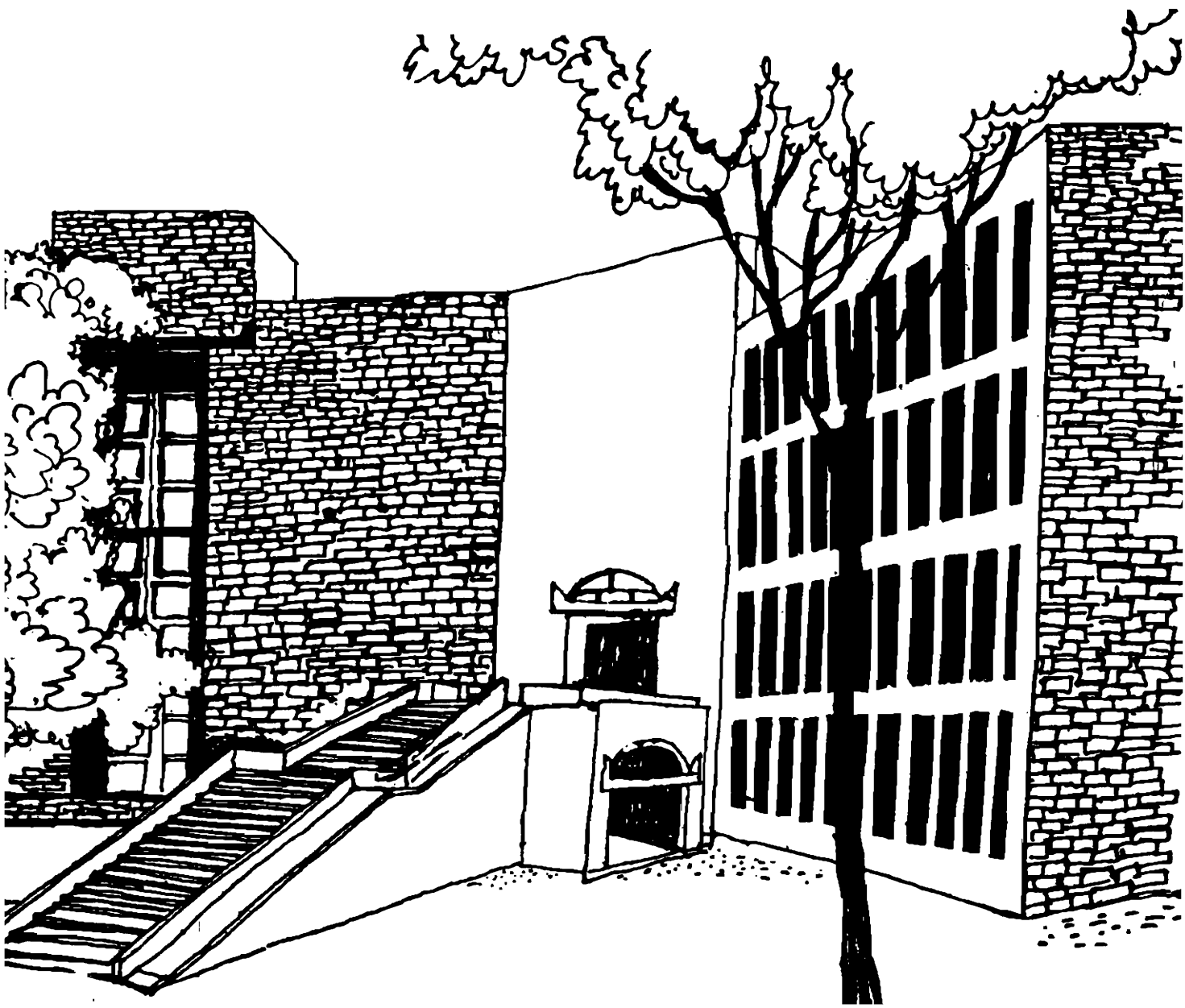
विद्याविनियोगाद्विकासः
IIM
AHMEDABAD

Working Paper



MACRO ECONOMIC THEORY AND POLICY: A PERSPECTIVE

By

G.S. Gupta

W.P. No.1356
March 1997

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD - 380 015
INDIA

Macro Economic Theory and Policy: A Perspective*

G.S. Gupta
Indian Institute of Management, Ahmedabad

I. Introduction

1. Macro economics is concerned with the behaviour of the entire economy. An economy's behaviour, in turn, is determined by the behaviour of its constituents, viz. individual households, firms and governments, which is the subject matter of micro economies. Thus, micro economics together with the theory of aggregation, provides the foundation of macro economics. It is now being increasingly realized that the behaviour of the entire economy and of its individual agents are highly interdependent and accordingly the Ragnar Frisch's distinction between micro and macro economics is getting blurred over time. However, the scope of macro economics could still be delineated to include the following:

- Measurement of national aggregates (macro variables) like, national income, saving, investment, general (macro) price, unemployment, poverty, income distribution, money supply, interest rate, bank credit, exports, imports, balance of payments imbalance, and public debt.
- Determination, fluctuations and growth of macro economic variables.
- Designing and implementation of stabilization policies, viz. fiscal and monetary policies.

---

* The paper was presented as an invited key paper at the conference of the Gujarat Economic Association held in Bhavnagar, Gujarat during February 22-23, 1997.

- Formulation and execution of government's regulating policies pertaining to various economic sectors, such as agriculture, industry, foreign trade, capital market, infrastructure and public sector, and various factors, such as foreign capital, foreign exchange and labour.

II. Measurement

2. Fairly good methodologies have been developed and applied to measure various macro magnitudes, and these have been adopted universally by most countries. However, since countries do differ in terms of the relative sizes of the unorganised sector, non-market economy, illegal practices, etc., the data are subject to varying degrees of inaccuracy, under-estimation and black economy, rendering them uncomparable across countries. Further, the price level as well as the inflation rate varies from country to country and so the nominal data standardized through the corresponding exchange rate do not provide an accurate picture for the purpose of country-wise comparisons. The later limitation has been overcome in the last decade through the compilation and publication of country-wise data on the purchasing power parity (PPP) basis. Inspite of all these developments, there are still problems such as:

- A few variables are still not measured on a standard basis through out the world. For example, imports are measured on CIF (cost, insurance and freight) basis in India, while most countries measure them on FOB (free on board) basis. Poverty line is very crudly defined in India (calories basis), and its definition varies significantly across most countries. At present, the nominal poverty line of India stands at about one-seventh of that of the world standard (US dollar one per day). Similarly, the unemployment data are not comparable across countries due to problems of its measurement.

- While data on financial sector variables are usually available with a little time lag in most countries, there are significant time lag differences in the availability of data on magnitudes of the real sector across countries.

III. Determination

3. Aggregate demand (AD) and aggregate supply (AS) determine the national income and general (macro) price, both of which are influenced by many factors, including government. The classical economists believed in the full employment of resources (labour and capital) and accordingly they accorded only a passive role to the demand: "supply creates its own demand" (Say's law). The experience of 1930s (Great Depression and consequent huge unemployment) provided enough proof for the possibility of unemployment and that led Lord James Maynard Keynes (1936) to promote the theory of under-employment equilibrium. Under this theory, demand plays the active role and supply is assumed to match demand at a constant price. The Hicks' IS-LM model for determining the income and interest rate was popular until the 1960s. The findings of the Phillips curve, indicating a trade-off between inflation and unemployment, provided a menu to the policy makers, from which they could choose any combination of these two variables through the use of demand management policies. This theory was challenged by the experience of the late 1960s when the economies faced increasing inflation without a corresponding reduction in the rate of unemployment. Milton Friedman and Edmund Phelps provided on explanation to this phenomenon through their discovery of the "expectations augmented Phillips curve", which is downward sloping in the short-run and vertical at the "natural rate of unemployment" in the long-run. This caused the aggregate supply curve depended (negatively) on the expected inflation. Under this theory, the demand management policies are effective in reducing unemployment until it hits the "natural" rate, beyond which expansion in demand is to lead to increase in inflation without a decrease in unemployment. The OPEC crisis of 1970s triggered stagflation, rendering demand management policies superficial in checking either unemployment or inflation without

worsening the other. This led to the revival of the supply side (Laffer curve) economics and the theory of rational expectation, also known as the New classical Economics (Robert Lucas, Thomas Sargent, et al).

In the contemporary world, both demand and supply are supposed to play significant role in the determination of income and price, among other magnitudes. Demand management policies are incapable of curing stagflation. An increase in demand through either easy monetary policy and/or easy fiscal policy (accommodating policy) would cure unemployment but at the cost of accelerating inflation and a decrease in demand through tight monetary and/or fiscal policy (extinguishing policy) would check inflation but at the cost of increasing unemployment. Under such a policy, only increase in supply would be able to attack both inflation and unemployment simultaneously. This is why supply side economics was revived when OPEC crisis caused stagflation. Rational expectations theory suggests that people form their expectations on the basis of full information rather than on merely past data (adaptive expectations) and accordingly it argues that the AD and AS curves incorporate all expected changes in policy variables. In consequence, it is only the unexpected changes in policy parameters which significantly tamper the AD and/or AS curve and thereby influence real magnitudes.

4. Aggregate demand has four components:

- Private (households) consumption expenditure
- Investment (private and public) expenditure
- Government consumption (current) expenditure
- Foreign expenditure (exports minus imports)

Various theories have been developed to explain each of these variables. For example, we have Keynes' theory of "absolute income hypothesis", Duesenberry - Modigliani's theory of "relative income hypothesis", Milton Friedman's theory of "permanent income hypothesis" and Pigon's "real balance effect" for consumption function. Similarly, there are theories of investment which suggest change in production or profit as the scale variable and interest rate as the price variable, and a partial adjustment model, among some other variables, such as the funds' availability and real balances. Government consumption is a need and policy variable. Exports and imports are explained through world/domestic income, relative (domestic versus international) prices and trade policy parameters. Interest rate is further explained through the demand for and supply of money, the former being determined by income, interest rate and inflation rate, and the latter by the high-powered money (largely a policy variable) and interest rate. Combining all these behavioural functions with the economic identity (income = expenditure) yields the aggregate demand (AD) function of the following type:

$$Y = f\left[C_o, I_o, M_o, c, e_{Ii}, e_{Li}, m, Y_w, P_w, G, t, H, F, P \right]$$

$$f_1, f_2, f_4, f_6, f_8, f_9, f_{10}, f_{12}, > 0 > f_3, f_5, f_7, f_{11}, f_{13}, f_{14}$$

. . . . (1)

The above function indicates that the demand for all goods and services which equals real income (Y) moves directly with

- autonomous consumption (C_o)
- autonomous investment (I_o)
- marginal propensity to consume (c)
- interest elasticity of money demand (e_{Li})

- world real income (Y_w)
- world price (P_w)
- government consumption expenditure (G), and
- high-powered (also called government) money (H),

and inversely with

- autonomous import (M_o)
- interest elasticity of investment (e_{Ii})
- marginal propensity to import (m)
- tax rate (t)
- foreign trade regulations (F), and
- price (domestic) level (P)

The above is a static function. If dynamic elements are introduced in the system, a few lagged values of some of the above variables will also appear as the determinants of the current income. It must be emphasized here that in the two dimensional diagram of income and price, the AD curve will be a downward sloping one, and it will be so for two reasons:

(a) Real balance effect: As price falls, real balances (magnitudes of financial balances adjusted for price changes) increase, which, in turn, causes induced consumption and investment expenditure to rise, which lead to increase in income.

(b) Interest rate effect: As price falls, real money balances rise, which, in turn, causes money demand and thereby interest rate to fall, leading to increase in induced investment, and through that to increase in aggregate demand and consequently in income.

While C_o, I_o, M_o, Y_w, P_w and G would merely influence the position (intercept) of the AD curve, all other variables in function (1) would affect both the position as well as the slope of this curve.

5. Aggregate supply is normally divided into two components:

- Production of commodities
- Production of services

The former includes both agricultural and industrial products, and the latter all kinds of services, including transport, communication, banking, insurance, public administration, defence, etc. Unlike the components of aggregate demand, which are influenced by separate set of variables, the two components of aggregate supply are determined by the same set of variables, though they may have differential effects. Accordingly, the aggregate supply (AS) is explained in aggregate instead of through separate components.

Aggregate supply or total production (= total demand = total real income Y) is determined by the quantity and productivity of resources employed in the production system, besides being influenced by weather and industrial environment in the economy. These resources are classified into human (labour: L) and non-human (capital: K) resources, where the former includes all kinds of labour as well as entrepreneurs, and the latter consists of all physical capital, be it natural (land) or human made (capital: structures, equipments and inventories).

Employment of a resource has two determinants: its stock and the proportion of the stock employed. The stock of labour consists of the whole population (N) while that of the capital, the total availability of structures, equipments and inventories (K). The proportion of population that is employed at any given period (λ_1) is governed by the age profile of population, sex ratio, health, working hours' norms, child labour, retirement age, minimum

wage regulations, wage rate, and direct tax (personal and corporate) rates, among other factors. The proportion of capital that is employed (λ_2) depends on the finished vis-a-vis unfinished capital (viz. structures under construction, equipments under production, transition and installations, factories waiting for essentials like power supply, government clearance, etc. and those under litigation, idle inventories, etc. - these do not contribute to current production), cost of capital [capital rental (P_k) raw-materials prices (P_r), cost of infrastructure (P_i), etc.], and returns on capital (output price) , both current (P) and expected (P^*). Interest rate is a component of capital cost, which is determined by the demand for and supply of funds, and thence on income (Y) and high-powered money (H).

Productivity of labour is a function of the sincerity (S), health (h), education/training (E) of the labour, rewards and punishments system (wage rate: W), working conditions, availability and cost of complimentary resources, etc. Productivity of capital varies with the level of technology (T), its maintenance and the quality of labour.

Weather (W) is an important determinant of agricultural production and it is usually measured by rainfall. While a good rainfall is beneficial to crop, too much of it is harmful as well. Industrial disputes harm production and it is often measured by the number of man hours lost due to trade unions' activities, strikes, lock outs, etc.

Thus, there are a host of factors which ultimately govern the aggregate supply. To include

only the significant ones and to put them succinctly, the aggregate supply function may be expressed as follows:

$$Y = F\left[N, K, S, h, E, T, W, P_R, P_I, t, H, R, D, P, P^* \right]$$

$$F_1, F_2, F_3, F_4, F_5, F_6, F_{11}, F_{12}, F_{14}, > o > F_7, F_8, F_9, F_{10}, F_{13}, F_{15}$$

.....(2)

The function postulates that the supply of all goods and services is a positive function of

- population (N)
- stock of capital (K)
- sincerity of the people (S)
- health of the people (h)
- education and training of the people (E)
- level of technology (T)
- stock of high-powered money (H)
- rainfall (R), and
- price level (P),

and is a negative function of

- wage rate (W)
- price of raw-materials (P_R)
- price of infrastructure (P_I)
- tax rate (t)
- industrial disputes (D), and
- expected price (P^*)

The stock of capital (natural as well as human-made) is no more a great constraint for increasing production, for it can be acquired (ofcourse at a price) and land yield could be improved substantially. The real limit to production comes from the qualitative factors, like education,health, motivation and life styles of the people (thriftiness, hard work, mobility, etc.). It is for this reason that the emphasis is shifting from economic growth to human

development. Also, the experience of successful economies indicate that the value addition is more in conception than execution, and that comparative advantage is derived more through design, branding and distribution than through manufacturing, which is relatively easy to copy.

The AS curve, in a two dimensional diagram, does not emanate from the origin because it costs to supply and accordingly there is a shut down price. Its slope is positive for three reasons:

(a) Profit incentive: As price increase, profit rise, which encourages firms to invest more, which tend to increase supply and thereby income

(b) Sticky money wages: Money wages are sticky due to long-term between firms and labour, and the presence of trade unions which will permit downward revision even in the presence of deflation.

(c) Money illusion: Workers are subject to money illusion and because of that when money wage rises due to inflation, even though real wage may have declined, they tend to supply more labour and, of course, firms demand more labour in the face of falling real wage. This result into increased employment and thereby increase in output and income.

6. National income and general price are determined by the interactions of the AD and AS functions. A solution of functions (1) and (2) for the endogenous variables Y and P would yield the desired result. The following results in this regard may be recalled:

(a) an increase in AD and/or in AS will always result into an increase in Y, and vice versa.

(b) a decrease in AD and/or an increase in AS will always cause a decrease in P, and vice versa.

(c) a simultaneous increase or decrease in both AD and AS produces an ambiguous effect on P.

(d) an opposite change in AD and AS leads to an ambiguous effect on Y.

Bearing these facts in mind, one can easily understand that the solution of functions (1) and (2) would yield income and price determination models such that all variables in these two functions but one (P) would be the determinants of each of the national income and general price, and that their directional effects would be as follows:

(a) An increase in real national income can be brought about through any one or more of the following means:

- increase in any one or more of the following parameters/variables:

  C_o, I_o, c, e_{Li}, Y_w, P_w, G, H

  N, K, S, h, E, T,

- decrease in any one or more of the following parameters/variables:

  M_o, e_{li}, m, t, F,

  W, P_R, P_I, P^*

(b) A decrease in general price can be ensured through any one or more of the following sources:

- decrease in any one or more of the following parameters/variables

  C_o, I_o, c, e_{Li}, Y_w, P_w, G, H

  N, K, S, h, E, T

- decrease in any one or more of the following parameters/variables

  M_o, e_{li}, m, t, F

  W, P_R, P_I, P^*

The effects of any other combinations of changes in these parameters/variables could not be judged a priori, it will depend on their relative degrees of changes and the corresponding multipliers.

It must be emphasized here that the above approach makes it amply clear that while the endowment of resources is useful for attaining high income levels, economic prosperity can also be achieved through sincerity and hard work, investment in human capital (health, education and training), thrift, and globalization, which are now recognized as the driving forces for success. It is the emphasis on these latter factors through which the Asian tigers have achieved their successes.

7. The values of the macro-economic variables other than real national income and price level will be determined at the intermediary steps in the process of the determination of income and price variables.

IV. Business Cycles and Growth

8. Fluctuations and growth in income and price are caused by changes in one or more of their determinants. The earlier debate on whether business cycles are real or monetary phenomenon is no more relevant, for either real or monetary magnitudes or both could be responsible for business cycles, either group could dominate the other, and the dominant group of factors could very well be different in different periods in a given country and for different countries during the same period. Though this is the true state of affairs, different schools emphasize different factors for cyclical fluctuations. The new classical economics

consider technological change, inter-temperal substitution of leisure and natural factors (floods, earthquakes, etc.) as the principal causes of business cylces, while the new Keynesian economics hypothesizes imperfect competition, menu cost and efficiency wages as the causal factors for cyclical fluctuations.

9. The one sector model of Harrod and Domar is often used to explain the rate of growth:

$$g = s/c \qquad \text{.... (3)}$$

where g = growth rate in real national income (%)

s = rate of savings (S/Y) (%)

c = incremental capital-output ratio (ICOR) ratio (number)

The model provides a fairly good explanation to the changes in year to year growth rates. This is because the other determinants of growth hardly change in short periods, and more importantly, their impact is contained in the saving rate and ICOR.

V. Stabilization Policies

10. Stabilization and regulating policies are effected to attain certain high level goals, like

- high and growing national income
- stable price
- social justice
- free from foreign dictation

It is now well known that these goals are often conflicting (Phillips and Kuznets' curves), and thus the policy makers need to prioritize them. Depending upon the priorities, policy makers design various policies to attain their stated or otherwise goals.

11. There has been a lot of debate in the literature with regard to the demand management policies, called stabilization policies. These include fiscal and monetary policies. The former concerns about the government revenue, expenditure and debt while the latter about the supply and cost of money, and credit. These policies supplement the automatic stabilizers (like taxation, subsidies and social security programmes) in helping the economy to revive when in recession and to check when inflation becomes unbearable. Their effectiveness hinges on the interest elasticities of investment and money demand. The fiscal policy is more effective with respect to real income the greater is the interest elasticity of money demand and lesser is the interest elasticity of investment, and quite the opposite is true for the effectiveness of monetary policy.

12. Money (including credit) is now considered as a factor of production and the interest rate is, of course, a determinant of investment. Thus, "money" and accordingly monetary policy matters not only with regard to inflation but also output so long as it is below its full employment level. However, the significance of monetary policy is undermined due to the following two factors:

(a) Time lag: Milton Friedman has argued that monetary policy suffers from two kinds of lags, viz. inside and outside lags, and that these lags are long and variable, and hence impinge on the effectiveness of monetary policy. To remedy this problem, Friedman has suggested the rule-based policy, under which money supply must be increased at a pre-determined rate year after year. The critics of this policy, however,

have argued that the policy will then cease to be a stabilization one, which presupposes a discretionary policy.

(b) Deficit financing: Budget deficit, which equals excess of government expenditure over its revenue (including borrowings) is financed through issue of adhoc treasury bills to the country's central bank, which leads to increase in currency, and thus money supply. Since the decision on budget deficit is taken by the finance ministry, the central bank looses its control on money supply, which, in turn, makes monetary policy subordinate to fiscal policy. To minimise this problem, some understanding has been reached between the finance ministry and Reserve Bank of India.

A developing economy needs growing supply of money. This is needed partly to finance monetization and partly to meet the growing demand for money. The former is small, and the latter is given by the multiple of the rate of growth in real income and the income elasticity of demand for money. Income elasticity is quite stable at around 1.5 (for broad money: M_2) and thus a 7% growth rate in the economy should need about 12% growth rate in broad money to have a zero rate of inflation. A growth rate in money supply of less than 12% would harm production and thus lead to unemployment, while that of more than 12% would cause inflation.

Since money supply directly affects the price level, it has been argued that monetary policy could be entrusted with the primary task of price stability, leaving other goals as the primary tasks of fiscal policy. This is what the monetary authorities in India have been suggesting for last several years. However, if people form their price expectations rationally (using all the available information) rather than adaptably (using past data only), then it is argued that unexpected changes in money supply/high-powered money alone exercise some influence on real magnitudes. Under such a situation, monetary targeting would render monetary policy superficial.

13. Some government has always been considered essential as well as supportive for growth and stability even by stunt supporters of laissez-faire. The undisputed activities for government thus include maintenance of law and order, and defence. To these most people will add provision of some education and health services, and role in infrastructure development. Inclusion of other services and commercial activities has been under debate, and lately the consensus is in favour of curtailment, if not deletion. Also, the current is towards reduction of government deficits and debts. On the revenue side also, there is an all round reduction in both direct and indirect taxes through out the world. These developments would lead to weakening of the role of fiscal policy.

Government expenditure has always been regarded as to crowding out the private expenditure, particularly through increase in interest rate. Further, if government expenditure is financed through borrowing from public, the private investment would be reduced and this would add to the crowding out effect. However, it is now being argued that if government expenditure is directed towards the development of infrastructure, it would lead to crowding in of private investment, through making the latter more profitable.

Fiscal policy influences the economy directly. Government expenditure is a component of aggregate demand and so an increase in it pushes up the demand, and hence the national income and price level. The investment part of this expenditure causes aggregate supply to increase, which reinforces the income but affect the price in the opposite direction. The financing of this expenditure may neutralise these effects partly or fully, depending upon the method of financing it. The neutralization will be less atleast in the short-run the more is the

government expenditure financial through borrowing from abroad or printing money than through public borrowing or taxation, in that order.

While indirect taxes distorts resource allocation, direct taxes cuts resource use. They, of course, have good consequences as well, for they can be discriminatory and thereby help curb inequalities. The direct taxes cause adverse effects on work efforts and savings, and accordingly a cut in them is very much emphasized these days, particularly by supply side economics.

VI. Regulating Policies

14. Regulating (supply management) policies pertaining to various sectors affect the use and distribution of resources across sectors, and since resources' productivities vary from sector to sector, they exert influence on the overall productivity of resources, and thereby on the national income and price. For example, the policy pertaining to the dilution of the role of public sector (de-reservation, privatization) would entail replacement of public investment by private investment, and if the latter is more efficient than the former, it would lead to improvement in overall resource productivity and thence in national income. Similarly, liberalization of foreign trade and foreign exchange would cut trade barriers, and thereby encourage exports and imports, which, in turn, would enhance specialisation and thereby resource productivity, and hence national income. Reforms in capital market brings new instruments for raising and investment of funds, reduce transactions cost as well as cost of capital, and improve the availability of credit for business, among other things, and thereby contribute to growth in national income. Policies favouring agriculture, like subsidies to

fertilizer and food, differential electricity tariff structure, priority lending, tax shied of agricultural income, etc. tend to divert resources from non-agriculture sector to the agriculture sector, and through this they affect resource productivity, perhaps negatively ! We may hasten to add that some such policies have good distribution effects. Policies pertaining to controlling the size of enterprises, like MRTP Act, prohibits large scale expansion and thereby forbids firms to reap benefits through economies of scale, which adversely affect national income, though it may be good on the equity ground. Policies favouring infrastructure development tends to move resources from the "other" sectors to infrastructure sector, and since the latter have, in general, a longer gestation period than the former, the short-run growth is sacrificed for long-term one. However, infrastructure development facilitates production of "other" sectors and reduce the cost of production across all production sectors, and thence tends to raise national output.

Since early 1980s, there is a good deal of de-regulation through out the world. Most countries have achieved good success through this programme. However, some regulation would have to remain, partly to give the direction, and partly to catch the guilty and foster equity. Thus, there is a paradox of equity : less government intervention is associated with less equity.

VII. Conclusions

15. Government exists everywhere and it is there to stay. It is perhaps more in most countries and less in a few economies. Since it alone could run some institutions (like judiciary, police, defence, etc.) and supply the currency, it will have to have some taxation.

These, in turn, influence income and price, among other factors. Thus economic policies, which deal with currency supply, government expenditure and taxes, have a role to play in any society. Similarly, the private sector must be regulated and accordingly some regulating policies are indispensable. Furthermore, these policies are capable of influencing the high level goals in the desired direction and magnitudes, provided these could be conceived and executed independently by the policy makers. The factors responsible for their poor effectiveness include the following:

- lack of consensus among policy makers with regard to clear articulation of high level goals
- politics and bureaucracy in formulating and implementing well defined policies
- uncertain/unstable policy multipliers/elasticities
- long and variable time lags in policy effects
- cost of policies, such as loss of votes and/or bribes.

These costs appear to be higher in developing economies based on parliamentary system of democracy (like India) than in developed economies based on presidential form of government (like USA). It is because of these factors that while policies have been fairly effective in some economies they have remained undependable in some other countries.

To conclude, theory is ever developing and the present theory will remain valid only until it serves to explain the current events. The day it fails to explain the current phenomena, it will be replaced by a new theory. Similarly, meaningful policies can be designed and implemented only if the policy-makers are clear about their objectives, for appropriate policy varies from objective to objective.

References

1. Akerlof, G.A. et.al (1996): The Macro economics of Low Inflation, Brookings Papers on Eco. Activity, No. 1, pp. 1-75.

2. Bhagwati, J. (1994): India in Transition: Freeing the Economy, Delhi, Oxford Univ. Press (108 pages).

3. Friedman, B.M. and Kuttner, K.N. (1992): Money, Income Prices and Interest Rates, American Economic Review, 82, June, pp. 472-92.

4. Friedman, Milton (1953): The Methodology of Positive Economics, in Friedman M. (ed), Essays in Positive Economics, Chicago University Press.

5. Mankiw, N.G. (1990): A Quick Refresher Course in Macro-economics, Journal of Economic Literature, Vol.28, December, pp.1645-59.

6. Lucas, Robert E. (1996): Nobel Lecture: Monetary Neutrality, Journal of Political Economy, Vol. 104, No.4, pp. 661-82.

7. Patel, I.G. (1984): Economy Theory and Economic Policy: Some Reflections in the Indian Context, in .... ed.: Development Perspectives, Delhi, Institute of Economic Growth, pp. 41-59 (lecture delivered at IEG on May 14, '84).

8. Rotemberg, J.J. (1987): The New Keynesian Microfoundations, NBER Macroeconomics Annual, Vol.2, pp. 69-104.

9. Rodrik, Dani (1996): Understanding Economic Policy Reforms Journal of Economic Literature, Vol.34, No. (March) pp. 9-41.

10. Stein, Jerome L. (1982): Monetarist, Keynesian and New Classical Economics Oxford, Blackwell.

11. Tinbergen, Jan (1939): Business Cycles in the United States of America, 1919-1932, Geneva, League of Nations.