, including payments in kind; payments that are made from the proceeds of levy imposed on agricultural products; subsidies that are given to reduce the cost of marketing including internal handling, processing, international transport and freight subsidy on export shipments. As India does not have a system of direct export subsidies, it was not bound to make any reduction commitment on export subsidies. A few benefits were available to the exporters of agricultural commodities through income tax exemptions under section 80 - HHC of the

Income Tax Act (1961) on profits from export sales. In 2000, the government decided to phase out these benefits over a period of five years starting from 2000-2001, making profits taxable by 2004-2005. As the agreement allows developing member countries to subsidize costs of marketing agricultural products including handling, upgrading and other processing costs and the costs of domestic and international transport and freight, India is making use of these provisions. The schemes facilitate mainly the exports of horticultural items and are operated by the Agricultural and Processed Food Products Export Development Authority (APEDA).

Because the exports of many agricultural items have been adversely hit owing to the fall in commodity prices and aggressive subsidization by those members that are allowed to subsidize their exports, the government is thinking of extending these subsidies, which are permissible under the agreement, to other agricultural products as well. Though there is no commitment by India on export subsidies, there are restrictions on introducing direct export subsidies in the kture that are not compatible with the agreement. Bound rates of plantation 1 cash crops Cash crops are high value crops of great economic importance and provide huge employment opportunities, the important among them being tea, sugar, coffee, rubber and tobacco. In recent times, cash crops have even facilitated the external sector, especially export crops like tea and coffee. The policies relating to the cash crops also underwent changes with the advent of the Agreement on Agriculture. A major factor causing changes in production, prices and trade is the commitment concerning the bound rates. India is among the biggest producers, consumers and suppliers of tea in the world. However, even tea has been under-performing. Tea production in India peaked in 1998 and has been on the decline ever since. In fact, tea production declined by 5.9% in 2005. Natural rubber also did well in terms of production. Increases in production are despite the lifting of quantitative restrictions on natural rubber imports since April 1, 2001. Globally, rubber prices have hit the roof. They jumped 123% in 2005, indicative of the growing demand.

Concluding remarks

Agriculture continues to be the backbone of Indian economy by providing livelihood for more than half of her total population. The primary sector of the economy also acts as a significant contributor to GDP and foreign exchange. In recent year, Indian agriculture has experienced profound changes. Changes elsewhere in the economy will also continue to put pressure for changes in the agricultural sector. A major change that took place in this sector is the globalization of Indian agriculture. The first tentative change to support arrangements was introduced following India's implementation of the Uruguay Round Agreement on Agriculture (AoA), which required India to revise its trade support policies. As a result, the strict controls on trade in agricultural products were loosened with the virtual removal of all quantitative restrictions. The replacement of these control measures with relatively high tariffs has so far had little impact on trade or opened the domestic market up to competition. Globalization of Indian agriculture offers both opportunities and challenges to policy makers. Opportunities exist for deriving large benefits through substantial increase in the agricultural exports, especially, high value labour-intensive agricultural products. The challenges lie in modernizing small-scale agriculture and making it efficient and competitive.

UNIT-III: TRENDS, POLICIES & PERFORMANCE IN INDUSTRIAL SECTOR

1 of 13 Industrialisation In India Jana Hambrock and Sebastian Hauptmann - Socrates The development of India into a modern industrialised country is a slow but continuing process. Jana Hambrock and Sebastian Hauptmann provide a detailed analysis of the Indian economy, referring to its historical and theoretical context, as well as to its future prospects. Introduction To discuss the topic "The Indian approach to industrialisation", this essay is divided into several parts. Firstly, the reasons for, and policies of industrialisation are discussed. The theoretical framework is finished by identifying

indicators to be used in the evaluation of the success of such policies. The second section gives a rough overview of the development of industrialisation in India since independence. The third section goes into more detail and provides information about some specific and important areas for industrialisation. The fourth section uses the defined indicators to measure the success of India's two main approaches to industrialisation and evaluates the results. The fifth section describes the main problems India faces today and in the future. Last but not least, the sixth section informs about current trends in Indian policy. Theoretical Framework for Industrialisation Before analysing the Indian approach, we want to introduce the aims of industrialisation, give a rough overview of the industrialisation strategies for Less Developed Countries (LDCs) and identify indicators for the evaluation of the success of industrialisation policies. Why Industrialisation? What are the ultimate objectives of economic development? Different governments may have different objectives in mind. Generally, however, they will include a faster growth of national income, alleviation of poverty, and reduction of income inequalities. But how is industrialisation expected to contribute to these goals? The experience of industrial economies shows a close association between development and industrial expansion. But industry is also thought to provide certain spill over which would benefit other activities: enhancement of skills, training of managers, dispersion of technology, etc. Moreover, pessimism about the prospects of food and raw materials made the substitution of domestic for imported manufactured goods seem the most promising route to development for many countries. Industrialisation and foreign trade Economists and policymakers in the developing countries have long agreed on the role of government in providing infrastructure and maintaining stable macroeconomic policies. But they have disagreed on policies toward trade and industry. The form of government intervention in this area is the distinguishing feature of alternative development strategies.

A convenient and instructive way to approach the complex issues of appropriate trade policies for development is to set these specific policies in the context of a broader 2 of 13 Less Developed Countries strategy of looking outward or inward. Outward-looking development policies encourage not only free trade but also the free movement of capital, workers, enterprises, the multinational enterprise, and an open system of communications. By contrast, inward-looking development policies stress the need for LDCs to evolve their own styles of development and to control their own destiny. Within these two broad philosophical approaches to development, a lively debate has been carried out between the free traders, who advocate outward-looking export promotion strategies of industrialisation, and the protectionists, who are proponents of inward-looking import substitution strategies. The advocates of import substitution (IS) – the protectionists – believe that LDCs should substitute domestic production of previously imported simple consumer goods and extend this later to a wider range of more sophisticated manufactured items – all behind the protection of high tariffs and quotas on imports. In the long run, IS advocates cite the benefits of greater domestic industrial diversification and the ultimate ability to export previously protected manufactured goods, as economies of scale, low labour costs, and the positive externalities of learning by doing cause domestic prices to become more competitive with world prices. By contrast, advocates of export promotion (EP) of both primary and manufactured goods cite the efficiency and growth benefits of free trade and competition, the importance of substituting large world markets for narrow domestic markets, the distorting price and cost effects of protection, and the tremendous success of the East Asian export-oriented economies of South Korea, Singapore, and Hong Kong .

The balance of the debate has swung back and forth, with the protectionists predominating in the 1950s and 1960s, and the export promoters gaining the upper hand in the late 1970s and in the 1980s and 1990s, especially among Western and World Bank economists. Indicators for measuring economic development Of course, any development policy has to be assessed by measuring the economic

development it effects. India's first Prime Minister Jawaharlal Nehru declared on the eve of the departure of the British, on 14 August 1947, that India's task in the future included "the ending of poverty and ignorance and disease and inequality of opportunity". These measures will be used to determine the success of the inward-looking policies he initiated, as well as to compare their success with the success of the reform policies. Therefore, growth of income per capita, alleviation of poverty and reduction of income inequalities are amongst the most important indicators. To measure advances regarding inequality of opportunity and ignorance, several indicators pertaining to education and health will be used. These are two important public goods to which every individual is entitled; both for their intrinsic importance and for their enhancement of instrumental personal, social and process roles, and also empowerment and distributive roles.

History of Industrialisation in India This section gives a rough overview of the history of industrialisation in India. Several areas will be discussed in more detail in the following section. Under colonial rule, India, as with most other developing countries, followed a non-industrial model. But many Indians believed that progress was retarded by this. It was believed that true economic progress lay in industrialisation; Smith's and Ricardo's ideas of international specialisation and mutually advantageous free trade 3 of 13 were rejected, at least until India became an exporter of more sophisticated goods. Industrialisation since Independence India's first Prime Minister, Jawaharlal Nehru, Premier from 1947 to 1964, saw industrialisation as the key to alleviating poverty. Industrialisation not only promised self-sufficiency for his nation that had just regained political sovereignty, but also offered external economies accruing from technical progress. Believing the potential of agriculture and exports to be limited, Indian governments taxed agriculture by skewing the terms of trade against it and emphasising import substitution, thus giving priority to heavy industry.

Nehru believed a powerful state with a centralised planned economy to be essential if the country was to industrialise rapidly. The Industries (Development and Regulation) Act (IDRA) in 1951 laid the foundations for this administrative control on industrial capacity. But, over time, the licensing requirements became increasingly stringent and were accompanied by a gamut of procedures that required clearance by a number of disparate and uncoordinated ministries. In order to pursue IS, the Import Trade Control Order of 1955 subjected almost all imports to quantitative restrictions in the form of import licenses. These were supplemented by tariffs at rates that were among the highest in the developing world. Indian state intervention in industrial development has been extensive. Unlike many East Asian countries, which used state intervention to build strong private sector industries, India opted for state control over key industries. At different times, nationalised industries included chemicals, electric power, steel, transportation, life insurance, portions of the coal and textile industries, and banking. To promote these industries the government not only levied high tariffs and imposed import restrictions, but also subsidised the nationalised firms, directed investment funds to them, and controlled both land use and many prices. Under Prime Minister Indira Gandhi (1966-77), two major shifts took place in the role of the state. First, the neglect of agriculture was reversed through state activism in subsidising new seeds and fertilisers, agricultural credit, and rural electrification. The green revolution took off and by the mid-1970s India was self-sufficient in grain. The second shift was the further tightening of state control over every aspect of the economy. Banks were nationalised, trade was increasingly restricted, price controls were imposed on a wide range of products, and foreign investment was squeezed. In 1973, dealings in foreign exchanges as well as foreign investment came to be regulated by the Foreign Exchange and Regulation Act (FERA).

The act virtually shut out the inflow of new technology from abroad in the 1970s and 1980s, particularly when these involved large equity participation. The Indian system of state planning went far beyond the

usual inward-looking industrialisation policies that most developing countries pursued after World War II. The government regulated the most basic business decisions for all firms above a certain size: borrowing, investment, capacity utilisation, pricing and distribution. The over-restrictive, and often self-defeating nature of the regulatory framework, began to become evident by the late 1960s and early 1970s. Comprehensive planning was increasingly criticised as planned targets were not met and many plans were not even implemented. The lack of success in some dimensions led to a new and more restrictive set of regulations. One example is the attempt to reserve sectors for small industries and to restrict the growth of large firms. Beginning in the early 1980s, a mild trend towards deregulation started. Economic reforms were introduced, starting to liberalise trade, industrial and financial policies, while subsidies, tax concessions, and the depreciation of the currency improved 4 of 13 export incentives.

These measures helped GDP growth to accelerate to over 5% per year during the 1980s, compared to 3.5% during the 1970s, and reduced poverty more rapidly. However India's most fundamental structural problems were only partially addressed. Tariffs continued to be among the highest in the world, and quantitative restrictions remained pervasive. Moreover, a significant government influence continued in the allocation of credit to firms and a discouragement of foreign investment. Relatively inefficient public enterprises, controlling nearly 20% of GDP, remained a drag on economic growth. The government expanded antipoverty schemes, especially rural employment schemes, but only a small fraction of the rising subsidies actually reached the poor. Competition between political parties drove subsidies up at every election. The resulting fiscal deficits (8.4% of GDP in 1985) contributed to a rising current account deficit. India's foreign exchange reserves were virtually exhausted by mid-1991 when a new government headed by Narasimha Rao came to power. In July 1991, India launched a second major economic reform program. The government committed itself to promoting a competitive economy that would be open to trade and foreign investment. Measures were introduced to reduce the government's influence in corporate investment decisions. Much of the industrial-licensing system was dismantled, and areas once closed to the private sector were opened up.

These included electricity generation, areas of the oil industry, heavy industry, air transport, roads and some telecommunications. Foreign investment was suddenly welcomed. Greater global integration was encouraged with a significant reduction in the use of import licenses and tariffs (down to 150% from 400%), an elimination of subsidies for exports, and the introduction of a foreign-exchange market. Since April 1992, there has been no need to obtain any license or permit to carry out import-export trade. As of April 1, 1993, trade is completely free, barring only a small list of imports and exports that are either regulated or banned. The WTO estimated an average import tariff of 71% in 1993 which has been reduced to 40% in 1995. With successive additional monetary reforms, the rupee, since 1995, can nearly be considered a fully convertible currency at market rates. India now has a much more open economy. Special areas of economic policy After giving a rough overview of the history of industrialisation, this chapter provides more detailed information about the areas of human factors for industrialisation, structure of foreign investment, and the process of privatisation. Human Factors for industrialisation A very necessary ingredient for promoting industrialisation and technological change is the investment in human capital. India's current average adult literacy rate is low at 52%. There are large inequalities between males (literacy: 64%) and females (literacy: 39%), between urban and rural areas, and between different social classes. Low levels of female education in India are due to the gender division of labour. Females are expected to spend most of their life in domestic work and child rearing. Secondly, the practice of dowry and the ideology of hyper gamous marriage can turn female education into a liability.

An educated girl is likely to be more expensive to marry off, thus female education tends to be a threat

to the social order. Illiteracy is widespread not only in older groups, but also among young boys and girls, particularly in rural areas. The remarkable neglect of elementary education in India is all the more striking given the widespread recognition, in the contemporary world, of the importance of basic education for economic development. Primary education in India is not compulsory. However those who receive primary education and make it through secondary school 5 of 13 have an excellent chance of getting a high-class University education. India has a huge supply of people with more education than they can use. Amartya Sen argued that there were deep-seated class biases in the pressures that have determined Indian educational priorities, and that the inequalities in education are, in fact, a reflection of the inequalities of economic and social powers of different groups in India. India's hierarchical, brahmin-dominated society has been noticeably casual about primary education; resources have been poured into the higher education that benefits the upper class. The persistence of endemic illiteracy and educational background in India generally limits the freedom and well-being of the Indian masses and has a direct role in the relative deprivation of women in particular. Elementary education is extremely important for a successful integration in the world market and if the process of growth were more 'participatory' it could raise the income-earning power of large parts of the nation. Even if India's high technology industries, such as modern computer software or engineering products had an accelerated growth, the bulk of the Indian population would benefit only marginally.

Foreign Investment Policy Instruments Since independence, new foreign investment has been rigidly controlled in line with established development thinking. Investment was mostly restricted to industries where it was felt that the acquisition of foreign technology was important, or where the promise of exports was convincing. The FERA was a landmark. In most industries, foreign shareholdings in rupee companies had to be reduced to 40%. The relative importance of foreign ownership in the private corporate sector fell significantly in the next decades. The attitude towards foreign investment began to change in 1985 as a part of Ghandi's drive for advanced technology. Despite this, looking at 1988 shows how poorly India fared in attracting private foreign investment. Net Private Foreign Investment to India (in million US$) was $280. This is compared to her Asian competitors with figures of $2344 (China), $1093 (Thailand) and $986 (Philippines). Since the liberalisation in, mid-1991 India has become a magnet for foreign investment. A noteworthy feature is the dramatic speed of approvals, some taking only a week. Automatic approval of projects in 34 industrial sectors is permitted. The constraint that foreign investment should reach only 40% was relaxed to 51%.

In certain sectors, such as infrastructure and computer software, the ownership can also be as high as 74%. In some sectors such as transport infrastructure, full foreign ownership is permitted and even encouraged. Foreign direct investment rose from $170 million in 1991-92 to $1.3 billion in 1994-95. India is targeting foreign direct investment of at least $10 billion annually by the turn of the century. It attracted a total of $2.4 billion in 1996-97 and $3.4 billion in 1997-98. Foreign direct investment is nearly 25 times higher than it was before the economy was liberalised. The government in New Delhi is continuing to work toward reforming long-standing policies to make the country more "investor friendly"; a move that continues to heighten US interest in the country. A growing number of US companies, motivated by an increasingly favourable investment climate and the country's huge reserves of both human and natural resources, have seriously begun to consider investing there. US investment has been more than 24% of the total investment since 1991. In 1995 approximately $3.5 billion of US foreign investment flowed into India. The US continues to be the leading investor in India. The US is followed by other more 'traditional' investors like the U.K. (6.4%), Israel (5.9%), Mauritius (4.6%), Japan (4.2%) and Germany (4.1%). Most of the investment interest has been in the telecommunications, oil refining, automobile and transportation sectors, with other projects developing in the electronics, software and electrical equipment industries. 6 of 13 Revitalisation of the Indian Private Sector India has

always been a trading nation.

Centuries of alien rule and decades of socialism did not stamp out the Indian entrepreneurial spirit. The Statement of Industrial Policy 1991 reduced the list of industries reserved for the public sector from 17 to 6. In 1992/93, 104 out of a total of 237 central public sector enterprises made losses. With few exceptions, the inefficiency of public enterprises, which generate 17% of GDP, has continued to be a serious issue. It is clear that there is a prima facie case for privatisation on grounds of efficiency. However, the strength of the case for privatisation varies with the type of industry. Now exposed to international competition, Indian companies are forming alliances with each other to face the challenges of the future. It is now even possible for Indian firms to merge with other companies. Procter & Gamble merged its operations with Godrej Soaps. Coca Cola acquired Parle, its erstwhile competitor, thus extending the cola wars to new exotic lands. Companies are enjoying the benefits of economies of scale and synergy. As larger and stronger groups emerge, they will have the resources necessary to invest in upgrading technology and will become more competitive. Evaluation of Industrialisation in India the indicators named above will be used to evaluate the success of Indian industrialisation policies. A distinction will be made between the period from Independence until 1980, characterised by inward-looking policies such as IS, and the period from 1980 until today, characterised by reforms and the opening up of the Indian economy. The following analysis with indicators compares the achievements of these two periods only.

Absolute statements of Indian achievements follow later on. It must be emphasised that the analysed data conceals sharp disparities within India between development-oriented states and laggards, between women and men, between adults and children, and between city and countryside. Different states have progressed at differing paces and, even within states, different regions have achieved markedly varied results. Even more noticeable than geographic differences in poverty reduction are the inequalities that persist across gender, caste and ethnic groups. Social indicators for women – literacy, for example – are distinctly lower than for men, and the level of scheduled castes and tribes in both economic and social achievements is still well below the national average.

Growth of national income

Growth of national income in GNP per capita in India was about 1.4% in the years from 1960 to 1980. The effects of the reforms of the 1980s are reflected in growth figures: the average GNP per capita growth increased to 3.25%. And with further opening up in the 1990s, the GNP per capita reaches new heights with 3.8% average growth in the period from 1987 to 1997. Alleviation of poverty In the early 1950s, about half of India's population was living in poverty. Since then, poverty has been declining slowly. The poverty reduction was given new impetus by the reforms: falling from around 55% in 1974 to just under 35% in 1994 by a headcount index. In the 1980s and 1990s, poverty reached historically low levels. Still, because of India's rapid population growth rate, the relative reduction of poverty has not been sufficient to reduce the absolute number of poor which increased from about 164 million in 1951 to 312 million in 1993-94.

Reduction of income inequalities

The reduction of income inequalities has only made slight advances. The biggest 7 of 13 advances were made mostly before the reforms. On the other hand, one of the biggest increases in inequality happened in the late 1970s, and the developments for the late 1980s / early 1990s in Figure 1 look promising. Compared to other low-income economies, the inequality is relatively low. Education From 1960 to 1977 the reduction of illiteracy was only 11%. From 1978 to 1995, it was 25%, thus much higher. Of course, there are also long-term developments involved here, so that the higher reduction in the second

period might be partially due to actions taken in the first period. Health Life expectancy, used as an indicator of health, has increased constantly since independence. During the period from 1960 to 1980, it increased from 43 years to 52 years, which is an increase of 21% in 20 years. From 1980 to 1995 it grew to 62 years, which is a 19% increase in only 15 years. This means that the growth of this indicator has increased by a rate of 24% compared to the previous period. Even clearer is the improvement in the reduction of infant mortality. This was reduced by 25% in the period 1960 to 1995 and a further reduction of 45% took place from 1980 to 1995. This is partially due to better education of mothers, as well as to an improved economic situation of parents. Summary Independence - 1980 The system of state planning constrained growth of the private sector by allowing it to expand only with government permission. But despite the massive interventions, economic progress was made during the period following independence.

The per capita GDP grew at a respectable rate of 1.4% per annum from the late 1940s into the 1970s. Both famine and poverty were significantly reduced during this period. Nevertheless, most economists argued that the interventions lowered India's economic growth rates to a level which was not adequate for a country that saved and invested over one-fifth of its GDP. With few major producers of many key industrial products, the concentration of domestic production was very high, inviting monopolistic pricing. Moreover, as the world economy grew and as beneficial opportunities for growth through trade expanded, India paid an increasing price for its economic isolation. The Indian system of state planning has been described as combining "the worst of socialism and capitalism, by suppressing growth while failing even to deliver the social welfare that communist systems provided". The liberalisation that started in the 1980s and gained further momentum in mid-1991 proved the critics of the old system right. Per capita GNP reached historically high growth rates; industrial output-growth averaged 8.4% in 1994-95; exports were up by 27%; inflation dropped below 10%; the current account deficit is below 1% of GDP; foreign-exchange reserves are high at $20 billion; and food stocks have hit an all-time high of 37m tonnes. The long neglected private sector today generates two-thirds of India's GDP. The World Bank describes the change of the state's role from that of principal investor to that of facilitator of entrepreneurship.

Thus, over the course of a few years, the old national consensus on socialism has given way to a new consensus on liberalisation. India – a perspective it should not be forgotten, that despite all mentioned advances, India is still a low-income, developing country. It has an economy slightly smaller than Belgium's with a GNP per capita of $390. Only about half of its 960 million people can read. Only 14% of the population has access to clean sanitation - a lower proportion than anywhere else except for parts of Sudan and Burkina Faso. According to the World Bank, 63% of India's under-five-year olds are malnourished. The infant mortality rates of two Indian states is above the sub-Saharan average. About 40% of the world's desperately poor live in India. India's progress in fighting poverty is modest when compared with some of its Asian neighbours. Between 1970 and 1993, the proportion of Indonesia's population living in poverty dropped from 58% to 8% – a greater decline in a shorter period of time. According to the World Bank, "it is through rapid growth that India will be able to reduce poverty and generate the resources to invest in the health and education of its people who will in turn sustain this growth, [as] overall growth accounted for the lion's share of poverty reduction: 80% of the decline in the number of households below the poverty line between 1951 and 1970, and almost 100% since 1970". But India, like many developing countries that adopted a philosophy of government intervention with import substitution policies, is finding that economic reform can often be a slow, incremental process. Complications continue.

Domestic producers will resist tariff reductions that subject them to increased competition. Government

bureaucrats will try to maintain the power and influence they acquired during periods of substantial government involvement in economic decision making. The reforms so far are a positive step but must be extended and accelerated if India is to catch up with the East Asian tigers. It is not possible to condemn the inward-looking policies as totally wrong. Some advances were made and no one can say what would have happened if India had followed another strategy. In our opinion, the idea that industrialisation was important for India in the 1950s was right, as the share of commodities in world trade is constantly decreasing. However, the view that exports are not important and that India could go its own way was wrong. By protectionism and interventions, India fostered the establishment of industries. India didn't create an efficient private sector but a huge, inefficient public sector, and protectionism lowered the competitiveness of India's economy. Furthermore, the neglect of exports led to the fact that India's share of world trade decreased from 2% in 1950 to 0.5% in 1990. In our opinion, India should have followed an EP-strategy as the Asian tigers did and shouldn't have created the system of state planning and such a large public sector; both of which led to huge inefficiencies. The success of the recent opening up of the 9 of 13 economy illustrates the potential India has. Therefore, India should proceed in this direction to encourage further economic growth. Still, economic growth alone is not enough. Amartya Sen emphasises that growth must be "high and participatory". But even today, India's "have-nots are treated virtually as are-nots" due to the caste-system and are neglected.

Sen toured India in January 1999 to communicate his message that Indians are woefully underfed, undereducated and sickly, even by the standards of poor countries. The impact remains to be seen. India's biggest current problems will be covered in the following section.' India's current problems regarding industrialisation. After evaluating important indicators for industrialisation and giving a summary of industrialisation since independence, we will now take a more detailed look at some specific areas for future industrial development in India. Infrastructure Perhaps the biggest problem for doing business in India is the woeful state of its infrastructure. Consider this: it takes four days for a truck to travel the 900 miles between India's national capital New Delhi and its commercial capital Bombay. It takes months to get connected to the power supply in any Indian city, and several years to get a telephone connection in large cities. Poor infrastructure is acting as a drag on the Indian economy, and the Indian government is now attracting private domestic and foreign investment to build the backbone of a modern economy. A recent report estimated that investment in infrastructure would rise from 5.5% of GDP in 1997, to about 7% in 2000/01.

This includes massive improvements in telecommunications, power, energy, and transport. India has recognised the vital role telecommunications play in the growth of the economy. The Indian telecom sector was wholly under government ownership and control until recently and was characterised by under-investment and outdated equipment. There is vast potential for extending these services in India, which has one of the world's smallest telephone densities of 1.3 per 100 people, compared with the world average of 10 per 100. Advanced communication services such as fax, data transmission, and leased circuits are becoming increasingly common. Foreign collaboration is also being encouraged in cellular phones and paging systems. In the telecommunications sector, estimates for regional investment need range from $40 billion a year, to as high as $70 billion a year by the end of the century. The power problems are severe in India with three-hour-a-day power cuts and damaging voltage fluctuations that require companies to generate their own power. Investment in energy is a sound way of increasing manufacturing activity.

If all 49 proposed private sector power projects are implemented, these would add a total of 20,000 megawatts to India's current capacity of 66,000mW. However it should be noted that India's energy demand is growing at 8-10% a year. As part of India's liberalisation efforts, the transportation sector has

been opened to private investment. The government is offering incentives to invest $4.7 billion to construct and operate bypass roads, highways, bridges, railways, and ports. Health and Education HIV/AIDS is a newly emerging threat to India's public health. About 3 million people in India may be affected. Malnutrition also continues to impede India's development. Prejudices against women and girls are reflected in the demographic ratio of 929 females for every 1,000 males. 10 of 13 To support India's goal of achieving universal primary education, the World Bank is supplementing increased state government expenditure. This has boosted school enrolment, particularly among girls and disadvantaged children, and is improving the quality of instruction and learning achievement. Amartya Sen reckons that India could enrol all its children in primary school by spending an additional 0.5-1% of GDP. Providing basic health and education is not expensive where labour is cheap. But health and education indicators, while showing some progress, still remain among the world's lowest. Public sector another big problem is India's notoriously bloated and inefficient public sector. The World Bank has turned down applications for power loans worth $750 million for projects in some states because of mismanagement in their government.

Many electricity boards have become insolvent as a result of providing electricity at extremely subsidised rates and ignoring large-scale thefts of electricity. State governments have been unable or unwilling to take the politically unpalatable decisions needed to make their electricity boards viable. The most telling evidence of the cost of delaying reform is the sheer effort companies have to expend to cope with the country's labyrinthine bureaucracy. For example, foreign investors continue to seek permission from the Foreign Investment Promotion Board, even though their plans are covered by the automatic approvals system. Corruption An immediate threat to India's governance is not the tottering coalition governments or the BJP, but corruption. The combination of a state-run economy and weak political institutions created all too many opportunities for crooked politicians and bureaucrats. Worse still for the business community is that the government itself is the fountain-head of corruption. This is particularly serious in view of the huge importance of the government sector in India's economy. Corruption has become ubiquitous at all levels and is accepted by everyone.

Many Indian businessmen feel that liberalisation of the economy will have no impact on reducing the corruption that has become so well entrenched. The influx of foreign companies is already unleashing a new wave of even greater corruption. A survey of 183 US firms conducted by the US embassy in 1995 revealed that US investors rated corruption in India as the third worst problem they faced after red tape and a lack of electric power. The blame for the deluge of corruption in India lies in the lack of transparency in the rules of governance, extremely cumbersome official procedures, excessive and unregulated discretionary power in the hands of politicians and bureaucrats, who are prone to abuse it, and a lax judiciary. Tax Problems Tax reforms have been seeking to transform India's tax system from one with high differential tax rates falling on a narrow base, into one with tax rates at moderate levels falling on a broad base. The 1995 fiscal budget reduced taxes on corporate income, and a major reform of excise taxes has been implemented to make it resemble a value-added tax more closely. But the government's income is also constricted by an inefficient taxation system. Rural areas are not taxed because they contain such a large pool of voters and no government has had the political will to change this. Income tax is skilfully dodged. 11 of 13 this leaves the government with excise and customs duties, which represent two thirds of all taxes.

Labour market India needs greater labour market flexibility to make its companies more competitive and its economy more productive. Politically powerful labour unions have stifled most efforts at serious reform or privatisation of India's largest public sector enterprises, including most banks, all insurance companies, and many major industries, even though privatisation would probably cost the jobs of no

more than 1.1% of the urban labour market. India's labour laws hinder efficiency and growth. Financial sector India's financial sector still cannot effectively mobilise and mediate capital to respond to economic changes. The resulting high cost of capital makes Indian industry and exports less competitive. In spite of recent improvements, India's equity markets are still too thin and volatile to inspire great confidence on the part of domestic or foreign investors. Bond markets are practically non-existent. Liberalisation of the insurance industry, which would greatly improve the investing of India's substantial savings, now 26% of GDP, has been stymied. India's banking system remains flawed, with the dominant state-owned banks still carrying bad loans amounting to 15 to 25% of their total. Outlook The arrival of a BJP-led government in March looked like a setback for freer trade. It took two steps away from trade liberalisation. Firstly, India's anti-dumping procedures were tightened. Secondly, the Finance Minister imposed an extra tariff of 4% in June.

However, it is too early to conclude that India is returning to protectionism. The government insists that tariffs were increased to raise revenue, not to protect Indian business. BJP strategy regarding foreign investment BJP party leaders seem keen to limit foreign investment in all areas other than infrastructure. They are worried that Indian culture will be eroded by western consumerism such as food habits brought in by Kentucky Fried Chicken or McDonald's. Such sentiments cause alarm. "Foreign investors are not exactly queuing up to enter India, and this attitude will scare away those who are weighing up the possibilities of doing business here," cautions a top executive with a foreign investment bank in Bombay. In its defence, the BJP says that while it seeks to protect domestic industry and reserve "India for Indians", it does not intend to take back the reforms. But approved and actual foreign direct investment already shrank between January and July 1998. Approvals totalled only $4.7 billion, compared with $7.1 billion in the same period in 1997 and actual inflows slid to $1.6 billion from $1.9 billion. Furthermore the BJP's decision to conduct five nuclear tests in May 1998 underscored India's reputation for unpredictability and highlighted the vulnerability of infrastructure investment to international and domestic political pressures. The sanctions imposed by the US on India include bans on private banking assistance to the Indian government and pressure on multinational lenders such as the International Monetary Fund to withhold loans.

The sanctions hit the Indian economy and Indian companies generally, and were potentially very onerous for foreign developers. On the other hand, the government recently encouraged foreign direct investment. In July 1998 it put forward a plan allowing foreign companies to take stakes of up to 26% 12 of 13 in Indian insurance companies, having resisted opening the insurance market to foreigners in the past. "Automatic" approval of foreign investment of up to 100% was extended to more sectors of industry. Recent development of the macroeconomic situation The macroeconomic situation is also causing concern. After a year of patting itself on the back for escaping the Asian crisis, the Indian government is now sitting up at some spine-chilling signs that the economy hasn't been unscathed after all. India's gross fiscal deficit will rise to 6.6% of GDP from a planned 5.7% in 1998, forcing the government to keep borrowing and pushing up interest rates. But the government's infighting and inability to push through much-touted economic reform bills raises doubts as to whether it can tackle these problems. The ballooning trade deficit comes on top of sluggish industrial production, high inflation (a 9% annual rate in the first half of November), and an expanding budget deficit. Currency devaluations in the rest of Asia have made Indian exports even less competitive than they were previously. The current deficit of $2 billion has been pushed to the highest level since 1991. The rising deficit is financed by foreign-exchange reserves, and is expected to put upward pressure on the rupee . On the other hand, GDP growth is forecast to move upwards to 6.4% in 1999. This follows a slowdown to 5.1% in 1998 due to a 1.5% decline in agricultural production, slowing exports, and industrial growth. Factor-cost GDP is forecast to expand by an annual average of 6.7% until 2002-2003. Overall, it remains

to be seen how entrenched the reforms are in India in the face of more difficult and troubled economic conditions.

UNIT IV: TRENDS, POLICIES & PERFORMANCE IN SERVICE SECTOR

GROWTH AND STRUCTURE OF THE SERVICES SECTOR IN INDIA

The Services sector accounts over one half of India's GDP. The examination of the Services sector at a reasonably disaggregated level is necessary because the services sector (tertiary sector) is very highly heterogeneous in nature than the primary and the secondary sectors. Further technological advance, the process of globalisation and increased reliance of outsourcing have led to rapid changes in the economic structures of many economies including India. And these changes have resulted in the relatively higher levels of growth of the services sector. This study attempts to understand the growth and structure of the services sector in India through the analysis of the sub□sectors within the services sector at a level of disaggregation that has so far not been adequately analysed in the literature. It identifies sub□sectors within services that have contributed mainly to GDP growth. It also identifies sub□sectors that have contributed mainly to employment growth. The quality of employment in the services sector is examined through the analysis of the productivity levels in different services.

Introduction There is a large body of academic literature on the role of services sector in the Indian economy. The growing share of the services sector in the gross domestic product (GDP) of India indicates the importance of the sector to the economy (GOI 2012; Eichengreen and Gupta 2010; Singh 2006; Papola 2008). The services sector accounted for about 30 per cent of total GDP of India in 1950s; its share in GDP increased to 38 per cent in the 1980s, then to 43 per cent in the 1990s and finally to about 56.5 per cent in 2012□13 (GOI 2013). Thus, the services sector currently accounts for more than half of India's GDP. This process of tartarisation (dominance of the tertiary or services sector) of the economy has been accompanied by a decline in the share of the primary sector (agriculture) and a more or less constant share of the secondary (industry) sector over the years. In spite of its growing share in the total GDP, scholars have noted a serious mismatch between the share of services in total GDP and the corresponding share of services in total employment. For example, while the share of the services in GDP increased from 34 per cent in 1970s to 54 per cent in 2010□11, the corresponding share of services sector employment in total employment changed from 15 per cent in 1972□73 to only about 26.67 per cent per cent in 2009□10. As a consequence, a large proportion of workers remain in rural agriculture. Among others, this has led to a situation of a large gap in productivity between agricultural workers and workers in the services sector (Papola and Sahu 2012; Papola 2012). The services sector is a highly non□homogeneous sector comprising a wide range of activities. There are differences within the services sector with regard to the contribution of different subsectors to GDP and to employment. Consequently, the labour productivity within the services sector is also likely to vary widely. The services sector and particularly jobs in the services sector are often discussed in the literature on the informal sector. Service sector employment is associated with informal sector not only due to the relatively large proportion on unprotected jobs, but also due to the fact that a large proportion domestic workers are accounted for as services sector workers (Jonakin 2006). In this paper, we attempt to understand the growth and structure of the services sector in India through an analysis of the different sub□sectors within the services sector at a level of disaggregation that has so far not been adequately analysed in the literature. A study of the services sector at a reasonably disaggregated level is necessary because, as noted earlier, unlike agriculture (the primary sector) and industry (the secondary sector), the services sector (the tertiary sector) is much more heterogeneous in nature. Further due to communications led technological advancement, the process of globalisation and increased reliance of outsourcing as a mode of production organisation, rapid changes have occurred in the economic structures of many economies including India. And a large part of this change is visible in the form of

growth and change in the structure of economies in favour of larger share of the services sector.

In the analysis of the service sector GDP and services sector employment at a disaggregate level, we attempt to identify subsectors within services that have contributed mainly to GDP growth. We also attempt to identify subsectors that have contributed mainly to employment growth. Thus we attempt to address the question of whether there is, as in the case of the aggregate economy, a mismatch between contribution to GDP and to employment within the subsectors of the services sector. A related question that we would like to address is on the quality of employment across different services that employ proportionately large number of workers. This leads us to the study of the productivity levels in different services. We compare the productivity 3 levels across different services with that of the average within the services sector and also with agriculture and the manufacturing (or the industry) sectors. In the debate on the role of services sector and the 'services sector led growth' witnessed in India during the 1990s and 2000s, scholars have frequently questioned the medium to long term sustainability of this form of economic growth, which is heavily dependent on the services sectors performance. For example, questions are being raised as to how dependent the services sector growth is on government spending and to what extent the services growth in India is led by the external sector. Finally, a number of services are closely linked to production or manufacturing. In the past, some of these services would be performed in□house within manufacturing enterprises.

A combination of factors including technological advances, global competitive cost cutting pressures, fluctuating market demand and so on, have led to reorganisation of production such that producer services that contribute directly to manufacturing capacity are now seen as being independent from the process of manufacturing. Thus producer services are considered services and placed under that services sector. An important component of producer services is Information Communication Technologies (ICT) enabled producer services. Growth of producer services is desirable for the growth of the manufacturing sector. In addition, due to ICT led technological possibilities and due to abundance of specifically skilled ICT workers, producer services based in India could cater to industry in other countries as well. In this paper we attempt to compare the performance of producer services with distributive services and social or personal services. We begin the next section by briefly discussing what constitutes the services sector and how scholars have attempted to distinguish it from industry. We then discuss the issues and debates related to the definition, identification and measurement of the services sector particularly with reference to India. This is followed by brief description on the nature and sources of data on the services sector in India.

The next section has a brief discussion on what constitutes the services sector and the debate on the concept and definitions. In this section we also discuss measurement issues in general and those that are specific to India. In section 3 we analyse the growth and structure of GDP growth in India from 1950 till 2009□10. The focus though is on the latest period from 2004□05 to 2009□10. Section 4 presents a brief analysis of the growth and structure of services sector employment in India. This analysis is undertaken at the 2 digit as well as at the 5□digit levels. Section 5 is on the levels of productivity within the service sector and Section 6 looks at the different possible classifications of services and attempts to understand the prospects of growth and sustainability through this alternative classification. Finally, Section 7 provides a brief summary of the report and concludes. The Services sector What constitute the services sector? The term services sector refers to, at the most aggregate level, a large group of activities that include trade, hospitality (hotels, restaurants), transportation, communication, entertainment, health, education, public services and so on. It can be argued that, even at the aggregate level, the services sector is more heterogeneous than the other two sectors, agriculture (primary sector) and industry

(secondary sector). Thus if the primary sector involves producing goods directly from natural resources (agriculture, fishing, hunting, mining and so on) and secondary sector involves modifying material goods into other more useful products and commodities, then the tertiary sector or the services sector includes all activities that do not produce or modify material goods (Illeris 2007).

In other words unlike the output of agriculture, mining or manufacturing which are material and tangible, the output of the services sector such as teaching, cleaning, selling, curing and entertaining have no physical form and therefore are immaterial or intangible (Noon 2003). Given its nature and heterogeneity, there is a large body of literature where scholars have debated on the precise definition and identification of the services sector.1 In this debate, scholars have argued that even in the most advanced countries where the services sector accounts for the largest proportion of all economic activities, it is defined negatively or as a residual comprising all economic activities that do not belong either to the primary and secondary sector (Illeris 2007). Scholars have also attempted to arrive at precise and positive definition of the services sector. T. P. Hill wrote a set of influential papers on the concept and definition of the services sector as being distinct from goods (Hill 1977, Hill 1979). In an early review on what constitutes the production of goods and what would be services, Hill (1977) provides a positive definition of the services sector.2 In a detailed discussion of the concept, definition and measurement of the services sector, Hill makes a distinction between 'services affecting goods' and 'services affecting persons'. And thus proposes a definition of the services sector "as a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit".

Despite its 'vagueness' in part, the positive definition by Hill was nevertheless influential and contributed to the UN System of National Accounts (1993) (Illeris). For a very brief and concise discussion of the distinction between goods producing operations and service operations see Noon (2003). 5 internationally accepted definition of what constitutes services is given by the UN SNA (1993). According to the SNA (1993), "Services are not separate entities over which ownership rights can be established. They cannot be traded separately from their production. Services are heterogeneous outputs produced to order and typically consist of changes in the conditions of the consuming units realized by the activities of producers at the demand of the consumers. By the time their production is completed they must have been provided to the consumers."3 And "The production of services must be confined to activities that are capable of being carried out by one unit for the benefit of another. Otherwise, service industries could not develop and there could be no markets for services. It is also possible for a unit to produce a service for its own consumption provided that the type of activity is such that it could have been carried out by another unit."4 Among the many services that are discussed in the literature on the concept of services, an important type can be called producer services.5 These services are essentially manufacturing activities that appear to be 'services activities' when the manufacturing process is subdivided and broken down into several components. The fact that some of these manufacturing activities appear to be similar to service activities is further exacerbated when these components of manufacturing are sub□contracted out or outsourced to other enterprises. This has led to a blurring of the distinction between manufacturing and services. Growth of the services sector: A recent phenomenon? In recent years, there has been an unprecedented growth in services across all countries. While in the advanced industrialised countries this is seen as a continuation of the economic transformation, the above average growth of the services sector as compared with manufacturing and agriculture is also seen in some less developed countries like India.

The rise in the services sector has been attributed to a number of possible factors both from the demand

as well as the supply side (Lee and Wolpin, 2006). It has been argued that the disproportionate growth in services, at least in the case of India, is not a recent phenomenon. For example, Mitra (1988) noted the disproportionate growth in services GDP in India as well as the absence of corresponding increase. Kumar et al (2007) discuss the 'ambiguities inherent' in the accepted definitions of "manufacturing" activities and "services" in the case of estimation of GDP in India focusing on the unorganised or the unregistered sector. Examples are activities such as painting and polishing of metal components, cleaning, ironing and o on of textiles and garments. 6 services employment in the 1980s. On similar lines, Nagaraj (1991) observed that rather than a sudden spurt of growth in services in recent years, the large share of services sector in recent times is due to the relative higher base in the 1950s and more or less steady growth from early 1950s onwards. It has also been pointed out that there is a difference in nature and type of services between the advanced industrial countries and the countries that are still at lower levels of income. While services sector employment in advanced countries may not imply low quality employment, in case of less developed countries a large proportion of the service economy has low quality employment (Ghosh 1991).

According to one argument, services sector occupations in less developed countries (LDCs) arise out of scarcity of employment opportunities in other sectors. In this context, Ghosh (1991) says that Arthur Lewis (1954) "rightly observed that cheap supply of labour and social prestige consideration of the upper strata of population make possible the employment of a large number of domestic servants in LDCs." Thus while labour productivity in the services sector in advanced countries would be on par with or higher than in manufacturing, in less developed countries the labour productivity in services sector is relatively lower. Secondly, accordingly to Ghosh (1991), the distributive services in the tertiary occupations (trade and transport) in LDCs are low□productivity and low□income type as compared with advanced countries; and finally services sector occupations in advanced countries are highly capital□intensive, whereas on the contrary in less developed countries there is very little use of capital. Thus, it may be concluded that a part of the services sector growth in less developed countries such as India should be treated with caution and should not be taken as an indicator economic growth. While it is true, as in the case of India, that the share of services sector was already notable in the 1950s, and there has been steady growth of the sector since, there is no doubt that the nature and quality of growth of services GDP has changed in more recent years.

Major changes in the services sector the recent period is brought about by three important factors: the role of IT and ICT led services, globalisation process and increased reliance on outsourcing. In their study of globalisation of outsourcing, Kotabe et al (2009) have identified three phases in a period of about 20 years starting in the mid□1980s. The first wave which started in the mid□1980s was primarily focused on global sourcing of 'manufacturing activities.' The authors then identify a second wave of global outsourcing starting sometime in the 1990s. This is the time when large firms in the advanced countries began to reorganise and a number of them began by closing down their in□house IT departments. By then IT services were developed enough for it to be commoditized and offered by a third specialist firm. According to Kotabe et al (2009) "Global sourcing mostly involved labour□intensive and standardized programming activities, which could be easily sourced from locations like India." The third phase is identified with the beginning of the business process outsourcing (BPO) that extends beyond pure IT services to other services such as legal affairs, accounting, human resources management, finance, sales and after□sales such as call centres. However, global outsourcing is possible in these cases only to the development of appropriate communication and IT technologies. In the second phase, India is considered a source country and this continues and gets strengthened in the third phase.

Factors that have led to spurt in services growth Scholars have offered a number of explanations about the growth in services employment. An important factor for services growth is demand led. The increased demand for services by the producers of goods and services 'is in part due to firms externalizing service functions that previously had been performed internally (Kirn 1987). It has also been argued that in comparative terms, there has been a spurt in the intermediate demand for services in recent years (Kirn 1987). The 'growth of multinational firms, the increase in international trade, and the proliferation of products' are also seen as causing an increase in the demand for services. Stanback et al (1981) have argued that multinational firms that compete in increasingly complex business environments 'have expanded the amount of effort devoted to activities such as planning, coordination, and control and consequently have increased their use of services' (Stanback et al 1981, cited in Kirn 1987). Apart from the demand factors discussed above, scholars have also proposed supply side factors that have contributed to the increased role of the services sector.

This is more prominently seen with regard to services employment and with regard to the advanced industrial economies. The technology led increases in labour productivity in manufacturing sector could lead to relative changes in employment share such that this results in the net decline in manufacturing employment and no change or increase in the services employment. Several scholars have argued that the relative increase in the share of services sector employment may not be due to opportunities or productivity levels in the services sector, but more to do with the productivity levels in the manufacturing sector – this is because the manufacturing sector is the "learning sector" while the services sector is not (Casares 2007). Based on a review of a number of studies on labour productivity or per worker output in industry and in services in the United States, Kirn (1987) has argued that the 'most significant cause of services employment growth' is the relative slower growth in labour productivity in the services sector compared to similar increases in the goods producing manufacturing sector. Kirn (1987) cites a number of studies starting from Fuchs (1968) to Beyers et al (1985) while making this argument. Whether this logical argument about the relative change in labour productivity holds good for the less developed countries. Further, in the present context, with the growth and proliferation of the use of computers both in the services and well as in the manufacturing sectors, the issue of the relative change in labour productivity needs to be revisited.

As this study has shown in subsequent sections, there are sub sectors within the services sector that have high and growing labour productivity, while some other more traditional services have low labour productivity. The inverse relationship between productivity and employment growth in the services sector is seen from another dimension by Kong and Hoon (1998). In their study of productivity and employment growth in the private sector and public sector in the US between the 1950 and 1975, the authors found a direct relationship between high productivity growth in the private sector and consequently lower employment possibilities. In this period, they have noted a growth in public sector employment. The trend is reversed in the 1980s and later when productivity growth in the US slowed down. In this later period, larger private sector employment opportunities and falling share in public sector employment were observed by Kong and Hoon (1998). Thus at least for the US, Kong and Hoon (1998) show that public employment acts as a buffer providing employment to those in the services sector who are unable to be absorbed by the private sector.

Services sector measurement issues:

There are mainly three main sets of problems with regard to measurement of services sector value added. The first set of problems relates to the inability to measure the value of output itself. For example there are services that are not marketed or do not have an explicit 'market value' such as services that are provided by public administration. In such cases, it is difficult to obtain an economic value of the

services provided. A part of this problem is also the difficulty in obtaining the actual 'quantity of service' provided. In case of a number of services, their true economic value is difficult to measure and evaluate. While government services to its citizens tops the list of services that are problematic in obtaining their economic value, other such services are ownership dwellings, defence services, banking and financial services and so on. The problem of measurement of the services sector has engaged governments and scholars since several years.

The difficulty is in the pricing of various services such as public administration, health services, education services and so on where the state may play a major role and many of these services may not have a 'market value'. Here the general method of measuring value added is the value of wages given to workers in the sector. Thus an increase in either employment or in wages both lead to a corresponding increase in value added. case of services such as health and education, Hill and McGibbon (1966) have argued that the demand for such services "is likely to be highly income elastic so that their relatively slow measured rate of growth in real terms must be viewed with some scepticism." The second set of problems relate to obtaining the real value of services as opposed to the nominal value of services. The absence of appropriate price deflators for many different types of services makes it difficult to arrive at the value added in services in real terms. There have been a number of attempts to overcome this problem by using different methods of deflation. The most popular method is the method of double deflation. In the method of double deflation, the value of output and value of inputs are deflated separately by their appropriate price indices and the value added for the service is then estimated as the difference between the output and inputs (CSO 2007).

The third set of issues is to do with the inability to actually make measurements on the ground and hence the use of indicators as proxies for the existence and growth of some services. For example, in the case of a number of services, employment (that is, the total number of persons employed in that in providing that service to rest of the economy) is used as an indicator to arrive at the size and growth of the service. Thus the total value added in the services sector is arrived at using different methods and measures for different services. Services sector measurement issues India Having discussed the three problem areas of services sector measurement in general, we now turn to discuss issues specific to India. Accordingly to Shetty (2007), the main problem with regard to estimating services GDP in India emanates from the fact that the estimates for GDP are arrived at in seven main categories, each being subdivided into subcategories and each of the subcategories in turn being classified further into three institutional sectors viz., private sector, public corporate sector and the unorganised sector. Each of these three institutional sectors has its own characteristics, making collection of data and estimates complicated and complex (Shetty 2007).
Due to the lack of availability of appropriate data, the method used in arriving at the estimate of GDP in case of a number of services, especially in the unorganised sector and in a few cases in the private corporate sector, a method is evolved where by GDP is obtained as a product of estimates of value added per worker and estimates of total number of workers. In this method, first a measure of the average gross value added (GVA) per workers in the particular sector or sub□sector is obtained through specialised surveys that are conducted for this purpose. The estimates for the total employment in the sector are then obtained from another source. For a fuller understanding of the more recent measure and methods used to arrive at the Services sector GDP in India see CSO (2007). employment are then multiplied to obtain estimates of the GDP of that sector. The problem with this method is that not only there could be a regular mismatch between obtaining estimates for GVA and employment, resource and other constraints imply the GVA estimates or even employment estimate in the inter□survey period which can be five to six years in case of NSS and ten years in case of the Census are based on extrapolations. In case of services sector which has been identified as fast changing and growing sector of the economy, such

extrapolations on thin past data do not lead to robust estimates.

This is obvious from the difference in estimates for the same year and in current prices of various services when the series are revised from time to time. Not surprisingly, the differences are higher, at higher levels of disaggregation. Another limitation with regard to the measurement and estimation of services GDP in India is that estimates are not obtained at a sufficiently disaggregated level. While there is an improvement on this front with every new release of GDP series, the latest being the series with base year 2004□05, when compared with manufacturing sector, the services are far behind. In this exercise of improving the coverage in every new GDP services, the Central Statistical Organisation also regroups economic activities according to a new classification scheme. In a detailed critique of this classification scheme, Banerjee et al (2007) conclude that data from the NSS enterprises surveys subsequent to the changes made in the 1999□2000 series support the regrouping of service sector activities. On the private corporate sector Unlike the long history of having price indices for whole sale prices and consumer prices for commodities, there is no price index for the services sector. Estimating the GVA from the private sector is thus complicated by the fact that it is difficult to obtain appropriate price indices separately for inputs and outputs or various components of GVA, such as salaries and wages and operating surplus in order to use the method of double deflation (Sharma et al 2007). In addition to this there is a no agency in the country that collects and disseminates current data on the private corporate sector (quarterly or annual). In this connection, the Ministry of Corporate Affairs (MCA), Government of India, initiated the MCA21 project in 2006. The MCA21 project aims to enable easy and secure access to MCA services in an assisted manner for corporate entities, professionals, and general public. The MCA21 project is designed to fully automate all processes related to enforcement and compliance of the legal requirements under the Companies Act, 1956.

According to Sharma et al (2007), for years subsequent to the base year (once the new series are released) in respect of various industry groups the estimates of value added are based on different procedures, depending upon the availability of data. For a comparison of the level of disaggregation between the previous series (base year: 1999-2000) and the series before that (base year: 1993-94). The corporate sector through periodic online filing of accounts by companies. Scholars have also suggested that an annual survey of services enterprise (ASE) be organised on similar lines to the Annual Survey of Industries (ASI). The strengthening of corporate sector statistics, introduction of ASE and the service sector price indices are the key to improving the quality of services sector GDP estimates (Sharma et al 2007). And all this would then provide sufficient data to embark on an index of service production (ISP) similar to and on the line of the index of industrial production (IIP).

On the informal and unorganised sector The second institutional category for which data are thin according to Shetty (2007) is the unorganised sector. The CSO has a detailed method at arriving at estimates of the GDP from the unorganised sector. In the case of the manufacturing sector as well as the services sector GVA per worker are obtained through NSS surveys (called followup surveys to economic census) for the base year. For subsequent years, the estimates of GVA are obtained by extrapolating and by making use of physical and price indicators (Saluja and Yadav 2007). However the estimates of value added obtained from enterprise surveys are criticised for being low and further the second criticism is that newer and growing services are not being captured by these surveys (Saluja and Yadav 2007). In this situation the use of appropriate indicators for the unorganised sector can be problematic, first in correctly representing the unorganised sector and second in a situation where vast changes happen within the sector over time. With the example of the financial services covering the banking and non-banking services, annual data regarding the activities of unorganised non-banking enterprises and money lenders is not available.

In this situation, Saluja and Yadav (2007) explain that CSO has been using a method whereby for the base year 1980-81, it was assumed that unorganised non-banking financial enterprises and money lenders would constitute about a third of the organised non-banking enterprises. While this ratio itself could be questioned, it has remained at that level from then on till 2004-05 (latest base year) despite the passage of about 25 years and several economic and social changes that have taken place in the interim period. Another indicator often used for obtaining estimates of GDP in the unorganised sector is employment. As is well known, NSS surveys that provide reliable estimates of employment are conducted every 5-6 years. To add to this, if one of the NSS surveys turns out to be not as reliable (due to it being an unusual year such as a drought year for example), then all estimates of employment based on this survey would also be unreliable.

For a detailed discussion on the method of estimating value added specific to the unorganised sector services see Saluja and Yadav (2007). Finally, in the unorganised sector, it is well known that workers engage in multiple occupations simultaneously. And since the workers' surveys only capture two or three main occupations and not details on their intensity in terms of time or value of incomes, this further adds to the complexity in obtaining estimates for the unorganised sector GDP. Giri et al (2007) have suggested an alternative method for measuring labour input in the unorganised sector more accurately. They suggest collection of data at the 5 digit level for current daily status so as to be able to capture multiple work or economic activities undertaken by workers in the unorganised sector. In a study of the unorganised sector GDP at a more disaggregated level, Manna (2007) found that the precision of estimated GVA per worker is relatively low for activities of storage and warehousing, real estate, rent and business activities; health and social work; and other services (urban only). Further, while examining the GVA per worker for proprietary and partnership enterprises on the one hand and other enterprises on the other, Manna (2007) found that the estimates for the GVA per worker in the case of the later was generally inferior to that for proprietary and partnership enterprises. There is also a wide divergence between the enterprise survey based estimates of aggregate GVA and that (GDP at factor cost at current price) based on the National Accounts Statistics for the activity of hotels and restaurants according to this analysis.

Banking and financial sector Banking and financial sector is one of the fast growing sub□sectors within the services sector. This sector has also attracted attention with regard to measurement of GDP (Barman and Samanta 2007; Chakrababorty and Das 2007). As in the case of many other services, the output of the financial sector cannot be measured directly and to obtain real values of output, some kind of a method of imputation has to be used. In the Indian case, conceptually there are two approaches – the national accounts approach and the banking production□function approach (Chakrababorty and Das 2007). According to experts in the field, the national accounts approach does not take into account "the provision of finance to bank borrowers in itself as an output of the banking industry, which is in sharp contrast to the bank production function approach." In addition there is a problem in dealing with the non performing assets (NPA) and non□performing loans (NPL) of the financial sector. As in the case of other services, attempts are being made to construct appropriate price and quantity indices for the banking and financial sector. India has adopted the SNA 1993 guidelines for arriving at GDP estimates for this sector since the GDP series of 1993-94. For a detailed listing and critique of the statistic on banking and financial sector GDP in India see Barman and Samanta (2007) measures (Barman and Samanta 2007). Scholars are also of the view that the implementation of the SNA 1993 has led to a change in the way the financial sector is treated with regard to its contribution to national income. The important questions in this connection are the 'valuation of GDP of the banking sector at constant prices and the treatment of NPLs of banks' (Chakrababorty and Das 2007).

In this regard, scholars have argued that the current approach could 'significantly underestimate the contribution of banking sector GDP. This is more so due to the adjustment of financial intermediation services indirectly measured (FISIM) which is done to eliminate risk premium from interest rates (Chakrababorty and Das 2007; Rath et al 2007). For the banking sector, it has been argued by scholars that a weighted average index of the PFCE (Private Final Consumption expenditure) and GDCF (Gross Domestic Capital Formation) could possibly yield a better measure for deflating the banking sector GDP as compared to the practice of WPI deflation (Rath et al 2007). Role of computers Another interesting question that has been raised in the connection of estimating services sector output is the role of computers and whether computers add to the measurement problems especially with regard to the services sector output. Rath et al (2007) list a number of studies that have pointed out an increased presence of computers both in manufacturing as well as in services. However, the presence of computers appears to be associated with the increase the productivity in manufacturing and not in services. Secondly, according to their review, several service activities using computers have not been adequately captured in the official data. They argue that while the output of computers themselves may not be difficult to estimate (as in the case of manufacturing sector), the output due to software may be more difficult to capture and estimate.

Reviewing literature that has studied valuation of computer software, Rath et al (2007) show that since multiple versions of the same software are offered over time and each new version is typically an improved version with additional features, valuation of software is further complicated. A number of scholars have argued that official statistical system has not kept pace with the rapid growth of the software industry. In this situation, Rath et al (2007) have suggested that a product method at obtaining value added from computers and software may be more appropriate. To conclude this discussion on the challenges in measurement of services sector in India, it is worth quoting from the economic Survey of 2010-11 "One of the important challenges faced by the country is collection of data on the services sector. The challenge of data collection leads to difficulties in compilation of an index for services sector production, non-representation of many services sectors in the calculation of the wholesale price index, limited availability of published data on pricing of services, and limited data on trade in services. Even where data are available, they suffer from 14 deficiencies related to definition, method of collection, suitability for pricing, and construction of indices." (page 242). With this background, we now go on to present our findings on the growth and structure of the services sector in India. 3. Analysis of the services sector GDP in India In this section we undertake a detailed analysis of the growth and structure of the services sector GDP in India. We first discuss the growth of services sector which is then followed by a discussion on the structure of services and change in the structure of services. Our analysis here is for the years starting from 1950 and goes on till 2009-10.15 The major focus of our analysis, though, is in recent period. For better understanding we have decided to divide the entire period into 5 parts.16 The first period is from 1950 to 1965-66. The second period begins in 1966-67 and ends in 1979-80. The third period begins in 1980-81 and ends in 1995-96 while the fourth period is from 1995-96 to 2004-05 and the last period is from 2004-05 to 2009-10. Growth and structure of services sector GDP in India 1950 to 1980 The services sector in India has experienced sustained and secular growth for early years in our study period. For the period from 1950-51 till 1965-66, the average annual growth rate of the services sector was about 4.3 per cent.

Within the services sector, however, there is a wide variation in the growth performance of different sub-sectors. Some services grew faster than the average for all services and others grew slower. Between 1950-51 and 1965-66, the services that grew at a rate faster than the average growth rate for the entire services sector are: Public administration (6.37 per cent), Banking (6.8 per cent), Insurance (6.8 per

cent), Road transport (6.06 per cent) and Trade (5.2 per cent). Other sub-sectors that were relatively smaller in size and had smaller base values and experienced higher growth rates during this period were: Education (8 per cent), Water transport (6.15 per cent), Air transport (9.64 per cent) Health (5 per cent) and Communications (7 per cent) (Appendix Table 1). The services sub-sectors that experienced lower than average growth in the period from 1950-51 to 1965-66 belonged to the category of Personal services (2.33 per cent) and to Dwellings and business services (2.45 per cent). The periodicity is also in line with other studies in the research programme of which study is a part. 15 cent), Barber & beauty shops (1.32 per cent) and Tailoring (1.87 per cent). Within business services the low growth services were Dwellings (2.34) real estate (3.72) and legal services (0.25).

In the second sub-period from 1966-67 to 1979-80, the pattern of growth in the services sector is more or less similar to first sub period from 1950 to 1966. Between 1966-67 and 1979-80, the average annual growth rate for the entire services sector of 4.33 per cent was no different from the earlier period of 4.30 per cent per annum. Several sub sectors within the services sector also experienced growth rates similar to the earlier period except Trade (2.33 per cent) and Hotels (2.13 per cent) that experienced lower than average growth rates while the growth rates of business services (6.33 per cent) appeared to pick up. The low rates of growth in the personal services continued and further dropped to below a percentage point for all personal services including Domestic service (0.56 per cent), Laundry, dyeing & dry cleaning (0.93 per cent) Barber & beauty shops (0.81 per cent) and Tailoring services (0.44 per cent). Structure and change in the structure 1950-51 to 1979-80 Structure of the services sector in 1950 In 1950 at the time that India gained independence, the structure of the services sector was such that Trade (25 per cent) and Dwellings (23.8 per cent) together accounted for about half the services sector GDP. The other important services in terms of GDP were Public administration (9 per cent) and Recreation (5.4 per cent). Other services that accounted for more than 3 per cent of the total services sector GDP were Religious and community organisation (4.7 per cent), Road transport (4.5 per cent), Railways (3.7 per cent) and Education (4.1 per cent). All personal services together accounted for 8.4 per cent of the total services sector GDP (Appendix Table 2). Structure in 1966 and changes from 1950 to 1966 Between 1950 and 1966, the first period under consideration in this analysis, there was no major change in the shares of Hotels, Restaurants and Railways.

However, notable increases in shares were found for Road transport (whose share increased from 4.5 per cent in 1950□51 to 7.4 per cent in 1965□66), the entire banking sector (2.4 per cent to 3.3 per cent) and specifically for banks (1.2 per cent to 2.7 per cent). Other sub sectors that experienced large increases in their shares relative to the total services sector belonged to the domain of the public sector or the state sector. The share of Education services increased from 4.1 per cent to 7.3 per cent, which was essentially the expansion of public education system. Similarly, share of Public sector communications increased from 0.5 per cent to 0.7 per cent and finally Public administration also increased from accounting for 9.0 per cent of total services to 12.4 per cent. In the period from 1950 to 1966, major decline in shares were accounted for by Recreation and entertainment services (whose share in total services declined from 5.4 per cent in 1950 to 2.9 per cent in 1965□66), Personal services (from 8.4 per cent to 3.8 per cent), Radio and TV (from 1 per cent to 0.5 per cent) and Dwellings (from 23.8 to 17.8 per cent). Structure of different services in 1980 and changes from 1966 to 1980 As noted in the earlier discussion on growth of different services, overall, the growth rates of services remained similar in the two periods from 1950 to 1966 and from 1966 to 1980.

However there were large differences in growth rates of individual service activities in these two sub periods. This gets reflected as changes in the shares of different individual services by the year 1980. For example, Road transport continued to increase in share accounting for 5.8 per cent in 1965□66 and 7.4

per cent in 1979□80. Similarly, the share of air transport increased from 0.2 per cent to 0.6 per cent (an almost trebling of its share) and storage from 0.2 per cent to 0.4 per cent. The Banking and insurance sector also increased its share with Banks' share in services increasing from 1.7 per cent to 2.5 per cent and that of non□life insurance increasing from 0.9 per cent to 1.3 per cent. The growth of the public sector led services continued in this period. While the share of education services remained unchanged that of medical services increased from 2.1 per cent o 2.6 per cent, that of public sector communications increased from 0.7 per cent to 0.9 per cent and finally public administration from 12.4 per cent to 14.7 per cent (Appendix Table 2). In the period from 1966□67 to 1979□80, the service activities that experienced a relative decline in their shares were trade (whose share in total services GDP declined from 28.4 per cent in 1965□66 to 21.8 per cent in 1979□80). The share of hotels also declined from 2.2 per cent to 1.7 per cent.

Among the other services the decline of dwellings (17.8 per cent to 14.7 per cent), recreation and entertainment services (2.9 per cent to 2.1 per cent) and personal services (6.2 per cent to 3.8 per cent). The last three continue with a declining trend that began in the 1950s. The only public sector led service that experienced a decline in its share was Railways from 4 per cent to 3.5 per cent. Contribution to growth 1950 to 1980 Growing sectors contribute to overall growth, and larger sectors due to their size also contribute to growth. In the period from 1950 to 1966, Trade, Dwellings, Public administration, Education services, Road transport, Railways and Banks together contributed to about 80 per cent of the overall services sector growth. Of these, Trade (30.5 per cent), Dwellings (13 per cent) and Public administration (13.3 per cent) accounted for over 55 per cent the services sector growth. The services growth pattern changed in the next period from 1966 to 1980. Besides a notable decline in some services such as Trade, growth in services began to get more and 17 more diversified. In terms of contribution to total services growth, Public administration, Trade, Dwellings, Road Transport, Education services, Banking and Railways together contributed to about 68 per cent of the total growth. The contribution to services growth from Trade (15.4 per cent), Dwellings (11.9 per cent) Education (7.1 per cent) and Railways (3 per cent) was lower in this period than in the previous period. The contribution to growth of Public administration (16.2 per cent), Road transport (8.2 per cent) and Banking (5.5 per cent) was higher in this period as compared to the previous sub period. Table 1 Contribution to GDP growth by service sub□sectors, 1950□51 to 1979□80 (%) SNo. Description of category 1950□51 to 1965□66 1965□66 to 1979□80 1 Public administration & defence 13.3 16.2 2 Trade 30.5 15.4 3 Dwellings 13.0 11.9 4 Road transport 6.4 8.2 5 Education (and research & scientific) 7.7 7.1 6 Railways 4.2 3.0 7 Banks 2.0 2.9 8 Medical & health 2.2 2.8 9 Non□life insurance 1.0 1.4 10 Hotel and restaurant 2.4 1.1 11 All other services 17.3 30.0 Source: Derived from Appendix Table 3 Growth and structure of services GDP in India 1980 to 2004□05

In this section we analyse the growth and the structure of the service sector GDP for the more recent period, from 1980 till 2010. For the purposes of the analysis we have sub□ divided this period into three sub periods. The first sub period is from 1980□81 to 1996□97, the second sub period is from 1996□97 to 2004□05 and the last sub□period is from 2004□05 to 2009□10.The growth of the services sector accelerated from the early 1980s onwards. The average annual growth rate of the services sector from 1980□81 to 1995□96 was about 6.5 per cent. The services sector growth further increased to 7.7 per cent in the period from 1996□97 to 2004□05 and finally to 10.3 per cent in the most recent period from 2004□ 05 to 2009□10 (Appendix Table 4). In the period from 1980 to 1995□96, among the relatively larger service activities, Road transport (7.3 per cent) Banks (8.8 per cent) and Hotels and restaurants (7 per cent) had growth rates of sectoral GDP higher than the average for services (6.9 per cent). Among the services that were relatively of smaller size but experienced notable high growth in this period were Business services (10.7 per cent), Public sector communications (7.3 per cent), life insurance (8.7 per

cent) and Public sector telephones (10.7 per cent). All other 18 services such as Trade, Public administration, Education services and Railways that accounted to major part of the growth in services in the earlier period from 1950 to 1980, appear to have lower than average growth from 1980□1 to 1995□96. Pattern of services growth appears to change from 1996□97 onwards. From 1996□97 till 2004□05, the total services GDP grew at 7.7 per cent. The highlights of services growth in this period are high growth of banking and insurance services, communication services and business services. The growth rate of trade that had declined in the previous two time periods appears to have picked up between 1995□96 and 2004□05. The annual average growth rate of Trade in this period was 10.7 per cent.

Road transport continued with its previous growth performance, achieving about 8.6 per cent per annum. The most spectacular growth performance is however from the communication services. In this, public sector telephones (20.8 per cent) and private sector communication (36 per cent) both emerge as rising services, albeit from a low base.17 In this period there was also high growth in the banking and insurance sector, banks (13 per cent), non□life insurance (8.6 per cent) and life insurance (16 per cent). The services that remained relatively large but experienced lower than average growth rates between 1996□97 and 2004□05 were Dwellings (2.6 per cent), Public administration (6.3 per cent) and the Railways (5.1 per cent). Structure and change in the structure of services from 1980 to 2004 In the 1980s the services sector was in a way dominated by the public sector. Of the top 10 services which together accounted for about 79 per cent of services GDP, services dominated by public sector accounted for over 30 per cent. These are Public administration (14.5 per cent of services GDP), Railways (3.4 per cent), Medical and health services (2.6 per cent), and banks (2.4 per cent). The other services that were partially in the public sector domain are Road transport (14.6 per cent) and Education (6.9 per cent). The non□public sector related services that accounted for major share of services GDP in the 1980s were Trade (22.2 per cent), Dwellings (14.6 per cent) Road transport (7.9 per cent), and Recreation services (2.1 per cent) (Appendix Table 5). By 1995□96, a few years into the regime of new economic policies that favoured privatisation and reduced role of the state, the services that were previously in the public sector continue to grow. However, this growth could be due to the presence and growth in the private sector activities in these services. Public administration and Railways, the two services fully in the public domain had lower shares in services GDP in 1995□96 as 17 During this study, it has been brought to my notice that measurement issues plague the estimates of GDP in telecommunications sector. The estimates on the number of mobile connections used in the estimation of GDP are apparently highly inflated. Nevertheless, even after discounting for the inflated number of mobile connections in an appropriate manner, in comparison with other services, the growth performance of the communications sector continues to be remarkable. 19 compared with that in the 1980s. Data at this level of disaggregation do not permit the separation of the public and the private sector activities and a separate analysis is required which is not being undertaken here. In the year 1995□96, the top 10 services in terms of GDP remain the same as in 1980s, except for a few changes. Recreation and entertainment with a lower share in 1995□96 than in 1980 exits from the list of top ten services while the fast growing non□banking financial institutions accounting for about 3.4 per cent of the services GDP is in. Business services GDP which has experienced significant growth over this period appear to be in the 11th position in terms of GDP shares in 1995□96. Trade, whose growth rate was below the services sector average for several years begins to revive, and its share in 1995□96, though lower than in 1980, is still higher than in 1991□92. On the other hand, public administration that also had lower than average growth rates in the period from 1980 to 1995□96, has a lower share in 1995□96. Major changes in the structure of services GDP happened from 1995□96 to 2004□05. Trade continued to lead as the largest contributor to services GDP by accounting for about 27.5 per cent of services GDP. This is the highest share Trade has ever had since 1950s. In 2004□05, Public administration (11.1 per cent), Dwellings

(10.5 per cent), Road transport (9 per cent), Education (7.4 per cent), Banks (5.5 per cent) and Business services (5.5 per cent) are the major contributors to services GDP. Other important services accounting for over two per cent of the services GDP are Hotel and restaurants (2.7 per cent), Non□ banking financial institutions (2.7 per cent) and Public sector communications (2.1 per cent). Contribution to growth 1980□2004□05

A few services continued as major contributors to growth of services GDP (Table 2). The top five contributors to services growth in the period from 1980 to 1996 were Trade (which accounted for about 21.5 per cent of total services growth), followed by Dwellings (16.2 per cent), Public administration & defence (12.2 per cent), Road transport (8.4 per cent) and Education services (6.9 per cent). Together these top five services contributed to about 65 per cent of the services growth in the period from 1980 to 1996. As seen from Table 2 in the next time period from 1996 to 2004□05, the contribution of trade to services GDP growth further increased. Similarly the contribution of Road transport, Education, Banks, business services and Hotels and restaurants. In the period from 1996 to 2004□05, the contribution to services GDP growth of two important services declined and they are Dwellings (which had sharp decline contributing only to about 5.2 per cent of services GDP growth) and Public administration which contributed to about 10.2 per cent of GDP growth, down from the earlier period of about 12.2 per cent. 20 Growth and structure in the most recent period 2004□05 to 2009□10 The most recent period for which we attempt to analyse services sector GDP growth and structure, 2004□05 to 2009□10, is also the most vibrant and high growth period for the economy as a whole, but more for the services sector. Of all the periods discussed earlier, the growth rate of services GDP was the highest (at 10.3 per cent per annum) in this period. As in the previous periods, several individual service activities outperformed the average in terms of GDP growth. New and emerging services that appeared in the previous years as having potential for growth now proved that point by exhibiting remarkably high rates of GDP growth. Table 2 Contribution to GDP growth by service sub□sectors, 1979□80 to 2009□10 (%) share decline only after 1995□96. Services that exhibited an inverse U pattern in their change of their shares in GDP are Public administration, Education and Health. Their respective shares in services GDP increased till about the 1980s before beginning to decline. Hotels and restaurants on the other hand showed a U shaped pattern with their share declining till about the late 1980s and then increasing. Finally, there are two services that stand out prominently in terms of high growth in recent years. The first is Business services and the second is Private sector communications. Both these services accounted for negligible shares in the 1950s and 1960s, right up to the 1980s. Their share began to increase only after and major increases happened only in the 1990s and after. Private sector communications which did not exist in any significant way till 1990□91 (0.1 per cent) grew to account for about 3.5 per cent of services GDP in 2009□10. Similarly business services of which computer related services is a major component accounted for only about 1.3 per cent of the services GDP in 1989□90 and this share increased to 7.4 per cent in 2009□10. 4. Analysis of services sector employment in India In this section we aim to understand the growth and distribution of employment across different services. For this we use data on employment from the NSSO surveys on employment and unemployment.18 The analysis of the growth and structure are carried out at the 2□digit level for the years 2004□05 and 2009□10. At this level of disaggregation, See Appendix note on data for more details 23 data on employment at available for 26 categories. An analysis of the nature and type of employment within the services sector is attempted using data at the 5□digit level. In their present form the 2□digit and 5□digit categories used in this section do not correspond to the services sector sub categories discussed in the discussion on services GDP in the earlier section. In the period from 2004□05 to 2009□10, employment in the services sector grew at a modest 1.84 per cent per annum. However, within the services sector there were several 2□digit service activities where employment grew at a much faster rate. Among the 2□ digit services that accounted for at least 1 per cent of total services employment, employment in Computer and related

activities grew at the highest rate at 17.8 per cent per annum. This was followed by financial intermediation having employment growth of 4.46 per cent and Public administration with an employment growth of 2.96 per cent. The only other 2□digit service activity with at least one per cent of the service sector workforce and having above average employment growth was Land transport (2.65 per cent) (Appendix Table 8). Other 2□digit services that had a lower base in terms of share in total services workforce but high average annual employment growth rates were activities supporting and auxiliary to transport (14.42 per cent), Activities auxiliary to financial intermediation (13.01 per cent), Real estate activities (9.38 per cent), Insurance and pension funding activities (9.20 per cent) and Sewage and refuse disposal activities (6.76 per cent). Services that employed relatively larger proportion of service sector workers but registered lower than average growth rates of employment were Retail trade (which has an employment growth of about 1.41 per cent), Education services (1.56 per cent), Hotels and restaurants (1.38 per cent) and Wholesale trade and commission trade (1.21 per cent). Share and change in share at 2□digit level In terms of employment, at the 2□digit level of disaggregation, the top ten sub□sectors accounted for about 87.2 per cent of the total services sector employment in 2009□10. The corresponding share of the top five sub□sectors in the same year was about 67 per cent. Retail trade which accounted for about 31.4 per cent and 30.7 per cent of total service sector employment in 2004□05 and 2009□10 respectively, is the largest employer of service sector workers in India. The next two services that accounted for relatively large proportion of workers were land transport (14 per cent in 2009□10) and Education (10 per cent in 2009□10). This was followed by Public administration and defence (8.1 per cent), Hotels and restaurants (5.3 per cent) and Wholesale trade and commission trade (4.6 per cent) (Appendix Table 9). Contribution to growth in services employment In the period from 2004□05 to 2009□10, in terms of contribution to total services employment growth, the largest contribution was from Retail trade, which accounted for 24 almost one fourth of the total services employment growth. Other services that contributed significantly to services employment growth are Land transport (20.23 per cent) Public administration (12.35 per cent), Education (8.75 per cent), Computer and related activities (7.25 per cent) and Financial intermediation (per cent 4.71). Together the top ten service activities contributed to about 93 per cent of total employment growth in the services sector. (Table 3) Table 3 Contribution to growth in services employment, 2004□05 to 2009□10 (%) NIC Code Description of services Contribution to growth in per cent 52 Retail trade except of motor vehicles 23.95 60 Land transport 20.23 75 Public administration and defence 12.35 80 Education 8.75 72 Computer and related activities 7.25 65 Financial intermediation 4.71 55 Hotels and restaurants 4.03 63 Auxiliary transport activities 3.57 51 Wholesale trade and commission trade 3.09 74 Other business activities 2.94 66 Insurance and pension funding 2.59 All other services 6.51 Source: Derived from Appendix Table 12 Quality of employment in the services sector In this section we attempt to analyse data on employment by employment status categories in order to arrive at some understanding of the quality of employment in the services sector in India. The NSS data on employment gives three main employment status categories viz., self□employed, regular workers and casual workers. Besides this, NSS provides employment data on three sub categories of self□employed worker, that is, own account workers, employers and unpaid helpers. Casual employment and unpaid helpers are unambiguously low or poor quality employment, own account workers category would comprise a mix of both low quality employment and reasonably good quality employment. Regular workers can be assumed of relatively better quality employment – there are however several caveats to this. For example, NSS considers all workers engaged in domestic household chores as regular workers as it is assumed that the duration of employment is more or less regular. With this background, we attempt to understand the quality of services sector employment using the NSS employment status categories at the 2□digit level of disaggregation. Taking regular employment as a proxy for decent quality employment 25 we identify services where a relatively large proportion of regular workers are employed. Top five services sub sectors accounted for 67 per cent of

all regular workers in the service sector in 2009□10. They are Education (21.2 per cent), Public administration (18.8 per cent), Land transport (12.0 per cent), Retail trade (9.5 per cent) and Health and social work (5.2 per cent). As opposed to regular employment, we take the combination of workers in casual employment and unpaid helpers to form the service sector workers who are engaged in poor quality employment. The top five services sub□sectors that accounted for the largest proportion of casual workers + unpaid helpers accounted for 83.1 per cent of all such workers in the services sector in 2009□10. These are Retail trade (36.6 per cent), Land transport (18.9 per cent), Hotels and restaurants (10.4 per cent), Other service activities (9.5 per cent) and Wholesale trade and commission trade (7.7 per cent). The services employing the largest proportion of unpaid helpers were Retail trade (60.4 per cent) ; Hotels and restaurants (12.0 per cent), Other service activities (10.7 per cent), Wholesale trade and commission trade (7.6 per cent) and Land transport (3.3 per cent). Quality of employment within a service activity can also be gauged by the proportion of casual workers helpers in total workforce within the particular service activity. Thus at the 2 digit level, we identify services in which the proportion of casual workers + unpaid helpers was the largest. They are, Hotels and restaurants (with about 33.8 per cent of its workers being either casual worker or unpaid helpers in 2009□10), Activities of private households as employers of domestic staff (32.7 per cent), Wholesale trade and commission trade (28.9 per cent) and Sewage and refuse disposal, (24.8 per cent) (Appendix Table 11). Similarly, and on the other hand, the services with better quality jobs are services with the largest proportion of NSS regular workers. In 2009□10, these were Public administration (where 97.9 per cent of all employment was regular employment), Computer and related activities (90.0 per cent), Education services (87.8 per cent), Financial intermediation (87.7 per cent) and Post and telecommunications (79.7 per cent). Employment trends in the services sector: an analysis at the 5 digit level The above discussion on the quality of employment in the services sector is based on the analysis of employment figures at the 2□digit level. Here we attempt to have a deeper and more complete understanding by trying to analyse the employment trends by at the 5 digit level and by the NSS employment status categories and hence attempt to further narrow down our search for services that provide good quality employment versus other services that provide poor quality employment. As in the analysis above, NSS regular employment is taken as a proxy for good quality employment while the combined share of casual workers and unpaid helpers is taken to indicate poor quality employment. The 5□digit services considered in this analysis are only those that accounted for at least one per cent of total services employment in 2009□10. 26 We begin by presenting the figures for growth of employment at the 5□digit level. As we have seen in the earlier section, services employment grew at about 1.84 per cent per annum between 2004□05 and 2009□10 (Appendix Table 13). Within the services sector, at the 5 digit level, services that accounted for at least 2 per cent of total services employment and that grew at a rate faster than the average were: Other non□scheduled passenger land transport by motor vehicles (in which employment grew at about 5.3 per cent per annum in this period), Restaurants without bars (4.94 per cent), Freight transport by motor vehicles (4.27 per cent), Retail sale of cereals and pulses and other grocery (3.26 per cent), Retail sale of fresh fruits and vegetables (2.88 per cent) and Primary education (2.74 per cent). We then identify 5□digit services that provided poor quality employment, that is, we identify the top five services in terms of the total number of casual workers+ unpaid helpers (Appendix Table 15). In 2009□10, the top five services in terms of 'poor quality employment' together accounted for about 37 per cent of the total 'poor quality workers'. They are Retail sale of cereals and pulses (11.41 per cent), Freight transport by motor vehicles (10.71 per cent), Restaurants without bars (5.79 per cent), Retail sale of fresh fruits and vegetables (4.72 per cent) and Other non□scheduled passenger land transport by motor vehicles (4.69 per cent). Thus, it is seen that the sub□sectors with relatively higher growth in employment during 2004□05 to 2009□10 are also the ones that offer the poorest quality employment. This is an indication of a rather gloomy picture on the quality of services sector employment in India in the recent period. On the other hand, the 5□digit services with relative 'good quality' employment, that

is where large proportion of NSS regular workers are concentrated are Primary education (accounting for 11.23 of all regular workers), General public service activities of the state governments (7.78 per cent), Secondary education (5.61 per cent), Freight transport by motor vehicles (4.27 per cent) Other non□scheduled passenger land transport by motor vehicles (3.98 per cent). Share of good and poor quality employment within different services: The proportion of NSS regular workers to the total number of workers employed in any particular service activity would be an indicator of the extent to which good quality employment was available in that service activity. Similarly the proportion of casual workers + unpaid helpers to the total number of workers employed in any particular service activity would give an indication of the extent to which poor quality employment dominates that particular service activity. Here we attempt to identify 5□digit services that provide good quality employment as well as poor quality employment. 27 For the services sector as a whole, good quality employment or NSS regular workers accounted for about 42.2 per cent of total employment (Appendix Table 17). Thus services with a proportion of regular workers higher than this average for the entire services sector would provide an indication of avenues for good quality employment within the services sector. Of the 5□digit service activities that accounted for at least one per cent of the total service sector workers, the top five in terms of having the largest proportion of NSS regular worker within their respective work force are General public service activities of the state governments (98.9 per cent), Secondary education (98.2 per cent), Primary education (95.4 per cent) Monetary intermediation of commercial banks (95.4 per cent), Hospital activities (91.5 per cent) and Housemaid/servants (70.4 per cent). However, as the higher proportion of NSS regular workers in the last category, housemaid/servant shows, the NSS regular worker category is not perfectly appropriate category to capture 'good quality' employment. Poor quality employment dominated by casual employment or unpaid helpers account for about 17 per cent of total services employment. Thus service activities at 5 digit level with over 17 per cent of casual employment + unpaid helpers would give an indication that those services are avenues for poor quality of employment. The services that are dominated by casual employment and unpaid helpers and having above average share in these employment status were Washing and dry cleaning (with about 42.4 per cent of casual labour + unpaid helpers), Freight transport by motor vehicles (40.7 per cent), Restaurants without bars (36.8 per cent), Housemaid/servant (29.6 per cent), Retail sale of cereals and pulses (26.3 per cent), Retail sale in non□specialized stores with food, beverages (23.7 per cent) and Hair dressing (22.1 per cent) (Appendix Table 17). 5. Analysis of services sector productivity Productivity or labour productivity gives as estimate of the average economic value generated by an average worker. Labour productivity levels in a way determine the quality of employment. High levels of labour productivity by themselves do not ensure high wage levels and better conditions of work. However, high levels of labour productivity are one of the necessary conditions to achieve high wage levels and better conditions of work. In other words, it can be said that high productivity sector are likely to provide better quality employment. It can be also said, with a few caveats that high productivity employment is also likely to be more sustainable and stable. Productivity difference across different service activities also has implications for equity. The concept of productivity as used in this discussion does not have technological connotation as in manufacturing productivity. This is both because of the lack of technology led innovation in a number of service activities and also because of the diverse mix of criteria that have been used in forming sub□sectors within the services sector. Of course, in recent years there are a number of services where there is an actual enhancing of labour productivity due to the use of computers and communications 28 technologies. Our data, however, do not provide us an indication of the productivity growth, and hence do not allow us to identify productivity gains due to technology or otherwise. As we have discussed in section 3, GDP data over a fairly long period of time are available by about 40 categories at the most disaggregated level. Employment data are available at an even more disaggregated level, that is, 5 digit level of industrial classification for the years 2004□05 and 2009□10. Combining the GDP data at the maximum possible level of disaggregation and matching the same with

employment data we have estimated productivity per worker in the services sector for about 36 service activities for the years 2004□05 and 2009□10. In the discussion below, we describe the productivity levels across these 36 service activities. We identify high□productivity services as well as low□productivity services and estimate employment in both. Through this exercise, we attempt to identify service activities that are likely to be more sustainable and stable and provide good quality employment. We also examine if within the services sector there is a mismatch between some services that provide bulk of the employment (low productivity) and others that account for bulk of the income (high productivity). Finally we study the changes in productivity in the period between 2004□05 and 2009□10, the period of relatively high growth in services in India. During 2009□10, the average productivity for the Indian economy (combining all the three sectors—agriculture, manufacturing and services) as a whole was estimated at □95,478 per worker per year. The average productivity figures for agriculture, manufacturing and services sectors in the same period were □26,537, □1,39,054 and □2,09,391 per worker per year respectively. Thus, while average labour productivity in agriculture was far below the national average, that of the manufacturing and services sectors were way above the national average, the average labour productivity of the services sector being the highest. Across all sectors of the economy, in the year 2009□10, labour productivity was highest in forestry and logging (10.2 times the national average), followed by utilities (7.33 times the national average) and fishing (2.3 times the national average). These three sectors of the economy however does not employ bulk of the workers. The bulk of the workers are employed in agriculture, services, manufacturing and construction. Of these, the labour productivity in both agriculture and construction was lower than the national average. The labour productivity in manufacturing was about 1.46 times the national average while it was about 2.19 times the national average in services. Thus at the most aggregate level, services sector appears to be a reasonably high productivity sector, even surpassing the manufacturing sector. (Appendix Table 19) 29 Labour productivity within services sector In the year 2009□10, the labour productivity across different services ranged from as low as □19,600 per worker per year in Private household with employed persons to as high as □67,94,000 in the non□life insurance sector (Appendix Table 20).19 Growth in productivity between 2004□05 and 2009□10 was highest in the non□life insurance sector (29.3 per cent) followed by communications sector (25.4 per cent per annum), Renting of machinery and Research and Development (both 17 per cent). The labour productivity in banks grew by 14.7 per cent. The labour productivity in households with employed persons grew at a rate of 14.4 per cent, albeit from a very low base. The services where the labour productivity grew the least or was negative in the period from 2004□05 to 2009□10 were storage activities (□4.2 per cent), Radio and TV (□4.1 per cent) Computer related activities (□0.4 per cent). Two important public or state run services also exhibit negative productivity growth, they are, Banking department of RBI (□175.6 per cent) and Employees provident fund (□5.2 per cent) (Appendix Table 20). High productivity services For the purposes of this analysis, high productivity services are defined as having productivity levels that were 5 times the average for the services sector in 2004□05 or 2009□10. The top five services with highest labour productivity in 2009□10 were Non□life insurance (□67,94,000 per worker per year) following by Banks (□14,59,000 per worker per year), Air Transport (□11,48,000 per worker per year), Communications (□10,53,000 per worker per year) and Computer relating services (□7,87,000 per worker per year) (Figure 1). In comparison with the average productivity in the services sector, the productivity levels in the high productivity services in 2009□10 was as much as 32.4 times in case of Non□life insurance and 7 times in the case of banks and 3.8 time in the case of computer relating services (Figure 2). In comparison with the national average productivity levels, the productivity levels in the high productivity services were even larger. For example, in 2009□10, Non□life insurance had 71 times the national average productivity, while Banks had 15 times the national productivity and Computer relating services had 8.2 times the national productivity. Similar comparisons with productivity levels in manufacturing and in Agriculture are given in Figure 3

19 According to the NAS, “The economic activities covered in services sector include ownership of dwellings (occupied residential houses) including imputed value of owner occupied dwellings also.” Thus in large number of cases, the value added is derived due to the existence and use of residential premises. Further, this may involve insignificant amounts of employment. Hence in the discussion of productivity of the services sector, we exclude the sub□sector under the heading “dwellings”. 30 A point to be noted here is that despite their high levels of productivity, these services provide very little employment. For example, the high productivity services discussed above together accounted for about 16.8 per cent of the national GDP in 2009□10. They, however, accounted for only about 1.14 per cent of the total employment. Figure 1 High productivity services (□1,000 per worker) Figure 2 High productivity services Comparison with average productivity in the services sector 0 1000 2000 3000 4000 5000 6000 7000 8000 Air Transport Communications other than post (Public + private) Banks (including postal savings) Non□banking financial institutions , including co□operative societies Non□life insurance Computer relating services International & other extra territorial bodies 2004□05 2009□10 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 Air Transport Communications other than post (Public + private) Banks (including postal savings) Non□banking financial institutions , including co□ operative societies Non□life insurance Computer relating services International & other extra territorial bodies 2004□05 2009□10 31 Figure 3 High productivity services Comparison with national average Low productivity services Similar to the definition of the high productivity services, low productivity services are defined as having productivity levels that are equal to or less than half the average for the services sector either in 2004□05 or in 2009□10 or in both years. In the year 2009□10, the latest year for which we have made estimations of labour productivity, the service activity with the lowest labour productivity is in Private households with employed person (□19,600 per worker per year), this is followed by Custom tailoring (□22,500 per worker per year), Hair dressing and other beauty treatment (27,000 per worker per year), Washing & cleaning of textiles (□40,400 per worker per year), Public sector Postal services (□59,700 per worker per year) and Hotel and Restaurants (□1,05,200 per worker per year) (Figure 4 and Appendix Table 20). As is evident from the estimates of average productivity and high productivity services provided above, low productivity services are at levels that appear to be the lowest in the economy. In order to examine this, we compare the productivity levels in these low productivity services with productivity levels in Agriculture. Two of these low productivity services, that is, Private households with employed persons and Custom tailoring had productivity levels in 2009□20 that were lower than in agriculture. Further, another low productivity service, Hair dressing and other beauty treatment had productivity levels more or less similar to that of agriculture (Figure 5). The remaining low productivity services had productivity levels marginally higher than in agriculture. 0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 Air Transport Communications other than post (Public + private) Banks (including postal savings) Non□banking financial institutions , including co□ operative societies Non□life insurance Computer relating services International & other extra territorial bodies 2004□05 2009□10 32 Figure 4 Low productivity services (□1,000 per worker) Figure 5 Low productivity services Comparison with agriculture 0.00 20.00 40.00 60.00 80.00 100.00 120.00 Private household with employed person Washing & cleaning of textiles Hair dressing and other beauty treatment Custom tailoring Public sector Postal services Employees provident fund org. Hotel and Restaurant 2004□05 2009□10 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 Private household with employed person Washing & cleaning of textiles Hair dressing and other beauty treatment Custom tailoring Public sector Postal services Employees provident fund org. Hotel and Restaurant 2004□05 2009□10 33 At this stage, it would also be appropriate to compare the low productivity with average productivity levels in the manufacturing sector. All the low productivity services had levels of labour productivity that were lower than in manufacturing (Appendix Table 22). The final point to be noted about low productivity services is that in 2009□10, together these services accounted 2.2 per cent of the national GDP. Their

share in national employment was however nearly double at 4.28 per cent. In other words, low productivity services provide for proportionately larger avenues of employment within the services sector relative to high productivity services. Thus, within the services sector, there is one set of activities that are high productivity and employing relatively smaller number of workers while there is another set of activities with very low levels of productivity employing relatively large number of workers. This mismatch between productivity and employment has long term implications for the policy of poverty and equity in the country. 6. Alternate classification of the services sector: An analysis In the debate on the growth and prominence of services, some scholars have argued that part of what is called services is actually manufacturing. There could be a blurring of the distinction between manufacturing and services in many instances. First there are services that exhibit features of production, second there are services that directly lead to production, thirdly embedded services are those where final products have components of goods and services and finally repair services also have features that are very similar to that of production. Services that exhibit some features of production are for example, restaurants and butchers. In restaurants production of food is undertaken and served to customers. Since it is not possible to separate the activity in the kitchen to that in the dining hall of the restaurant, the entire business of a restaurant is classified as a service. However, on closer examination, not only does a restaurant 'produce' processed food, in case of restaurants that act mainly as a takeaways, the semblance with the process of production of food is even larger. Another such activity is that of a butcher. In less developed countries the activity of a butcher would be classified as a service activity. However, as the economy gets more and more complex, slaughter houses are involved, meat processing plants are set up and meat packaging and storing facilities are also set up. The meat is then sold either in super markets or in specialised shops. Thus as the economy gets more and more advanced, the activity of the butcher is sub□divided with one part classified under manufacturing and the other part involving sale of meat as service. Then there are services that directly lead to production (as intermediate goods) or productive services. For example, computing services, accounting services, legal services 34 and so on. All these services are directly related to the ensuing production process or in other words, large scale production cannot be undertaken without the use of these services. Embedded services are those in which the final products have components of both goods and services. For example, in recent years most equipment and machinery are produced to run on some kind or software and at the time of the purchase of such equipment, the software is already installed in it. Another example of embedded services is all kinds of repair and refurbishing of old machinery and motor vehicles that render these 'as good as new' and ready for resale. Repair and maintenance of equipment and machinery that are using in the process of manufacturing could very well be classified as part of manufacturing. In the National Industrial classification and the system of national accounts adopted in India, all kinds of repair services except for repair and maintenance of motor vehicles are classified under industry/manufacture and not under services. The blurring between goods and services or a goods services continuum has led to a debate on what constitute services. Some scholars have argued that with regard to some services the strict dichotomy made between services and manufacturing is 'overdrawn' as these services are organised on ways that are similar to manufacturing (Hill 1977; Singh 2006). This has also led scholars to propose alternate schemes of classification of services by their similarity to or distinction from the process of manufacture. Based on end user or beneficiary of services, services have been classified into two types, viz., Producer services/household services and Intermediate services/Consumer services. This scheme of classification has, however, proved to be not useful as the two categories are not mutually exclusive with large overlap with them. A second classification, based on the method of financing of the services has been attempted, viz., State funded or tax funded services and private services. This classification is also not useful as the tax and state policy both may and do vary from state to state and over time. A third type of classification is based on the marketability of the service. Thus services are classified as marketed services (assumed to be mainly provided by private enterprises), non□marketed services (assumed to be

provided by the state). But in the present times where a number of services are provided both by the market and by the state, this classification also does not appear to be useful in providing a better understanding of the services sector. Based on a combination of end user and ownership (Browning and Singelmann 1977), have proposed a four way classification of services. By this classification, distributive services are those involving transportation, communication, retail and wholesale trade. Producer services include banking, insurance, other financial activities, business services – accounting, computer services, legal services and so on. Social services include health, education, welfare services, and other government services and Personal Services include 35 domestic and personal services, hotels, restaurants, entertainment. The classification of Browning and Singelmann (1977) places all services into one category or another and these are mutually exclusive. Apart from this services that can be linked to production such as producer services and distributive services are clearly identified. Thus we use this scheme of classification to understand the structure of services sector in India for the most recent period from 2004□05 to 2009□10. Our estimates show that Distributive services account for the largest share in employment and GDP followed by Social services. The share of both Distributive services and Social services in GDP also more or less corresponds to their share in total employment (Table 4). Producer services are as large as Social services in terms of GDP (in 2009□10), but account for relatively smaller share of employment. On the contrary, Personal services that account for the least in terms of GDP share, however, account for substantial share in employment. In terms of labour productivity, Producer services have the highest productivity which was about 2.92 times the average labour productivity in services for 2009□10. Personal services on the other hand had the lowest labour productivity accounting for less than a third of the average productivity for services. In the Indian services growth story, the dominance of Producer services and Distributive services in the Indian economy is perhaps good news. The low productivity and relatively high employment in Personal services is perhaps bad news. we have attempted to understand the growth and structure of the services sector in India through an analysis of the different sub□sectors within the services sector at a level of disaggregation that has so far not been adequately analysed in the literature. 36 In the analysis of the service sector GDP and employment at a disaggregate level, we have identified sub□sectors within services that have contributed mainly to GDP growth. We also identify sub□sectors that have contributed mainly to employment growth. We have also attempted to address the issue of quality of employment across different services that employ proportionately large number of workers. The analysis of the services sector in this paper also includes estimates and analysis of the productivity levels in different services. In the period from 1950 to 2009□10, two important sub sectors, Trade and Public administration appear to remain stable with regard to their contribution to services sector GDP. The share of Trade changed from 25 per cent to about 26 per cent. Similarly the share of Public administration changed from 9 per cent to 10 per cent. A closer look at the interim period of about 60 years indicate that Trade shows a U shaped pattern with regard to its share in total services GDP—its share first declined to about 20 per cent in 1991□92 before increasing to 27 per cent in 2009□10. Similarly, Public administration displays an inverse U shaped pattern with regard to its share in total services GDP. Public administration peaked with a share in services GDP of about 14.7 per cent before declining to 10 per cent in 2009□10. The services that have notable increases in shares in services GDP through the period from 1950 till 2009□10 are Banks (whose GDP increase from about 1.2 per cent in 1950□51 to 8.3 per cent in 2009□10), Road transport (from 4.5 per cent to 8 per cent), Business services (from 0.8 per cent to 7.4 per cent) and Insurance (0.8 to 2.7 per cent). Of these, the share of Business services increased sharply starting from the mid□1990s. Services that experienced a secular decline in the share in services GDP in the period from 1950s till 2009□10 are Dwellings (23.8 per cent to 7.6 per cent), Domestic services (8.4 per cent to 1.8 per cent) Recreation and entertainment services (5.4 per cent to 0.8 per cent) and Radio and TV (1.0 to 0.015 per cent). Of these the last three experienced share decline only after 1995□96. Services that exhibited an inverse U pattern in their

change of their shares in GDP are Public administration, Education and Health. Their respective shares in services GDP increased till about the 1980s before beginning to decline. Hotels and restaurants on the other hand showed a U shaped pattern with their share declining till about the late 1980s and then increasing. Finally, Business services and Private sector communications stand out prominently in terms of high growth in recent years. The first is Business services and the second is Private sector communications. Both these services, however, accounted for negligible shares in the 1950s and 1960s, right up to the 1980s. Their share began to increase only after the 1980s and major increases happened only in the 1990s and after. 37 Using employment data by NSS employment status categories we have attempted to identify good quality employment—as represented by NSS regular employment and poor quality employment—as represented by casual employment and unpaid helpers. We have estimated the growth and share of good quality employment in this manner at both the 2□digit as well as at the 5 digit levels. Combining data on GDP and employment, we have estimated labour productivity across different service activities for the years 2004□05 and 2009□10. We have identified high productivity services (having at least 5 times the average services productivity) and low productivity services (having half the average services productivity). The high productivity services are Non□life insurance, Banks, Computer relating services, Air Transport and Communications other than post. Our analysis found that despite their high levels of productivity, these services provide very little employment. The low productivity services, viz., Private household with employed persons, Washing & cleaning, Hair dressing, Custom tailoring and Hotel and Restaurants. All the low productivity services had levels of labour productivity that were lower than in manufacturing. The final point to be noted about low productivity services is that in 2009□10, together these services accounted 2.2 per cent of the national GDP. Their share in national employment was however nearly double at 4.28 per cent. In other words, low productivity services provide for proportionately larger avenues of employment within the services sector relative to high productivity services. Thus, within the services sector, there is one set of activities that are high productivity and employing relatively smaller number of workers while there is another set of activities with very low levels of productivity employing relatively large number of workers. This mismatch between productivity and employment has long term implications for the policy of poverty and equity in the country. The larger picture that emerges from this analysis of services sector for about 60 years seems to indicate that the services sector is likely to continue to grow, at least in the medium term. In other words, this study does not find any reason to believe that the growth of services as seen in the past is not sustainable. However, there is a cause for worry as the quality of employment generated in a number of services that provide employment to the masses is both low productivity and poor quality employment.

AGRICULTURE ECONOMICS (313)

Agricultural Economics: Meaning, Scope and Nature

Meaning of Agricultural Economics:

Agricultural Economics, as its title implies is that branch of economics which deals with all aspects of problems related to agriculture. According to Snodgrass and Wallace, "Agricultural economics is an applied phase of the social science of economics in which attention is given to all aspects of problems related to agriculture."

A similar definition has been furnished by Prof. Jouzier as, **"Agricultural Economics is that branch of agricultural science which treats of the manner of regulating the relations of the different elements comprising the resources of the former whether it be the relation to each other or to human beings in order to secure the greatest degree of prosperity".**

Scope of Agricultural Economics:

The foregoing definitions indicate the scope of agricultural economics. A common theme of scarcity of resources and choice of uses runs almost through all of these definitions. That way, agricultural economics is not different from the general economics.

All the tools of analysis used in general economics are employed in agricultural economics as well. We have the same branches of agricultural economics i.e. economics of production, consumption, distribution, marketing, financing and planning and policy making as in case of general economics. A study at the micro and macro level for the agricultural sector is also generally made. Static and dynamic analyses are also relevant for the agricultural sector of the economy.

To be more specific, these definitions point out that agricultural economics examines how a farmer chooses various enterprises e.g., production of crops or rising of cattle and how he chooses various activities in the same enterprise. E.g., which crop to grow and which crop to drop; how the costs are to be minimized; what combination of inputs for an activity are to be selected; but amount of each crop is to be produced but type of commercial relation the farmer have to have with people from whom they purchase their input or to whom they sail their product.

Agricultural economics does not study only the behavior of a farmer at the farm level. That is, in a way, the micro analysis. Agricultural problems have a macro aspect as well. Instability of agriculture and agricultural unemployment are the problems which have to be dealt with, mainly at the macro level.

And then, there are the general problems of agricultural growth and the problems like those concerning tenurial systems and tenurial arrangements, research and extension services which are again predominantly macro in character. Such problems their origin, their impact and their solutions are all the subject matter of agricultural economics.

There are numerous socio-cultural, economic, political, technological and infrastructural factors which also determine the agricultural land use, cropping patterns and agricultural processes.

Of these factors, land tenancy, system of ownership, size of holdings, availability of labour and capital, religion, level of technological development, accessibility to the market, irrigation facilities, agricultural research and extension service, price incentives, government plans and international policies have a close impact on agricultural activities. The impact of these factors on the decision making processes of agriculture has been illustrated in the present article.

1. Land Tenancy:

Land tenure includes all forms of tenancy and also ownership in any form. Land tenancy and land tenure affect the agricultural operations and cropping patterns in many ways. The farmers and cultivators plan the agricultural activities and farm (fields) management keeping in mind their rights and possession duration on the land.

2. Size of Holdings and Fragmentation of Fields:

It is not only the land tenancy and the system of ownership which influence the agricultural and cropping patterns, the size of holdings and fragmentation of fields also have a close bearing on agricultural land use patterns and yields per unit area. In the densely populated areas of the developing countries the size of holdings is generally very small.

3. Consolidation of Holdings and Operational Efficiency:

In order to overcome the disadvantages of fragmentation of holdings, consolidation of holdings has been done in many parts of the country. The advantages of consolidation of holdings are manifold. Important amongst them have been explained below. The fragmentation of holdings makes the efficient management and supervision of the farm operations difficult. It causes considerable waste of labour of the cultivator and his plough cattle. Land consolidation makes it necessary for him to look after the crops and put up a fence around the holding.

4. Labour:

The availability of labour is also a major constraint in the agricultural land use and cropping patterns of a region. Labour represents all human services other than decision making and capital. The availability of labour, its quantity and quality at the periods of peak labour demand have great influence on decision making process of the farmer. The different crops and agrarian systems vary in their total labour requirements. The labour inputs vary considerably round the year for most of the agricultural enterprises with the result that many farmers employ a mixed system of production in order to keep their labour fully employed.

5. Capital:

Capital subscribes definite limitations to the selection of crops. AH agricultural inputs like the livestock, irrigation, seeds, fertilizers, insecticides, pesticides, feeding stuffs, labour, purchase of land, machinery, carts, vehicles, various agricultural equipment's, buildings, fuel and power, sprays, veterinary services and repairs and maintenance require capital. All the farmers make their decisions on the basis of capital to invest.

6. Mechanization and Equipment's:

The technological changes including the use of modern hand tools, animals drawn implements, tractors, thrashers and more economic patterns of farm management play a vital role in the selection of crops grown and decision making at the farm level. These changes help in improving the crop yields.

The improvements occur partly from the use of more effective equipment but also, because mechanization makes it possible to carry out farming operations more quickly and at the precise time calculated to maximize outputs. In the plains of the Punjab and western Uttar Pradesh, for example, the increasing substitution of tractors for bullocks has greatly shortened the time; the farmer has to spent on the ploughing and sowing of the kharif and rabi crops.

7. Transportation Facilities:

Transportation facilities also have a direct bearing on the cropping patterns of a region. Better transport linkages are advantageous because of the economies in farm labour and storage costs which they make possible. These savings in turn help to make it economic for farmers to buy fertilizers and better equipment's. Better transport also makes it possible for farmers to put their less accessible land to more productive use.

8. Marketing Facilities:

The accessibility to the market is a major consideration in the decision making of the farmer. The intensity of agriculture and the production of crops decline as the location of cultivation gets away from the marketing centres. This is particularly noticeable when a bulky but low value crop has to be transported to the market. If it takes much time to send the produce, especially at the peak time, to the market when the farmer could have been profitably employed in other activities. The marketing system also influences the decision making of the farmer. In most of the countries the agricultural commodity markets are controlled by the buyers rather than sellers.

The term '**institutional factors'** refers to the particular system under which land is owned and managed.

The ownership and management have a direct bearing on agricultural productivity and efficiency. The government has given emphasis on institutional advancement through land reforms, besides technological advancement.

A land reforms package broadly involves the following components:

(i) Abolition of intermediaries,

(ii) Tenancy reforms (i.e., providing security of tenure),

(iii) Ceiling and redistribution,

(iv) Consolidation,

(v) Updating of land records.

Abolition of Intermediaries:

Even during the struggle for independence, it was widely recognised that the stagnation in the Indian agricultural sector was primarily due to exploitative agrarian relations. Zamindars were the chief instrument of exploitation. Hence, abolition of zamindari system, along with other intermediary tenure systems, became the topmost priority of land reforms immediately after independence.

The abolition of intermediaries started in 1948 with the enactment of legislation in Madras. In some other states, the legislations for abolition of intermediaries were passed before 1951. West Bengal, the state worst affected by the ravages of absentee landlordism, adopted the legislation in 1954-55. In this way, most of the states had passed the Acts related to abolition of intermediaries by the end of the First Plan.

Tenancy Reforms:

Tenants can be classified into (i) occupancy tenants, (ii) tenants-at-will, and (iii) sub-tenants. The rights of tenancy of the occupancy tenants are permanent and heritable. Hence, the occupancy tenants do not face the fear of eviction so long as they pay rent on time. But the position of tenants-at-will and sub-tenants is very precarious, since such tenants depend on the mercy of landlords. Hence, special laws have had to be enacted and implemented to protect these people. These laws relate to (i) regulation of rent, (ii) security of tenure, and (iii) conferment of ownership rights on tenants.

Security of Tenure:

Legislations have been passed in most of the states to protect tenants from ejectment and grant them permanent rights in land. The purpose of these legislations is to ensure that (i) ejectments are lawful, (ii) land assumed by an owner is only for personal cultivation, and (iii) the tenant is assured of a prescribed minimum area in case of resumption.

Conferment of Ownership Rights on Tenants:

Legislative provisions have been made in many states for conferment of ownership rights on tenants. Some of the states have acquired ownership of land from landowners and transferred it to tenants. Sub-tenancies have generally been prohibited except in certain cases such as widows, members of armed forces, minors, unmarried women, persons suffering from disabilities, etc.

Ceilings on Agricultural Holdings:

The basic aim of the ceiling laws is to accomplish the elimination of excessive ownership of land.

Under the old ceiling laws (till 1972), only about 23 lakh acres were declared surplus in India, out of which only about 13 lakh acres were redistributed. Further, different states had adopted different policies regarding land ceiling. To bring uniformity in land ceiling policies, a conference of chief ministers was held in 1972. A new land ceiling policy was evolved in this conference.

Consolidation of Holdings:

Consolidation of fragmented agricultural land holdings has been an integral part of the land reform policy of the Indian government as fragmented holdings impede agricultural process. Initially, the programme of consolidation was started on a voluntary process but was later made compulsory.

Legislations have been passed in most of the states to prevent sub-division and fragmentation of lands beyond a certain limit. This minimum limit is known as the standard area and has been fixed at different levels by different state governments. Necessary provisions have been made in the Consolidation Acts in Assam, Bihar, Rajasthan, Gujarat and parts of Andhra Pradesh, and in the Land Reforms Acts in Uttar Pradesh and West Bengal to ensure that size of holdings does not fall below this minimum limit.

Cooperative Farming:

The Congress Agrarian Reforms Committee headed by J.C. Kumarappa, which was formed to study problems related to land reforms, concluded in its report (1949) that without cooperative moulds such as cooperative farming, “the efficiency of agriculture cannot be substantially increased”.

Four kinds of cooperative farming were identified by the Cooperative Planning Committee, These are:

(i) cooperative collective farming in which members have to give up their lands for ever but are paid wages and gain a share in the surplus produce; (ii) cooperative tenant farming, in which land owned by a society—comprising many farmers—is divided into holdings and then distributed among them. Each farmer has to pay a rent for his portion of the land. However, the producer of his holding is entirely his own; (iii) cooperative better farming wherein farmers get together to perform agricultural activities with improved methods but on their own separate lands; and (iv) cooperative joint farming wherein small farmers pool their lands together for better cultivation without giving up the ownership of their lands.

Cooperative farming has failed in the face of the existing inegalitarian economic structure. It has become a means of by-passing land reforms and is used for securing a preferential treatment in obtaining loans and grants from government. The lands pooled together are scarcely regarded as joint property.

Relationship between Agriculture and Industry

The interdependence of these sectors are listed below:

(A) Impact of Agriculture on Industry:

Agriculture has huge positive impacts on the industrial development, such as:

(a) It regularly supplies raw materials like sugarcane , jute cotton, oilseeds, tea, spices, wheat; paddy etc. to the consumer goods industries.

(b) It supplies cereals, vegetables and other food items to the industrial labourer and fodders for the domestic animals in the dairy industries on a regular basis.

(c) Farmer-households used to save their money in the bank and other financial institutions which ultimately is used by the industry owners in the form of investment.

(d) Both for consumer and capital goods Industries agriculture sector gives a ready market for the finished products.

(e) It regularly supplies manpower to the industries

(B) Impact of Industry on Agriculture:

This is needless to mention the impact of industry on agriculture.

The impact of industry on agriculture as follows:

(a) It regularly supplies scientific tools and equipment's like tractors, harvesters, pump-sets chemical fertilizers etc. to agriculture increase the per hectare production.

(b)To increase the market for finished agricultural goods some infrastructural development like roads, railway, storage etc. are very essential. In this connection industry plays a vital role.

(c) Industries provide huge employment opportunities and therefore help to absorb all the surplus labour in our agriculture. This lea to more industrial development.

(d) Agricultural sector itself is a huge market for the different finished products of Industries. Farmers buy several industrial products like bi-cycle, torch, radio etc. All these flourishment of industries.

Thus in nutshell, we can say that bath agricultural and industry are complementary to each other. The operate hand to hand. The development of one sector depends on the growth and performance of the other sector

Unit2

Farming Types: 4 Important Systems of Farming

The following points highlight the four important farming systems. The farming systems are: 1. The Traditional System 2. Commercial Farming 3. Collective Farming 4. Cooperative Farming.

Farming System # 1. The Traditional System:

This is a system which is generally prevalent in a backward, segment of agriculture. The main feature of this farming system can be traced to the characteristics of an overall backward economy. Industrial sector is non-existent and therefore the population mainly depends upon agriculture.

Population pressure on agricultural, has resulted in perpetual sub-division of holdings and therefore, size of the farm is very small. In some cases, the size of the farm is so small that it is difficult for the farmer to use the family labour and other resources optimally on the farm.

As agriculture is backward, there is no marketable surplus on such small farms. This system is therefore,

also called subsistence farming. Large size of the family makes agricultural labour intensive. The capital used on the land, is of crude form.

In terms of the elements which distinct traditional system from other farming we can say that the farm, that is cultivated is generally owned by the farmer himself. He is the controller of the operations on the farm. That is, he decides what should be produced, what quantity of various inputs each of the various crops.

He is also the operator of the farms i.e. he cultivation the land with his labour along with that of his family. In other words, in such a farming system the farmer combines in himself, the rules of an owner, a controller and an operator of the farm, This system is also known as peasant farming.

One could also visualize a variant of this system with regard to the ownership of land. The farmer cultivating the small piece of land may be a tenant rather than the owner. However in actual practice tenancy is on a very limited scale in such a system. Two factors work against tenancy. One is that the size of the farm is rather small and as such, there is generally no surplus land available with the owner to lease it out.

Farming System # 2. Commercial Farming:

Commercial farming represents, as against the peasant farming. The other extreme of farming system. Here, as against the private ownership of a farm by a single farmer, the ownership is generally in the hand of a large number of personal who form a joint stock company to won the form. (However, commercial farming is compatible even a single owner if he can own a large farm-large enough, as to necessary the use of hired labour), so far as the control of over production i.e. decision making power with regard to production is concerned it is generally in the hands of employed managers. The hired labourers operate the farms.

They constitute a class different from that of the managers who supervise the work. In India, various tea and coffee plantations are the fine examples of commercial farming. Commercial farming is quite popular in U.S.A. Australia and U.K. Commercial farming is also known as estate farming or corporate farming in case a joint stock company owns the farm. Another name for commercial farming is capitalistic farming simply because, in this, case production is carried on with the help of machinery which is generally hired.

And this system is called commercial farms because, unlike in subsistence farming, the production is meant for the market. Almost the whole of the product (except that which is necessary for seeds etc.) is marketed.

State Farming:

This farming system is somewhat similar to the commercial farming or capitalistic farming. The only difference is with regard to the ownership of the farming. Where as in case of a commercial farm the ownership of the farm lies with a joint company (or in some cases with a land lord), in case of state farming, the state itself is the owner of the farm. So far as the control over population or operating of the farm is concerned, in both cases, the hired managers have the decision making power with regard to production and the hired workers work on the farm.

State farming has all the advantages of capitalistic farming. There are no financial problems for a state farm. Necessary improvements in the land can be made; improved agricultural practices can be adopted, productive as sets for efficient production can be procured; well can be dugs up, tube wells can be installed and necessary buildings and roads on the farm can be built commercial economies of various types can be reaped.

Market surplus of food grain and raw materials required by the industrial sector are produced on such farms. The state farms, in-fact, in some measures can be an important over a commercial farms owned by an individual or a joint stock company.

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Farming System # 4. Cooperative Farming:
We know that the traditional system of farming no doubt has certain advantages like higher intensity of cropping, higher employment level and higher productivity per acre, it suffers from certain disadvantages due to the small size of the holding some improved crop practices e.g. rotation of crops and difficulties in carrying out some developmental operation like fencing, digging of a well, weak bargaining power in the market etc. To overcome these difficulties associated with small farms and at the same time, to reap the incentives of ownership, a new system of farming has been suggested. It is known as cooperative farming.
Farm size
Farm types
The six basic farm types are:
Type 1. *Small subsistence-oriented family farms.*
Type 2. *Small semi-subsistence or part-commercial family farms*, usually of one half to two hectares, but area is not a good criterion: the same basic structure can be found on much larger 20- to 30-hectare farms as in the Punjab, Sind, and North West Frontier Provinces of Pakistan.
Type 3. *Small independent specialized family farms.*
Type 4. *Small dependent specialized family farms*, often with the family as tenants.
Type 5. *Large commercial family farms*, usually specialized and operated along modified estate lines.
Type 6. *Commercial estates*, usually mono-crop and with hired management and absentee ownership.

Each of the six farm types is now discussed in turn.
Type 1: Small subsistence-oriented family farms
There are two main subtypes. First, and of lesser numerical importance, are those based on only one or two crops or livestock types (e.g., on maize or cassava or coconuts; or on yaks or camels). Some farms of this subtype are based more on exploitation or management of a local natural resource - in the extreme case, by use of shifting cultivation or by nomadism - than on deliberate choice of their main farm enterprise (e.g., on indigenous sago palm, palmyrah, coconut or nipah). However, the main group of Asian subsistence-oriented farms is based on a wide range of crops and animal types. This second subtype is of necessity more highly mixed than are Type 2 part-commercial farms. Farms which are completely self-sufficient are rare, but self-sufficiency remains the operating objective and, if forced by circumstances, farms of this type could exist in isolation from the outside world. The structure of a Type

1 farm is exemplified in Figure 2.5 below. The focus for evaluation and analysis of Type 1 farms is the household rather than the farm component of the system. However, Type 1 farms have most of the characteristics of Type 2 farms and these are discussed below in relation to this latter type.

Type 2: Small semi-subsistence or part-commercial family farms

This type is predominant throughout South and South East Asia in terms of the number of such units, the large number of people supported by them and the total volume of their production - especially of basic foodstuffs.

Operating objective: The general operating objective of this farm type is family sustenance, pursued first by production of foodstuffs for consumption and of produce/materials for use on the farm, and second by generation of some cash income for the purchase of (a) non-farm produced food essentials (salt, tea etc.); (b) other essentials such as clothing, medicines, transistor radio, batteries etc.; and (c) some farm inputs (such as agricides and fertilizer).

Type 3: Small independent specialized family farms

The key characteristics of Type 3 farms are (a) their specialization in some particular crop or livestock activity which distinguishes them from the mixed farms of Types 1 and 2; and (b) their management independence which distinguishes them from Type 4 farms.

Type 3 farms fall into three subgroups according to their management orientation/purpose and type of income: (A) commercially-oriented farms, and family sustenance-oriented farms which achieve this objective through either (B) sale of part of their production (which makes them of necessity part-commercial farms) or (C) multiple-use of produce from their single specialized activity and/or barter of some of this produce for necessary commodities/goods which cannot be produced or purchased. In this latter situation such farms are also a subtype of subsistence farms (Type 1), but differ from the main body of near-subsistence farms in that only one main production activity is pursued. A sub-classification of Type 3 farms is shown in Figure 2.2. Some examples of these Type 3 farm subtypes are noted below. Probably the most important are the Subtype B near-continuous paddy farms of the wet tropics.

Subtype A (commercial):

· small farms specializing in poultry, pig, dairy or vegetable production around metropolitan areas.
· orchid and horticulture farms.
· vegetable farms in upland areas throughout Malaysia, North Sumatra and Java.
· smallholder rubber, oil palm or pepper holdings in Malaysia and Indonesia.
· citronella and cinnamon farms in southern Sri Lanka.

Subtype B (part-commercial):

· continuous and near-continuous paddy farms of the monsoon lands.
· upland/dryland maize and cassava farms.
· smallholder coffee or cacao farms.

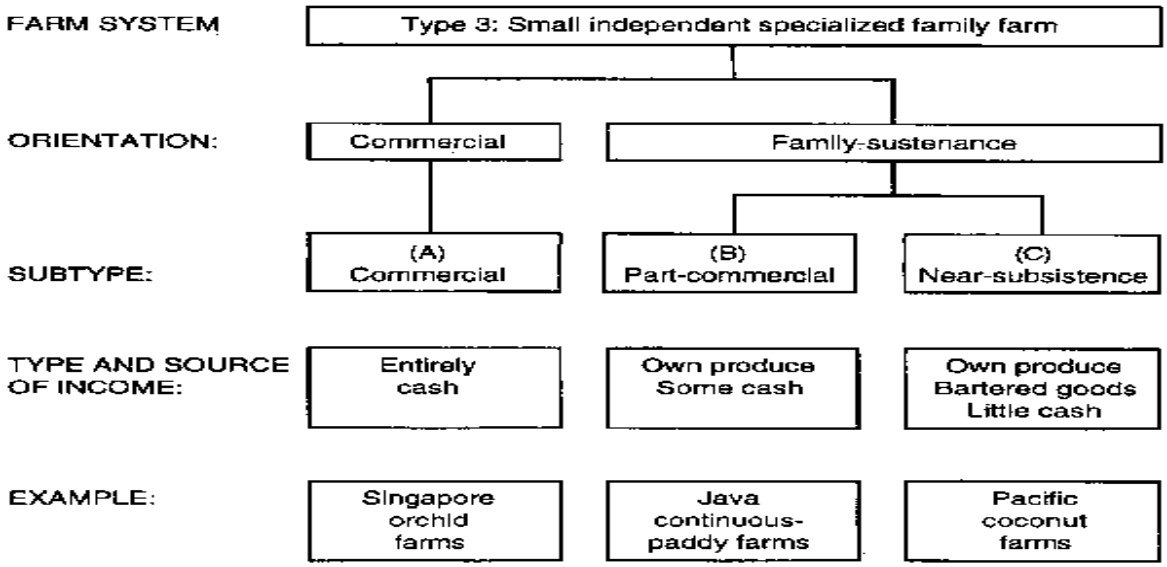
Subtype C (near-subsistence):

· near-subsistence maize farms of East Bhutan, Nepalese hills and Sarawak.
· cassava-based farms on poor soil in South Java.
· sago farms of South East Asia and New Guinea.
· yak/sheep migratory farms of the high Himalayan valleys.

type 4: Small dependent specialized family farms

Structurally, except for their lack of independence, Type 4 farms are quite akin to Type 3 farms and contain the same three (A) commercial (B) part-commercial and (C) near-subsistence subtypes; however, they are sufficiently important to be examined as a separate type. The characteristics which set them apart from farms of Types 1, 2 and 3 are their high degree of activity specialization and the lack of real decision-making power possessed by the farm family. The specialization characteristic may be

based on the same factors noted above for Type 3 (independent specialized) farms. The dependence characteristic arises from the fact that on Type 4 farms the family is not free to decide what to produce, nor frequently the conditions under which some obligatory activity is to be carried on. This lack of independence can be due to several factors, viz.



New Agricultural Strategy

The following points highlight the top ten features of new agricultural strategy of India.

They are: 1. Consolidation of land holdings 2. Improved Variety of Seeds 3. Greater Intensity of Cropping 4. Extension of Irrigation 5. Modern Farm Machinery 6. Role of Public Institutions 7. Package of Inputs 8. Guaranteed Minimum Prices 9. Agricultural Research and Education 10. Plant Protection Measures

1. Consolidation of Land Holdings:

Land ownership rights to the tillers and basic forward outlook Punjab farmers was the basic reason for providing ground to the green revolution in the northern India.

2. Improved Variety of Seeds:

Agricultural revolution is primarily due to the miracle of improved varieties of seeds which have increased yields per acre

3. Greater Intensity of Cropping:

The new agricultural strategy is not only concerned with higher yield but also with greater intensity of cropping. Therefore, new crop rotations have been made possible by developing short duration varieties of paddy, jowar, bajra and maize which are suited to different agro-climatic conditions. In the same way, other crops like barley, oilseed, potato and vegetables have also been considered for rotation

4. Extension of Irrigation:

In the areas, where new agricultural strategy is being applied, irrigation facilities are speedily being expanded to assure the adequate water supply. During the last 10-12 years, there has occurred a remarkable growth of tube-wells, pump-sets etc.

5. Modern Farm Machinery

Modern farm machinery like tractors, harvesters, pumping sets, tube-well, etc. are being increasingly used and are replacing the bullocks. Being, time saving, use of modern machinery in agriculture is

conducive to multiple cropping. Because of accuracy and timelines of use of inputs by machines, the costs have been reduced

6. Role of Public Institutions:

Several new public institutions like National Seeds Corporation, Agro Industries Corporations, National Co-operative Development Corporation etc. have been set up to promote services to the cultivators at door steps. Moreover, they have been provided with sufficient funds to lend liberal loans to peasants to adopt latest farm technology

7. Package of Inputs:

The main thrust of the new agricultural strategy is the application of the package of improved practices. In other words, it aimed at making the cultivators to adopt simultaneously all the elements needed for augmenting production. The main constituents of the package practices are improved seed, fertilizers, plant protection measures and water use etc.

8. Guaranteed Minimum Prices:

The guaranteed minimum prices have been given due recognition as an incentive to agricultural production. Support price policy for food-grains was adopted in 1964 throughout the country. In order to advice the govt. for suitable price policies for agriculture, Agricultural Price Commission was set up in the subsequent years. Similarly, Food Corporation of India was also set up to purchase food-grains

9. Agricultural Research and Education

A number of measures have been adopted in this direction of facilitate organisation and development of agricultural research. The Indian Council of Agricultural Research was reorganised in 1965. Agricultural Universities have been set up in most of the states which were conceived as combining the function of education, research and extension

10. Plant Protection Measures:

As pests and diseases have been causing severe damage to crops, plant protection has been considered another major component of new agricultural strategy. This programme includes seeds treatment, intensive aerial and ground spraying against insects, weed control and rodent control.

Green Revolution

The Green Revolution in India refers to a period when Indian agriculture was converted into an industrial system due to the adoption of modern methods and technology such as the use of high yielding variety (HYV) seeds, tractors, irrigation facilities, pesticides, and fertilizers. It was mainly found by M.S. Swaminathan. This was part of the larger Green revolution endeavor initiated by Norman Borlaug, which leveraged agricultural research and technology to increase agricultural productivity in the developing world**.**

After 1947 India had to rebuild its economy. Over three-quarters of the population depended on agriculture in some way. But agriculture in India was faced with several problems. Firstly, the productivity of grains was very low. And India was still monsoon dependent because of lack of irrigation and other infrastructure.

There was also an absence of modern technology. And India had previously faced severe famines during the British Raj, who had only promoted cash crops instead of food crops. The idea was to never depend on any other country for food sufficiency

To increase agricultural production and productivity, the Government of India invited a team of experts sponsored by the Ford Foundation. The team submitted its report entitled India's Food Crisis and Steps to Meet It. in April 1959. This report suggested the means of improving production and productivity of the country with stress on modern inputs, especially fertilizers, credit, marketing facilities etc.

On the basis of the recommendation of this team Government introduced Intensive Area Development Programme (lADP) in 1960 in seven selected districts. The seven selected districts were West Godavari

(AP), Shahabad (Bihar), Raipur (Chhattisgarh), Thanjavaur (T.N.), Ludhiana (Punjab), Aligarh in U.P. and Pali (Rajasthan). As a result of high-yielding varieties of wheat the production of wheat rose to high level of 5000 to 6000 kg. These seeds required proper irrigation facilities and extensive use of fertilizers, pesticides and insecticides.

Much of the success was caused by the combination of high rates of investment in crop research, infrastructure, and market development and appropriate policy support that took place during the first Green Revolution (GR). I distinguish the first GR period as 1966–1985 and the post-GR period as the next two decades. Large public investment in crop genetic improvement built on the scientific advances already made in the developed world for the major staple crops—wheat, rice, and maize—and adapted those advances to the conditions of developing countries

The GR strategy for food crop productivity growth was explicitly based on the premise that, given appropriate institutional mechanisms, technology spillovers across political and agroclimatic boundaries could be captured. However, neither private firms nor national governments had sufficient incentive to invest in all of the research and development of such international public goods. Private firms operating through markets have limited interest in public goods, because they do not have the capacity to capture much of the benefit through proprietary claims; also, because of the global, nonrival nature of the research products, no single nation has the incentive to invest public resources in this type of research.

Features of the Green Revolution

- The *introduction of the HYV seeds* for the first time in Indian agriculture. These seeds had more success with the wheat crop and were highly effective in regions that had proper irrigation. So the first stage of the Green Revolution was focused on states with better infra – like Punjab and Tamil Nadu.
- During the second phase, the HYV seeds were given to several other states. And other crops than wheat were also included into the plan
- One basic requirement for the HYV seeds is *proper irrigation*. Crops from HYV seeds need alternating amounts of water supply during its growth. So the farms cannot depend on monsoons. The Green Revolution vastly improved the inland irrigation systems around farms in India.
- The *emphasis of the plan was mostly on food grains* such as wheat and rice. Cash crops and commercial crops like cotton, jute, oilseeds etc were not a part of the plan
- Increased availability and use of *fertilizers* to enhance the productivity of the farms
- Use of *pesticides and weedicides* to reduce any loss or damage to the crops
- And finally the introduction of *technology and machinery* like tractors, harvesters, drills etc. This helped immensely to promote commercial farming in the country.

Market Surplus

The Green Revolution by and far was a success. But now there was another aspect to it. The government had to ensure that the benefit of the higher productivity was passed on to the general public. If the farmers kept the grains for themselves then the benefit of the higher productivity would be lost.

But thankfully this did not happen. Due to the high yield and productivity of the farms, the farmers started selling their produce in the markets. The portion of the produce which is sold by them is known as market surplus.

And so the higher output caused due to the Green Revolution started benefiting the economy. There was a decline in the prices of grains and such food products. The common man was able to easily afford to buy them. The government was even able to stock grains and builds a food bank in case of future food shortages.

Impact of the Green Revolution

- ***Increase in Agricultural Production***: Foodgrains in India saw a great rise in output. It was a remarkable increase. The biggest beneficiary of the plan was the Wheat Grain. The production of wheat increased to 55 million tonnes in 1990 from just 11 million tonnes in 1960.

- ***Increase in per Acre Yield:*** Not only did the Green Revolution increase the total agricultural output, it also increased the per hectare yield. In case of wheat, the per hectare yield increased from 850 kg/hectare to an incredible 2281 kg/hectare by 1990.

- ***Less Dependence on Imports:*** After the green revolution, India was finally on its way to self-sufficiency. There was now enough production for the population and to build a stock in case of emergencies. We did not need to import grains or depend on other countries for our food supply. In fact, India was able to start exporting its agricultural produce.

- ***Employment:*** It was feared that commercial farming would leave a lot of the labour force jobless. But on the other hand, we saw a rise in rural employment. This is because the supporting industries created employment opportunities. Irrigation, transportation, food processing, marketing all created new jobs for the workforce.

- ***A Benefit to the Farmers:*** The Green Revolution majorly benefited the farmers. Their income saw a significant raise. Not only were they surviving, they were prospering. It enabled them to shift to commercial farming from only sustenance farming

Impact or the Effects of Green Revolution:

(i) Increase in Production and Productivity:

As a result of new agricultural strategy, food grains output substantially increased from 81.0 million tonnes in the Third Plan (annual average) to 203 million tonnes in the Ninth Plan (annual average) and further to 212. 0 million tonnes in 2003-04. HYVP was restricted to only five crops – wheat, rice jowar, bajra and maize. Therefore, non- food grains were excluded from the ambit of the new strategy.

(ii) Scientific Cultivation

A very important effect of Green Revolution is that traditional agricultural inputs and practices have given way to new and scientific practices. Instead of farm seeds, farmers are now using HYV seeds. Traditional fertilizers are replaced by chemical fertilizers. Consequently under HYV seeds increased sharply from 1.66 million hectares in 1966-67 (when green revolution came to India) to about 78.4 million hectares in 1998-99.

(iii) Change in Cropping Pattern:

Two changes are significant. First, the proportion of cereals in the food grains output has increased and the proportion of pulses has declined. Second, the proportion of wheat cereals has increased while that of coarse grains has declined.

(iv) Development of Industries:
Green revolution has benefited the industrial development. Many industries producing agriculture, machinery, chemical fertilizers, pesticides, insecticides etc., have come up to meet the growing demand for these commodities.

(vi) Change in Attitudes:
A healthy contribution of green revolution is the change in the attitudes of farmers. Our farmers have now begun to think that they can change their misfortunes by adopting new technology. Unlike past, they are now giving up traditional agricultural practices for scientific practices

UNIT3
Land reform, a purposive change in the way in which agricultural land is held or owned, the methods of cultivation that are employed, or the relation of agriculture to the rest of the economy. Reforms such as these may be proclaimed by a government, by interested groups, or by revolution.

Objectives Of Reform
Reform is usually introduced by government initiative or in response to internal and external pressures, to resolve or prevent an economic, social, or political crisis. Thus reform may be considered a problem-solving mechanism. The true motives for reform, however, may well differ from those announced by the reformer.

Economic objectives
Economic development has become a major objective of governments and political parties in recent decades. Efforts have been made to encourage agricultural progress by means of agrarian reform in favour of the peasant who does not own his land or whose share of the crop is relatively small, and who therefore has little incentive to invest capital or expend effort to improve the land and raise productivity. Another mechanism has been to encourage labour-intensive cultivation, on the assumption that traditional or feudal landowners often use their land extensively and wastefully.
Improvements in irrigation include increasing the water supply, draining swampy land, and regulating the quantity and quality of water flow. Irrigation is especially important in that it involves large investments and infringes on tenure rights, both matters that invite public responsibility and intervention. Irrigation and technology are closely related to the use of fertilizer and other chemicals. Chemicals may be difficult to apply without irrigation, and neither may be practical unless farming technology has advanced beyond relatively primitive methods. Improvement of the pattern of cultivation may be inhibited, however, by traditional attitudes, the lack of skills, or the scarcity of capital. Another difficulty is that changes in the pattern of cultivation are usually long-term investments that may be too slow to satisfy immediate pressures for reform

Meaning of Capital Formation:
Capital formation means increasing the stock of real capital in a country.
In other words, capital formation involves making of more capital goods such as machines, tools, factories, transport equipment, materials, electricity, etc., which are all used for future production of goods.
For making additions to the stock of Capital, saving and investment are essential.

Process of Capital Formation
In order to accumulate capital goods some current consumption has to be sacrificed. The greater the extent to which the people are willing to abstain from present consumption, the greater the extent that

society will devote resources to new capital formation. If society consumes all that it produces and saves nothing, future productive capacity of the economy will fall as the present capital equipment wears out.

Three Stages in Capital Formation:
Although saving is essential for capital formation, but in a monetized economy, saving may not directly and automatically result in the production of capital goods. Savings must be invested in order to have capital goods. In a modern economy, where saving and investment are done mainly by two different classes of people, there must be certain means or mechanism whereby the savings of the people are obtained and mobilized in order to give them to the businessmen or entrepreneurs to invest in capital.

Therefore, in a modern free enterprise economy, the process of capital formation consists of the following three stages

(a) Creation of Savings:
An increase in the volume of real savings so that resources, that would have been devoted to the production of consumption goods, should be released for purposes of capital formation.

(b) Mobilization of Savings:
A finance and credit mechanism, so that the available resources are obtained by private investors or government for capital formation

(c) Investment of Savings:
The act of investment itself so that resources are actually used for the production of capital goods

Role of Agriculture in Economic Development:
The agriculture sector is the backbone of an economy which provides the basic ingredients to mankind and now raw material for industrialisation.

Therefore, the role of agriculture for the development of an economy may be stated as below:

1. Contribution to National Income:
The lessons drawn from the economic history of many advanced countries tell us that agricultural prosperity contributed considerably in fostering economic advancement. It is correctly observed that, "The leading industrialized countries of today were once predominantly agricultural while the developing economies still have the dominance of agriculture and it largely contributes to the national income. In India, still 28% of national income comes from this sector.

2. Source of Food Supply:
Agriculture is the basic source of food supply of all the countries of the world—whether underdeveloped, developing or even developed. Due to heavy pressure of population in underdeveloped and developing countries and its rapid increase, the demand for food is increasing at a fast rate. If agriculture fails to meet the rising demand of food products, it is found to affect adversely the growth rate of the economy. Raising supply of food by agricultural sector has, therefore, great importance for economic growth of a country.
Increase in demand for food in an economy is determined by the following equation
$D = P + 2g$
Here,
D stands for Annual Rate of Growth in demand for food.

P stands for Population Growth Rate
g stands for Rate of Increase in per Capita Income.
2 stand for Income Elasticity of Demand for Agricultural Products.

3. Pre-Requisite for Raw Material:
Agricultural advancement is necessary for improving the supply of raw materials for the agro-based industries especially in developing countries. The shortage of agricultural goods has its impact upon on industrial production and a consequent increase in the general price level. It will impede the growth of the country's economy. The flour mills, rice shellers, oil & dal mills, bread, meat, milk products sugar factories, wineries, jute mills, textile mills and numerous other industries are based on agricultural products.

4. Provision of Surplus:
The progress in agricultural sector provides surplus for increasing the exports of agricultural products. In the earlier stages of development, an increase in the exports earning is more desirable because of the greater strains on the foreign exchange situation needed for the financing of imports of basic and essential capital goods.

5. Shift of Manpower:
Initially, agriculture absorbs a large quantity of labour force. In India still about 62% labour is absorbed in this sector. Agricultural progress permits the shift of manpower from agricultural to non-agricultural sector. In the initial stages, the diversion of labour from agricultural to non-agricultural sector is more important from the point of view of economic development as it eases the burden of surplus labour force over the limited land. Thus, the release of surplus manpower from the agricultural sector is necessary for the progress of agricultural sector and for expanding the non-agricultural sector.

6. Creation of Infrastructure:
The development of agriculture requires roads, market yards, storage, transportation railways, postal services and many others for an infrastructure creating demand for industrial products and the development of commercial sector.

7. Relief from Shortage of Capital:
The development of agricultural sector has minimized the burden of several developed countries who were facing the shortage of foreign capital. If foreign capital is available with the 'strings' attached to it, it will create another significant problem. Agriculture sector requires less capital for its development thus it minimizes growth problem of foreign capital.

8. Helpful to Reduce Inequality:
In a country which is predominantly agricultural and overpopulated, there is greater inequality of income between the rural and urban areas of the country. To reduce this inequality of income, it is necessary to accord higher priority to agriculture. The prosperity of agriculture would raise the income of the majority of the rural population and thus the disparity in income may be reduced to a certain extent.

9. Based on Democratic Notions:
If the agricultural sector does not grow at a faster rate, it may result in the growing discontentment amongst the masses which is never healthy for the smooth running of democratic governments. For economic development, it is necessary to minimize political as well as social tensions. In case the majority of the people have to be kindled with the hopes of prosperity, this can be attained with the help

of agricultural progress. Thus development of agriculture sector is also relevant on political and social grounds.

10. Create Effective Demand:
The development of agricultural sector would tend to increase the purchasing power of agriculturists which will help the growth of the non-agricultural sector of the country. It will provide a market for increased production. In underdeveloped countries, it is well known that the majority of people depend upon agriculture and it is they who must be able to afford to consume the goods produced.
Therefore, it will be helpful in stimulating the growth of the non- agricultural sector. Similarly improvement in the productivity of cash crops may pave the way for the promotion of exchange economy which may help the growth of non-agricultural sector. Purchase of industrial products such as pesticides, farm machinery etc. also provide boost to industrial dead out.

11. Helpful in Phasing out Economic Depression:
During depression, industrial production can be stopped or reduced but agricultural production continues as it produces basic necessities of life. Thus it continues to create effective demand even during adverse conditions of the economy.

12. Source of Foreign Exchange for the Country:
Most of the developing countries of the world are exporters of primary products. These products contribute 60 to 70 per cent of their total export earning. Thus, the capacity to import capital goods and machinery for industrial development depends crucially on the export earning of the agriculture sector. If exports of agricultural goods fail to increase at a sufficiently high rate, these countries are forced to incur heavy deficit in the balance of payments resulting in a serious foreign exchange problem.
However, primary goods face declining prices in international market and the prospects of increasing export earnings through them are limited. Due to this, large developing countries like India (having potentialities of industrial development) are trying to diversify their production structure and promote the exports of manufactured goods even though this requires the adoption of protective measures in the initial period of planning.

13. Contribution to Capital Formation:
Underdeveloped and developing countries need huge amount of capital for its economic development. In the initial stages of economic development, it is agriculture that constitutes a significant source of capital formation.
Agriculture sector provides funds for capital formation in many ways as:
(i) agricultural taxation,
(ii) export of agricultural products,
(iii) collection of agricultural products at low prices by the government and selling it at higher prices. This method is adopted by Russia and China,
(iv) labour in disguised unemployment, largely confined to agriculture, is viewed as a source of investible surplus,
(v) transfer of labour and capital from farm to non-farm activities etc.

14. Employment Opportunities for Rural People:
Agriculture provides employment opportunities for rural people on a large scale in underdeveloped and developing countries. It is an important source of livelihood. Generally, landless workers and marginal farmers are engaged in non-agricultural jobs like handicrafts, furniture, textiles, leather, metal work, processing industries, and in other service sectors. These rural units fulfill merely local demands. In

India about 70.6% of total labour force depends upon agriculture.

15. Improving Rural Welfare:
It is time that rural economy depends on agriculture and allied occupations in an underdeveloped country. The rising agricultural surplus caused by increasing agricultural production and productivity tends to improve social welfare, particularly in rural areas. The living standard of rural masses rises and they start consuming nutritious diet including eggs, milk, ghee and fruits. They lead a comfortable life having all modern amenities—a better house, motor-cycle, radio, television and use of better clothes.

16. Extension of Market for Industrial Output:
As a result of agricultural progress, there will be extension of market for industrial products. Increase in agricultural productivity leads to increase in the income of rural population which is turn leads to more demand for industrial products, thus development of industrial sector.
According to Dr. Bright Singh, "Increase in agricultural production and the rise in the per-capita income of the rural community, together with the industrialisation and urbanisation, lead to an increased demand in industrial production." In this way, agricultural sector helps promote economic growth by securing as a supplement to industrial sector.

Agri Credit
Meaning of Agricultural Credit:
Agricultural credit is considered as one of the most basic inputs for conducting all agricultural development programmes. In India there is an immense need for proper agricultural credit as Indian farmers are very poor. From the very beginning the prime source of agricultural credit in India was moneylenders.
Types of Agricultural Credit:
Considering the period and purpose of the credit requirement of the farmers of the country, agricultural credit in India can be classified into three major types:
(a) Short Term Credit:
The Indian farmers require credit to meet their short term needs viz., purchasing seeds, fertilisers, paying wages to hired workers etc. for a period of less than 15 months. Such loans are generally repaid after harvest.
(b) Medium Term Credit:
This type of credit includes credit requirement of farmers for medium period ranging between 15 months and 5 years and it is required for purchasing cattle, pumping sets, other agricultural implements etc. Medium term credits are normally larger in size than short term credit.

(c) Long Term Credit:
Farmers also require finance for a long period of more than 5 years just for the purpose of buying additional land or for making any permanent improvement on land like sinking of wells, reclamation of land, horticulture etc. Thus, the long term credit requires sufficient time for the repayment of such loan

Sources of Agricultural Credit in India:
In India, agricultural credit are being advanced by different sources. The short term and medium term loan requirements of Indian farmers are mostly met by moneylenders, co-operative credit societies and Government. But the long-term loan requirements of the Indian farmers are also met by moneylenders, land development banks and the Government.
Nowadays, the long term and short term credit needs of these institutions are also being met by National Bank for Agricultural and Rural Development (NABARD).

Sources of agricultural credit can be broadly classified into institutional and non-institutional sources. Non-Institutional sources include moneylenders, traders and commission agents, relatives and landlords, but institutional sources include co-operatives, commercial banks including the SBI Group, RBI and NABARD.

TABLE 7.15. Borrowing of Cultivators from Different Sources (Percentages)

Sources	*1951-52*	*1961-62*	*1971*	*1981*	*1995-96*
A. Non-institutional					
(*i*) Moneylenders	69.7	49.2	36.1	16.1	7.0
(*ii*) Traders	5.5	8.8	8.4	3.2	5.0
(*iii*) Relatives and friends	14.2	8.8	13.1	8.7	3.0
(*iv*) Landlords and others	3.3	14.5	10.7	8.8	10.0
Sub-total [(*i*) to (*iv*)]	92.7	81.3	68.3	36.8	25.0
B. Institutional					
(*v*) Government	3.1	15.5	7.1	3.9	5.0
(*vi*) Co-operatives	3.3	2.6	22.0	29.9	40.0
(*vii*) Commercial and Rural Banks	0.9	0.6	2.6	29.4	30.0
Sub-total [(*v*) to (*vii*)]	7.3	18.7	31.7	63.2	75.0
Total A + B	100.0	100.0	100.0	100.0	100.0

Disbursement of Agricultural Credit in India in Recent Years:

In recent years, the disbursement of agricultural credit has reached a new dimension. Co-operatives, commercial banks and Regional Rural Banks (RRBs) are advancing both short-term, medium term and long term credit to Indian farmers to help them to adopt modern technology and improved agricultural practices for raising crop productivity and production.

TABLE 7.16. *Disbursement of Agricultural Credit since 1985-86*

(*₹ crore*)

Item	*1985-86*	*1995-96*	*1998-99*	*2000-01*	*2002-03*	*2010-11*
1. Co-operative Banks Short term	2,787	8,331	12,571	16,564	20,247	N.A.
Medium term and Long term	1,087	2,148	3,386	4,220	4,049	N.A.
Total	3,874	10,479	15,957	20,784	24,216	70,105
2. Commercial and Regional Rural Banks	3,131	11,553	20,903	31,930	46,514	3,76,674
3. Grand Total	7,005	22,032	36,860	52,714	70,810	4,46,779

In order to improve the flow of credit to agriculture, the Government has introduced the following measures in 1998-99:

(i) Procedural simplification for credit delivery has been made (as per R.V. Gupta Committee Report) through rationalisation of internal returns of banks.

(ii) More powers have been delegated to branch managers to raise the credit flow to agriculture.

(iii) Introduction of composite cash credit limit to farmers, introduction of new loan products with saving components, cash disbursement of loans, dispensation of no due certificate and discretion to banks on matters relating to margin security requirements for agricultural loans above Rs 10,000.

(iv) Introduction of at least one specialised agricultural bank in each state to cater to the needs of high tech.

(v) Introduction of cash credit facility.

(vi) Insuring Kisan Credit cards to farmers to draw cash for their production needs on the basis of the model scheme prepared by NABARD.

(vii) The Government has made arrangement for hassle free settlement of disputed cases of over dues.

(viii) To augment Rural Infrastructural Development Fund (RIDF) with a corpus of Rs 10,000 crore with NABARD to finance rural infrastructure development projects by states.

Thus the flow of institutional credit for agriculture and allied activities which was Rs 31,956 crore in 1997-98 is estimated to have increased to Rs 64,000 crore in 2001-02. The total credit now from all

agencies is projected to reach the level of Rs 82,073 crore by 2002-03.
The total credit now to agriculture during the period 1997-2002 is likely to be of the order of Rs 2,33,700 crore which is close to the Ninth Plan projection of Rs 2,29,750 crore.
For the Tenth Plan period (2002-07) the credit flow into agriculture and allied activities from all banking agencies is projected at Rs 7,36,570 crore, which is more than three times the credit flow during the Ninth Plan.
Farm Credit Package:
The Government of India announced the "Farm credit package" in June 2004 which aimed at doubling the flow of institutional credit for agriculture in the ensuing three years. Accordingly, the credit to the farm sector got doubled during two years, i.e., from Rs 86,981 crore in 2003-04 to Rs 1, 80,486 crore in 2005-06, as against the stipulated time period of three years.
The credit flow continued to increase at Rs 2, 29,401 crore in 2006-07 and then to Rs 3, 84,514 crore in 2009-10 and finally to Rs 6, 07,375 crore in 2012-13.

Steps Taken to Raise Credit Flow to Agriculture:
In recent years, the Government has taken some definite steps for raising the credit flow to agricultural sector.
The following measures have been taken by the government for improving agricultural credit flow and bringing down the rate of interest on farm loans:
(i) Targeting:
Targeting practice is followed for raising the flow of agricultural credit. Accordingly, agricultural credit flow target for 2013-14 was fixed at Rs 7, 00,000 crore and achievement was Rs 7, 30,765 crore (Provisional) as against Rs 6, 07,375 crore in 2012-13. Agricultural credit flow target for 2014-15 has been fixed at Rs 8, 00,000 crore.
(ii) Crop Loans:Arrangement has been made to provide crop loan to formers. Accordingly, farmers have been availing of crop loans up to a principal amount of Rs 3, 00,000 at 7 per cent
cent annum during 2014-15.
(iii) Discouraging Distress Sale:
In order to discourage distress sale of crops by farmers, the benefit of interest subvention has been made available to small and marginal farmers having Kishan Credit Cards for a further period of up of six months (post-harvest) against negotiable were house receipts (NWRs) at the commercial rates.
(iv) Relief for Natural Calamities:
In order to provide relief to farmers on occurrence of natural calamities, interest subvention of 2 per cent will continue to be available to banks for the first year on the restructured loan amount on account of natural calamities and such restructured loans will attract normal rate of interest from the second year onwards as per the policy laid down by the RBI.

Problems of Agricultural Credit in India:
Since independence, the institutional agricultural credit structure in Indiia was very poor. In the post-independence period, various attempts were made by the Government for enriching the institutional agricultural credit structure of the country leading to continuous growth in the base and sources of agricultural credit.
Both the co-operative sector, commercial banks and rural banks are trying simultaneously for meeting credit requirements of the farmers. Even then, there are number of problems faced by agricultural credit structure of the country which are standing on the path of development of the agricultural sector.

The following are some of these problems:

(i) Insufficiency:
In spite of expansion of rural credit structure, the volume of rural credit in the country is still insufficient as compared to its growing requirement arising out of increase in prices of agricultural inputs.

(ii) Inadequate Amount of Sanction:
The amount of loan sanctioned to the farmers by the agencies is also very much inadequate for meeting their different aspects of agricultural operations. Considering the amount of loan sanctioned as inadequate and insignificant, the farmers often divert such loan for unproductive purposes and thereby dilute the very purpose of such loan.

(iii) Lesser Attention of Poor Farmers:
Rural credit agencies and its schemes have failed to meet the needs of the small and marginal farmers. Thus, lesser attention has been given on the credit needs of the needy farmers whereas the comparatively well-to-do farmers are getting more attention from the credit agencies for their better credit worthiness.

(iv) Growing Overdues:
The problem of over-dues in agricultural credit continues to be an area of concern. The recovery of agricultural advances to various institutions is also not at all satisfactory. In 1997-98, the recovery of agricultural advances of commercial banks, co-operative banks and regional rural banks were 63 per cent, 66 per cent and 57 per cent respectively.
Such growing over-dues have also been resulted from poor repaying capacity of farmers. As a result of that, the credit agencies are becoming wary of granting loan to farmers.

(v) Inadequate Institutional Coverage:
In India, the institutional credit arrangement continues to be inadequate as compared to its growing needs. The development of co-operative credit institutions like Primary agricultural credit societies, land development banks, commercial banks and regional rural banks, have failed to cover the entire rural farmers of the country.

(vi) Red Tapism:
Institutional agricultural-credit is subjected to red-tapism. Credit institutions are still adopting cumbersome rules and formalities for advancing loan to farmers which ultimately force the farmers to depend more on costly non-institutional sources of credit.

Suggestions for Removing Limitations of Agricultural Credit in India:
For effective modernisation of agricultural sector and also to stimulate its growth pattern, a broad based and simplified rural credit structure is very much desired and important. Accordingly, Prof. Darling has rightly observed, "A proper system of agricultural credit will not only lower the rate of interest but also imply a system in which productive loans will gradually replace the unproductive ones."
Thus, in order to remove limitations and problems of agricultural credit in India the following measures may be suggested:
(i) To monitor the taccavi loan offered by the Government in a serious manner.(ii) Co-operative credit societies should be organised to make it efficient and purposeful for delivering the best in terms of rural credit. Moreover, these societies may be transformed into a multi-purpose society with sufficient funding capacity.
(iii) Middlemen existing between credit agencies and borrowers should be eliminated.

(iv) Reserve Bank of India should arrange sufficient fund so that long term loans can be advanced to the farmers.
(v) Power and activities of the Mahajans and moneylenders should be checked so as to declare an end to the exploitation of farmers.
(vi) The Government should introduce the credit guarantee scheme so as to provide guarantee on behalf of the farmers for getting loans.
(vii) The banks should adopt procedural simplification for credit delivery through rationalisation of its working pattern.
(viii) The Government should issue Kisan credit cards to the farmers to draw cash for their production needs on the basis of the model scheme prepared by NABARD.
(ix) In order to check the fraud practices adopted by the farmer, for getting loans from different agencies by showing same tangible security, a credit card should be issued against each farmer which will show the details about the loans taken by them from different agencies.
(x) Credit should also monitor over the actual utilisation of loans by developing an effective supervisory mechanism.

Unit4

Agricultural cost and price

Commission for Agricultural Costs and Prices (**CACP**) is a decentralised agency of the Government of India. It was established in 1965as the **Agricultural Prices Commission**, and was given its present name in 1985. It is an attached office of the Ministry of Agriculture & Farmers Welfare, Government of India.

The Minimum Support Prices in India are recommended by a statutory body known as Commission for Agricultural Costs and Prices (CACP). It gives recommendations to the government on MSP for Kharif and Rabi seasons.

The Cabinet Committee on Economic Affairs (CCEA), determines the Minimum Support Prices (MSP) of various agricultural commodities based on the recommendations of the CACP keeping in view factors like increase in the cost of production, demand and supply situation, inter-crop parity, and trend of domestic and international market prices etc.

Currently, 25 agricultural commodities are covered under the function given to the CACP for advising the government in respect fixing MSP. The Commission is required to convey its recommendations to the Government well before the sowing season of the crop.

The objective of the price policy underlying MSP is to bring a balanced and integrated price structure for agricultural commodities. The prices should be in accordance with the overall needs of the economy and protecting the interests of the producer and the consumer. Several price and non-price factors are considered while estimating the MSP.

The CACP, while formulating the recommendations on Price Policy, considers a number of important factors including cost of production, changes in input price, trends in market prices, demand and supply situation etc.

The cost of cultivation/production takes into account all paid out costs, such as, on hired labour, bullock labor and machine labor (both hired and owned) expenses on use of material inputs like seeds, fertilizers, manures, irrigation charges including cost of diesel or electricity for operation of pump sets, etc. Besides, cost of production includes imputed values of wages of family labour and rent for owned land. The cost also covers depreciation for farm machinery, building, transportation and insurance charges. State wise and crop wise cost estimation is made for recommending MSPs.

Agricultural Marketing in India

Agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. These services involve the planning, organizing, directing and handling of agricultural produce in such a way as to satisfy farmers, intermediaries and consumers. Numerous interconnected activities are involved in doing this, such as planning production, growing and harvesting, grading, packing and packaging, transport, storage, agro- and food processing, provision of market information, distribution, advertising and sale

India is an agricultural country and one third population depends on the agricultural sector directly or indirectly. Agriculture remains as the main stray of the Indian economy since times immemorial. Indian agriculture contribution to the national gross domestic product (GDP) is about 25 per cent. With food being the crowning need of mankind, much emphasis has been on commercialising agricultural production. For this reason, adequate production and even distribution of food has of late become a high priority global concern.

Agricultural marketing is mainly the buying and selling of agricultural products. In earlier days when the village economy was more or less self-sufficient the marketing of agricultural products presented no difficulty as the farmer sold his produce to the consumer on a cash or barter basis.

Today's agricultural marketing has to undergo a series of exchanges or transfers from one person to another before it reaches the consumer. There are three marketing functions involved in this, i.e., assembling, preparation for consumption and distribution. Selling on any agricultural produce depends on some couple of factors like the demand of the product at that time, availability of storage etc. The products may be sold directly in the market or it may be stored locally for the time being. Moreover, it may be sold as it is gathered from the field or it may be cleaned, graded and processed by the farmer or the merchant of the village. Sometime processing is done because consumers want it, or sometimes to conserve the quality of that product. The task of distribution system is to match the supply with the existing demand by whole selling and retailing in various points of different markets like primary, secondary or terminal markets.

Most of the agricultural products in India are sold by farmers in the private sector to moneylenders (to whom the farmer may be indebted) or to village traders. Products are sold in various ways. For example, it might be sold at a weekly village market in the farmer's village or in a neighboring village. If these outlets are not available, then produce might be sold at irregularly held markets in a nearby village or town, or in the mandi.

In India, there are several central government organisations, who are involved in agricultural marketing like, Commission of Agricultural Costs and Prices, Food Corporation of India, Cotton Corporation of India, Jute Corporation of India, etc. There are also specialised marketing bodies for rubber, tea, coffee, tobacco, spices and vegetables. Under the Agricultural Produce (grading and marketing) Act of 1937, more than forty primary commodities are compulsorily graded for export and voluntarily graded for internal consumption. Although the regulation of commodity markets is a function of state government, the directorate of marketing and inspection provides marketing and inspection services and financial aid down to the village level to help set up commodity grading centers in selected markets.

As we have a tradition of agricultural production, marketing and allied commercial activities, now it is the time for us to brainstorm and come out with new ideas of value added services. These value added services will give the existing agricultural engine a new dimension. The next logical step could be food-processing which not only could be another revenue generating area but also can provide lots of full-time employment to our youths. With the changing agricultural scenario and global competition, there is a need of exploiting the available resources at maximum level.

There was a survey undertaken by the directorate of marketing and inspection in the ministry of agriculture in 1970-71 and 1971-72, of five hundred regulated markets was, with a view to assessing the adequacy and efficiency of the existing regulated markets and highlighting their drawbacks and deficiencies and suggesting measures to develop them. One of the most important drawbacks has been the inadequate financial resources of some of the market committees. During the fourth plan, a central sector scheme was drawn up by the ministry of agriculture to provide a grant at 20 per cent of the cost of development of market, subject to a maximum of Rs. 2 lakhs. The balance will have to be provided by the commercial banks. Another important development in the field of regulated markets is the keen interest taken by the International Development Agency (IDA) in the development of the infrastructure in regulated markets. The IDA is financing the development of infrastructure in 50 markets of Bihar.
India, with a large and diverse agriculture, is among the world's leading producer ofcereals, milk, sugar, fruits and vegetables, spices, eggs and seafood products. Indianagriculture continues to be the backbone of our society and it provides livelihood tonearly 50 per cent of our population. India is supporting 17.84 per cent of world'spopulation, 15% of livestock population with merely 2.4 per cent of world's land and4 per cent water resources. Hence, continuous innovation and efforts towardsproductivity, pre & post-harvest management, processing and value-addition, use oftechnology and infrastructure creation is an imperative for Indian agriculture. Variousstudies on fresh fruits and vegetables, fisheries in India have indicated a losspercentage ranging from about 8% to 18% on account of poor post-harvestmanagement, absence of cold chain and processing facilities. Therefore, agroprocessing and agricultural exports are a key area and it is a matter of satisfactionthat India's role in global export of agricultural products is steadily increasing. India iscurrently ranked tenth amongst the major exporters globally as per WTO trade datafor 2016. India's share in global exports of agriculture products has increased from1% a few years ago, to 2.2 % in 2016.

Recent growth rates show that agri-food production is rising faster than growth indomestic demand, and volume of surplus for export is witnessing accelerated growth.This offers scope and opportunity for capturing overseas markets to earn foreignexchange and enable producers to earn higher prices for farm produce. India is among the highest-ranking countries in production volume for various commodities like rice, cotton, dairy, fruits, vegetables, meat and seafood, but the nation has access to only 60 percent of the produce due to lack of storage infrastructure, which leads to an estimated loss of up to 40 percent of the produce. In fact, these losses are estimated at $13 billion annually.
Indian imports of condiments and sauces in 2018 exceeded $32 million of which nearly $5.8 million were from the United States. Other large suppliers included China, Thailand, Malaysia, and several European countries. Retail and restaurant sector offerings are growing and demand for imported condiments and sauces is on the rise as consumers experiment with how to use these imported ingredients.

Government Initiatives

Some of the recent major government initiatives in the sector are as follows:
Prime Minister of India, launched the Pradhan Mantri KisanSamman Nidhi Yojana (PM-Kisan) and transferred Rs 2,021 crore (US$ 284.48 million) to the bank accounts of more than 10 million beneficiaries on February 24, 2019. The Government of India has come out with the Transport and Marketing Assistance (TMA) scheme to provide financial assistance for transport and marketing of agriculture products in order to boost agriculture exports.

The Agriculture Export Policy, 2018 was approved by Government of India in December 2018. The new policy aims to increase India's agricultural exports to US$ 60 billion by 2022 and US$ 100 billion in the next few years with a stable trade policy regime.
In September 2018, the Government of India announced Rs 15,053 crore (US$ 2.25 billion) procurement policy named 'Pradhan Mantri AnnadataAaySanraksHan Abhiyan' (PM-AASHA), under which states can decide the compensation scheme and can also partner with private agencies to ensure fair prices for farmers in the country.

In September 2018, the Cabinet Committee on Economic Affairs (CCEA) approved a Rs 5,500 crore (US$ 820.41 million) assistance package for the sugar industry in India.
The Government of India is going to provide Rs 2,000 crore (US$ 306.29 million) for computerisation of Primary Agricultural Credit Society (PACS) to ensure cooperatives are benefitted through digital technology.

With an aim to boost innovation and entrepreneurship in agriculture, the Government of India is introducing a new AGRI-UDAAN programme to mentor start-ups and to enable them to connect with potential investors.
The Government of India has launched the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) with an investment of Rs 50,000 crore (US$ 7.7 billion) aimed at development of irrigation sources for providing a permanent solution from drought.
The Government of India plans to triple the capacity of food processing sector in India from the current 10 per cent of agriculture produce and has also committed Rs 6,000 crore (US$ 936.38 billion) as investments for mega food parks in the country, as a part of the Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters (SAMPADA).
The Government of India has allowed 100 per cent FDI in marketing of food products and in food product e-commerce under the automatic route.

Achievements in the sector
Sugar production in India has reached 27.35 million tonnes (MT) in 2018-19 sugar season, as of March 15 2019, according to the Indian Sugar Mills Association (ISMA).
The Electronic National Agriculture Market (eNAM) was launched in April 2016 to create a unified national market for agricultural commodities by networking existing APMCs. Up to May 2018, 9.87 million farmers, 109,725 traders were registered on the e-NAM platform. 585 mandis in India have been linked while 415 additional mandis will be linked in 2018-19 and 2019-20.
Agriculture storage capacity in India increased at 4 per cent CAGR between 2014-17 to reach 131.8 million metric tonnes.
Coffee exports reached record 395,000 tonnes in 2017-18.
Between 2014-18, 10,000 clusters were approved under the Paramparagat Krishi Vikas Yojana (PKVY).
Between 2014-15 and 2017-18 (up to December 2017), capacity of 2.3 million metric tonnes was added in godowns while steel silos with a capacity of 625,000 were also created during the same period.
Around 100 million Soil Health Cards (SHCs) have been distributed in the country during 2015-17 and a soil health mobile app has been launched to help Indian farmers.

INDIA'S AGRICULTURE EXPORT POLICY- OBJECTIVES
• To double agricultural exports from present ~US$ 30+ Billion to ~US$ 60+ Billion by 2022 and reach US$ 100 Billion in the next few years thereafter, with a stable trade policy regime.
• To diversify our export basket, destinations and boost high value and value added agricultural exports including focus on perishables.

• To promote novel, indigenous, organic, ethnic, traditional and non-traditional Agri products exports.
• To provide an institutional mechanism for pursuing market access, tackling barriers and deal with sanitary and phytosanitary issues.
• To strive to double India's share in world agri exports by integrating with global value chain at the earliest.
• Enable farmers to get benefit of export opportunities in overseas market.

INDIA'S AGRICULTURE EXPORT POLICY-VISION

Harness export potential of Indian agriculture, through suitable policy instruments, tomake India global power in agriculture and raise farmers income. Attract private investments in export oriented activities and infrastructure. Post-Harvest Infrastructure supports smooth logistical movement of agri produce. This will have a direct co-relationship in increasing export volumes, assuring quality & ensuring better price realization per unit. Some of the benefits are as follows:

- Better quality compliance: Post Harvest processing of agri-produce, such as waxing of fruits, irradiation treatment of meat, sorting of bad/damaged fruits/produce, will increase shelf life of the produce and will be helpful in maintaining quality of the produce for distant markets.
- Facilitates smooth logistic handling: Will assure better handling of produce, result in decreasing wastage, increase marketable surplus quantity. The policy recommendations in this report are organized in two broad categories - strategic and operational.

Strategy

Policy Measures - Discussions with public and private stakeholders across the agricultural value chain highlighted certain structural changes that were required to boost agricultural exports. These comprise of both general and commodity specific measures that may be urgently taken and at little to no financial cost. The subsequent gains, however, are aplenty.

Infrastructure and logistics - Presence of robust infrastructure is critical component of a strong agricultural value chain. This involves pre-harvest and post-harvest handling facilities, storage & distribution, processing facilities, roads and world class exit point infrastructure at ports facilitating swift trade. Mega Food Parks, state-of-the-art testing laboratories and Integrated Cold Chains are the fundamentals on which India can increase its agricultural exports. Given the perishable nature and stringent import standards for most of the food products, efficient and time-sensitive handling is extremely vital to agricultural commodities

Holistic approach to boost exports - Agricultural exports are determined by supply side factors, food security, processing facilities, infrastructure bottlenecks and several regulations. This involves multiple ministries and state departments. Strategic and operational synergy across ministries will be key to boosting productivity and quality.

Greater involvement of State Governments in Agriculture Exports

Operational Recommendations

Focus on Clusters : There is a need to evolve and put in place institutional mechanism for effective involvement and engagement of small and medium farmers for entire value chain as group enterprise(s) within cluster of villages at the block level for select produce(s). This will help to realize actual benefit and empowerment of farming community to double their income through entire value chain

- Promoting value added exports

- Product development for indigenous commodities and value addition
- Promote value added organic exports
- Promotion of R&D activities for new product Development for the upcoming markets
- Skill development
- Marketing and promotion of "Brand India"
- Attract private investments in export oriented activities and infrastructure.
- Establishment of Strong Quality Regimen

Research and Development - Agricultural research and development (R&D) led by private industry along with higher infrastructure spend by the government will be the key to boosting agricultural exports.
Miscellaneous - Creation of Agri-start-up fund: Entrepreneurs are to be supported to start a new venture in Agri products exports during their initial period of establishment.