Trafficking in Drugs and Economic Theory

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To Almighty

न त्वहं कामये राज्यं न स्वर्गं नाऽपुनर्भवम् ।
कामये दुःखतप्तानां प्राणिनामार्तिनाशनम् ॥

I do not for a royal realm aspire,
For release or for paradise.
To serve those bent with grief I desire,
And calm their sorrows and help them rise.

1

INTRODUCTION

In developing economies like India which have embarked upon a path of planned economic development in the framework of a mixed economy, transactions of many commodities take place under black market conditions. Such illegal markets are quite extensively encountered in and around one's normal set of exchange activities. Thus, black markets relating to land, property, cement, sugar, petroleum products, foreign exchange, imported goods, licences and quotas are quite frequently encountered. Many of these markets are chronic in nature such as some brands of automobiles or land and property in certain locations. Many black markets are transitory in nature such as obtaining a berth in a train under pressure of demand. Some of these black markets may be marginally important while others may be quite serious in their implications such as drug trafficking.

Economists have given very limited attention to analysing the nature of transactions in black markets although the analysis of markets in general has been one of their primary concerns. A number of studies are available of tax evasion and avoidance and on estimation of the amount of black money in the economy. The purpose of the present study is, however, not a study of the size of the parallel economy. Rather, attention is paid to the genesis, the transactions and the implications of illegal or black markets as such. In this context, only a few studies have been made in the literature in terms either of

analytical models or empirical studies. There are, however, some studies directly dealing with black markets. It will be seen here that there is also a body of literature in economics, namely, analysis of disequilibrium markets that can be utilised for the purpose of understanding black market operations.

The classical economic theory advocated the doctrine of *Laissez faire* which provided a framework in which economic controls brought about by the governments had little role to play. Under conditions of competitive markets and non-interference by the governments, the neoclassical theories built up a framework which highlighted the efficiency of the market mechanism. The assumptions in these theories, like perfect competition among buyers and among sellers in factor as well as product markets are such assumptions that do not hold good in the real world economics. Imperfections of market and the nature of income distribution which results from the market economy was socially unacceptable. Governments came forward to reallocate resources bringing out a series of price and distribution controls. While in the Western economies, market mechanism had an acceptable place, centrally planned economics looked at the role of markets and prices differently. In these countries, economic activities have been largely in the hands of central authorities and prices are used only as transaction and subsidy/taxation devices.

In many third world countries, the role of prices was considered on a somewhat different wavelength. Being newly independent, the governments of these countries did not trust the capabilities of the market mechanism as adequate for leading them to the coveted goals of removal of poverty, social justice and rapid industrial development. They opted for economic planning in a mixed economy framework. Planning in these countries had dual objectives : first, to direct the economy towards the desired goals and secondly, to operate systems of controls for resource allocation and social justice by stepping up investment and growth rates.

Unlike a centrally planned economy where the market exists in a very limited and constrained way, controls in a mixed economy have to operate through the market.

1.1 Interventions in the Market Mechanisms

The free and unhindered working of the market mechanism under such idealistic conditions as were put forward by the neoclassical economists and conditions of non-interference by governments is not available in practice because of informational failures and market rigidities which are present even if the governments choose not to intervene. But, in addition, and some times because of the market imperfections, governments do intervene quite frequently in the free working of the market forces. Such intervention is brought about by a large variety of economic controls which range from price controls of various forms such as fixation of prices, minimum support prices, tariffs and quantity controls such as fixation of quotas and rationing.

The underlying idea of rationing is not new. It can be found in Hicks' writings under the label 'temporary equilibrium.' Recent mathematical researches on temporary equilibrium with quantity rationing has been greatly influenced by the reappraisal of the Keynesian theoretical framework undertaken by Clower (1965), Leijouhnfuvd (1968), Patinkin (1965) and more recently by Barrow and Grossman (1971). Some of the first systematic treatments of this concept in a general equilibrium framework were given by Glustoff (1968), Youne's (1970a, 1975), Dréze. (1975) and Benassy (1973). In these studies, in addition to the price system, quantitative constraints on trade, as perceived by agents, play a crucial role. According to Kornai (1980b) in the case of shortages, the selection criterion in rationing is of non-price type. It may be like urgent need, merit, family background, social status, political conduct, personal links with the allocator, return of favours and corruption. There is no society, according to Kornai (1980b), where these criteria of selection do not operate at all.

The main objectives of market intervention could be classified into two broad categories, namely, consumption constraining and profit constraining. Controls such as restrictions on the transactions of drugs in which case the quantity control is on the extreme amounting to near prohibition is a consumption restricting control. Fixation of prices of basic commodities would on the other hand be a

control brought about for ensuring that undue profits are not made under conditions of shortage and consumers are protected. Myrdal (1968) has provided a classification of various types of controls as positive and negative controls. Positive controls are those which encourage economic activities while negative controls liimit or even prohibit some of the economic activities. Negative controls are classified further into discretionary and non-discretionary controls.

Many a times controls are brought about for ensuring quality of products which is done by legally specifying standard and specification details.

1.2 Economic Regulation and Genesis of Black Markets

Once the sale and /or purchase of a commodity is restricted by quantity and /or price restriction, some methods have to be evolved for clearing the markets as the prices are unable to play their market clearing role by upward or downward adjustments. The result of a quantity restriction such as a quota without a price restriction would lead to consumers bidding for higher prices and the price would settle on a level much higher than would otherwise be the case forcing all those consumers who are unable to pay such a price to go without the good. Such a policy may be followed when the objective is to limit consumption or purchase of a certain good. At other times, price restrictions may be brought about along with quantity restrictions. This is usually the case when a commodity of common use is in short supply and an unrestricted market is likely to lead to prices far higher than the corresponding costs of production and the consumers need protection. It may also be the objective that an equitable distribution is ensured among the potential consumers.

A diagramatic representation in a partial equilibrium framework would help identify the implications of such a market situation. In Figure 1.1, the usual demand curve is drawn along with a supply curve which is a vertical line indicating a market situation of fixed supply. If price is restricted at a level P* which is below the market clearing level, the number of buyers would exceed the supply at this price (OB > OA). Therefore, some mechanism would be needed in order to

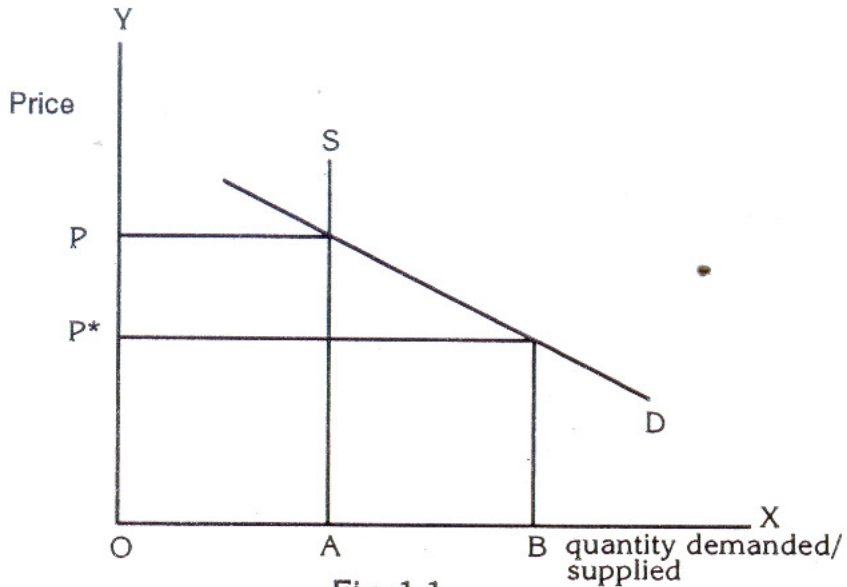

Fig. 1.1

allocate the available supply among the potential buyers who are all willing to pay the restricted price OP*.

A possible scheme in such a case would be rationing according to some norms which may lead each potential buyer to adjust his demand to a reduced level consistent with the norms applicable to him. As an example, if all individuals are treated equally they will all have to reduce their demand by a proportion OA/OB. If rationing is done on the basis of family size or other indicators, the adjustment in demand may be different for different persons. Since there are persons in the range OA who are willing to pay a higher price than OP*, they may be willing to pay a premium for an allocation higher than legally allocated to them if it is possible for them to find a way of bypassing the restriction of the rationing mechanism. As a result of this, a black market would emerge.

When rationing is resorted, all the claimants of the rationed commodity are divided into two groups, – those who get an allocation and those who do not. If $\{1,2, \ldots r \ldots n; n+1, n+2 \ldots i \ldots m\}$ is a set of claimants, where n claimants receive the ration and $(n+1, n+2 \ldots i \ldots m)$ do not and there is a

nominal price p(nom.) fixed by the rationing authority such that $d(p) > p$(nom.), for those who receive the ration, there will be a consumer's surplus, say $G(R)$, which is a social contribution to them.

On the other hand, $(n+1, n+2, \ldots m)$, i.e. those who did not receive the ration will incur a 'consumer's loss,say $H(R)$, which is of importance from two points of view, viz.,

(i) it is an important indicator of shortage, and

(ii) it reflects the latent pressure on the market of the good in question.

Claimants deprived of ration would be willing to spend the amount $H(R)$ for acquiring the commodity. This forms one of the basis of the generation of black markets.

Realising the potential of the illegal transactions, the regulatory authority need to have a surveillance machinery to ensure that the imposed restrictions are effectively implemented.

The condition of fixed supply is an extreme one. There may be other situations where the period of time is sufficient to permit an upward sloping supply curve indicating responses to price variations. In this case if prices are regulated below the market clearing price, once again there will be an excess demand providing the basis for the generation of black markets. It is often the case that when there is a periodicity in the supply such as in the production of automobiles where there may be daily, weekly or monthly despatches or as in the case of trains where there is a daily or weekly service between two destinations, the appropriate regulatory mechanism may be queueing. In many of thses cases, the goods are not divisible such that beyond the unit of supply, adjustments may not be possible. Once again there would be persons who are not willing to wait and who would be willing to pay a price for jumping the queue. Once again there would be a situation which could lead to the generation of black markets.

In case a black market is created, it would have an impact on the behaviour of sellers as well as the buyers. Conceptually one could think of at least three markets in such

a situation, namely, a parent market that would have existed in the absence of economic regulation, a legal market in which allocation is done according to some regulatory rule and an illegal market in which allocation is done according to a black market price which involves a premium over the regulated price. The segmentation of the parent market into these two parts would lead to segmentation of the original demand and supply schedules which may respond to the black market premia in specific ways. Prof. Galbraith (1952) describes the general mechanism of creation and operation of black markets as follows :

> "If the price increase is arrested somehow, say, for example, by rationing or price control, then the action runs not only against the interests of the sellers but also of buyers, who are not able to satisfy all or substantially all of their wants at the fixed price. An incentive thus exists for the coalition on behalf of higher prices between sellers and at least some buyers. This coalition is based on an equally rational interpretation of individual self interest; on both sides of the market. The larger the gap between fixed and potential price (equilibrium price if goods are available in the free market), of a particular commodity ... the greater the price elasticity of demand, the greater the proportion of all buyers who will be potential members of coalition ... while technically it is possible in such ... market to ration their customers at the fixed price, it is not their (seller's) most profitable course of action. The more profitable course, the sanction aside, is to raise the price and break the law ...
>
> In every day language, small black markets reflecting the price which sellers can get and buyers are willing to pay rather than to do without, will become a larger black market and eventually, it will become the only market."

It is clear that the genesis of black markets lies in shortage in relation to pressures of demand which may be created by regulation and by imposing other restrictions. In an economy, and in a particular circumstance, law may permit trading of some goods and prohibit some others. There are prohibitions in every system, even in the most free market countries. In these cases, either there is a strict imposition of prescription, the breaking of which imply a black market or if

they are not so strictly imposed, it may lead to the formation of, what Kornai (1980b) has called, 'grey markets'.

1.3 Administering Economic Regulation and Surveillance Mechanism

Since there is a clear incentive for potential buyers who are willing to pay a price higher than the regulated price for jumping the queue and /or augmenting their legal allocations in controlled markets, provided an alternative transaction channel existed, and since there is a clear incentive for the sellers to take advantage of the premium in the alternative channel, such an alternative is bound to be created unless there is a mechanism for administering the regulation and keeping surveillance over the threat of illegal transactions to the system.

If this machinery was to be fully effective there would not be illegal transactions. In other words, apart from shortages and the presence of consumption restricting conditions and economic intervention, a less than hundred per cent surveillance mechanism is a precondition for the existence of black markets.

It is always open to the policy maker, in principle, to eliminate or reduce the extent of black market transactions by revising the relevant legal provisions and by consequent restructuring of the market in which legal competition is increased. Such possibilities ought to be examined especially in illegal economic activities in which the efficiency of law enforcement is very low.

1.4 Range of Black Markets

All illegal markets are black markets. Wherever transactions take place for a 'consideration' in an illegal manner, black markets would be created. However, in terms of the 'seriousness' of the nature of illegal transactions in the eyes of law, they may be quite different from activity to activity. In this sense, on one extreme are pure black markets which are characterised by many allied criminal activities. Most activities in what is considered as the 'economic underworld' would fall in this category. There are other activities which are closer to the legal

world in which the transaction although illegal, may not be viewed with the same degree of seriousness. In such markets the interrelationship between legal and illegal markets is far closer. Under the title of 'black markets' Schelling (1967) notes the following :

> "A large part of organised crime is the selling of commodities and services contrary to law. In what we usually consider the underworld this includes dope, prostitution, gambling, liquor (under prohibition), abortions, pornography, and contraband or stolen goods. Most of these are consumer goods.
>
> In what is not usually considered the underworld, black markets include gold, contraceptives in some states, rationed commodities and coupons in war time, loans and rentals above controlled prices, theater tickets in New York, and a good many similar commodities that, though not illegal per se, are handled outside legitimate markets or diverted from subsidized uses."

1.5 Market Structures in Illegal Economic Activities

Just as there are organised crimes in general, economic illegal activities also become subject to organised operations specially on the seller's side. In the economic underworld, as it were, there could be a variety of market structures ranging from strong competition among sellers to monopolies or monopolistic competition or oligopolies. When potential profits are very high, there is a tendency for monopolies to develop. Many a times extra economic or criminal means are used to sustain such monopolies. Schelling (1967) defines 'criminal monopoly' as meaning :

> "... the use of criminal means to destroy competition whether a competitor is actually destroyed or merely threatened with violence, the objective is to get protection from competition ... when it cannot be legally achieved (through price wars, control of patents, or preclusive contracts)."

He further argues that in some sense each black marketeer could be interpreted as a monopolist since the law itself gives him protection from all participants who would have otherwise participated in the black markets if the relevant regulatory or prohibitory law did not exist. Thus, Schelling (1967) observes :

> "Any unsuccessful black marketeer enjoys a 'protected' market

> the way a domestic industry is protected by a tariff. The black marketeer gets protection form the law against all competitors unwilling to pursue a criminal career. But there is a difference between a 'protected industry' and a 'monopolized industry'. Abortion is a black market commodity but not a monopoly, a labour racket is a local monopoly but not a black market one, a monopoly in dope has both elements - it is a black market monopoly."

When restraints on trade lead not to single firm monopolies but to collusive price fixing it gives rise to cartels.

In a perverse sense, it can even be argued that monopolies or cartels leading to high prices, considered as a 'bad' or undesirable feature of legal markets, may be a desirable feature of black markets which are consumption restricting. This is in some sense two negatives making a positive because in this case the high prices lead to restriction of the extent of the black markets. Thus Buchanan (1973) observes :

> "Monopoly in the sale of ordinary goods and services is socially ineficient because it restricts output or supply. The monopolist uses restriction as the means to increase market price which , in turn, provides a possible source of monopoly profit. This elementary argument provides the foundation for collective or governmental efforts to enforce competition. Somewhat surprisingly, the elementary argument has rarely been turned on its head. If monoply in the supply of "goods" is socially undesirable, monopoly in the supply of 'bads' should be socially desirable, precisely because of the output restriction."

Buchanan (1973), however, cites a number of possible objections to such monopolization of illegal activities which range form distributional objections to those arising form interdependence among several illegal activities.

However, all black market scenarios do not readily lend themselves to formation of a monopoly or cartels or to centralised organizations. Many black market activities may have a large number of sellers competiting amongst themselves. It is an interesting question by itself as to what are the conditions under which some black market activities become organized and monopolised while others are characterised by a fair degree of competition.

1.6 Interlinked Structures of Black Markets

In the presence of conditions characterised by extensive interventions across the spectrum of economic activities such as systems of tariffs, quotas and licences, and economy-wide shortages in many goods, many black markets would come to exist simultaneously. In view of the illegal activities that are involved, there may be many persons and organizations specially on the supplier's side who may be operating in different black markets simultaneously. Due to interlinkages in productive activities and sales of inputs in black markets, different black markets may get interlinked. Thus in order to take advantage of a certain premium in a consumer good market the suppliers may respond by increasing the output for which they have to enter as buyers in another black market relating to the required input. Thus, A system characterised by extensive controls would lead to an interlinked system of distortions which are associated with illegal activities. Such systems begin to reverberate with illegal activities,' market distortions, resultant inefficiencies, further shortages and additional controls.

1.7 Institutional Practices in Black Markets

In the case of such commodities where black markets tend to have a chronic or long term existence, the channels of transactions, the interface with enforcement machinery and interrelationships among black marketeers tend to evolve specialised institutional practices over time. These practices develop rules of behaviour and understanding, well understood and accepted by the participants which include not only the buyers and the selleres but also personnnel of the enforcement machinery. Much of this becomes so accepted that such black markets are thoroughly integrated into the system coexisting side by side with the legal markets. It is for this reason that Schelling (1967) calls for a better understanding of the institutional practices in the economic underworld because these may lead to useful policy corrections. He observes :

> "Institutional practices in the underworld need to be better understood ... legal arrangements that make it difficult to disguise illegal transactions, and that make a punishable offense to pay tribute, might help to change the incentives. In a few cases, deliberate stimulation of competing enterprises could be in the public interest : loan-sharking for example, might be somewhat mitigated by the deliberate creation of new and specialised lending enterprises."

1.8 Black Markets and Parallel Economy

The profits made out form black market premia contribute to that part of the income in the country which is not declared for tax purpose. It therefore makes a direct entry into the parallel economy. A substantial part of these profits may go into real estates, commodity hoardings, gold speculations and smuggling. Some of it also goes into unorganized money markets in which high interest rates prevail, Much of the black income generated in black markets is utilised in furthering black market activities themselves. This may include speculative purchases of goods likely to be in shortage, 'cornering' of markets by controlling a large part of the supply and by participation in several black markets at the same time. A part of this money may also be devoted to 'buy out' surveillance authorities with a view to reducing the probability of effective punishment as well as the extent of penalties which may be associated with such activities.

In such black market set-ups, as those related to drugs, the profits are so huge that powerful drug syndicates with a large army of agents and racketeers are sustained on the accumulated profits. In the context of the modern world economy, international drug syndicates may be so powerful as to even control and influence policy making, at least in small countries. Even in large countries, much of the black market money may flow into political funds leading to an endogenization of policy making as well as its execution in relation to black marketing. There are many secondary crime activities which may be quite serious in nature which are sustained by income generated in the black markets.

A vertical structure of black market activities can easily develop in economies characterised by extensive controls with a weak or compromised surveillance machinery. In such systems organised crimes operate hand in hand often controlled by apex syndicates.

Huge incomes generated in such activities remain part of the parallel economy. Since black market incomes are undeclared, taxes are evaded not only for the 'premium' charged but often for the entire sale proceeds related to the illegal transactions.

1.9 Interface with the Legal Segments of the Economy

Even though black markets may tend to develop horizontal and vertical structures, they continue to have an important interface with the legal or the white economy. There are many channels through which some of the black market incomes are 'whitened.' Also, a portion of black incomes may be invested in such ways and avenues that would have a positive influence on output generation in legal markets. There may be many transactions which are partially legal and partially illegal. For example, many deals in land and property are registered so that by their very nature they have to belong to officially recorded transactions. Yet, part of the transaction may be undeclared, i.e. belonging to the black market while part of the transaction belongs to the legally sanctioned markets.

A schematic representation of the interface between black money, and markets and white money and markets is given in the following flow chart :

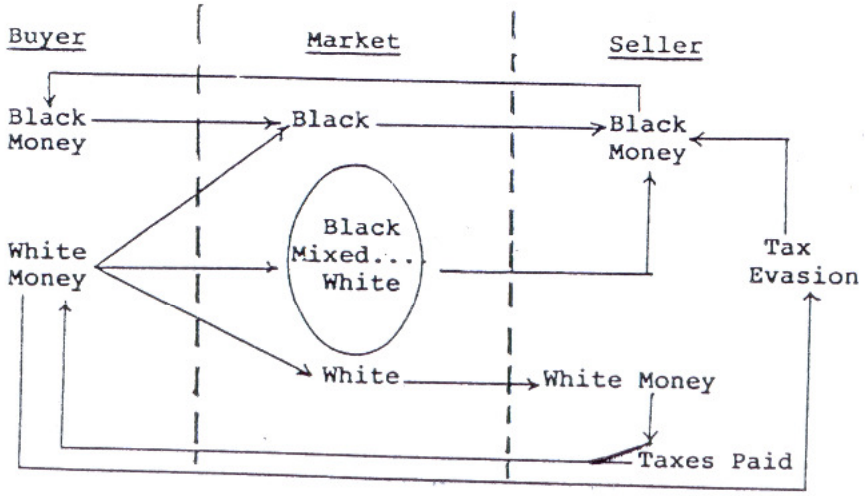

Fig. 1.2

1.10 Different Strands of Literature

As already pointed out, the availability of literature in economics dealing with illegal activities including black markets is rather limited. Still there are a number of strands of economic literature form which useful lessons can be drawn in order to help understand the mechanisms of black markets. In this context, three types of works could be useful for the present exercise. First, there is a body of literature which deals with the economics of black markets in a partial equilibrium framework of analysis. Secondly, a number of important studies have been devoted to analysing markets characterised by disequilibrium. The framework of such analyses is both partial as well as that of general interdependence. This body of literature could be adopted, although selectively, for purposes of analysing black markets which can also be viewed as markets in disequilibrium. Neither of these strands of literature, however, bring out the role of the law enforcement machinery in the context of black markets. There is, however, a third strand of literature dealing with the economics of crime in general. This could also be seen to have a relevance for the analysis of illegal economic activities in general and black markets in particular. Many of these studies are purely analytical in the sense that they offer conceptual frameworks form which certain messages emanate, some of them having policy implications. There are also some empirical studies specially in those areas where some data are available. In general, however, by the very nature of illegal activities empirical studies are constrained by data availability. As such very limited number of studies have been undertaken.

1.11 Trafficking in Drugs

It is difficult to develop something like a general theory of black markets because the analytical framework of such markets would differ form case to case depending on the nature of goods, the objective of intervention, the form and method of intervention and the framwork of related enforcement machinery. Therefore to draw some policy lessons and to provide an empirical context in which some of the theoretical constructs could be understood, it may be useful to adopt a case sutdy relating to the black market of some specific good. In the present exercise black

markets in drugs are used for this purpose.

Trafficking in drugs provides an example of black markets, the economics of which is both interesting and important and the illegal behaviour connected with it is considered to be socially and legally quite serious. The main motive for intervention in this market is a reduction or elemination of consumption of certain types of drugs. Such consumption is considered to be a social 'bad'. All marketing in such narcotic and psychotropic drugs is, however, not necessarily black. These drugs also have a number of medical uses and in small proportions they may also be a component of patent medicines, some of them even life saving ones. Therefore, there is a legal or licenced market for such drugs and licenced production of the base drugs is done in many countries. Thus there is an interface between a legal and an illegal market relating to the drugs which are being considered here. The restrictions on the trafficking of drugs are so severe that much competition among sellers is ruled out and the market gets into oligopolistic structures in which huge prices and profits prevail giving rise to a considerable amount of secondary crimes.

Although several aspects of the 'black' economy have been studied extensively in India and also internationally, studies relating to the creation, operation and implications of black markets are few and far between. In India, considerable attention has been given to the estimation of black money in the economy and the related problems of tax evasion and avoidance. The focus of the present study, however, is on black markets which provide an important segment of the parallel economy and need to be studied as distinct entities in their own right.

It was pointed out by Das Gupta (1950) more then some forty years ago that more work needs to be done in India in this context. He observed :

> "Not enough has yet been done, it appears, by our economists to analyse the affairs of black markets. We have had a lot of discussion concerning difficulties arising form the heterogenity of product within the same industry ... We have also been told about the possible failures of price control measures in the view of illegal transactions that 'shortage' would inevitably call forth. But the actual operation of the black markets, in spite of their wide prevalence have been left practically alone."

The situation has not changed much as far as Indian contributions to the subjcet are concerned. Although work done in some of the Western economies especially U.S.A as well as some of the erstwhile socialist economies do have a direct or an indirect bearing on the subject.

As already pointed out, literature relating to the studies of black markets have emanted from two streasm, viz.,

(i) analytical studies that deal with the impact of controls on demand and supply functions and resultant prices in fair and black markets; and ,

(ii) empirical studies reflecting specific commodity country contexts explaining the generation and implications of black markets.

Although Boulding (1948) was one of the first to offer an analytical partial equilibrium framework to study black markets. It is heartening to note that Prof. A.K. Das Gupta at Varanasi was one of the first Indians to anticipate the importance of this subject and to offer a formal framework of analysing black markets. Since then, a number of studies have come from abroad extending the original frameworks given in the Boulding-Das Gupta studies.

Empirical studies of black markets are constrained by limited, scattered and sketchy information sources because of the very nature of illegality of the transactions in black markets. Most studies available in the literature are based on interviews, secondary data obtained form police and legal surveillance authorities, micro studies of specific segments of the black markets, econometric estimations and parametric simulations of models. In the present work also, considerable attention has been paid to analytical modelling of various facets and features of black markets.

A general sketch of some of the improtant concepts involved in a study of the economics of black markets is

provided in the intoductory chapter. In chapter two, a summary of various analytical frameworks for the study of black markets in economic literature are presented. The issues addressed in these studies relate primarily to the question,

(i) how the 'parent' markets get segmented into the legal and black markets following intervention and how these markets can be cleared;

(ii) what will be the impact on prices, now that conceptually there are at least three prices - 'parent' market price, offical market price and black market price, and in case the black market is fragmented, there may be several black market prices;

(iii) what will be the impact on the demand and supply schedules; and,

(iv) what will be the impact on consumer welfare under alternative control mechanisms ?

Chapter 2 is divided into two parts. In the first part, framework based on partial equilibrium analysis are discussed. In the second part, shortage economies are considered as a whole. In the latter case, a market transaction is considered as a process which involves multistage decision making. It gives a more realistic picture and permits the intoduction of determinants which were either assumed away in the traditional economic theory or had to play a neglegible role. A survey of the contributions in this context is undertaken. Some of the important studies that have been discussed in Chapter 2 are those by Plumptre (1947), Boulding (1948), Bronfenbrener (1947) and Das Gupta (1950), Michaely (1954), Morishima (1967), Kornai (1980) and Teekens (1984).

In Chapter 3, Various approaches and explanations proposed in the economic literature for different adjustment processes that originate due to disequilibria in markets are surveyed and black markets are seen as special cases of disequilibrium markets, the relative roles of price and quantity adjustments, search costs, etc. are highlighted here. This chapter has two main sections.

In the first section the traditional general equilibrium

apporach is considered, while the second section deals with the adjustment processes in economies characterised by shortages. It is seen that in a shortage economy, aspirations of buying and selling agents continuously create 'tension' in the market and also create an environment for forced substitution. In the disequilibrium process, every time a new behaviour of economic agents may be encountered. The traditional approach, proves to be inadequate for analysing these situations and the more recent contributions especially those developed by Kornai (1980 a,b) are relatively more helpful.

Trafficking in drugs is adopted as a case study and its salient features are discussed in Chapter 4. Only narcotic and psychotropic substances are considered here as 'drugs'. These produce physical and psychological dependence in their abusers. Various drugs that fall into this category are listed and their characteristics are briefly discussed. It has been explained as to why people take to drugs. Concepts of 'drug scene' and 'drug subculture' are discussed along with the physiological and chemical aspects of drug abuse. The concept of 'tolerance' is briefly explained which helps in establishing the relevant demand relations in the next chapter. The extent of profitability in the illegal transactions of drugs is highlighted. For example, in the case of cocaine, raw marterial worth a value within the range of can. $ 1000-2000 is converted to the equivalent in value at the illicit wholesale stage in the range of Can $ 80,000 to Can $ 2,00,000. Thus, at 100% purity, its value would be Can $ 8,00,000 i.e., a conversion ration of more than 500.

The nature and *modus operandi* of the criminal organisations involved in drug trafficking, its modes of clandestine processing, ;distribution, and sales are discussed. The laws, organisation and control of these drugs in India are discussed along with certain important features of international drug control.

Chapter 5 presents an economic analysis of the drug trade. In constructing a framework for analysing the black market for drugs, concepts and terms developed in the previous analytical chapters have been utilised. The psychological and physiological dependence in the abusers of

drugs make their economic budget constraint, which is so important in the traditional economic theory, redundant or fuzzy. When dependence becomes very severe, there remains no alternative except to find drugs 'at any cost'. It is now recognised by most researchers in this field that abusers of the psychotropic drugs have their 'own world', with its own leaders, ideals and social fragmentations, like our normal world. It has been found that, drug trade at the individual level begins from 'seeding' of demand and thus necessitiates the study of an individual's time profile of drug consumption.

As the psycho-physiological tolerance increases the dependence on drugs, it increases demand for the drugs which become ultimately inelastic downwards both with respect to price as well as legal income. The market is fragmented at the retail stage and discriminatory prices are charged by the sellers according to the condition of the buyer, his degree of dependence and his capacity to pay. Prices are generally fixed on a markup basis. Major determinants of the drug price-profitability and sales, have been the level of dependence on the drug, level of demand for drug in general, risk involved because of legal and social restrictions, controls, and the per unit cost of drug at the ultimate seller level. The overall empirical context of the study remains a mixed economy characterised by extensive economic controls and concomittant black markets all around.

The generation of enormous black money in black markets for drugs serves as seed money for many allied black markets and criminal activities. These markets also serve as a ready source of supply of drug addicts as criminals who are forced into criminality in the mature stages of their addiction profiles. The costs to the society of drug control and prohibitions are multifaceted and may be enormous.

In the concluding chapter, an overview of the main findings of the study and the policy implications of intervention and control in the context of black markets is undertaken. First, the black market for drugs is discussed and subsequently the study is rounded off by getting back to a discussion of black markets in general.

2

ANALYTICAL STUDIES OF BLACK MARKETS

Black markets have been formally analysed by economists to a limited extent. In this chapter a brief survey of some of the major analytical contributions having a bearing on shortage markets in general and black markets in particular has been undertaken. Basically two approaches have been followed, first, the traditional partial equilibrium analysis approach, and secondly the more general approach for supply constrained economies as formulated by Kornai (1971) and his associates.

2.1 Boulding : Black Market Supply and Demand Curves

The traditional approach refers here to analysis couched in terms of equilibrium analysis. A pioneering contribution in this context is that of Boulding (1937, 1948) who offers a formal treatment of price determination in black markets using the conventional demand and supply schedules in a partial equilibrium framework. The mechanism indicated in his diagramatic analysis is explained below.

In figure 2.1, D and S are the demand and supply functions of a product in a competitive market. The free market equilibrium price is p (= NP). An official price p^0 (= OR) is fixed by control authorities such that p^0 (= OR) < p (= NP). At p (= NP) the supply was ON, while now at p^0 (= OR) it is RH. S^b and D^b are the black market supply and demand curves which are drawn assuming that there are special legal and moral obstacles that tend to restrict entry into the market. The effect is that at any black market price p^b the combined amount

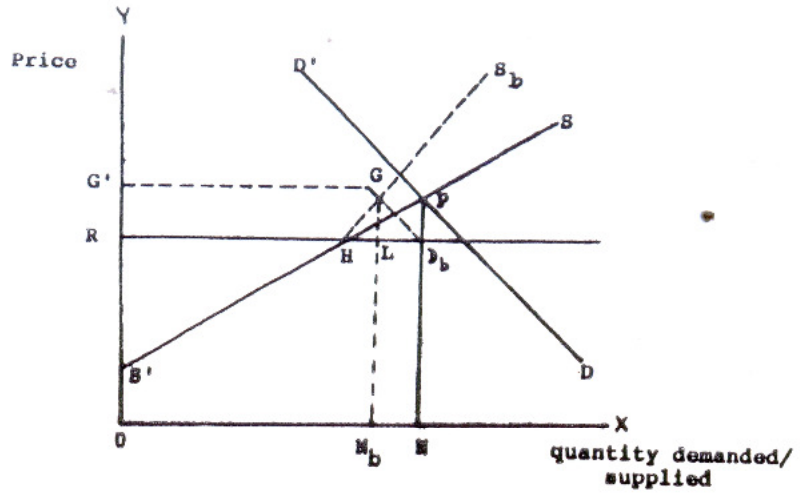

Fig. 2.1

supplied by the legal and the black market is smaller than that would be supplied in a free market at the same price. Price p^b is determined by the intersection of S^b and D^b such that p^0 (= OR) < p^b < (OG'). It is the price at which supply to the black market will be cleared.

This implies that the legally sold quantity is purchased only by those who would otherwise bid for a higher price for it in a free market. This may be the case when government controls are accompanied by rationing. Plumptre (1947) pointed out that it would be unlikely even without official rationing.

In this analysis Boulding considers S^b as consisting only of those units of the commodity that are purchased at a marginal cost higher than p^0, which in turn 'implies that goods that would have been supplied in the free market at free price would always be sold, under price control, at this price.' This, as pointed out by Michaely (1954), "is highly improbable." When

the difference between p^0 and p^b increases, some quantity supplied to the legal market shifts to the black market. However, Boulding did not overlook this possibility in his (1937) note, and attempted to incorporate it into his black market supply curve. However, he was not successful, as pointed out by Michaely (1954) and omitted this part when he reproduced most of the note in the revised edition of his *Economic Analysis* Vol. 1 (1948). Following conclusions can be derived from Boulding's analysis :

(i) the black market price may be less than the normal price as it would be in a free market,

(ii) the average price of the legal and the black market together is likely to be less than the normal price so that even if a black market develops as a result of price control the resulting average price is less than that which would have obtained in a perfectly free market,

(iii) the more rigorous are the measures taken against the black market buyers the lower is the black market price, and the larger the penalties placed on sellers, the higher is the black market price - the inference from this being that other things being equal, it would be better to penalise the buyers rather than the sellers in the black market.

2.2 Das Gupta : Marginal Risk Cost, Demand and Supply Curves

Reviewing Boulding, Das Gupta (1950) wrote that the matter had been presented in too simplistic a fashion and that the essential character of the phenomenon has been lost sight of. He gave his explanation with the help of a diagram given below.

Let D and S represent the normal demand and supply curves in an uncontrolled market. PN is the normal price with quantity bought/sold equal to ON. When a control price OR is fixed by the State, quantity supplied came down to RT and quantity demanded went up to RV. To relieve the congestion of demand commodity was rationed. But since the available supply in the legal market was only RT, many willing buyers were unsatisfied and an illegal market developed.

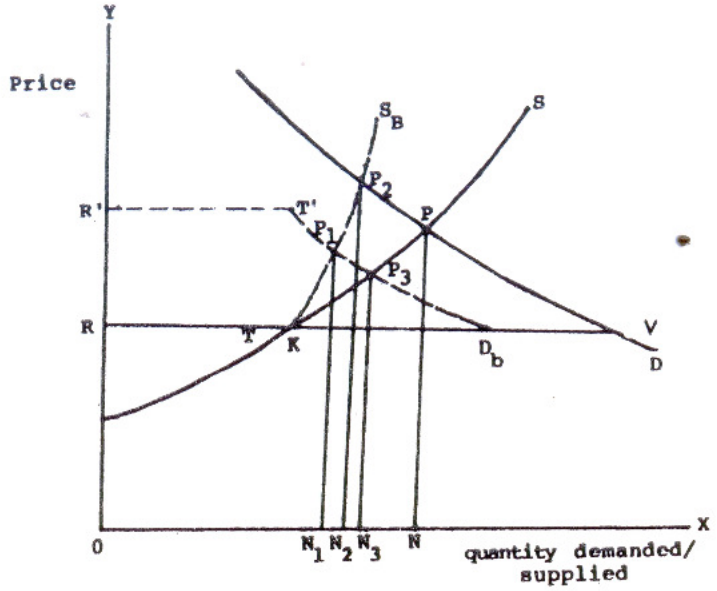

Fig. 2.2

According to Das Gupta it is incorrect to take the unobstructed black market demand curve. In fact, RT has been sold at the controlled price OR and has been, thus, open to buyers within the range PV equally with the buyers who were in the upper range of the demand curve. Thus, part of the legal purchase would be taken away by buyers buying in the range TV. The demand curve in the black market, in the absence of penalty gets shifted above DP_2. The stronger buyers within the range RT, with part of their demand unsatisfied would assert themselves in the black market and would offer a price higher than that shown at the original demand curve.

On the supply side, provided there was a risk in the black market sales, the black market supply curve would lie above the original supply curve over its whole length beyond T. The distance between the two curve depends upon the marginal risk cost. If marginal risk cost is constant then the two curves should be parallel to each other. If, on the other hand, as is more likely, the sellers are afraid of their extension of sales in

the black market, it will involve wider publicity and increasing risk of detection; the distance between the two curves would grow wider as they move to the right. The amount sold in the legal market will depend not only upon average cost but also upon the degree of restriction that has been placed upon the black market sales. RT, therefore, has certainly been the maximum amount that could be sold at the controlled price OR.

According to Das Gupta, the most important point in this context is that the so-called black market has been a bundle of isolated transactions which did not form a market at all. Individual buyers and sellers have been paired and separate prices tend to evolve in respect of the same commodity which depend upon the relative strength of the participants. To talk of the black 'market price' determined at the intersection of black market supply and demand curves has been, thus, according to Prof. Das Gupta, illegitimate. The theory that is relevant here is that of imperfect markets and discrimination.

2.3 Bronfenbrener : Black Market Prices and Supply Responsiveness

Another attempt to study black market was made by Bronfenbrener (1947). In his analysis, he assumed that shifts in supply from the official to the black market occurs only in response to a change in p^b. Black market demand is always equal to the excess demand in the official market at p^0; rationing is neutral and does not discriminate between more and less well offs, and finally that the total supply of the commodity is equal to the sum of the quantities in supply in both legal and black markets, when no black market exists.

With these assumptions he concludes that 'the black market demand will be a fraction of the free market demand determined by the ratio between the excess demand and the total demand at p^0.

The inconsistency inherent in Bronfenbrener's analysis can easily be seen. According to Bronfenbrener, an increase in S^b is due to increase in p^b, which causes a shift of supply from the official to the black market, while the black market demand

implies an unchanged excess demand in the official market at p^0.

Thus, it appears that both Boulding and Bronfenbrener have failed to take into account the "double effect" of black market and black market prices on demand. Furthermore, Boulding ignores the shifts in the quantity supplied due to the increasing gap ($p^b - p^0$), he also does not take those units of supply into account which are induced only by the existence of a black market and thus would not be available in the official market at all (Michaely 1954).

2.4 Michaely : Modification in Partial Equilibrium Approach Inhibited Demand and Supply Curves

Michaely's (1954) analysis of the black market rests mainly on the following assumptions :

(i) Only one commodity in a competitive industry is considered.

(ii) A change in its price has no noticeable income effects.

(iii) Psychological and speculative effects on the supply and demand schedules are absent.

(iv) No reselling of commodity is possible.

He defines an 'inhibited supply curve' as a schedule of quantities offered at each price higher than p^0 showing the rise of total supply in official and the black market due to an increase in p^b. An inhibited demand curve is a locus of quantities that would be demanded at each p^b when every one supposes that nothing is available in the official market. His analysis is explained in Fig. 2.3.

DD and SS are the demand and supply curves. The free market clearing price is p (= Q_eP_e). An official price p^0 (= OP_0) is fixed such that p^0 (= OP_0) < p (= Q_eP_e). The inhibited supply and demand curves become Q_0S' and DD' respectively. DD', being to the left of DD, denotes the involvement of additional costs, both moral and material, involved in black market purchases. Inhibited supply curve Q_0S' is to the left of SS, which implies that in the absence of an effective black market, i.e., when $p^b = OP_0$, official supply (P_0Q_0) is made at p^0 (= OP_0).

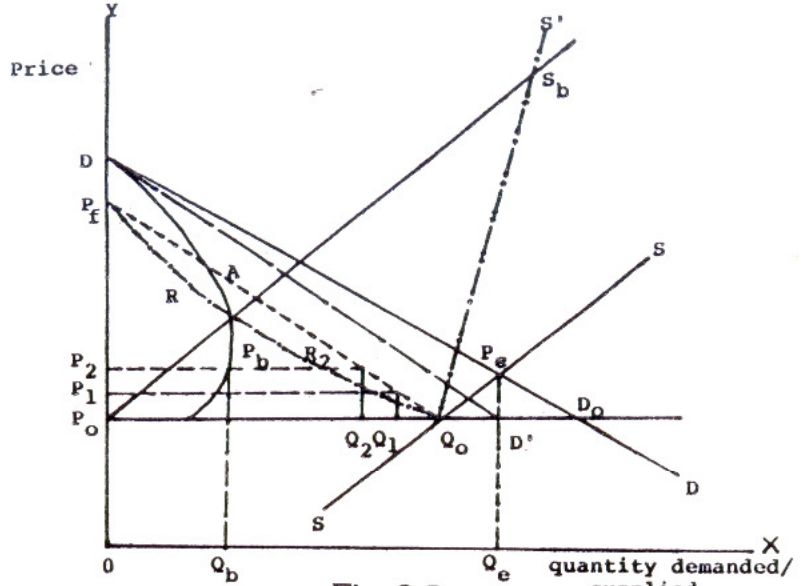

Fig. 2.3

Q_0AP_f is the 'availability curve' which shows that when p^b increases S^0 decreases. The backward slope of this line exhibits the cost differential between selling in the two markets due to a rise in p^b. These differentials are created because of possible penalties, risks involved, and other problems involved in black market operations.

It is interesting to note that there is another factor which works in the opposite direction, viz., an increase in supply S^0, when p^0 rises. Keeping the higher p^b in view, some additional quantity may be produced, clandestinely or otherwise. It will cause Q_0AP_f to be steeper than it used to be. Also Q_0S' will become steeper since the marginal cost of these units sent at different official markets and the low prices received for them is an additional cost of the added output produced for the black market.

The quantity supplied at each p^b is equal to the horizontal distance between Q_0S' and Q_0AP_f. This is shown by the line

P_0S^b. When it is identical to Q_0S' above the price P_f then the legal supply is zero.

It is somewhat more difficult to draw the black market demand curve D^b; for, it is difficult to determine the share which the official market has got out of the inhibited quantity demanded at each price. This share is indicated by the nature of rationing imposed. Michaely assumes a uniform rationing, i.e., equal points for everyone. Further, information on the distribution of buyers along the demand curve is also an important determinant. An increase in the quantity demanded consists of demand by old buyers as well as new comers. Here Michaely assumes that the number of buyers is proportional to the inhibited quantity demanded. On these assumptions he says that when $p^b = p^0$, the portion of the inhibited demand satisfied by official supply is determined by the ratio P_0Q_0 to P_0D'. When $p^b > p^0$, i.e., $OP_1 > OP_0$, it is clear that $S^0 (= P_0Q_1) < (P_0Q_0)$, i.e., quantity supplied legally is reduced. P_1R_1 is the part of demand supplied officially when $p^b (= OP_1)$. The line joining points created in this way is called the rationing curve (Q_0RP_f); showing the demand satisfied officially. By deducting it from the inhibited demand curve, the black market demand curve is obtained which is identical to the inhibited demand curve above OP_f. At OP_0 it is equal to Q_0D', the inhibited excess demand. Under these circumstances $p^b (= Q_bP_b)$ and the quantity transacted illegally will be OQ_b. Every increase in p^b will increase the quantity supplied in the black market. This is done by the additional quantity produced exclusively for the black market and also by shifting quantity from the official market. The stricter are the controls, the steeper will be black market supply curve since strict control steepens both the inhibited supply curve and the availability curve. There are two effects of a rising p^b on the quantity demanded in the black market, and these are in opposite directions. On the one hand, the quantity demanded decreases because the inhibited quantity demanded is reduced. On the other hand, it increases because part of the demand supplied legally decreases. According to Michaely, whenever the second factor is stronger, black market demand curve will be positively sloped. The slope of the rationing curve is positively related to that of the availability curve except at

points Q_0 and P_f. The availability curve must be to the right or at most tangenital to it because the availability curve shows the total quantity that is supplied by the official market (at various p^b) and part of the demand supplied by the official market cannot exceed it. The two curves may be identical in the improbable case when the quantity supplied illegally goes to those who would be the highest bidders in the free market.

Another feature which is interesting in Michaely's presentation is the peculiar shape of the black market demand curve. This shape suggests a paradox, viz., that even when the inhibited demand is equal to S^0 at P^0, it does not necessarily ensure that and effective black market would not prevail. In general, the positively sloped portion of the black market demand curve suggests that the amount transacted in the black market may be greater than the inhibited excess demand at a higher price. It may be seen that there are two intersection points, one at P_0, and the other, higher than this point. The higher point would be the stable one.

The most important proposition that Michaely (1954) has put forward is that if the additional costs of operating in the black market are no greater for the buyers than they for the sellers, the black market equilibrium price (p^b) will be higher, or at least, no lower than the free market equilibrium price. Bronfenbrener (1947) wrote how sensational was once the news that after the decontrolling of the price of meat, it rose above the previous black market price. Boulding (1937) has stated, 'The black market price may easily be lower than the price which would have obtained in the absence of all regulations.' Plumptre (1947) had pointed out that the demand and price in the black market are likely to be higher than Boulding's note might lead us to believe. Michaely (1954, foot note 14) noted that Plumptre's reason was mainly that the legal supply does not satisfy vigorous consumers first and buyers have a low degree of respect for the law. Bronfenbrener (1947) assumed without proof that in the case of imperfect competition, the black market price 'will usually exceed the controlled.....prices.' It should be noted that although $p^b > p$, the total quantity produced for both markets, i.e., legal and black, may be smaller than the quantity that would be

produced for a free market. This will happen if the extra cost, both moral and material, of producing for the black market are relatively high.

Finally, if the assumption of a negligible income effect is relaxed, the inhibited demand curve will be higher than that discussed earlier. In this case, demand will be augmented because of the increased real income. Similarly, if the assumption of psychological independence of demand and supply is relaxed expectations will begin to play a role. The expectation of a price rise, and fear of serious shortages leads buyers to buy more because they want, as Hansen (1951) puts it, 'to get hold of something even if there is no sensible use for what has been bought.' This response contributes also towards an increase in the inhibited demand curve.

The 'no resale' restriction is more serious since it happens in reality. When it is allowed for, the derivation of the demand and supply curves of the black market becomes more complicated. Price in a black market with resale may be lower than that without resale. But Michaely has argued that the removal of these assumptions would not alter substantially the conclusion that he has drawn.

2.5 Morishima : Money Income and Points Rationing

Morishima (1976) studied black markets, especially the case of resale of points, under a rationing scheme. He assumed 'M' to be the disposable money income of the buyer, which he spends on consumer goods and N to be the total number of points. It is assumed that the distribution of point is perfectly even.

There are 'n' kinds of goods, the money price of the i^{th} commodity is p_i, its points are denoted by q_i and the quantity of i^{th} commodity purchased is x_i.

A buyer chooses the highest x (utility maximization) satisfying the following conditions :

$$\Sigma_{i=1}^{n} \; p_i x_i \leq M \qquad \ldots \quad (1)$$

$$\Sigma_{i=1}^{n} \; q_i x_i \leq N \qquad \ldots \quad (2)$$

In a system without rationing this preferred combination is x^0 under condition (1). The total points needed to acquire x^0 is qx^0, where p and q are row vectors and x a column vector. Here, three situations may be distinguished :

(a) $q\,x^0 < N$

(b) $q\,x^0 = N$

(c) $q\,x^0 > N$

It can be said that if x^0 satisfies (1), then it is the most preferred x satisfying (1) and (2). Under situations (a) and (b) there arises no difficulty in acquiring x^0; consequently it will be purchased by the buyer. Further under (a) and (b), the point rationing has no effect on the buyer. His behaviour will be exactly as it was in a free market. It follows from the above that under these circumstances $x^0 = f\,(P,M)$ and it is independent of q and N. Under (a), there is an excess of points which a buyer will not buy while under (b) condition (2) there is an equality so that the buyer uses all its points.

It is the case (c) which is most interesting. It indicates that the acquisition of x^0 is not feasible for the buyer. As a result he is bound to search for another alternative, a second best, which consists of getting more points rather than money.

Therefore, the buyer may choose the most preferred combination x' satisfying condition (2). For this, the total money requirement will be equal to

$$\Sigma_{i=1}^{n} \; q_i x_i = M' \qquad \ldots \quad (3)$$

Here again, we can consider three possibilities

(i) $p \Sigma q_i x_i = px' < M$

(ii) $px' = M$

(iii) $px' > M$

Since x' satisfies condition (2), and under (i) and (ii) it satisfies the money condition, therefore it will be chosen. Leaving the efficiency of the rationing system aside, in these cases it is clear that the behaviour of the buyer is influenced by these conditions. Here $x' = f\,(q,N)$ and it is independent of p and M.

The simultaneous occurence of cases (iii) and (C), i.e., the case where the most preferred combination is chosen while considering only condition (1) fails to meet condition (2) and vice versa.

Condition (1) shows one $(n-1)$ dimensional plane and similarly condition (2) shows another plane of $(n-1)$ dimensions. Consequently, x satisfying both conditions forms an area of intersection of the two equalities which is a plane of $(n-2)$ dimensions. Choice of x is, therefore, made in this plane. Slope of the plane alters if the money price and the point price alter. If a change occurs in M or N, then their respective planes show a parallel movement. As a result, the two planes come to intersect at different points. This leads the buyer to choose a different most preferred point satisfying the condition $x = f(p,M,q,N)$. In this way, both M and N appear as effective limitations on demand.

Again three possibilities emerge :

(a') there is an excess of points ;

(b') there is an excess of money ; and

(c') there is an excess of neither money nor points.

The assumption of a perfectly even rationing suggests that case (a') will arise, probably, for those with low income and conversly (b') for those with larger incomes. Having assumed a uniform utility function for all the buyers, it is seen that no restriction is imposed on the demand of the poor while that of the rich persons restricted. Case (c') refers to the "middle class", i.e., who are neither rich nor poor.

In a system with some people having excess of points but less money and some with money but less points, a difficulty arises when exchange of points for money takes place between rich and the poor. Let p^b be the price of one ration point and R is the total number of points which the buyer purchases. If R is positive, the buyer purchases R points; if negative, he sells R points.

Total expenditure for purchasing R points, therefore, will

be Rp^b Total money that the buyer is able to spend on the consumer goods will then be $(M-Rp^b)$. Now the buyer has $(N+R)$ points and the choice of the most preferred x should satisfy the following conditions :

$$\Sigma_{i=1}^{n} \; p_i x_i \leq M - Rp^b \qquad \ldots (4)$$

$$\Sigma_{i=1}^{n} \; q_i x_i \leq N + R \qquad \ldots (5)$$

In order to see the way R adjusts and the nature of x that will be chosen, let us multiply (5) by p^b and then add it to the both sides of (4) and we have;

$$\Sigma_{i=1}^{n} \; (p_i x_i) + p^b \; (q_i x_i) \leq M - p^b R + p^b \; (N+R)$$

which gives

$$\Sigma_{i=1}^{n} \; (p_i + p^b q_i) \; x_i \leq M + p^b N \qquad \ldots (6)$$

Here x_i satisfies conditions (4) and (5) and would also satisfy (6). Therefore, it is not possible for the most preferred point, i.e., x^o which satisfies (6), to be any less desirable than the most preferred x satisfying (4) and (5). It is also clear that at x^o (6) will be satisfied as an equality. Therefore,

$$\Sigma_{i=1}^{n} \; (p_i + p^b q_i) \; x_i = M + p^b N \qquad \ldots (7)$$

It follows from the above condition that if the number of points qx^o needed to buy x^o exceeds N, then the deficiency has to be supplied from the black market. The buyer in the black market does not possess the money needed to buy these points, R^o (i.e., needed to cover x^o) because

$$M - px^o = R^o p^b$$

$$= p^b \; (qx^o - N) \qquad \ldots (8)$$

Here $M\text{-}px^o$ implies that with x^o, R^o, (4) holds as an equality and $R^o p^b$ is equal to $p^b(qx^o\text{-}N)$ implies that (5) holds as an equality. Thus R^o, x^o satisfy the required condition, which means that no more preferred combination other than x^o exists for the buyer.

Morishima (1976) observes thus when the black market exists the point of demand of household is the same as the point of maximum utility under the single constraints.....and is, therefore formally, exactly the same as the result reached by traditional consumer theory. It is seen that apart from substituting $(M + p^b N)$ for M, and $(p + p^b q)$ for p, there is nothing in the traditional demand theory that requires amendment.

The demand function for each x_i $(i = 1, 2,....., n)$ will be such that

$$X = x_i (p + p^b q ; M + p^b N) \qquad \ldots (9)$$

The demand for points in the black market will be such that

$$R = \Sigma_{i=1}^{n} \; q_i x_i (p + p^b q, M + p^b N) - N \qquad \ldots (10)$$

Where there is a black market, it is possible to formulate one's behavoiur plan, [(Morishima (1976)], 'by constructing every thing in cash terms, without being worried on an insufficiency of points.' It may be observed that (6) is the budget constraint when every thing is converted into money terms (and all transactions are settled in the black markets). The quantity of the goods demanded is determined by (9) without considering the shortage of points. The deficiency of points that must be supplied by the black market is (10).

Morishima (1976) goes on to say that with the assumption of a continuously differentiable demand function, $\partial x_i / \partial M$ appears as the money income effect, $\partial x_i / \partial N$, as the point income effect, $\partial x / \partial p$, as substitution effect of money income,

and $\partial x_i / \partial q_i$ as substitution effect of point prices. Then,

$$p^b \; \partial x_i / \partial M = \partial x_i / \partial N$$

$$p^b \; (\partial x_i / \partial q_i) = (\partial x_i / \partial q_i) \qquad \ldots (11)$$

In respect of the income effects two rules are obtained, viz.,

$$\Sigma \; p_i \, \partial x_i / \partial M + p^b \; \Sigma \; q_i \, \partial x_i / \partial M = 1 \qquad \ldots (12)$$

$$1/p^b \; \Sigma \; p_i \, \partial x_i / \partial N + \Sigma \; q_i \, \partial x_i / \partial N = 1 \qquad \ldots (13)$$

It is to be noted that (12) can be found at once if $(p_i + p^b q_i)$ is substituted for p_i in the usual income effect equation, that is, $p_i \; \partial x_i / \partial M = 1$. However, equation (13) is nothing more than equation (12) written taking equation (11) into account.

It follows from (12) that without an unit increase in money income, money expenditure will be increased by only $p_i \, \partial x_i / \partial M$ and the remainder will be spent in the black market to purchase points necessary to increase demand for each good by $\partial x_i / \partial M$. However, (13) implies that with an unit increase in points income, buyers will increase the demand by $\partial x_i / \partial N$ and themselves expend only $\Sigma \; q_i \, \partial x_i / \partial N$ points, and probably sell the remainder in the black market to acquire money by $\Sigma \; p_i \, \partial x_i / \partial N$ needed for the increase in the demand for each good.

It is important to note that as far as the substitution effect is concerned, an increase in the money price of a good will cause its demand to decrease, i.e.,

$$[\, \partial x_i / \partial p_i \,] < 0 \qquad \ldots (14)$$

Considering (11), $[\, \partial x_i / \partial q_i \,] < 0$ is obtained from (14) which implies that an increase in the point price of a good gives its demand a negative substitution effect. This shows that even

when there is a black market, a point rationing system has the effect of restraining the demand. Further, provided that q is not proportional to price $(p + p^b q)$ we have

$$\Sigma_i^m \ \Sigma_j^n \ [\partial x_i / \partial p_i] q_i q_j < 0 \qquad \ldots (15)$$

It can be shown from the demand function for points in the black market that the left hand side of (15) is equal to the substitution effect on the black market demand for points of an increase in the p^b of points, i.e., $[\partial R / \partial p^b]$, consequently (15) implies that if the black market price for points increases the black market demand for points decreases if the income effect is ignored.

2.6 Kornai : Economics of Shortage

In the previous section a single commodity market was considered. It was seen that under certain assumptions, i.e., certain conditions being fulfilled, the market gets cleared. Kornai (1971, 1980 a,b) has argued convincingly that no market is ever really cleared. Markets may be highly disequilibrated, being in a state of permanent excess demand (suction) or excess supply (pressure) due, for example, to interference and controls by governments.

Contrary to the neoclassical market allocation process, Kornai (1971, 1980 a,b) looks into the matter in a different way. According to him (1980, b); an allocation scheme is a function, in a mathematical sense which establishes the correspondence between the physical supply and the allocation of the products between households. This is usually determined not by a single complex decision (as standard economic theory suggests), but by a series of decisions involving several steps and taken according to definite rules.

(a) Market : As Elementary Contracting Process

According to Kornai (1971) a market of a product may be defined 'as a set of all elementary contracting processes relating to the product.' This being an event in the system, it is not independent of the rest of the events, and since it is a process it constitutes a process over time in which various acts may be

taking place simultaneously. This involves a complex network of information and its processing. Information here relates to the offer and counteroffer by the agents. Final contracts, price and non-price information appear side by side. Here unlike the neoclassical 'black box' market, the information flow is not anonymous and like a correspondence in a mathematical sense. Thus, it is seen that the conceptualization of Kornai's market is far wider than the standard textbook interpretation. The neoclassical market becomes its special case. He (1971) remarks that 'the point must be emphasised in order to remove confusion, many economists do not make the distinction and equate special markets with general concept.'

In Kornai's analysis, behaviour of the buying agent is considered as symmetrical to that of the selling agent and, as such, the analysis of one is sufficient to indicate the behaviour of the other.

(b) Selling and Buying Intentions

A selling intention in the contracting process in a period (t) is described by the vector $S_i(t)$ A; where A is the set of decision options for the agent. This vector may change during the course of the contracting process taking place in the period $[\underline{t}_i, \bar{t}_i]$. The degree of maturity of the selling intention in (t) such that $[\underline{t}_i \leq t \leq \bar{t}_i]$, is given by the difference $(\bar{t}_i - t)$. Thus the selling intention is a process occuring over time. A seller's 'aspiration level' proceeds gradually towards maturity from an elementary selling intention given by, say,

$$S_i(t) = \alpha_i^S (\underline{t})$$

The case of the buyer is symmetrical.

(c) Aspiration Levels

The notion of 'aspiration level' was borrowed from mathematical psychology (Lewin 1936). Its formation is a complex process, as Kornai (1971) observes : 'study of aspiration should be a common task for economists, economic sociologists and economic psychologists in future ...'

While formulating his aspiration level an agent draws on two major sources of information, viz.,

(i) his own cognitive process,
(ii) behaviour of the organization and environment.

Aspiration level characterises the psychological state of the agent and ultimately influences his actual behaviour. Aspiration level $\alpha(t_i)$ is the indicator vector which arises at the beginning of the elementary decision process taking place over $[t_i', t_i'']$. It expresses decision makers' first ideas about the decision to be taken at the end of the process. It takes into account wishes and expectations and changes gradually with time culminating finally into the final contractual decision.

In order to have access to the aspiration level (α) of the buyer he may be asked, 'assume that you find in the market all the products in unlimited quantities at the prevailing usual prices, ceteris paribus, and you must not exceed your budget constraint. Then what is the quantity that you intend to buy?' Symmetrically a question can be framed for the seller.

(d) Shortage-induced Corrections

Agents are forced to revise their buying intentions if shortages are encountered. For example, if a commodity X is available in two brands say, A and B, which may be presented as $[X,A]$ and $[X,B]$. If the buyer prefers $[X,A]$ but there is a shortage of it then buyer has two alternatives :

(i) he may wait for $[X,A]$, for a time t, $[\underline{t} \le t \le \bar{t}\,]$
(ii) or he may change his intention and buy $[X,B]$.

If the latter occurs, it implies that his intention has undergone a change. The contracting and decision process may be an indicator vector whose components now contain $[X.A.B]$. If its initial aspiration is $\alpha_i(t)$ and the final one is $\alpha_i''(\bar{t})$, then the difference vector is

$$x_i(t) = \alpha_i^*(\bar{t}) - \alpha_i(t)$$

which indicates the correction of aspiration. Factors responsible for such a change, other than shortage, may be a change of mind, acquisition of new information, etc.

(e) Tension of Buyer's Aspiration

If the entire market is considered, rather than a single contracting process, for some product [J.A.B] at the buying period t, then the tension of the buying aspiration of j^{th} product is

$$\mathfrak{I}_f^{(B)} \subset \{1, 2, \ldots, m\}$$

where superscript 'B' denotes buyer's case. For the seller 'S' will be used.

Here the quality factor has been ignored for the sake of simplicity and it has been assumed that quantity of the j^{th} product can be measured by real numbers. Denoting α_{ij} as the initial buying intention of the i^{th} agent for the j^{th} product, ω_{ij} the quantity actually purchased by the agent in the period (t), $[\underline{t} \le t \le \bar{t}]$. If the necessary waiting time of buying has been θ_j, i.e., the minimum number of periods which 'must have been elapsed' between initial aspiration and final fulfilment, then :

$\theta_j < \theta_j \quad \theta_j \quad \theta_j\ \}$, θ_j is the limiting period.

The tension of buying aspiration from the initial period to an arbitrary period T is,

$$\{\, T \mid \theta_j \le T \le \theta \,\}$$

which can be characterised as

$$\varepsilon_j(T) = \Sigma_{i=\mathfrak{I}_j^{(B)}} \alpha_{ij} - \Sigma_{t=\theta}^{T} \omega_i(t), \theta_j \le T \le \theta_j \qquad \ldots \quad (16)$$

The degree of tension, in percentage terms, ε_{ij} is :

$$\hat{\varepsilon}_{ij} = \Sigma_{i=\mathfrak{I}_j^{(B)}} \alpha_{ij} \,/\, \Sigma_{i=\mathfrak{I}_j^{(B)}} \Sigma_{\gamma=\theta_j}^{T} \omega_{ij}(J) \qquad \ldots \quad (17)$$

The global fulfilment ratio μ_{ij} is defined as,

$$\mu_{ij} = \Sigma_{i=\Im_j^{(B)}} \Sigma_{\tau=\theta_j}^{\theta j} \omega_{ij}(\tau) / \Sigma_{i=\Im_j^{(B)}} \alpha_{ij} \quad \ldots (18)$$

$$\bar{\mu}_j = 1-\mu_j$$

and immediate fulfilment ratio μ'_j may be defined as :

$$\mu'_j = \Sigma_{i=\Im_j^{(B)}} \omega_{ij}(\theta_j) / \Sigma_{i=\Im_j^{(B)}} \alpha_{ij} \quad \ldots (19)$$

Aspiration level is immediately and completely fulfilled if $\theta_j=\theta$ and $\mu_j^{(B)}=1$; otherwise there will be partial fulfilment. In reality $\Im_j^{(B)}, \varepsilon_j^{(B)}$ etc. modify with time.

In this sense,

$$\Im_j^{(B)}(t_0) \cap \Im_j^{(B)}(t_1) \cap \Im_j^{(B)}(t_2) \cap \Im_j^{(B)}(\bar{t}) = \phi$$

where ϕ is a null set.

(f) Relative Strength of the Market

Another important term is the relative strength of the market of the i^{th} product which can be defined as :

$$\Omega_j = \alpha_j^{(S)} / \alpha_j^{(B)} \quad \ldots (20)$$

This determines as to which of the trading partners, between the buyers and sellers, is stronger in the market, i.e., who dominates the market.

(g) Market Conditions : Pressure, Equilibrium and Suction

From the concepts defined above the following states of the market of the j^{th} product can be characterised :

$\Omega_j>1$ implies $\alpha_j^{(S)}>\alpha_j^{(B)}$: Pressure (Buyers' market)

$\Omega_j=1$ implies $\alpha_j^{(S)}=\alpha_j^{(B)}$: Equilibrium

$\Omega_j<1$ implies $\alpha_j^{(S)}<\alpha_j^{(B)}$: Suction (Sellers' market)

A state of pressure is characterised by an over supply of j^{th} product in the market. In this situation sellers queue for the buyers, $\theta_j^{(S)} < \theta_j^{(S)}$ but $\theta_j^{(B)} = \theta_j^{(B)}$. The tension of selling aspiration $\alpha_j^{(S)}-\omega_j^{(S)}=\varepsilon_j^{(B)}>0$, which implies, $\alpha_j^{(S)}>\omega_j^{(S)}$

On the other hand, buyers' aspirations are fully and immediately fulfilled, $\alpha_j^{(B)}>\omega_j^{(B)}$; which implies that $\varepsilon_j^{(B)}=0$. In this case, the fulfilment of sellers' aspiration, $\mu_j^{(S)}<1$ while $\mu_j^{(B)}=1$. Since $\alpha_j^{(S)}>\alpha_j^{(B)}$, we find that $\Omega_j>1$; which implies that the seller is not fully satisfied but the buyer is; and it is buyer who dominates the market.

The case of equilibrium, is straight forward but, according to Kornai (1971), is seldom found in reality. It can be characterised as :

$$\theta_j^{(S)} = \theta_j = \theta_j^{(B)} ;$$

$$\alpha_j^{(S)}=\omega_j^{(S)}$$

$$\alpha_j^{(B)}=\omega_j^{(B)} \Rightarrow \varepsilon_j^{(S)}=\varepsilon_j^{(B)}=0$$

$$\mu_j^{(S)}=\mu_j^{(B)}=1.$$

Since $\alpha_j^{(S)}=\alpha_j^{(B)}$ we have :

$$\Omega_j=1$$

The third situation which is really relevant here, is the state of 'suction.' It is also referred to as the sellers' market or 'shortage market.' The value of the absolute index $\varepsilon_j^{(B)}$ is high for a large number of products. It can be characterised as :

$\hat{\varepsilon}_j(B) >> 1$; may be even higher than 100%.

$\mu'_j(B)$ is very small, on the other hand,

$\mu_j(S) = 1$.

The aspiration of the seller is easily fulfilled,

$\alpha_j^{(S)} = \omega_j^{(S)}$

which implies,

$\varepsilon_j^{(S)} = 0$ and $\hat{\varepsilon}_j^{(S)} = 1$.

Further,

$\theta_j^{(S)} = \theta_j^{(S)}$ while,

$\theta_j^{(B)} > \theta_j^{(B)^*}$, which implies that buyers queue for the product.

In exceptional cases of shortages, the condition $\varepsilon_j^{(S)} < 0$ may also prevail which means $\hat{\varepsilon}_j < 1$ and $\alpha_j^{(S)} < \omega_j^{(S)}$; i.e. seller is compelled to sell more than his desired quantity.

The relative strength $\Omega_j < 1$ since $\alpha_j^{(S)} < \alpha_j^{(B)}$; which implies that the seller dominates the market. In the case of suction, an increase in the volume supplied takes place but the quality of the product need not improve since the buyers compete among themselves for the sellers. One may also find the quality of the product deteriorating. Furthermore, sellers, even when they are competitors among themselves, behave like monopolists to buyers. The burden of risk and uncertainty

falls on the buyers; selection of the buyers is made by sellers and not vice versa. Generally it is the buyer who seeks information about the buying possibilities.

Although Kornai has not formulated a theory of black markets explicity but in the course of his discussions of allocations under condition of shortage, he provides a very useful framework for the study of black markets. He points out (1980, b) that with reference to particular countries and time, the law permits trading of some goods and prohibits that of others. In the latter case, either legal prescription are strictly enforced so that breaking them means a black market, or observations of the law is not so strictly enforced in practice and then we have a 'grey market' with various shades of grey (Tornai 1975).

These markets also perform an allocative role offering commodities at effective prices and hence are an important constituent of the second economy. According to him (1980, b) the extent of black markets and prices charged in them depend in two factors :

(i) the intensity of the shortage, and

(ii) the degree of risk involved.

2.7 Teekens : Black Markets in Basic Goods

Teekens (1984) has utilized the concepts introduced by Kornai (1971), to analyse black market effects especially in the case of commodities relating to basic needs. In his analysis three groups of persons are considered, say, G^1, G^2 and G^3 where; G^1 has an access to the j^{th} product, G^2 may decide to take advantage by transacting with G^1. Further, it is assumed that the total supply of the product is sufficient to fulfil the aspirations of groups 2 and 3. The corresponding aspiration levels of the three groups are α_1, α_2 and α_3, respectively; which are assumed to be exogeneously given.

If money incomes of the three groups are respectively M_1, M_2 and M_3 and the price of the j^{th} product p_j then using Kornai's notations one can write,

$$\omega_{ij} = M_i/P_j \text{ if } P_j > M_i/\alpha_{ij} \qquad i = 1, 2, 3.$$
$$\omega_{ij} = \alpha_{ij} \text{ if } P_j \leq M_i/\alpha_i \qquad j = 1, 2, 3. \quad \text{... (21)}$$

where time indices are omitted for the time being. It is also assumed that α_1 increase with M_1 but less than proportionately and once α_1 is reached, no further purchase takes place. Lastly, it is assumed that $M_1/\alpha_{1j} < M_2/\alpha_{2j} < M_3/\alpha_{3j}$. These ratios indicate the maximum price each group is able to pay to attain its α_{ij}.

Now if $\Sigma_{i=1}^{n} \omega_{ij} < \Sigma \alpha_{ij}$ then there is a suction in the market of product j, i.e., unfulfilled aspirations exist even when p_j is such that $\Sigma \alpha_{ij} = \Sigma q_{ij}$, where q represents the quantity of the j^{th} product purchased by the i^{th} group. Since G^2 is assumed to be superior to G^1, with respect to the access to the market of the j^{th} product, it may decide to take advantage of its position.

Let the total supply $\Sigma q_j = \Sigma \alpha_{ij}$. If the assumption of no purchase after fulfilment of α_{ij}, is relaxed then it may be possible to buy more and sell it to G^1. It is possible, therefore, if

$$\left.\begin{aligned} &\alpha_{2j} + \alpha_{3j} \leq q_j < \alpha_{2j}(1 + M_1/M_2 + \alpha_{3j}) \\ &p^o < M_2/\alpha_{2j} \end{aligned}\right] \quad \text{... (22)}$$

The maximum quantity that can be sold in this way is

$$\left.\begin{aligned} &\omega_{2j}^b \leq q_j - \alpha_{3j} - \alpha_{2j}, \text{ if } p_j^o < M_2/(q_j - \alpha_{3j}) \\ &\omega_{2j} \leq M_2/p_j - \alpha_{2j}, \text{ if } M_2/(q_j - \alpha_{3j}) \leq p_j^o < M_2/\alpha_{2j} \end{aligned}\right] \quad \text{(23)}$$

The remaining quantity which G^1 can buy from the official market is

$$\omega_{ij} = q_i - \alpha_{3j} - \alpha_{2j} - \omega_{2j}^b, \text{ if } M_2/(q_j - \alpha_{3j}) \leq p_j^o < M_2/\alpha_{2j} \quad \text{... (24)}$$

or $\omega_{ij} = 0$ if $p_j^o \leq M_2/(q_j - \alpha_{3j})$

The residual budget of G^1 in the black market while making purchase at p_j^b is

$$b = M_1 - p_j^b(q_j - \alpha_{3j} - \alpha_{2j}) + p_j^o \omega_{2j}^b \quad \text{... (25)}$$

hence the quantity that G^1 buys in the black market is

$$\omega_{ij}^b = M_1/p_j^b + p_j^o/p_j^b \omega_{2j}^b - p_j^o/p_j^b (q_j - \alpha_{3j} - \alpha_{2j}) \quad \text{... (26)}$$

$$= \omega_{2j}^b \quad \text{... (27)}$$

When this is substituted in (26), the value of ω_{ij}^b, i.e., the quantity traded in the black market as a function of p_j^b set by G^2 is obtained :

$$\omega_{ij}^b = \omega_{2j}^b = \{M_1 - p_j^o(q_j - \alpha_{3j} - \alpha_{2j})\} / (p_j^b - p_j^o) \quad \text{... (28)}$$

This suggests that the profit π^2 of G^2 from his black market operation is not dependent upon p_j^b

$$\pi^2 = (p_j^b - p_j^o)\omega_{2j}^b$$

$$= M_1 - p_j^o(q_j - \alpha_{3j} - \alpha_{2j}) \quad \ldots (29)$$

This was expected since G^1 spends his total residual budget in the black market irrespective of p_j^b. It is interesting to note what (29) implies. It is the p_j^o which determines whether G^2 will enter black market or not.

If $p_j^o > M_i/(q_j - \alpha_{3j} - \alpha_{2j})$, then black market trading will not be possible. Returning back to the price determination in the black market by G^2 one sees that due to the specific market conditions the maximizing assumption will not do and one has to take other factors also into account, in particular the risk associated with illegal selling activities. Teekens (1984) assumes that the seller will maximize his expected profit defined as :

$$E(\pi^2) = r(-p_j^o\omega_{2j}^b) + (1-r)\ (p_j^b\omega_{2j}^b - p_j^o\omega_{2j}^b$$

$$\text{or} \qquad = [(1-r)p_j^b - p_j^o]\omega_{2j}^b \quad \ldots (30)$$

with the risk $r = f(p_j^b, p_j^o)$ such that $g(p_j^b, p_j^o) = 0$ when $p_j^b < p_j^o$.

In this maximization process, the resulting behaviour as identified by Teekens (1984) is 'in complete contradiction to the regular assumption about demand behaviour', which emerges because G^1 was rationed on the official market, i.e., due to shortage on the market their purchases are determined by the purchases of group G^2 which are equal to $(\omega_{2j}^o + \omega_{2j}^b)$.

Although Teekens (1984) has presented a very stylized analysis, as he himself notes, 'its aim being merely to provide a rough indication.' It is important, as it opens up a new direction of applicability of Kornai's system. In studies made so far, either in the traditional mould or Kornai's framework, major determinants of the black market price have been the shortage and the risk involved in illegal operations besides moral costs.

3

MARKETS IN DISEQUILIBRIUM AND ADJUSTMENT PROCESSES

Analysis of markets in disequilibrium, available in extant literature, although not necessarily directed towards studying black markets per se, provides useful insights into their working as they are also characterstically disequilibrium markets. Some of the available literature can be adapted for this purpose.

From well before the time of Adam Smith the literature of economic theory has contained arguments to the effect that competitive market prices will rise when there is an excess of demand and fall when there is an excess of supply. The underlying optimism while dealing with the adjustment towards equilibrium does not give proper emphasis to the disequilibrium processes that obtain in reality and clouds the fact that equilibrium is a rare and special case. In these analyses, motivations governing the formation of demand and supply responses were not given adequate attention. As early as 1946, Hicks noted, " ... but for the understanding of the economic system we need something more, something which does refer back, in the last resort of the behaviour of the people and the motives of their conduct."

In this Chapter, a brief survey of various approaches explaining the adjustment processes under the conditions of disequilibrium has been done and their implications for analysing black markets have been highlighted. This survey is divided into two parts, while the first part deals with the traditional approach and its subsequent extensions in the case

of perfect and imperfect markets, the second part considers markets characterised by shortage.

3.1 Traditional Approaches to Adjustment

3.1.1 Walras' Approach : Price Adjustments

The pioneer of the mechanical approach to adjustment process has been Samuelson (1947, 1983) who extended Walras' idea of tatonnement. It was in 1947 when, for the first time he gave a formal presentation of the laws of supply and demand. Its analysis is briefly considered here.

For an isolated competitive market for the j^{th} commodity, let the demand and supply respectively be represented by $D(p_j)$ and $S(p_j)$ let the equilibrium price be $(\hat{p}_j)$ determined by the condition $D(p_j) = S(p_j)$ It is assumed that $(\hat{p}_j)$ 'exists' and is 'unique'.

If $p_j \neq \hat{p}_j$, the question as to whether p_j converges to $\hat{p}_j$ as $t \to \infty$, is the problem of the stability of the equilibrium.

Let $Z_j = [D(p_j) - S(p_j)] > 0$, define the excess demand. Then $dp_j/dt > 0$ when $Z_j > 0$; zero when $Z_j = 0$; and negative when $Z_j < 0$. The problem of stability in the Samuelsonian equations. If $p_j \neq \hat{p}_j$, an adjustment process ensues for which the time path of $p_j(t)$ is described by the following differential equation.

$$\dot{p}_j(t) = h_i[Z_j(p_j(t))] \qquad i = 1, 2, \ldots n$$

where $p_j = d(p_j)(t)/dt$ and in the case of competitive equilibrium the movement of $p_j(t)$ is a function of $Z_j(t)$ or the excess demand for j^{th} commodity, i.e.

$$d(p_j)(t)/dt = h_i[Z(p_j)(t)]$$

Here $h_i > 0$, is any constant, monotone increasing differentiable real valued function, which represents the 'speed of adjustment'.

Two points have been worth noting here :

(i) neither the buyer nor the seller can affect $(\hat{p}_j)$ that prevails in the market,

(ii) price is the only adjustment parameter in the market.

At each time (t) buyers and sellers adjust their quantities that they wish to demand and sell respectively on the basis of $(\hat{p}_j)$. The Walrasian $p_j(t)$ moves through time, $Z_j \to 0$ and stability is achieved in the market at $(\hat{p}_j)$.

3.1.2 Marshallian Approach : Quantity Adjustments

It is interesting to note that Marshall (1920) has given an exactly opposite approach to adjustment process where quantity (q_j) is given and $[p_j(\tau)]$ moves accordingly.

In this case the adjustment equation acquires the form given below :

If $p_j = D(q_j)$ and $p_j = D(q_j)$ then,

$$\dot{q}_j(t) = \bar{h}[D(q_j)(t) - S(q_j)(t)]$$

where $\dot{q}_j(t) = dq_j(t)/dt, \bar{h} > 0$, is the 'speed of adjustment'. This refers to the fact that when $D(q_j)(t) > S(q_j)(t)$, the seller can profitably increase the quantity supplied and vice versa. If the time path of the solution of the above differential equation converges to the equilibrium quantity $(\hat{q}_j)$ as $t \to \infty$, the adjustment process is said to be convergent and equilibrium stable.

Hicks (1946) had noted that the Marshallian conditions of adjustment are more relevant for monopoly conditions as compared to competitive conditions. A confusion frequently

found in the literature, as pointed out by Newman (1965), arises from not distinguishing clearly between the theory of exchange from the theory of production. The Marshallian condition is explicity designed for the theory of production whereas Walras' price adjustment process is more suitable for the theory of exchange. Hence, the two ought not be compared directly.

Theoretical studies following the lead of Samuelson (1947) have primarily been directed towards deriving necessary and sufficient conditions for dynamic adjustments.

Works in this area have been surveyed in Negishi (1962) and Arrow and Intrilligator (1980, 1982). Important conceptual weaknesses in these analyses had been recognized by Koopmans (1957) and Arrow (1959). Some of these limitations are listed below :

(a) The traditional adjustment process is essentially arbitrary with respect to motivation. The static demand and supply functions form its basis which themselves are derived from the proposition that agents maximise their objective functions while dynamic properties are never deduced as the maximizing responses.

(b) The correspondence principle of Samuelson states that the requirement of dynamic adjustment process should be examined as an independent source of restriction on the static function of economic system.

Gordon and Hynes (1970) write, 'The methodology is anomalous and may not yield purposeful theorems, precisely because the adjustment mechanisms are not linked to the analysis of utility or profit maximizing behaviour ... in the disequilibrium positions.'

The following observation of Koopmans (1957) is very pertinent in this context :

> 'If for instance, the net rate of increase in price is assumed to be proportional to the excess demand over supply, whose behaviour is thereby expressed ? And, is the alternative hypothesis, that the rate of increase in supply is proportional to the excess demand price over supply price any more plausible, or any better traceable to behaviour motivations ?'

However, on the question as to whose behaviour is described by the fundamental equation of adjustment, Walras, assumed the existence of an auctioneer or the 'market manager' who quotes the price. When $Z_{ij} < 0$, auctioneer raises (p_j) and vice versa, this process continues until $Z_{ij} = 0$.

3.1.3 Non-tatonnement Processes

In order to overcome the problem associated with the tatonnement process, non-tatonnement processes have been explored by several economists. Models of non-tatonnement process developed so far deal only with the pure exchange case. In such models the dynamic adjustment equation of the tatonnement process, i.e., $dp_j(t)/dt = Z_j[(p_j)(t)]$ is replaced by :

$$dp_j(t)/dt = \Sigma_{i=1}^{m} q_{ij}[p_j(t); \bar{q}_1(t), \bar{q}_2(t) \quad \ldots \bar{q}_m(t)]$$

$$= -\Sigma_{i=1}^{m} \bar{q}_j(t); \qquad j = 1,2,\ldots n$$

and

$$d\bar{q}_{ij}(t)/dt = F_{ij}[p_j(t) ; \bar{q}_1(t), \bar{q}_2(t) \ldots \bar{q}_m(t)]$$

$$i = 1, 2, \ldots . n$$

$$j = 1, 2, \ldots . m$$

Here q_{ij} denotes demand for j^{th} commodity by i^{th} buyer and $\bar{q}_{ij}(t)$ denote holding of j^{th} commodity by i^{th} buyer at (t) ; q_i is a vector denoting $[\bar{q}_{i1}(t), \bar{q}_{j2}(t), \ldots \bar{q}_{jm}(t)]$. F_{ij} is the transaction rule that individuals follow to change their stock of commodities i.e., $\bar{q}_{ij}$.

Thus $\Sigma_{i=1}^{m} \bar{q}_i(t)$ denotes the vector of all commodities available in the economy at (t).

In the case of pure exchange $\Sigma_{i=1}^{m} \bar{q}_i(t)$ is a constant for

all (t) implying that $\sum_{i=1}^{m} dF_{ij}/dt=0$; $\forall j$. It should be noted that $\bar{q}_{ij}(t)$ moves over time and this represents the essence of the non-tatonnement process, which allows intermediate purchases. If $[\hat{p}_j, \hat{\bar{q}}_j]$ is an equilibrium state of the non-tatonnement process then $\sum_{i=1}^{m} q_{ij}\,[\hat{p}_j, \hat{\bar{q}}_j] = \sum_{i=1}^{m} \bar{q}_{ij}$ which implies that stability in this case can be defined in terms of $[p_j(t), \bar{q}_j(t)] \rightarrow [\hat{p}_j \hat{q}_j]$ as $t \rightarrow \infty$.

Three variants of non-tatonnement processes, all dealing with pure exchange, have been discussed in the literature. There are 'barter process' (Negishi, 1961, 1962). 'Edgeworth process' (Uzawa 1962, Hahn 1962, Morishima 1962) ; and the 'Hahn-Negishi (1962) process.' However, the main feature of these analyses remains the same as presented above, Takayama (1985).

In the Walrasian approach, the auctioneer is the '*deux ex machina*', introduced into the analysis to salvage the system despite its contradiction with the logical structure of the competitive markets. The traditional adjustment process attributed to competitive markets proves inconsistent with an important axiom of the model. When $D \neq S$, it is logically inadmissible that each and every agent can buy or sell unlimited quantities at the given price, therefore, it cannot apply in the competitive markets in their logically complete form.

Furthermore, the fundamental equation is subject to doubt and criticism that since it was introduced to summarise the price behaviour in the disequilibrium situation, it does not describe the movement that arises because of costs of adjustment which leads to moving equilibria. This type of adjustment process implies that given an initial price and the level of excess demand, the course of future prices is

predictable. But if this were true, profit opportunities would exist and sellers exploring these opportunities would act in a manner that would destroy the stability of the hypothetical differential equation. Its logic is analogous to that which suggests that stock market price may be represented by a random walk (Cootner 1964).

It becomes even more complicated when we deal with a multimarket situation. All these studies were made keeping the Arrow-Debreu world in view (Arrow and Hahn, 1971).

3.1.4 Adjustment Processes Involving Information and Search Costs

The basic question of actual adjustment remains ambiguous if not unanswered. Recent works by Fisher (1972) and Gepts (1971) have rectified the situation somewhat. Both, while building a model with a non-tatonnement process, place the responsibility of changing prices with individual agents. In each model the price setter follows a rule which eventually leads to a convergence of the process to competitive equilibrium. But why should agents follow such a rule has been left unanswered by them. This has perhaps been done in order to preserve the 'stability proof' used in the literature; Gepts (1971) formulated an individualised version of the Edgeworth process while Fisher (1972) confines himself to the Hahn process. Rothschild (1975) suggested three criteria that a satisfactory model should have, viz.,

(i) there should be a discussion of the rules which the market participants follow in a disequilibrium situation,
(ii) a discussion of the *modus-operandi* of the rules in the market in equestion, and,
(iii) a convergence theorem.

Most of the models deals with the second and third, but not with the first.

3.1.4.1 Stigler : Buyer's Behaviour with Search Costs

Stigler (1961) through his work on 'The Economics of Information' developed a normative theory of buyer's behaviour when search costs are involved in purchases.

When there are a variety of unknown prices, buyers will purchase from the shop with lowest price. If buyer visits 'n' stores then the expected price he pays is the expected value of the minimum of 'n' observations from a sample of probability distribution $F(x)$ i.e.,

$$m_n = \int_o^\infty [1-F(x)]^n dx$$

which decreases as $n \to \infty$. The expected gain from another search is,

$$g_m = m_n - m_{n+1}$$

$$= \int_o^\infty [1-F(x)]^n \; F(x)dx$$

If the cost of search is 'C' then, the buyer should search until $g_m \geq c > g_{n+1}$ i.e., he should stop searching when marginal gain from search starts decreasing.

Stigler's theory has been criticized by several economists like McCall (1965) and Nelson (1970) on the ground that his rule is not optimal. It should, according to them, be a sequential one. This implies that the last search is beneficial if $c < g(s)$ and must be stopped as soon as $c \geq g(s)$. The optimal sequential decision then is to continue searching till the lowest price observed is greater than R where $g(R) = S$.

A slightly different model was given by Gestwirth (1971). Rothschild (1975) points that these may be called as 'partial-partial equilibrium theory'. It explains how buyers should react to price variability but not as to where this price variability comes and who persues this. Since the behaviour of the price setter is unexplained it cannot be affected by the buyer's behaviour. Stigler explains that if store prices are uniformly distributed, and buyers follow the above strategy then the expected number of buyers who will buy from the store charging a price 'p' will be equal to

$$D(p) = k\,(1-p)^{n-1} \qquad k > 0.$$

$D(p)$ according to Stigler will not be different from ordinary demand function. In order to derive a demand function, a store

must assume that prices at other stores are fixed and independent of their own activities. He states further that if sellers know buyer's search rule generation $D(p)$ they would choose to maximise profit $[D(p)] - c[D(p)]$ where $c[D(p)]$ is the seller's cost function which is assumed to be identical for all sellers, so that they may choose the same (p).

3.1.4.2 Fisher : Seller's Behaviour and the Search Process

Fisher (1970) modelled the case when sellers, are with identical cost functions and are facing infinitely elastic demand at the established market price. Each seller bases his estimated price on Ris experience in the previous period. When excess demand is postitive, seller will raise his estimate of market price and increase the supply. If on the other hand, it is negative, he will lower the estimate of market price and reduce the supply. It is to be noted that rather than specifying buyer's behaviour Fisher assumes that search process is rational, which implies that stores charging low prices have at least as many buyers as the higher price stores. Assuming identical demand functions, the amount that the buyer purchases depends upon the price at that store and not the buyer's search history. Let us define the aggregate demand as $D(p)$, aggregate supply as $S(p)$, and the equilibrium price as $(\hat{p})$. If all the stores charge the same price, all will experience excess supply or excess demand unless $p=\hat{p}$. Then we have a situation such that $p_{\min} < \hat{p}$, or price or $p_{\min} \geq \hat{p}$. The rational search assumption implies that the lowest price store has more than fair share of buyers. When $p_{\min} < \hat{p}$ sellers experience excess demand and raise the prices; on the other hand, when $p_{\min} \geq \hat{p}$ they face negative excess demand and lower the price. These observations along with other assumptions are sufficient to ensure convergence. The assumption that sellers first forecast equilibrium price and then adjust supply raises some difficulties. Rothschild observed : "Unless the convergence to equilibrium is terribly speedy, sellers will notice that their forecast of market price is incorrect."

Fisher's suggestion that the seller will pick the quantity without considering the profitability or loss is unreasonable.

Uncertainty analysis has also been introduced by some economists. It has been summarised in Baron (1970), McCall (1971), Leland (1972) among others. Fisher's analysis leads to the conclusion, in the words of Rothschild (1975) : "It is a formidable task to design decision rules appropriate for dynamic uncertainty and at least momentarily imperfectly competitive situation. The proof of convergence is still harder. Even when this has been done, the question .... of what sort of equilibrium such a model should have".

3.1.4.3 Phelps and Winter : Satisficing Behaviour

Phelps and Winter (1970) presume but do not supply the answer to the problem. They study a market in which a seller may charge $p > \hat{p}$, in the short run without looking at all of its buyers instantly. They assume that if a seller finds himself with $p > \hat{p}$, he will adjust his price to $\hat{p}$. Phelps and Winter study the optimal adjustment process in this way. However, they do not pay attention to the problem as to how the market prices are determined, nor how sellers attain equilibrium. Winter (1971a, 1971b) has provided a partial answer to the problem. He utilized the concept of 'satisficing' revivingly introduced by Alchian (1950), which roughly states that if sellers satisfice (rather than optimise), competitive equilibrium will result. In his latter contribution (1971b) he employs the concept of 'mark up' and states that in each period sellers set two parameters. First, their capacity and, secondly, their prices. They consider these 'mark ups' on the average variable cost per unit.

3.1.4.4 Diamond : Buyer's Ignorance

The fact that sellers knew the difficulties of buyers in obtaining information, and the market power it brings to the seller has been taken as basis in Diamond (1971) and Rothschild (1970). In his study Diamond assumed that sellers know the demand function and have no competition among themselves and good will. They are facing identical cost functions, and they act to maximise short run profits under these conditions.

It may be optimal for the seller to set $p > \hat{p}$ so as to raise consumer's next reservation price. Diamond ignores this

possibility and assumes that the only stable price is $\hat{p}$; the monopoly price which maximises [$D(p).(p - c)$]. To see this let $p(t)$ be constant at $\bar{p}$ for a long time. It would then be possible to raise price such that $p > \bar{p}$; without loosing the buyers in the short run i.e., $\varepsilon > 0$ such that,

$$N(\bar{p} - \varepsilon) = N(\bar{p}) = N(p + \varepsilon).$$

The equilibrium, therefore, must have the property

$$(\bar{p}-c-\varepsilon)\, D(\bar{p} - \varepsilon) < (\bar{p} - c)\, D(\bar{p}) > (\bar{p}-c+\varepsilon)\, D(\bar{p} + \varepsilon)$$

If it is assumed that [$D(p)(p-c)$] has a unique local and global maximum price $\hat{p}$ then $\bar{p} = \hat{p}$, is the only equilibrium. He shows that, with a few more assumptions, $p_t \to \hat{p}$ in $t < \infty$. Thus in his model sellers take advantage of buyer's ignorance. Rothschild (1970) on the other hand, assumes that firms compete among themselves. He then characterises the equilibrium but does not provide a convergence result.

3.1.4.5 Aoki : Middleman with Imperfect Information

Massano Aoki (1974, '75, '76) considered a model of price adjustment with a middleman and analysed his pricing policy under imperfect information. He assumed, presence of numerous competitors to the middleman, selling same or close substitutes. It is assumed that seller does not know the distribution of market except that of his own. Customers response to changing prices occurs through gradual learning. Out of price and quantity ; let us denote it by p, and q ; only price has been taken as variable and quantity q as fixed. Finally, it has been assumed that the middleman faces stochastic demand and observes only a mix of two items of information,

(i) a feed back from his own earlier price settings,

(ii) information originating from some exogeneous factors which do occur independent of his decision.

It has been assumed by Aoki (1976) that customer's arrival rate can be represented by the mathematical theory of renewal process (Cox, 1962), see also 0.5.1. Effects of the exogeneous factors are then revealed indirectly through sales.

If k customers arrive in an interval length t with probability $p(N_t = k) = (\rho t)^t / k! e^{-\rho t}$; where N_t is the number of customers arriving if p is held constant over the interval I. Once a customer arrives at the store, he buys a random quantity, $q \geq o$. If q is assumed as continuous variable and $G(q, \theta, p)$ the distribution function with probability $g(q)$, then assuming $G(.)$ a Beta distribution 'Γ', we have

$$g(q) = (\mu(\mu q)^{\alpha-1} e^{-\mu q})/\Gamma(\alpha) \quad \ldots$$

where α and μ are shape and scale parameters respectively. These may depend on price p and the exogeneous parameter θ.

According to Aoki (1976), the most difficult question that a middleman faces in the light of random customer arrivals and varying amount of purchases, is a sequential statistical decision problem. It is quite difficult for the middleman to know exactly when and how the price he has set is significantly different from that prevailing in the market (those of his competitors), and when and how the shift in demand and sales is due to exogeneous factors.

With an exogeneous shift in demand schedule, the customer purchases $y = (1 + \theta) x$ instead of x of the initial period when $\theta = 0$. The quantity purchased is governed by the probability density function.

$$q(y) = v((vy)^{\alpha-1} e^{-vy})/\Gamma(\alpha)$$

where, $v = \mu / 1 + \theta$ which implies that the scale parameter is changed now to $\mu / 1 + \theta$ while the shape parameter α remains the same.

If p is the price set by the middleman such that if it is lower than the prevailing market price $p < \hat{p}$, the demand at p would increase as buyers with greater purchasing power would like to stock up the commodity. On the other hand, if $p > \hat{p}$, buyers with greater purchasing power would curtail their purchases more sharply then those with smaller purchasing power, when this process is interpreted as a shift in probability distribution we find that

$$q(p) \cong q(\hat{p}) + \quad (p-\hat{p})^{\xi}$$

where $(0) = 0$ and $(p - \hat{p})$ is small for $|p-\hat{p}|$.

If there are two substitutes, let us put them in a serial order to identify, say 1 and 2, and the utility function of the customer is

$$u = (q_1^{\gamma} + q_2^{\gamma}) q_3^{\beta} \qquad 0<\gamma,\beta<1$$

and if the middleman maximizes utility function u subject to his budget constraint $M = p_1 q_1 + p_2 q_2 + p_3 q_3$; the result of maximization is

$$q = const.\ p_1^{-1}\{1+(p_2/p_1)^{\gamma/(\gamma-1)}\}^{-1}$$

Aoki (1976) reaches at the result that

the shape parameter :

$$\alpha(p) \cong \alpha(\hat{p})\ (1+\epsilon(p-\hat{p}))^2\ (1+2\xi\epsilon(p-\hat{p}))^{-1}$$

the scale parameter :

$$\mu(p) = \mu(\hat{p})\ (1+\epsilon(p-\hat{p}))\ (1+2\xi\epsilon(p-\hat{p}))^{-1}\ (1+\theta)^{-1}$$

and the mean price :

$$m(p) = m(\hat{p})\ (1+\epsilon(p-\hat{p}))\ (1-\theta)^{-1}$$

where $\epsilon(p-\hat{p})<0$ for $p-\hat{p}>0$

$\epsilon(p-\hat{p})>0$ for $p-\hat{p}<0$

Aoki's modelling of customer's arrival as a renewal process leaves us to define first customer's arrival by some different probability distribution. According to him (1976), when a customer's order is bigger than the existing stock, his order is partially fulfulled by exhausting the existing stock and the middleman orders enough goods to fill the remainder. So the process is really a renewal process. The period between two successive reorders is called one cycle. Middleman's commission is proportional to Q/T_Q where Q is the total quantity sold and T_Q is the time interval in which one cycle is completed.

3.1.4.6 Other Approaches : Oligopoly, Exploitation of Imperfect Consumers

The nature of equilibrium when buyers are imperfectly informed about prices have been studied by Salten (1965, 1968, 1970), Phelps and Winter (1970) and Rothschild (1971). The most important feature of Rothschild model was the description of the dynamic flow of buyers. Tesler (1962) also utilised the same approach while studying the brand loyality. Furthermore, it may be observed that a satisfactory answer regarding the nature of equilibrium price when sellers understand the situation and compete among themselves leads to a reasonable theory of oligopoly. Attempts in this direction have been made by Friedman (1971a, 1971b), Marshak and Selten (1971) and Kirman and Sobel (1972). Rothschild (1975) suggests that the buyer's ignorance is exploited even when sellers compete among themselves. This implies that 'perfect competition will not protect the imperfect consumers'.

The conclusion of the adjustment processes described so far remain a few steps removed from reality. Stigler's proposal disappears once the equilibrium is established. It has been argued that in a continually changing real world, the process based on the distribution of equilibrium price acquires a broader concept of equilibrium. Two approaches have been put forward in this context. It has been proposed by Green and Majumdar (1972) that in a dynamic and uncertain situation equilibrium can only be some sort of statistical regularity. Although they have utilized the general equilibrium framework, they have argued that it is applicable to a single market also.

The second approach, Rothschild (1975) involves finding exogeneous reasons for the price variability. It has been assumed that buyers and sellers are unaware of the exact nature of their environments and never find it profitable to become perfectly informed.

Thus the whole of the traditional price theory rests on the tacit assumption that market excess demands are independent of the current market transactions. This implies that the magnitude of income is taken as an independent variable in the general equilibrium model.

Hicks in his *Value and Capital* (1946) has described the role of current transaction in general equilibrium as follows :

> 'Since in general, traders cannot be expected to know just what total supplies are available on any market, not what total demand will be forthcoming at particular prices, any price which is fixed initially can only be a guess. It is not probable that demand and supply will actually be found to be equated at such a guess price, ... if there is a change of price in the midst of trading, the situation appears to elude the ordinary apparatus of demand and supply analysis, for, strictly speaking, demand curves and supply curves give us the amounts which buyers and sellers will demand and supply at the start and adhere to throughout. Earlier writers such as Walras and Edgeworth have therefore supposed that demand and supply analysis ought strictly to be confined to such markets as would permit 'recontract's, i.e. markets such that if a transaction was put through at a 'false' price ... it could be revised when the equilibrium price was reached.'

Hicks (1946) observes :

> " .... in general case .... gains and losses due to false trading only give rise to income effects; .... We have seen again and again that a certain degree of indeterminateness is nearly always imparted by income effects to the laws of economic theory. All that happens as a result of false trading is that this indeterminateness is somewhat intensified. How much intensified depends, of course, upon the extent of the false trading; if very extensive transactions take place at the prices very different from equilibrium prices, the disturbances will be serious. But I think, we may reasonably suppose that the transactions which take place at very false prices are limited in volume.'

According to Clower (1965), it will hardly be a solution, if the income effects are ignored even, they appear to be then unpleaded. He writes that 'The essential question is whether the supply and demand functions of traditional analysis are in any way relevant to the formation of market prices in situation where disequilibrium transactions cannot be ignored.'

According to Clower, a satisfactory way to define such measures is to suppose, that actual transactions in any given market are always dominated by the short side of the market.

Thus, market transactions are equal to planned market supply if demand is greater than supply, and to planned market demand if supply is equal or greater than demand. He writes, 'Taken by itself, this addendum to traditional theory has no logical implications but it opens the way for further analysis.'

Thus, it is seen that with the renewed interest in the non-Walrasian economics after Clower (1965) and Leijonhufvud (1968), the basic idea behind all the models in this area is that price may not clear the markets at all time. Therefore, adjustment can at least partially be carried out through quantities. There has been a bifurcation in this line of research during the last decade, leading to one branch dealing with adjustment processes in a microeconomic setting while the other studies it in a macroeconomic setting.

The former branch can be divided further into two sub-branches, the first of which abandons the assumption of competitive equilibrium in all the markets. They assume some degree of price rigidity, and then study quantity adjustments. Representatives of this line of research are Glustoff (1968), Dre'ze (1975), Benassy (1975a, 1975b, 1977), Youne's (1975), Grandmont and Laroque (1976) and Malinvaud and Youne's (1978), Bohm-Levine (1974) and Heller and Starr (1979).

The second category of researches addresses itself to the problem of non-competitive price formation. Examples of this approach are Negishi (1961, 1972), Benassy (1976) and Hahn (1978).

Attempts relating to the macroeconomic adjustment processes have been confined mainly to the studies of unemployment and inflation. Some important studies are by Solow and Stiglitz (1968), Youne's (1970), Barrow and Grossman (1971, 1974, 1976), Grossman (1971), Benassy (1973, 1975, 1978), Malinvaud (1977), Negishi (1979), Hildenbrand and Hildenbrand (1978), Dixit (1978), and Muelbauer and Portes (1978).

3.2 Adjustments in the Markets Characterised by Shortage

In a shortage economy the seller is rather rigid. Supply does not adjust itself automatically to the demand signals. The more intensive the shortage is, the slower is the adjustment between demand and supply. The more the seller enjoys the dominant position, the more he can leave demand to adjust to supply. This according to Kornai (1980b), becomes the cause of continued shortage. He points that exactly because supply adjusts badly to the buyer's requirements, those products in demand are supplied less and less. Thus, a vicious circle from the sales side is generated. Further, for the seller, the normal level of output stock of unfilled orders is more or less acceptable. He has no strong impulse to deviate from it.

However, the situation is different for the buyers whose demand is almost unsatiable and who would like to accumulate the largest possible stock of material they need most. Therefore they are always dissatisfied.

Earlier it was seen that if the system is in a state of Walrasian equilibrium there is never any shortage. It was also seen that this approach ignored the motivational and attitudinal factors. Kornai argues that any economic system is rarely in the state of equilibrium in the Walrasian sense. There is always a disequilibrium. He designates the shortage case as 'normal'. It is to be noted that Clower (1965) himself took only one step forward. He suggested that when there is an excess demand, it is the shorter side that exerts itself and actual purchase is realised at the level of supply. According to Kornai, it may only be a beginning of the story, but its continuation starts a series of events, e.g. when initial demand is not satisfied, buyers may make forced substitution or may wait for the next delivery.

The adjustment process in a shortage situation in terms of the analysis offered by Kornai (1980b) is briefly considered below, starting with the concept of the 'normal state'.

(a) Normal State

Any normal state according to Kornai (1980b) 'can be itself reproducing, self-perpetuating only because it is accepted as normal by the members of the system. Queuing, postponing

purchases in spite of the available financial means, forced substitution, all these are social costs accepted by the members of the system as normal.' In such a system, shopping is a process and not a single or final act.

It is assumed that only a single group of product is being traded consisting of two concrete products, *G* and *H*. There are '*n*' buyers, *G* is in shortage and requires a queue while *H* is adequately available for all. There is only one seller. The model is dynamic and buyers revise their demands.

If λ_n buyers purchase *G*, $P_G > P_H$ and so *G* is qualitatively superior to *H*. Further, $(1-\lambda)n$ buy *H* voluntarily. Income and all other factors influencing buyer's decision are given and are invariant over time. The only signal at this stage of decision is the relative price $P=P_G/P_H$. Buyers' initial buying propensity is λ_i. Given the relative price (P), $\lambda_i(P)$ is the fraction of buyers of type *'i'* who seek *G* rather than *H*, i.e. it is the probability that a buyer would prefer initially *G* to *H*.

(b) Shopping Process

The shopping algorithm that Kornai (1980b) proposes considers the initial d_i as a function of *'P'* where such effect is absent $\lambda_i(P) = \lambda_i$ for some constant λ_i.

Depending upon the options, and attitudes, buyers are categorised in the following way :

(i) $\varphi(\omega)$ - those queuing to purchase *G*.

(ii) $(1-\varphi(\omega))$ - those not queuing. In this case buyers may insist on buying *G* but may postpone the decision of joining the queue.

(iii) those who did not join the queue but did not postpone the buying decision. In this case they may substitute *H* for *G*, i.e. forced substitution.

(iv) $(1-\lambda_i(p))$ - those who substitute *H* for *G* voluntarily depending upon the relative price (p). Though this possibility is excluded, it relates to those who neither queue nor buy *G* or *H*, but keep the money unspent, i.e., forced saving. In this system, Kornai represents the attitude of buyers by following functions and parameters. He denotes the initial buying propensity at (P) as :

$\lambda_i(P)$; $\varphi_i(\omega)$ propensity at the queuing time ω ;

$\mu_i(P)$ as forced substitution queuing propensity ;

$(1-\mu_i(P))$ as waiting propensity at (P) ;

γ_i, χ_i as Post-*G* and Post-*H*, need renewal rates,

$1/\chi_i$ as average *H* satisfaction time, and

ψ_i as the reconsideration rate.

It should be noted that buyer's attitude is specified in terms of only two signals, *P* and ω. Having once accepted the price *P*, buyer considers only ω. Further, buyers of *'i'* type, are grouped in four categories :

(i) $Y_{1i}(t)$ which denotes to the buyers of type *'i'* who are joining queue at (t).

(ii) $Y_{2i}(t)$ those who have previously acquired *G* and at the time (t) who are not ready to start shopping again, i.e., *'G* satisfied buyers'.

(iii) $Y_{3i}(t)$ those called *H* satisfied buyers.

(iv) $Y_{4i}(t)$ those waiting buyers of type *'i'*, who previously postponed the decision at given queue and at (t) do not decide to consider the same decision.

(c) Supply Rate and Effective Service Flow

The maximum number of buyers who can be served per unit of time in the supply rate R^S. In stores, it depends on initial inventories and deliveries of supplies. There is an effective service flow *(r)*, i.e., actual number of buyers served per unit of time. Further, $r = S$ for $Y_1 > 0$, and $r = 0$ for $Y_1 = 0$, i.e., no service is made if there is no queue. It is to be noted that the queue is the only linkage which makes the participants of the system mutually

interdependent. Queuing time ω appears as the argument in the queuing propensity $\varphi_i(\omega)$. This does not imply that the buyer necessarily percieves ω correctly, but it implies that only the aggregate behaviour of buyers is a function of ω. Non-priority queue is assumed here. It is further assumed that the parameters $R^S, P, \gamma_i, \chi_i, \varphi_i$ are exogenous.

$\varphi_i > \chi_i$ for all i ; $P \geq 0$, average H satisfaction time $1/\chi_i > \psi_i$; φ_i $(i = 1, 2, \ldots k)$ all non-increasing with $\varphi_i(o) = 1$; and have continuous first order derivatives ; λ_i are all nonincreasing and continuous, $\lambda_i(P) - 0$; with lim $p \to \infty$. Forced substitution propensity μ_i $(i = 1, 2 \ldots k)$ are all nondecreasing and continuous such that if $\lambda_i(P) = 0$, for some i, and P, then $\mu_i(P) > 0$.

(d) Adjustment Process

With all these assumption the adjustment mechanism in the condition of shortage can be explained with the help of following equations :

$$\dot{Y}_{1i} = \lambda_i \varphi_i(\omega)\ (\gamma_i Y_{2i} + \chi_i Y_{3i}) + \varphi_i(\omega)\psi_i Y_{4i} - \gamma_i$$

$$\dot{Y}_{2i} = \gamma_i - \gamma_i Y_{2i}$$

$$\dot{Y}_{3i} = [1 - \lambda_i + \lambda_i \mu_i\ (-\varphi_i(\omega))]\ (\gamma_i Y_{2i} + \chi_i Y_{3i}) + \mu_i\ (1 - \varphi_i(\omega))\varphi_i Y_{4i} - \chi_i Y_{3i}$$

$$\dot{Y}_{4i} = \lambda_i (1 - \mu_i)\ (1 - \varphi_i(\omega))\ (\gamma_i Y_{2i} + \chi_i Y_{3i}) + (1 - \mu_i)\ (1 - \varphi_i(\omega))\ \psi_i Y_{4i} - \psi_i Y_{4i}$$

(e) Special Features of Adjustment Process in Kornai's Analysis

In the above model it can be seen that all the state variables, i.e., the effective service flow and the queueing time are functions of time. With the help of the theory of non-linear ordinary differential

equations Kornai shows that results 'exist' and are 'unique'. Its stability aspect is considered here :

It is apparent from the model that when $R^S < D$, i.e., the rate of supply is less than the potential demand per unit of (t), $Y_1^*(\omega)$ approaches a positive value. While when $Y_1^*(\omega) \to o$ for $R^S > D$. He proves that if $\lambda(P) > 0$, and $R^S < D$, and all the four assumptions hold, queueing propensity has second order derivative, φ'' for all $\omega > 0$. In such a case there exists an $\varepsilon > 0$ such that the stationary state is asymptotically stable.

But one thing which is noteworthy here is that the above analysis does not indicate how the system reacts to large perturbations away from the stationary state. At this point Kornai asserts that if we can ignore the possibility of queueing, we can prove that system is globally stable.

Further, there will be no queue when $R^S \geq D$, where D reflects the buyer's attitude (potential demand) concerning (P) and needed renewal rate.

(f) Dependence of Normal State and Supply Rate

(a) D being constant by assumption ω is a continuous function of R^S.

(b) The normal queue $Y_1^* = f(R^S)$. It is positive for $R^S < D$ and zero for $R^S \geq D$.

Thus it can be summarised as the higher the R^s shorter the normal queueing time but not necessarily a shorter queue.

(g) Dependence of Normal State on P

For any fixed R^S, and collection of parameters and functions describing buyer's attitude, there exists a minimal queue clearing price, i.e., a finite relative price P_0 satisfying :

$$P < P_0 \Rightarrow Y_1^* > 0$$
$$P \geq P_0 \Rightarrow Y_1^* = 0$$

In other words 'there is always a relative price high enough to make the corresponding normal state queue smaller. P_0, according to Kornai, renders $D = R^S$. It can be compared to Walrasian market clearing price. If price is below it, there will always be a queue and vice versa.

(h) Queuing Time

$\omega^* = f(P)$ implies that a higher relative price never yields a larger normal queuing time and there is always a restriction price high enough to make the corresponding normal state queue less.

(i) Forced Substitution Propensity and Queuing Propensity

If $R^S < D$, and $\varphi_1, \varphi_2 \ldots \varphi_k$ and $\eta_1, \eta_2 \ldots \eta_k$ are the two alternative collections of queuing propensity function, and, if for all i, $\varphi_i(\omega) \geq \eta(\omega)$ for all $(\omega) > 0$; and for some i; $\varphi_i(\omega) > \eta_i(\omega)$ for all $(\omega) > 0$, then $[\varphi_i]$ is said to dominate $[\eta_i]$.

In this case normal queuing time corresponding to the first collection exceeds normal queuing time of the second, which implies that higher queuing propensities yield a normal state with a larger queuing time. This queuing propensity can be a decision variable of the buyer but the queuing time will be the joint consequence of various decisions of individuals.

The actual shortage depends on the tolerance of the buyer. Higher forced substitution propensity never yields longer queuing time.

(j) Frictions of Adjustment in Markets Characterised by Shortage

Case I. *When seller is ignorant of buyer's initial demand.*

In the state of shortage, if a seller does not know any thing about the composition of initial demand, all the 'm' products will be presented in equal shares in his total supply.

In this case he follows the following stock rule.

$$S_t = (1 + \lambda)\, D/m \qquad \lambda > 0.$$

where $D = \sum_{i=1}^{m} d_i$ is the total initial demand

λ = the stock parameter.

It is to be noted that λ is a decision variable of the seller also used as stock indicator.

Buyer in Friction of Adjustment

A buyer in such a situation tries to satisfy his initial demand, part of which still goes unsatisfied and is covered by forced substitution. If the ratio of forced substitution is zero, it implies that no forced substitution was affected, if it is equal to one it would imply that all purchases were completed by forced substitution.

The forced substitution ratio is defined as the quantity purchased by forced substitution divided by total purchase. The problem associated with it is that we cannot know the value of this ratio exactly. An upper limit can be provided, which, the buyer does not exceed even in the most abnormal deviations between the composition of demand and supply. Therefore,

$$FS.\ (d.s.) \leq FS^{\max} \text{ for any } d, s.$$

This may also be taken as a shortage indicator.

If the total initial demand is concentrated on a single product then $1/m$ fraction of the demand will be satisfied in the line of initial intentions, the rest will be satisfied by forced substitution.

Further, if the seller is willing to keep as much stock of each product as the total initial demand, the initial demand vector would always be satisfied, even if all the initial demand is concentrated on a single product. Thus it can be concluded that shortage intensity is a decision function of product slack.

Case II. *When seller is aware of buyer's initial demand.*

If $d_1^{Pred.} \ldots d_m^{Pred.}$ are seller's prediction of buyers initial demand then $\sum_{i=1}^{m} d_i^{Pred.}$ = D, i.e., the total initial demand. But

the possibility of prediction error cannot be ignored. If E_i is the prediction error then

$$E_i = \begin{cases} d_i - d_i^{Pred.} & \text{if } d_i^{Pred.} < d_i \\ 0 & \text{if } d_i^{Pred.} \geq d_i \end{cases}$$

If maximum value of indicator of prediction error is $E_i^{\max} = D - E$. This arises if buyer's entire initial demand is directed to one favourable product.

The logic of the rule which seller uses in this modified case is that seller's starting point has some predicted demand for the product. This may have to be multiplied by the stock factor $(1 + \lambda)$.

Thus, the friction function has the form

$$(F.S.)^{\max} = f(\lambda. E)$$

It can be seen that the larger the intensity of shortage, the smaller is the product slack, and the larger is the error in decision maker's prediction. If prediction improves, smaller product slack is required for the shortage intensity to remain at the same level.

Delay and Rigidity in Seller's Adjustment

Keeping the short run adjustment in view, let us assume that there is no problem with information. The seller knows exactly at (t_0) that initial demand has changed suddenly, say, d' > d. Let us assume further that there has been no shortage before (t_0). Then the question arises that how far is supply adjusted to meet the new initial demand ?

Path of the adjustment is represented as -

$$S(t) = \Omega(t) \; d + (1 - \Omega)(t) \; d'$$

(supply) (resistence parameter) (old initial demand) (New initial demand)

If $\Omega = 0$, then there is perfect adjustment and $S(t)$ has adjusted to $(1 - \Omega)(t)\, d'$.

$\Omega = 1$, then no adjustment has taken place and continue to be equal to the old initial demand as at $(t) < (t_0)$.

Thus we see that delays and rigidity in seller's adjustment is attributed to the resistance parameters. There may be many factors which can be used to explain it, e.g., the subjective restriction on the part of the decision maker. The most obvious explanation is the desire for a quite life. It is always easier to respect old patterns if no significant reward is present for the newer efforts and thoughts. If new initial demand is adjusted by $(t + 1)$ then the delay is $\Im = ((t + 1) - t_0)$; and the rigidity indicator can be defined as $\xi = \sum_{t=t_0}^{t} \Omega(t)/\Im$.

These friction factors are connected to shortage and slack by a similar relationship. The greater the $\Im(lag)$ the more rigid the adjustment of supply to change in initial demand, the more intensive the shortage will be, then the buyer will be forced to search more, accept more forced substitution and so on. Meanwhile, as a consequence of the difference between physical supply and initial demand a larger slack may develop.

According to Kornai, shortage, slack, as well as friction each has a normal level. It is the norm of shortage to show, in particular, resistance to change. A reduction of friction in some field does not necessarily entail that there will be a permanent elimination of shortage in that field.

3.3 Adopting Disequilibrium Analysis for Black Markets : Some Considerations

In essence, black markets are markets in disequilibrium. Such markets are characterised by continuous tensions, informational rigidities, and risks as well as penalties. Buyers may be in search of sellers and sellers may be in search of buyers too but the market is diffused and spread out. Thus the main features of the disequilibrium analysis considered in this chapter offer a framework in which analysis of black markets can easily be cast; the main modification that is needed is to incorporate the presence of legal and police surveillance mechanism which are associated with the economic controls that lead to the generation of black markets. In the presence of this additional force which becomes a third party apart from the buyers or the sellers, the

adjustment processes described earlier would need to be modified, the implications of which can be analysed from the view point of (i) buyers, (ii) sellers, and (iii) police surveillance authorities. Conjointly, they will have implications for the policy-making entities entrusted with the formulation of economic controls.

As far as the buyers are concerned, the basic difference would be a change in the cost functions associated with search cost that were introduced in some of the markets dealing with non-tatonnement processes. It is expected that in the presence of the police surveillance mechanism , the cost would increase. These would also be the additional consideration of penalties associated with getting caught in an illegal transaction, however, the nature of penal cost may be asymmetric between buyers and sellers. Except in some cases the penalties imposed on sellers are likely to be much higher than those on the buyers, if any. Thus in black markets also there is scope for formulating search rules, as has been done in some of the models reviewed here.

In the case of sellers, there would be a change in the cost functions, also can now be cast in expected value terms by utilizing probabilities of getting caught and the associated penalties. In their case, there may also be an element of search cost in the sense that buyers are not necessarily aware as to availability of the supplier. Sellers are not passive participants in the market but they cannot advertise their goods explicitly. Therefore, they have to incur themselves certain search costs. As indicated earlier, in the case of sellers, the costs in terms of penalties are likely to be much higher.

While for individual black markets, modifications in the cost functions, both for buyers and sellers, would enable the adoption of the existing disequilibrium literature to black markets as far as the macro system is concerned, where there are global shortages and where several illegal markets co-exist, the presence of the police surveillance authorities provides the basis for a qualitative change in the analytical framework.

Although, a formal analytical framework for analysing the implications of inclusion of regulatory bodies in black markets [illegible] readily available, an insight can be obtained from some

of the empirical studies. In particular, it is not necessarily implied that higher costs on the police surveillance mechanism would be associated with a reduction in the incidence of illegal behaviour. Even conceptually, it can be argued that beyond a point the returns to additional investment in police surveillance mechanism, may be very little. In fact, due to secondary corruption they may even be positively associated. Secondary corruption takes place when the buyers and sellers in the black markets respond to the regulations and penalties by offering a part of the premium that they receive, to the surveillance authorities as bribes, with a view to reducing the probability of getting caught as well as the amount of associated penalties.

The new costs of administering economic regulations could be quite high if it is a part of the society's objective that such regulations are meant to be implemented and not meant to be bypassed by the channels provided by black markets and secondary corruption. In fact, an explicit consideration of the economic costs of price and other controls is not automatically a part of the policy framework in which such decisions are taken. Most economic control decisions are taken in a segmented manner, in isolation of each other, however, they are regulated and administered by a mechinery which is largely common for them, although, there may also be some specialised bodies for specific illegal activities. The number and scope of economic controls therefore bears little relationship with the capacity of the police surveillance mechanism to cope with them. The result is that with inefficient administration, the objectives of economic regulations are only partially met and a number of distortions are caused by the fragmentation of the markets and additional costs for buyers and sellers. The subjective costs of running a society with compromised values in the presence of extensive corruption are in addition to these considerations.

In the following chapters and attempt will be made to study various aspects of the black market of a selected commodity group. It would provide and actual context which we can cast in the framework of the analytical tools of the economics of black markets that have been considered so far.

4

DRUGS AND TRAFFICKING : SALIENT FEATURES

"Homer sang of it, Hannibal died of it and Nero gained power with it." Celsus, a Roman physician of the first century, alludes to opium under the quaint name of "poppy tears".

Drugs have been in use, in one way or the other, since the inception of human race. Herbs, roots, leaves, plants, etc. have been used to relieve pains and help control diseases. The use of drug in itself does not constitute an evil, if properly administerd. It is in fact a medical blessing. Unfortunately, certain drugs also initially produce enticing side effects, such as a feeling of euphoria, a sense of 'feeling good', elation, serenity and power. What began as something of recreational activity has evolved in time into a problem of dependence and abuse. During the course of the past few decades, drug abuse has spread at an unprecedented rate and has fanned out to almost all corners of the globe. It has imposed a staggering burden on the people and the nations of the world. The illicit production, distribution and sales of these drugs have intimidated and corrupted public servants and have even destabilised governments. The sheer volume of 'drug money' has affected the money supply and exchange markets. It has had an inimical impact on people in all walks of life, of all ages and classes. It has been having a damaging effect on traditional values, life style, and therefore it poses a serious threat to societies everywhere.

In the present chapter, aspects of the drug trade are considered. Only those drugs are considered here, which have

been classified as narcotic and psychotropic drugs. According to pharmacologists, narcotics are drugs that depress the activity of the brain and the Central Nervous System (CNS). Psychotropic drugs are those which produce psychological dependence and thus, the abuser is forced to take subsequent doses in order to return to his previous psychological state. Illegal activities involved in drug trade are commonly known. These involve processes ranging from the illegal purchase of raw materials to the illegal sales of processed drugs on the street to the final consumer, i.e., the drug addicts and neophytes, i.e. fresh drug abusers.

In various studies made through interviews and informal conversations with traders and abusers of these drugs, it was found that the *modus operandi* had certain special features making the black market activities in drugs rather distinct compared to other black markets.

An analysis of a whole range of reports on drug abuse throughout the world suggests that drug dependence is increasing at an alarming rate in every part of the world. With every form of increase there is a concomittant increase in lawlessness, i.e. crime and violence and crime against property. Further, the impact is predominantly among youths, and thus it is going to affect not only the present but also the future generations.

4.1 Types of Drugs of Abuse

Since drugs being abused nowadays are of a large variety, it may be useful to classify them on the basis of their characteristics, constituents, and psychophysiological effects. One classification is in terms of 'hard' and 'soft' drugs. The 'hard' drugs refer to narcotics and 'soft' to all others. These terms are not very appropriate, as 'hard' is equated with 'dangerous' and 'soft' with 'not so dangerous'. There is in fact no scientific basis for such a classification and many soft drugs are much more dangerous than some drugs belonging to the hard category. The fallacy about hard and soft drugs have been responsible for a greater concern being expressed over heroin addiction than over the numerically much greater dependence on the other drugs. For

the sake of convenience, major drugs are classified under the following heads :

(1) Opiates
(2) Cannabis products
(3) Products of Erythroxylone coca
(4) L.S.D. and Indolic Hallucinogens
(5) Psychoactive phenylisoproputamines
(6) Phencyclidine
(7) Amphetamines and structurally related drugs
(8) Combined substances
(9) Look alikes
(10) New combination possibilities.

4.1.1 Opiates

The products of Papover somniferus (Poppy) are collectively referred to as Opiates. It may be encountered in crude form like opium and poppy straw or more purified chemical substances such as morphine and heroin. Opium contains 25-30 alkaloids of which morphine, codeine, thebaine, noscapine papaverine, marceine, and heroin are the most important ones. Morphine is generally available in the form of tablets and powder which may have codeine. The second most important item among opiates is heroin, which ranks rather high in the illicit drug trade.

Studies have shown that opiates including heroin, morphine and synthetic narcotics such as pathedine and methadone develop tolerance and psychophysiological dependence characterised by physical disturbances (an abstinence syndrome) when its dose is discontinued. Its complete withdrawal may result in severe health disturbances and occasionally death. Its abuse in combination with alcohol, sedative hypnotics or tranquilizers produces potential effects leading to increased tolerance, dependence and risk of death. Its prolonged abuse causes loss of appetite, bodyweight, constipation and malnutrition. An abuser commonly uses the same needle for many individuals. Since it is unsterilized it causes hepatite obsessions, endocordities and other ailments,

(U.N. Scretariat, 1982, Siegal, 1985,).

4.1.2 Cannabis Products

The abuse of cannabis is very old, but its abuse in its modern form, i.e. in the form of its derivatives like marijuana, hashish and liquid hashish has grown very rapidly in recent years.

The abuse of cannabis products increases tolerance and dependence. It has predicatble effects on heart, causes postural hypertension, cerebrovascular diseases, or coronary arteriosclenosis. Recent findings indicate that maternal and paternal exposures to cannaboids can reduce the development of reproduction functions in to the offsprings. It has damaging effects on endocrine functions in both male and females. It interferes with the learning process and intellectual performance. Its prolonged use leads to intense physical dependence and psychological disturbances ranging from anxiety reactions to alteration in sensory and perceptual functions, (U. N. Secretariat, 1982).

4.1.3 Products of Erythroxylone Coca

Cocaine hydrochloride and coca paste which are commonly traded in illegal markets are derivatives of coca leaves. Coca paste is an intermediary product in the chemical extraction of the cocaine hydrochoride from coca leaves. Cocaine hydrochloride, is a powerful euphorant. Its abuse produces a brief elation, that quickly gives way either to a return to the baseline mood, or to the displeasure resulting in a strong desire to return to the momentary escablatic experience, a cycle that leads to compulsive use. The high dose of cocaine induces physical dependence but this is a less contributory factor than the intense psychological craving to perpetuate cocaine use (Cohen, 1884).

4.1.4 L.S.D. and Indolic Hallucinogens

Hallucinogens include a number of substances such as lysorgic acid diethylamide (LDS), phencyclideine and diethyltryplamine. Even in small doses these drugs produce intense effects causing detachment form reality and an inability to function normally.

Even small does produces distortion of perception, hallucination, psychotic reactions, often accidental death and suicide (U.N. Secretariat, 1982). LSD has been encountered in a variety of presentations, in solutions, tablets, in sugar lumps, in refilled capsules, microdots, dones and increasingly in recent years with absorption paper (O'Neil et al., 1983).

4.1.5 Psychoactive Phenylisoproputamines

Since 1977, there has been a decreasing trend in the abuse of LSD concomittant with an increase in demand for substituted amphetamine compounds. The most popular are MDA, MMDA and MDMA.

They have appeared under a variety of street names such as 'love drug' (MDA) and 'ecstacy' (MDRA) which seem to have enhanced their appeal. Their effects are like hallucinogens (Stafford, 1983). These are generally sold at prices US $ 6-10 for a single dose (Perry, 1974).

4.1.6 Phencyclidine (PCP)

This had been sold in cigarettes laced with 35-75 mg of PCP powder up to 1970, but nowadays, it has been replaced by tobacco cigarettes dipped in concentrated liquid PCP. Such a treatment increases its dose to as much as 120 mg per cigarette. The combination of PCP with cannabis cigarettes is also very popular.

It is available at $ 10-20 per cigarette. An intensified dose leads to the dissociation of the abuser form reality. It remains a dose of choice but it is often associated with confusional delirium and violent psychotic disorders (Siegal, 1985, Domino, 1981; Smith, 1980).

4.1.7 Amphetamines and Structurally Related Drugs

Amphetamines are used in medicine as stimulants for the central nervous system. Prolonged abuse of these produces tolerance and dependence and causes malnutrition, hypertension, high blood pressure, loss of co-ordination and collapse. Aggressive behaviour and paranoid psychosis are also its common effects. Its withdrawal causes deep depression, fatigue

and often suicidal tendencies. The increased tolerance and dependence compels its abuser to return again to the previous state (U.N. Secretariat, 1982).

4.1.8 Combinations and Multiple Drug Abuse

In 1965, a mixture of codeine and glutathemide came in use among the individuals seeking heroin like euphoria. Cocaine is also used with other drugs. The 'speed ball' as it is commonly known, is a combination of intravenous injection of cocaine hydrochloride and heroin. Observations show that its popularity is increasing. Some abusers also use heroin to come down form the stimulating effects of cocaine for the same reason alcohol, methaqualine, barbiturates and benzodiazepines are also used. Thus in addition to the problem of cocaine abuse, a physical dependence of depressants also develops (Cohen, 1984). A major reason for such popularity is that a drug of two substances combined can be obtained at a lower price than it would cost for a dose of pure heroin producing similar effects.

The physical dependence, toxic crisis reactions and fatal doses have been described as result of these polydrug abuses in Siegal (1985).

4.1.9 Look Alikes

The look alikes are substitutes of the main drugs which have been in use. An increasing trend towards developing these has been observed in recent years. Any average look alike stimulant contains a combination of caffine (250 mg) phenylpropanolamine (50 mg) and ephedreine sulphate (25 mg). Ingestion of such a large quantity shows clearly that these abusers have got a high tolerance level.

These low cost look alikes enable the abuser to continue consuming these substances for a long time. A hundred capsules of this look alike were sold at $ 20 approximately (Siegal, 1985).

It has been observed that existing combinations slowly disappear as new experimentations are made with new drugs. Recent experimental combination reported by young abusers includes the following non-prescription medicines, ephedrine

with pyrilamine maleate, ephedrine with phenobarbital, and ephedrine with diphenhydramine hydrochloride etc.

Studies have supported that these combinations are used as more potentiated substitutes and therefore, yield high levels of dependence. Search for new possible combinations continues.

4.2 Psycho-physiological Aspects of Drug Abuse

Opium, Cannabis, cocaine, mescaline etc., are among the principal drugs abused today. All of these have mythological associations and all have been attributed mystical properties within the confines of circumscribed cultures. A wide variety of claims have been made for these, but as these claims were disproved, a tendency to substitute new synthetic drugs has emerged. In fact, the habit of taking drugs has different origins. In the culturally influential countries the rise in the incidence of drug dependence has occurred simultaneously with wide spread signs of general unrest and revolt among its youth, particularly students and the more intellectual persons. Such a revolt may be characterised by a lack of any clearly defined social or political purpose and the desire to destroy the established order. This may reflect the lack of any new ideologies via which their hopes for the future may be channelized. Since the old political ideologies, that formally served as foci have largely failed, discredited or had their limitations exposed.

At the level of an individual, it is seen that the variability with which an individual reaches emotional maturity is also a factor of prime importance. Intelligence reaches a peak in adolescence and physical maturity in man gradually occurs earlier while, emotional maturity may not be reached until the mid thirties and extends over a much wider age range.

Physical and intellectual maturity gives a very false idea of a young person's ability to cope with the problems of life. The general factor of causation raises complex issues relating to which only some opinions can be expressed. In such a state very few are able to restore their orientation towards creative or constructive aims. Lack of purpose apparent among youths makes it difficult for the less equipped to face the reality. Since

they are frustrated, they seek a release which leads them to drugs. Mother Teresa, at an international conference on drug awareness held at Bombay on 24th March 1989, remarked, 'Drugs and alcohol are used to forget, to get rid of loneliness within, the hunger for love is much greater than for a piece of bread and it drives people to drugs.'

Once they fall into this habit, the effect of drug deludes them into believing that they have found some new meaning of life. Slowly it becomes too late to stop and they become dependent. The easy availability of drugs provides a means of relief form the boredom of every day life.

4.3 Drug Scene and Drug Subculture

Studies have shown that individuals who abuse drugs, lose touch with reality after some time and live in their own world which depends upon the nature of drug they abuse. In the scientific community, it is known as the 'drug scene' (Lucchini, 1985). It generally comprises four distinct categories of people :

(i) neophytes,

(ii) addicts who enjoy higher status vis-a-vis other addicts,

(iii) multiple drug addicts, and

(iv) non-addict drug dealers.

It is interesting to note that the drug scene has its own hierarchy, structure and criteria of success and failure.

The life styles of the addicts and the drug sub-culture (which is classified according to the drug being used, e.g., 'cocaine subculture) are largely influenced by the drug they consume. Every drug scene deteriorates in time so that it becomes fragmented into small groups. This is usually caused by legal interventions or massive influx of new addicts. The fragmentation of drug scene is followed by an increase in the multiple drug abuse which often aggravates the activity behind the illicit drug trade. While addict's physical concern is to obtain the daily dose of his drug, drug addiction, drug scene, legal measures and social controls all combine to impose severe constraints on the addict. In drug scenes, the young addict generally avoids situations that might appear as a challange though, he remains in a continuous search for his identity and

thus, is continually brought face to face with his identity as a drug addict.

The drug scene is hierarchically structured; it has its own leaders and followers. There is a social differentiation and division of labour which, in some cases may be very elaborate (Premble and Casey, 1976).

The social status attained in drug scene involves two functions : (i) identification function, and (ii) gratification function.

Through the identification function, the young addict compares himself to the group of its leaders. He perceives the role assigned to him as his personal identity. Whenever identity conflicts arise, the young addict applies the rules of the drug scene, which help him to stabilise his drug consumption for a certain period of time. For example, if heroin is the predominant pattern in the drug scene, multiple drug abuse will be less common and most of the young addicts will remain faithful to heroin.

In addition to the pleasures derived from the drug abuse, the gratification function refers to the reward the addict enjoys if he conforms to the norms and rules of the drug scene. For example, the young addict can count on some regularity and equality in the distribution of drug and on some control of quality.

Fragmentation in the drug scene occurs when legal disruptions and massive influx of new addicts results in the loss of stability to the structure of the drug scene. Its organisational hierarchy becomes overturned, giving rise to an anarchy of needs and scarcity of the drug supply. At this time, multiple drug abuse starts increasing, making law enforcement and social controls more difficult. For this reason it has been argued by Lucchini (1985) that, the effect of identification and gratification functions of the drug scenes should be given attention in considering the prevention of the consequences of drug addiction.

A drug subculture has its own system of social norms and rules governing interactions of the addicts and requiring them to show a high degree of conformity, thereby inducing more

dependence of addicts on drugs. This conformity may differ according to the type of hierarchy and stratification that characterise different drug scenes.

As a general rule, the greater is the degree of hierarchy and stratification, the greater is the degree of conformity required. In some cases it was found that in a drug scene, there may be some initiation that the neophytes (young addicts) must undergo. It motivates them for criminal acts which in turn supplements their deep satisfaction because of the conformity to the norms of the drug scene. Such criminal activities are not for obtaining drugs but also as a component of the hedonic life style of the addict. This was confirmed by statements made by the young addicts (Cusson, 1981).

The illegality of the drug requires considerable intellectual and social efforts on the part of the addict and the search for the drug is a full time activity. This activity is not determined exclusively by the needs to obtain drugs for consumption but it is also a source of social gratification in drug scene.

An addict in possession of certain amount of drugs becomes the centre of attention and the focal point for requests, through which he gains new identity, which he may perceive as a reward never experienced before.

Some authors like Berger et. al (1981). point out that drug addicts should be regarded as individuals who depend more on the life style they maintain than on the drug itself. Other studies (Blumer, 1976 and Becker, 1974) have thrown light on the influence of a stable drug scene on the development of the drug dependent behaviour.

According to Cohen (1981) the nonaddict drug dealer is an important agent in drug scene. He compares dealers who are the managers of the system, to a slave trader, each of which, is aware of his death, his suicide, his Junkies, and the often suspect origin of money paid to him. It is this dealer who determines access to drugs. As long as his source does not dry up he can easily replace a drug scene by another by changing the supply of drug. The nature of the drug scene and its predominant hedonistic philosophy are particularly well suited to the quest of immediate satisfaction of the pleasure instinct.

Even an addict who enjoys a high social status remains totally dependent on the drug scene.

The drug addict neither knows how, nor is able to invest his energies over long periods, and thus he cannot imagine lasting and cooperative relationships.

Cooperation is limited to the immediately attainable objectives which is nothing other than conforming to the drug scene implying increasing involvement with drugs.

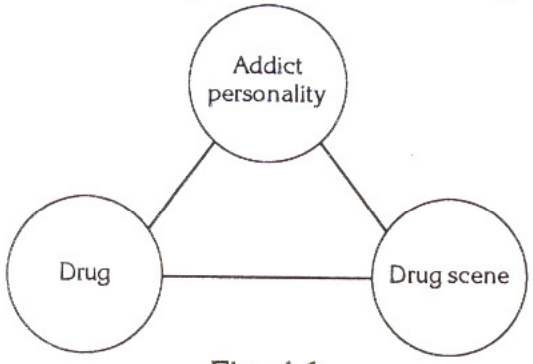

Fig. 4.1

In the triangular relationship depicted above, if the drug factor predominates the other two, the addict gradually begins to withdraw from his surroundings. Such a process has been seen in the cases of opiates, amphetamines and to all combinations of psychoactive substances involving massive use of drugs.

Finally, the core effect is summarised by De Jong, who writes that the neophyte feels little need to share his experience with those around him. At this state the illegal heroin itself need not occupy any important place in consumer's day to day life. As the level of his consumption increases, the addict is unable to do anything but to search for the drug (De Jong, 1983).

4.4. Tolerance, Dependence and Drug Abuse

For a number of years 'World Health Organisation Committee on Addiction Producing Drugs' has attempted unsuccessfully to define drug addiction for the use of international control. In 1964 they recommended that drug dependence can be defined as a

'state arising from repeated administration of a drug on a periodic or continuous basis and induced both psychic and physical dependence.' They felt that this characteristic varied with the drug involved so that there would be a drug dependence of morphine types, or of amphetamine type and so on.

However, to define dependence scientifically, tolerance would need to be defined first.

It can be defined as a decrease in biological response that results from repeated administration of the same dose of a drug. It can therefore refer to the fact that the dose of a drug has to be increased in order to produce the same biological response as the initial dose.

Physical dependence can be considered as referring to the changes in the organism's underlying tolerance, such that withdrawal of the drug results in the manifestation of the abstinence symptoms, which can be reduced or abolished by another dose of the durg.

Studies by Warberton and Segal (1971), Russel et al. (1971a), Ressel, Warberton and Segal (1969), Kaito and Goldberg (1969), Martin (1970), Russel and Warberton (1973), Russel, Vasquez, Overtreat and Dalglish (1971b), and Warberton (1975) show that the normal performance of the addict depended on the continued presence of the drug. From these studies it can also be seen that some of the basic systems of the brain are capable of adjusting biochemically to maintain the behaviour within the normal limits, but it must, however, be pointed out that the rate of adjustment for a particular behaviour depends on the extent of their dependence on the neurochemical system. In many studies it has been found that the magnitude of abstinence symptoms depended to a certain extent on the dose. Further, it is interesting to note that the direction of the effect was opposite to that of tolerance.

It might be expected, therefore, that in the case of human dependence if a drug produces euphoria and anxiety reduction then its withdrawal results in dysphoria which can be eliminated by further injection and so, escape from the abstinence symptoms could form the basis for drug dependence.

Here two examples are considered, one, dependence in the case of opiates and the other in the case of amphetamines.

Dependence in the case of opiates seems to fall in two phases- the initiation phase and the physical dependence phase. The first dose of an opiate gives the subject an elevated mood with the amount of euphoria depending upon the dose administered and the route of administration. Warberton (1975) notes:

> 'The opiate novice finds that if subsequent injections are closely spaced the dose must be augmented to achieve the same impact effect. This represents the development of tolerance to the effects of drugs. After a while the impact and coasting euphoria effects of the injection diminish as physical dependence develops and repeated injections are then required by the addict to alleviate the unpleasent depression that begins to occur as the drug effect wears off.'

Thus, the physical dependence phase is characterised by the need for the effects of the drug to maintain normal functions.

Tolerance for opiates has been described by Deneau (1972), as a shortening of the duration of dose effects, and a diminition of the biological effects of the opiate drug. The rate and degree of development of tolerance depends on a number of factors including individual biological responses, type of opiate (drug) dose and its frequency of administration.

Amphetamine abusers report that the drug gives them a feeling of excitement and omnipotence. The following is an account of a subjective experience of amphetamines,

> 'Hay man, dig it here's how it feels... Do you like to drive fast in your car, see with no wind shield, see, and they say you can have the New York city all to yourself with all the other cars gone. You can do anything you want, ...you can go fast, as you want to go, Dig it man, imagine all that power...'
>
> (Gioscia, 1972, p. 167).

This intense euphoria can be experience by an oral dose in the first instance but often users progress to intravenous injection to intensify this effect. In order to prolong the pleasant sensation the abuser has to give himself another dose after 3-4 hours and then repeatedly.

Thus the major factor in dependence is the euphorian effects. Avoidance of abstinence symptoms also contribute to the motivation of intake (Warberton, 1975).

4.5 Trafficking in Drugs

The Oxford Advanced Learner's Dictionary defines the term 'trafficking' as "a trade (in commodity especially illegally or immorally)". The term is defined quite elaborately in the Prevention of Illicit Traffic in Narcotic Drugs and Psychotropic Substances Act, 1988 (PITNDPS, 1988) in its clause 2 (e) as follows :

2 (e) Illicit traffic in relation to narcotic drugs and psychotropic substances means;

(i) cultivating any coca plant or gathering any portion of coca plant;

(ii) cultivating the opium poppy or any cannabis plant;

(iii) engaging in the production, manufacture, possession, sale, purchase, transportation, warehousing, concealment, use or consumption, import interstate, export interstate, import into India, export from India or trans government, of narcotic drugs or psychotropic substances;

(iv) dealing in activities in narcotic drugs or psychotropic substances other than those provided in sub-clause (i) to (iii); or

(v) handling or letting any premises for the carrying on of any of the activities referred to in subclauses (i) to (iv), other than those permitted under the Narcotic Drugs and Psychotropic Substances Act, 1985, or any rule or order made or any condition of any licence term or authorisation issued, thereunder and includes :

(1) financing, directly or indirectly, any of the aforementioned activities;

(2) abetting or conspiring in the furtherence of, or in support of doing any of the aforementioned activities; and

(3) harbouring persons engaged in any of the aforementioned activities.

It is clear that the term trafficking involves trade in commodities, the consumption of which is considered to be undersirable. As far as the legal definition is concerned, all aspects of marketing, starting from the initial points of supply, all the way to the final consumers are covered under the term trafficking.

Illicit drug trade is a product of human need and human greed. Drug business generates huge illicit funds which are used to support these activities further. Its larger profits and unlimited prospect attracts many enterprises including international networks.

Drug business involves huge profits. A serious limitation in any study dealing with illicit activities is the lack of a sound data base. But to have an idea of the profitability involved in the drug trade a few studies reported by United Nations are highly informative.

For example, Stalmer et al. (1983), have reported:

> "Opium farmers in the 'Golden Triangle' (Burma-Thailand-Laos) and the 'Golden Crescent' (Afghanistan-Pakistan-Iran) regions of Asia receive Can. $ 800-1500 for ten kilograms of opium which in turn yields one kilogram of pure heroin. One kg of pure heroin produces Can $ 15000 for traffickers in the region of heroin laboratories. When that one kilogram of heroin is delivered in Montreal, Toronto and Vancouver it will sell for Can. $ 200000 at the wholesale level, the final product that emerges after being cut and diluted is a capsule dose unit, costing Can. $ 35-45 to the addict population... One kilogram of pure heroin can, (thus) generate sales totalling Can. $ 15 million."

The profitability involved in drug trade is quite clear from above citations. This attracts the greed and lust of typical profiteers with glamorous dreams, to enter the trade. The risk involved, enormous profits and the very nature of dealings lead to other activities also. It has given birth to several criminal organisations and organized crime syndicates which operate for one purpose only - financial gains and the power it brings, Stalmer et al. (1983). Whenever a criminal organisation

becomes established it takes a life of its own. It can survive and continue its operation even though several of its key members are removed through prosecution and imprisonment provided its financial assets remain intact. Drug syndicates operate in almost everymetropolitan city in the world and are having extended networks to cover the region in the periphery. Their activities are such that they attract organisations from different countri. In drug scenes, the young addict generally avoids s tuations that might appear as a challange though, he remains in

continuous search for his identity and thus, is contin ally brought face to face with his identity as a drug a dict.The drug scene is hierarchically structured; it has i s own leaders and followers. There is a social differentiati n and division of labour which, in some cases may be very elabor

te (Premble and Casey, 1976).The social status att ined in drug scene involves two functions : (i) identification functi n, and (ii) gratification function.Through the identificati n function, the young addict compares himself to the group o its leaders. He perceives the role assigned to him as his p rsonal identity.

Whenever identity conflicts arise, the young addict app ies the rules of the drug scene, which help him to stabilise his drug consumption for a certain period of time. For example, if eroin is the predominant pattern in the drug scene, multiple rug abuse will be less common and most of the young addicts w ll remain faithful to heroin.In addition to the pleasur s derived from the drug abuse, the gratification function refer to the reward the addict enjoys if he conforms to the norms and rules of the drug scene. For example, the young addict can count on some regularity and equality in t e distribution of drug and on some control of quality. ragmentation in the drug scene occurs

when legal disruptions and massive influx of new addic s results in the loss of stability to the structurthat it brought to its traders initiated several other types of activities also, which included the diversion of raw and processed material from legal sources, clandestine processing of drugs, adulteration etc. For example, traffickers of illicit drugs have

proved to be very adept at synthesising a great variety of drugs including methaqualone, methamphetamine, at source by paying several times higher prices to the grower than which the grower could get from selling to legal buyers. These diverted materials are then processed in clandestine laboratories and from there it is moved forward for sales.

The international organization and local agents both help each other to establish the clandestine laboratories so as to maintain smooth supplies. It is a problem faced not only by countries producing raw materials of drugs but those also who come in the routes of various destinations. The rule followed in setting up the plant suggests the settlement at the place which is geographically, legally and economically most convincing.

These laboratories not only process the raw materials but also synthesise many drugs for 'combination drug supply'. Thus it is used for drug combination, adulteration, dilution and formulation. Such laboratories have been seized in Belgium, Denmark, Iran, Mexico, Netherlands, Korea, Sweden, UK and Northern Irelands, and USA.

Clandestine laboratories in Canada and FRG were manufacturing PCP and LSD, Methaqualone was being manufactured in Mexico. Clandestine laboratories manufacturing heroin have been seized in Burma, France, Iran and Italy. Cocain was produced in South American countries, Haislip (1984).

In addition to the clandestine synthesis of drugs there has recently developed a practice of clandestine production of pills utilizing controlled and non-controlled drugs from diverted bulk powder. The most outstanding example of the phenomenon is the recently documented worldwide diversion of methaqualone powder. It appeared that methaqualone was diverted virtually from every country in which it was illegally manufactured. The bulk of the powder has been ordered by drug traffickers through legitimate brokers in the 'free zone areas', who in turn ordered powder directly from manufacturers. The powder was often shipped to countries in the Carribbean for making tablets to be smuggled to US and other destinations.

These laboratories not only process a product developed with diazepam, which is used in the production of methaqualone counter-feits that resembled 'Quaa lude 300'S. including the inscription 'Lenamon 714'. These mathaqualone lookalikes which contain diazepam as an ingredient have been found throughout the world.

Organizations dealing with such activities have been found in many countries. In a typical scenario, the traffickers possess a legitimate enterprise and place an order for bulk diazepam through a broker or directly from the manufacturers. Because the powder has been controlled neither internationally not in any country manufacturing it, the transaction point was legal. The powder was once more shipped through free ports into the country of destination where it was to be used for illegal purposes. The existence of legal channels of production, trade and consumption also helps in hiding clandestine operations and diversion of legally manufactured drugs for illicit usage. Chatterjee (1981) observed :

> "The restriction upon distribution of drugs, on a retail basis, have been weakened by the fact that, in certain countries, drugs are distributed on the strength of 'oral' prescriptions without verification of the validity of the medical practioners or of the persons to whom such drugs are distributed. Unless an appropriate method of identification of the parties, i.e., medical practioners and patient (by whatever means appear to be suitable or appropriate), and unless some uniformity in the pharmacy laws of various countries concerning these procedural means have been achieved, all efforts towards control of trade in drugs will meet with only partial success. To this should be added the practice of physicians in many countries of acquiring drugs for their personal use without any appropriate prescriptions for themselves, and indeed the incidence of drug addiction is quite high among physicians in many countries".

Diazepam has also been found in varying amounts in combinations with other drug, including heroin, PCP, dihydrocodeine and chlorodiazepam. It has also been found to be the active ingredient in shipment of counterfeit of hydromorphene (Dilaudid) tablets, a potent synthetic narcotic used against pain. This drug has been found smuggled from

south America to US. This new trend of counterfeiting hydromorphene was discovered in September 1980. Initially the traffickers used caffine or phenobarbital as the active ingredient.

It can be seen that by utilizing intermediaries and resources diverted from 'free zones' and by exploiting gaps between national and international laws the drug traffickers have gained access to a great variety of drugs and chemicals.

4.6 Drug Trafficking - *Modus operandi*

Since the risk of arrest and seizure is high, traffickers use various techniques and methods of hiding the material, camouflaging and continuously altering them. Some trafficking methods are rather astonishing. It has been found that diplomats of various countries have been participating in such activities. Since they have special governmental facilties, for them chances of being caught is less. Similarly, many other distinguished dignitaries like ex-kings and princes have also been found involved in the trade. Diplomatic bags, workers of international air and shipping services are also utilised for trafficking.

Many other methods have been found in various encounters. For example, marijuana, hashish and liquid hashish, reached Canada by air, land and sea by commercial aircrafts, ships, motor-boats and motor vehicles. Standard concealment methods encountered in 1987, include integral containers, body packs, regular containers, regular and modified luggages, containers of handicrafts, toys, sports, and musical instruments, as well as perishable and canned foods. Motherships include fishing boats and coastal freights. Large scale trafficking is attempted by sea and cargos. Body packs are used for smaller amounts in which condoms containing drugs are placed in anus in the case of male and veginal passage in the case of female traffickers, or both. This is the most dangerous method encountered so far, practised by traffickers since the risk of death is the highest. Letters are also used containing special drug coated papers. In America thousands of cases have been encountered and consequently postal and custom officers are 'empowered' to check it.

Since big organizations are the principal traffickers, they have also been found having their own clandestine air strips in remote areas and locations. The major means of transport of drug trafficking for Thailand are ships. The drug is transported from the growing area in bulk to Bangkock or to various points along the gulf of Thailand from where it is allocated to various markets, Stalmer, Fahlman and Vigeany (1985).

4.7 Drug Distribution and Sales - *Modus operandi*

In this subsection we intend to examine the *modus operandi* of the illicit criminal organisations in the context of drug sales. Drugs are supplied to various countries by international criminal organisation having their own international networks. Through various ways mentioned above, they identify the markets in the world economy on the basis of their own information systems and previous experiences on market creation. Nearly all the major and metropolitan cities in the world have agents of the international criminal network. They buy drugs from these organizations and disperse it to the regional markets for sale. The sales organization of the region is hierarchical. Dealers in these subregions have their own units to perform the transaction. There are several area agents who perform like second stage agents. They have their branches with units, they are engaged in popularizing the drug, identifying the 'target' areas, the clients and sell their drugs.

In one of the interviews the author was told that at a lower stage, say for example a city, there may be one or a few dealers/agents who have their own groups to perform the 'action'. Since a high risk of being caught is involved, it is preferred at every stage to pay to the immediate source and similarly receive the payment at the time of transaction (partially/fully in advance) from the succeeding 'agents'. In an informal conversation the author noticed that when there are more than one 'seller' or 'dealer' in an area, they act more or less as competitors intending to monopolise the market. Heavy 'mark ups' are added at each transaction depending upon the level of law enforcement, risk, and the level of demand.

Each of the dealer has his own unit of workers. He

imposes a price limit below which drug was not to be sold but there was no ceiling to price. It may vary limitlessly. For instance, in an interview the author found that the price of a grain of heroin in Varanasi range from Rs. 125 to Rs. 1500. Premium on risk also has an important place. Level of risk is lowered by paying officials a portion of the profit.

Author was told by a small "bhang" seller that he pays around Rs. 25000-30000 per annum to the officials, when asked about the profit, he was told that it was in range of Rs. 5-8 lakhs per annum out of which Rs. 1 lakh is generally 'invested' for the 'safety' of the business. It is quite clear that it is not possible for a small licensed Bhang shop to earn such huge profit only by seelling the Bhang.

An interesting feature emerged in the case of ultimate seller who dealt directly with the consumers. He was found to be fixing the price having certain parameters in mind. Price included the price fixed by the principal dealer plus mark-up determined by ultimate seller based on the appearance of the buyer, i.e., his intensity of addiction, degree of urge, and of course, a bargain based on his ability to pay. Bargaining vanishes as the above parameters are strengthened.

In the extreme, when buyer comes with intense desire for drug as compelled by his psychophysical dependence, pays whatever he is asked for. It has been found that they give all of their valuables besides their purse, for one or a few doses of the drug. Whenever an addict does not possess any thing or enough to pay for the drug, he is forced to certain crimes for the selling agent, against a single dose or so.

4.8 Major Trafficking Routes

Drug trafficking is a business of high risk, high profit syndrome. Involvement of international criminal organizations in it is well known. Narco-terrorism as a term has emerged currently in Latin America after the M-19 guerrillas of Colombia and the Sendero Luminoso insurgent of Pern started selling hard drugs to buy arms - is now heard in India too. For decades, bulk of the supply of drugs to the West, say heroin, originated from the region known as the Golden Triangle which includes parts of

Thailand, Laos and Burma. Pakistan, situated at the edge of the Golden Crescent, which includes Afghanistan and iran, mostly shipped the raw opium to the refineries of West. Elimination of Turkey as an illicit opium producer, a reduction in Mexican output, collapse of the drug empires in the Golden Triangle under severe attacks of concerned governments, dislocation caused by political upheavels in Iran and the Soviet presence in Afghanistan, a sharp decline in the demand for heroin in the United States and simultaneously a bumper 800 ton poppy crop in 1979-80, combined to give Pakistan the dubious status of the world's principal producer of heroin.

Given the bulk quantity and the risks involved in the shipment to the West through Iran and Afghanistan, it was almost inevitable that the wave would hit India, sandwiched between the Golden Crescent and Golden Triangle, which together generated more than 70 per cent of the world's traffic in opium derivatives.

Till 1982, big league Indian smugglers were mostly smuggling silver out of the country to bring gold in, when the silver prices crashed in the U.S.A., they found a more lucrative alternative. The antiquated Indian drug laws were hardly any deterrent for drug running.

Under such conditions, India emerged as an emergency route but later it became a major transit country for illicit narcotics. The trickle began in 1981 when a four kilogram of heroin was seized. The boom in the heroin was seized. The heroin trade through India coincides with the petering out of Pakistan's early success in drug enforcement.

'India's problem in respect of heroin, says an Interpol document presented at its general assembly in Belgrade in 1986, 'is not of its making but created by its neighbours.'

The intricately complicated system of transferring drugs from the Golden Crescent to the consumer centres of the West is controlled and coordinated by the drug barons of Pakistan and Afganistan working in tandem with major international crime syndicates; but the transportation of the drug and its distribution within India is generally handled by local underworld gangs on contract and commission basis. The

proliferation of small independent bands of drug dealers in the country make their identification tougher. According to a drug enforcement official 'Indians are still the middlemen, the clearing agents.'

4.9 Control and Regulation of Drug Trafficking : International Agreements

The control and regulations of drug trafficking is not entirely in the hands of any single government. The strength of drug trafficking and criminality associated with, is marked by transnational operations. Routes of drug trafficking are so spread out between nations and so deep in their strength that any single country would find it very difficult to control it by its own efforts. Realising the limitations, many governments have already joined hands under the auspicies of United Nations and otherwise to develop an international framework, both in terms of law and in terms of surveillance machinery. As a result of which, a strong international cooperation in narcotic control has been evolved.

It started in 1909 with the efforts of the United States when an Opium Convention was organised by thirteen countries taking interest in it at that time. This Convention met in Shanghai and adopted a series of resolutions. An international control machinery was set up for the first time which was known as the League of Nations Advisory Committee on the trafficking in Opium and Other Dangerous Drugs. This committee became instrumental in organising many of the future conventions relating to narcotic control.

Some of the important conventions are listed below :

1912 Convention signed at Hague on 23rd January 1912, known as International Opium Convention;

1925 Convention signed at Geneva on 19th February 1925;

1931 Convention signed at Geneva on 13th July 1931, known as International Convention for Limiting the Manufacture and Regularising the Distribution of Narcotic Drugs;

1936 Convention for suppression of trafficking in dangerous drugs;

Similarly there have been a number of international agreements. The important historical events are listed below :

1925 Agreement signed at Geneva on 11th of February 1925, covering the manufacture and trade of prepared opium;

1931 Agreement signed at Bangkok on 27th November 1931, known as the Agreement for the Control of Opium Smoking in the Far East;

1946 Agreement considered together a number of protocols, agreements and conventions on narcotic drugs held earlier.

Two important protocols subsequently agreed upon were the following:

1948 Protocol signed at Paris on 19th November 1948;

1953 Protocol signed at New York on 23rd June 1953 for limiting and regulating the cultivation of the poppy plant and the production and international wholesale trade of opium.

Up to 1961 nine treaties had been signed. they were all brought together in 1961 by a convention known as the 'Single Convention on Narcotic Drugs 1961'. This convention terminated the earlier treaties and came into operation in 1964.

With more new types of drugs of abuse coming on the scene, subsequently, a new convention known as 'The Convention of Psychotropic Substances 1971' was adopted under the United Nations. This provided an international control mechanism for such psychotropic substances as were not covered by the 1961 convention.

'The Single Convention on Narcotic Drugs 1961' was amended by a protocol of 1972 making it a more wholesome instrument of regulation filling up some of the loose ends of 1961 convention.

Much later the convention of 1988 was adopted on the 19th December 1988 at Vienna in which 43 countries signed including India. Most of the important provisions of this convention have been implemented in India through the

'Narcotic Drugs and Psychotropic Substances Amendment Act, 1988'.

On the international side, at about this time, an important agreement took place at the 'International Conference on Drug Abuse and Illicit Trafficking' held at Vienna from 17th to 26th June 1987. This agreement is known as "The comprehensive Multidisciplinary Outline of Future Activities in Drug Abuse Control." This deals with :

(i) prevention and detection of demand,

(ii) control of supply,

(iii) suppression of illicit trafficking,

(iv) treatment and rehabilitation.

In India the oldest law covering the scene of drugs was the Opium Act 1847; followed by the Opium Act, 1878 and Dangerous Drug Act of 1930. It was after a long gap that the government was seized with the problem of extensive drug trafficking taking place at the borders of the country. It enacted the Narcotic Drug and Psychotropic Act, 1985' which came into effect from 14th November 1985 to control the problem. This replaced all existing laws and gave considerable strength to the law to control and check drug trafficking. Since there are many agencies dealing with different aspects of drug control, like customs and Central Excise, Economic Intelligence Bureau, State Police Authority as well as the Narcotic Control Bureau; there has always been a problem of coordination between the agencies. The Narcotic Control Bureau is expected to play some of the coordinating roles. The hands of official agencies were further strengthened by an ordinance with the title 'The Prevention of Trafficking in Narcotic Drugs and Psychotropic Substances Rules, 1988, which came into effect on the 4th of July 1988. It was subsequently made a law by an admendment of Parliament to provide further teeth so as to attack the assets of drug trafficking syndicates. The Narcotic Drugs and Psychotropic Substances Act, 1985 was amended by the Narcotic Drugs and Psychotropic Substances Amendment Bill 1988 which is known as the NDPS Amendment Act, 1988. This has come into effect from 29th May 1989.

APPENDIX - I

SCHEDULE - 1

Indian Narcotic Drugs and Psychotropic Substances Act, 1985
(Rule 53 and 64)

1. Narcotic Drugs :

a) Coca Leaf

b) Cannabies (Hemp)

c) i. Acetorphine
   ii. Diacetylmorphine (Heroin)
   iii. Dihydrodesoxymorphine (Desomorphine)
   iv. Extrophine
   v. Ketobemidone

and their salts, preparations, admixtures, extracts and other substances containing any of these drug.

Sl. No.	International non-proprietary names
1.	(+) - Lysergide
2.	Eticyclidine
3.	Rolicyclidine
4.	Psilocybine
5.	Tenocyclidine
6.	Meclopulone
7.	Methaqualone
8.	Alprazolam
9.	Amfepramcone
10.	Benzphetamine
11.	Bromazepam-1
12.	Cemazepam
13.	Clobazam

14. Clorazepate
15. Clonazepam
16. Clotiazepam
17. Cloxazolam
18. Delorazepam
19. Estazolam
20. Ethinamate
21. Ethylloflazepate
22. Fludiazepam
23. Flunitrazepam
24. Halazepam
25. Haloxazolam
26. Ketazolam
27. Lefetamine
28. Loprazolam
29. Lormetazepam
30. Mazindol
31. Medazepam
32. Methyprylon
33. Nimetazepam
34. Oxazolam
35. Phendimetrazine
36. Phentermine
37. Pinazepam
38. Pipradrol
39. Prazepam
40. Temazepam
41. Tetrazepam
42. Triazolam
43 Salts and Preparations of above.

5

TRAFFICKING IN DRUGS : STRUCTURE, MARKET TENSIONS AND ANALYSIS

In the preceding chapter, an attempt was made to highlight the salient features of trafficking in drugs and related issues. It was pointed out that the strong psycho-physiological effects that drugs have on its abusers, become one of the major factors in determining the nature of demand for drugs. Monopolization of drug agents, strategies to avoid and bypass legal restrictions and deliberate creation of effective shortages at the retail end of the drug market are some of the special features of the supply side.

An influx of neophytes in the drug scene, cohesiveness of the drug subculture, hierarchy in the drug scene along with its ideals and norms, the nature of the drug abused in the drug subculture, price, risk and potential punishment are some of the features that characterise the demand side.

In the present chapter an attempt has been made to analyse various aspects of the black market in drugs by casting them in an analytical framework based on concepts developed in the earlier chapters for understanding the nature of the black market from the viewpoint of economists, as distinct from sociologists or legal experts who have also analysed intensively, the subject of drug abuse. It is seen that from such an understanding of the 'economics' of drug trafficking, some useful policy lessons can be drawn.

5.1 Shortages and Illicit Sector : Observational and Measurement constraints

Following the Kornai system, a distinction first needs to be made between a 'control sphere' and 'real sphere', so as to clearly highlight the problem of observation and measurement.

Using notions and terminology introduced earlier, the buyers' side is considered first.

5.1.1 The Case of Pressure

In this case $\Omega_j>1$ which implies that $\alpha_j^{(S)}>\alpha_j^{(B)}$; sellers search for buyers. As such buying aspirations can usually be identified with actual purchases, i.e., $\alpha^{(B)}=\omega^{(B)}$. Thus with the observation of real sphere, conclusions concerning the control sphere can be drawn. In other words, in the state of pressure, it would be sufficient to observe, $\omega^{(B)}$, i.e. actual purchases of buyers to draw conclusions concerning the buying intentions. In the state of pressure the demand function in traditional economic theory actually reflects not only purchases but also buying intentions.

5.1.2 The Case of Suction

In this case, $\Omega_j<1$ implying $\alpha_j{}^{(B)}>\alpha_j{}^{(S)}$; intention and realisation would essentially differ, $\alpha_j{}^{(B)}>\omega^{(B)}$ in view of the shortage. Many buyers may have to correct their aspirations. In these cases one has to be cautious in using roughly collected statistics. As Kornai (1971) observes :

> "Turnover statistics and household statistics reflect not the buyer's aspirations and intentions (his demand) but the distortion of these intentions produced by circumstances external to the buyer... we must not draw conclusions about the control variables (buying intention) from the real variable (purchase) ...The buyer's aspiration can be observed only through suitable interviews."

In such cases public opinion polls and other market survey devices may be needed to study demand.

Seller's intentions are also important. In the case of suction, $\alpha_j^{(S)}<\alpha_j^{(B)}$, $\alpha_j^{(S)}=\omega_j^{(S)}$ and $\Omega_j<1$. Thus, the selling intention of the seller is actually realised, therefore, the real variables (production and sales) reflect seller's intention in legal markets, i.e., control variables. However, in the case of pressure, seller's aspirations can be observed only by means of interviews and opinion research.

To summarise, following observations can be made:

(i) In the state of suction, buyer's aspirations $\alpha_j{}^{(B)}$ can be observed only through suitable interviews. In this case,

$$\alpha_j^{(S)}=\omega_j^{(S)}$$

(ii) In the state of pressure, seller's aspirations, $\alpha_j^{(S)}$ can be observed only throuh suitable interviews. In this case

$$\alpha_j^{(B)}=\omega_j^{(B)}.$$

In this context Kornai (1971) writes :

> 'Measurement and observation are usually preceded by theoretical clarification of interrelationships, theory in turn, can be further improved and made more precise on the basis of experiences gained in the measurement and observation.'

(iii) Even these observations are very difficult in illegal sectors.

5.2 Assumptions

In order to develop an analytical framework, the following simplifying assumptions are being made :

(i) Only one drug scene is considered.

(ii) The drugs produce a high level of tolerance and psycho-physiological dependence in its abusers.

(iii) There are only two types of abusers :

(a) Addicts 'A'

(b) Neophytes 'N'

such that, the total number of abusers is :

$$U = A + N$$

(iv) There is only one unaddicted seller in the drug scene who uses addicts as 'missionary salesmen.'

(v) There are legal restrictions and penalty systems.

5.3 Behaviour of the Drug Abuser

From assumption (ii), above, let there be a group of commodities (drugs) in the drug scene :

$$G = \{ G.\ H.\ L. \}$$

Such that $G \geq H \sim L$, which implies that G is considered superior in the drug scene (G-subculture). Therefore, a queue is created by addicts mainly for G. However, H, which is a substitute for G and L which is a 'look alike' in spite of their shortage otherwise, are easily available.

Addicts are mainly G-addicts while neophytes do not have any strong ordering in their preferences and, therefore, may search for G, H or L.

Thus, it is seen that the drug scene is divided into two major parts; first, addict's part of the drug scene and secondly, neophyte's part of the drug scene.

Various aspects of these separated but interdependent parts are considered below.

An interesting fact in it is that in the same drug scene the addict's part exhibits a state of suction while the neophyte's part depicts a state of pressure. The intersection of the two exhibits a mixed nature of the market. Its schematic representation is given in Fig. 5.1.

In such a case the aspiration levels of buyers and sellers deeply characterise their psychologies and ultimately affect their actual behaviour in the drug scene.

5.3.1 Behaviour of the Drug Addict

An addict is he who has acquired a high level of tolerance and drug dependence by abusing psychotropic and narcotic drugs, such that, withdrawal of the drug results in the manifestation of abstinence symptoms which can be reduced or abolished by another dose of the drug.

If $\alpha_{GA}^{(B)}$ is the buying aspiration of an addict at (t), $[\underline{t} \leq t \leq \bar{t}]$; $\omega_{GA}^{(B)}$ is his actual purchase, his necessary waiting time for buying the drug G is θ_G^B; then

$$\theta_{GA}^{(B)} < \theta_G$$

The tension of his buying aspiration $[\underline{t}, T]$ is

$$\varepsilon_{GA}^{(B)}(T) = \alpha_{GA}^{(B)} - \Sigma^T\ \omega_{GA}^{(B)} \qquad \ldots (2)$$

A G-addict is exclusively involved with G-subculture and abuses the drug G. But in order to retain the possibility of substitution it has been assumed that drugs of the type H and L also exist in G and $p_G > p_H$.

Influx of neophytes and public intervention in the drug scene creates a state of overall suction in it. In the addict's part of the drug scene this shortage is more explicit than that in the neophyte's part. This is found because of the high dependence of the G-addicts on G while there is a little possibility of making any substitution or switch over to other drugs. Since these addicts have high aspirations for G, i.e., $\alpha_{GA}^{(B)} >> \alpha_G^{(S)}$, the drug scene is seller dominated i.e., $\Omega_G < 1$. The tension of the buying aspiration $\varepsilon_{GA}^{(B)} > 1$. Furthermore, the immediate fulfilment ratio $\mu_G^{(B)} > 1$ and the global fulfilment ratio $\mu_G^{(B)}$ is extremely high. That is why, in the addict's part of the drug scene with G-

subculture, addicts continuously search for the drug, partly for the physical needs and partly for their 'identification' and 'gratification' functions.

While studying a particular case of heroin abuse Phillips and Votey Jr. (1981) formulated a model assuming that the demand for heroin is simply a function of price, p, and income y of the abuser, i.e.

$$D=h(p,y)\ ;\ \partial h/\partial p<1\ ;\ \partial h/\partial y>0.$$

Besides others, they seem to have ignored the possibility of substitution with the argument that any effort to control a particular drug will probably curtail the supply of its substitutes also in the equivalent fashion. However, the actual drug markets do not satisfy this assumption. As discussed briefly in the preceding chapter, there are constant efforts both on the part of sellers and abusers to find out new substitutes and look alikes, keeping legal restrictions and prices in view. Furthermore, it is the norm of a drug subculture, say G-drug subculture, in the drug scene which is responsible for such acts, price and income constitute only a part of their determinants.

With an overall shortage in the drug scene and especially severe shortage in the G-subculture, $\alpha^{(B)}_{GA}>>\alpha^{(s)}_{G}$ and $\Omega_G<<1$; sellers dominate the drug scene and the G-subculture.

In fact, it is the dealer who determines access to drugs. As long as his source of supply does not dry up he can easily replace one drug scene by another, by changing the supply of drug. The drug addict cannot assume that a lasting 'cooperative' attitude on the part of the sellers would exist. Cooperation is thus limited to the immediate satisfaction – nothing other than conforming to the drug scene implying increasing involvement with drugs.

If the seller converts the G-subculture into H-subculture when there is really a short supply of G or legal restrictions have been enforced strictly, then an addict with high aspiration $\alpha^{(B)}_{GA}$, and $\hat{\varepsilon}_{GA}$ craves more severely for the drug. For him there would be two alternatives :

(i) either to adopt to H-subculture (forced substitution),

(ii) or to quit - which is highly unlikely because of high dependence on drug.

Finally, the only alternative that remains, is to conform to the H-subculture. If we consider average transactions in the G-subculture, the tension of unfulfilled buying aspiration of the addict will be such that :

$$\varepsilon^{(B)}_{GA}=\begin{cases}\alpha^{(B)}_{GA}-\omega^{(B)}_{GA} & \text{iff } \alpha^{(B)}_{GA}-\omega^{(B)}_{GA}>0\\ 0 & \text{iff } \alpha^{(B)}_{GA}-\omega^{(B)}_{GA}<0\end{cases} \qquad \ldots (3)$$

Let us consider a situation in which a seller, due to strict enforcement of legal restrictions, wants to change the drug scene by transforming G-drug subculture into H-subculture. Since we are dealing here with addict's market, we have to keep in mind that here $\alpha^{(B)}_{GN}>>\alpha^{S}_{G}$ and $\Omega_G<1$. Sudden disappearing of G from G-subculture, and resulting increased withdrawal effects in addicts, increase their search activity.

The position of an addict in a drug subculture can be characterised as $(\alpha^{(B)}_{GN},M.c)$ where c is the search cost and M is the money value of addict's purchasing power. Then

$$\max \cup \{[S_i(\omega,\theta)_{1\le i\le n}],\alpha^{(B)}_{GA}\} \qquad \ldots (4)$$

Subject to

$$p\omega+c\theta\le M\ .$$

where S is satisfaction of motivation vector.

The point to note here is that an adddict's M implies either the money value of his assets which he can use to buy drugs or the money value of his criminal acts decided by the seller. In strict

monetary sense, if $\alpha_{GA}^{(B)}$ is very high, i.e., if addict has become completely dependent, his budget constraint becomes 'redundant'.

Let us suppose now that the seller of *G*-subculture, introduces a new drug H' with per unit price p^h While searching for *G*, let us suppose that a fraction of the addict's population $\lambda[\theta,\alpha_{GA}^{(B)},M.c]$ accepts the drug H' after failing in its search efforts for *G* and a fraction $[1-\lambda(\theta,\alpha_{GA}^{(B)},M,c)]$ succeeds in discovering *G*, at least for a few transactions.

Those who have accepted the drug H', adjust their behaviour and demand a quantity y^h resulting from

$$\max \cup \{S_i(\omega',y,\theta')\} \qquad \ldots (5)$$

$$\text{subject to } p^h y^h + p\omega' + c'\theta' \leq M$$

The prime index denotes the new parameter value with *c'*, a function *c'* (*c*) of *c*. Since the seller is interested in transforming *G*-subculture in to *H*-subculture, his aggression towards profiteering tends to lower down, at least, unless a complete transformation takes place. This enables us to accept the budget constraint for the time being.

The fraction $(1-\lambda)\to o$ as $t\to\infty$ and a complete transformation of the drug subculture takes place with time and then market with $\Omega_G < 1$ becomes fully operative.

The individual demand for H' in the fraction of addict's population $[\lambda(\theta,\alpha_{GA}^{B},M,c)]$ will then be,

$$y^h = y^h(p^h,p,M,c',\theta) \qquad \ldots (6)$$

Assuming that there are *n* addicts in the fraction $[\lambda(\theta,\alpha_{GA}^{(B)},M,c)]$ of *G*-subculture, total demand for H' will be,

$$Y^h = \int \lambda\left[\theta(\alpha_{GA}^{(B)},M,c,p),\alpha_{GA}^{(B)},M,c\right] y^h(p^h,\alpha_{GA}^{(B)},M,c'(c)p)$$

$$n(\alpha_{GN}^{(B)},M,c)\; d\alpha_{GN}^{(B)} dM dc\,. \qquad \ldots (7)$$

Since *H*-subculture is being imposed by the dominant seller,it implies that $\alpha_{GA}^{(B)} - \omega_{GA}^{(B)}$ is negative and in case, $\omega_{GA}^{(B)} = 0$, the buying intention of the addict would remain unfulfilled. This would lead addicts towards forced substitution and they would buy $\omega_{HA}^{(B)}$ against their $\alpha_{GA}^{(B)}$. Gradually a complete transition to the H-subculture takes place via identification and gratification functions.

In the case of suction, supplier of a particular drug, may detach the supply itself to a considerable extent from $\alpha_{GA}^{(B)}$; consequently, a forced substitution is required. Eventually this may become the habit. However, there occurs a certain adaptation of the seller to addict's requirements, but only at a lower rate than that in the state of pressure.

5.3.2 Behaviour of the Neophyte

Neophytes are those who begin experimentation either motivated by curiosity or thrills or as a result of the 'pushing' activities of the addicts and sellers in the drug scene. They have not yet developed tolerance and dependence on drugs of the subculture they now belong to. Their appreciation of the risks involved both psycho-physiological and legal is limited and their purchases are highly subsidised by addicts and pushers in the drug scene. Transformation of non-abusers into neophytes depends on the pushing activities which in turn depends on pusher-addicts and suppliers. The higher are the profits made by the supplier from the addicts, the greater would be the availability of funds and incentives for the suppliers to incur expenditure on converting non-abusers into neophytes. At the same time, the higher the price for the addicts, the greater would be the pressure on them to work as pushers.

If one looked at the number of neophytes in a conventional way, the demand function would appear like the one given by Phillips and Votey Jr. (1981) to be described later.

Since a neophyte is either a non abuser or a non addict, we may conveniently assume that so far as he ramains a non addict he would act rationally. This enables us to retain the analysis of this segment closer to the standard one.

Let us assume that for each vector $x=(x_k)_{1\leq k\leq p}$ defines a possible pushing act. The neophyte chooses $u(x)$ and $\omega(x)$ in order to maximise.

$$\cup(u',\omega) \qquad \ldots (8)$$

Subject to :

$$u'=u'(u,x)$$

$$p(u)\omega=M$$

$$g(u,x)\geq 0$$

then the pushing acts which maximise

$$b[u(x),\omega(x)]-d(x) \qquad \ldots (9)$$

Where $b(u,\omega)$ is the total profit of the firm when it sells quantities ω at the quality level u; $d(x)$ is the expenditure due to pushing act.

If x is small and neophyte's $\alpha_{GN}^{(B)}$ is very very small or almost zero, with market tension $\Omega_G>1$, and if the neophyte wholly regrets his perceptive illusions, the loss due to pushing is the difference between the monetary value of

$$\cup[u(x),\omega(x)]-\cup[u(o),\omega(o)] \qquad \ldots (10)$$

But since this is a market characterised by pressure, it is more useful to think of the determinants arising from the supplier's side who are engaged in pushing. Here, availability of funds to the sellers and price prevailing in the addict's zone would be relevant.

The effective price for neophytes may be different, even

zero, if their consumption is fully subsidised by the pushers.

The crucial factor for these non-habitual abusers is the accessibility of drug in an atmosphere conductive to experimentation. Phillips and Votey Jr. (1981) define the demand function of the neophytes as :

$$\left(\begin{array}{c}\text{No. of}\\ \text{Neophytes}\end{array}\right) = \Psi \left(\begin{array}{c}\text{price, conviction rate; severity of punish-}\\ \text{ment ; pushing and number of addicts}\end{array}\right)$$

... (11)

where,

(i) Ψ is negatively related to price, conviction rate and severity of punishment.

(ii) Ψ is positively related to pushing activity and number of addicts in the drug scene.

Presence of 'pushing' reveals the fact that the buyers (i.e., neophytes) are dominating the market, $\Omega_G>1$. This characterises the state of pressure, such that $\alpha_{GN}^{(B)}<\alpha_G^{(S)}$. In the neophyte's segment of the G-subculture, the level of buying aspiration of the new entrant neophyte at $[t]$, $[\underline{t}\leq t\leq \bar{t}]$, is zero, i.e.,

$$\alpha_{GN}^{(B)}[\underline{t}]=0 \qquad \ldots (12)$$

At this stage no psycho-physiological tolerance and dependence exists and the neophyte remains unaddicted. The higher selling aspirations of the sellers and the addicts 'push' these neophytes.

At the time $[\underline{t}]$ since $\alpha_{GN}^{(B)}=0$ and assuming that not a single dose has been taken by the neophyte one can write :

$$\partial(\alpha_{GN}^{(B)})\ [\underline{t}]/\partial t=0 \qquad \ldots (13)$$

After the neophyte tastes the drug a few times, the very nature of the drug takes care of generating its own demand, then :

$$\partial(\alpha_{GN}^{(B)})\ [t]/\partial t>0 \qquad \ldots (14)$$

and also,

$$\partial^2(\alpha_{GN}^{(B)})\ [t]/\partial t^2>0 \qquad \ldots (15)$$

Thus, the neophyte becomes dependent on the drug of G-subculture; further, dependence increases at a positive rate with additional doses of drugs. Dominance of the neophytes over the market decreases with the increase in their addiction and finally neophytes become addicts and the 'pressure market' become a 'suction market', therefore :

$$[\Omega_G>1[\underline{t}]]\rightarrow[\Omega_G<1[\bar{t}]] \text{ as } t\rightarrow\infty \ . \ [\underline{t}<t\leq\bar{t}].$$

5.4 Market Structure in Drug Scene

In the preceding chapter it was observed that every drug scene deteriorates in time so that it becomes fragmented in small groups. It is usually caused by the public interventions or massive influx of neophytes and addicts. The fragmentation of the drug scene is followed by an increase in the multiple drug abuse which often aggravates the activity behind the illicit drug trade. Further, as a result of fragmentation of the drug scene, its organizational hierarchy becomes overturned giving rise to anarchy of needs and scarcity of drugs. Every dealer has his own unit of retailers. He fixes a price limit below which the drug cannot be sold to the addicts but there is no upper limit. However, it may not apply in the case of neophytes.

The fact is that in a drug scene, a dealer acts as a monopolist. Different dealers compete among themselves and make 'sectoral' compromises for locations.

Suction in G is a monotone increasing function of the intention and intensity of buying aspirations. The intensity is indicated by the extent and growth of activities promoting the attainment of buying aspirations, thus, among other things, by the 'pushing' done by the sellers, forced substitution and buyer's information searching activities.

A schematic representation of the general structure of the drug market in the drug scene can be given as follows.

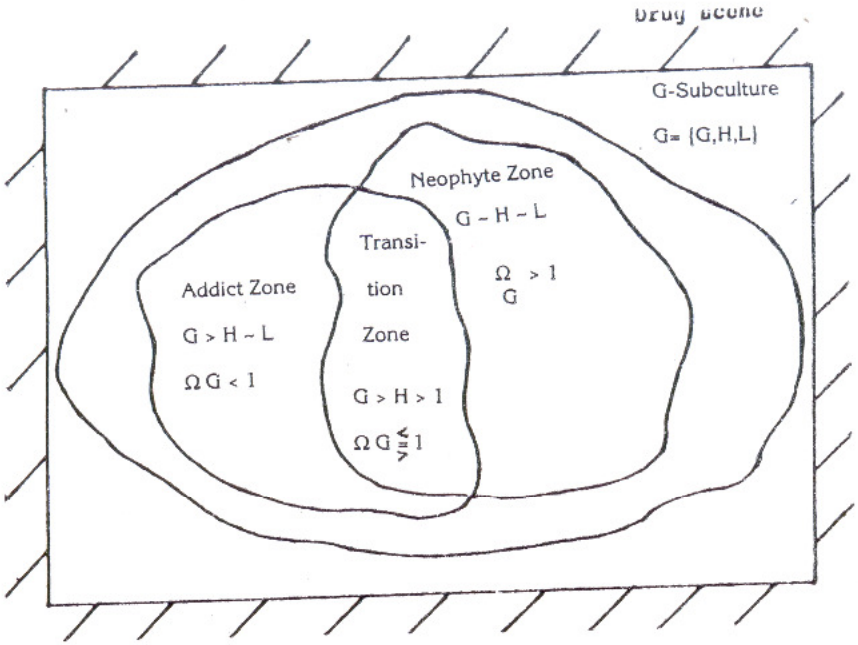

Fig. 5.1

Interesting features of the drug market in the drug scene are clear from the above diagram. It must be borne in mind that further 'partition' of the G-subculture into addict's, transitory and neophyte's part has been only for conceptual clarity. All the three segments exhibit a circular relationship.

5.4.1 Addict's Zone

At the outset it may be noted that there is a general suction in the drug scene G. The addict's part exhibits a state of most severe shortage in the drug scene. Here, the market is dominated by the seller i.e., $\Omega_G<1$ since $\alpha_{GA}^{(B)}>>\alpha_G^{(S)}$, addicts pursue sellers for the drugs since $\varepsilon_G^{(B)}$ is high enough and the degree of tension $\hat{\varepsilon}_G^{(B)}>1$ the global fulfilment ratio $\mu_G^{(B)}<1$, the immediate fulfilment ratio $\mu'_G{}^{(B)}$ is very small and $\alpha_{GA}^{(B)}>\omega_{GA}^{(B)}$.

On the seller's side, $\mu_G^{(S)}=1$ which implies that aspirations of the sellers are easily fulfilled, $\alpha_{GA}^{(S)}=\omega_{GA}^{(S)}$ implying that $\varepsilon_G^{(S)}=0$, and $\hat{\varepsilon}_G^{(S)}=1$. Further $\theta_G^{(S)} = \theta_G^{(S)}$ while $\theta_{GA}^{(B)} > \theta_{GA}^{(B)}$.

Thus, it may be seen that addicts are compelled by their psycho-physiological dependence and search continuously for the drug. Further, they compete among themselves. Another characteristic of this zone is that since there is a state of suction, supply of the drug is increased but quality deteriorates at the retailer's stage increasing profits several times higher. In such situations the retailer acts like a monopolist and the price of the drug is fixed by a 'mark up' over the cost including cost of risks involved and taking into account addict's aspirations.

Such a situation encourages and necessitates the 'pushing behaviour' on the part of the sellers and addicts. Most addicts belong to lower income groups and because of their addiction they become unemployable outside the drug scene. Their increasing dependence and decreasing employability reduces their incomes or purchasing power slowly to zero. At the same time because of their dependence and the high aspirations of the dominant seller, the difference between the aspirations of the buyer and that of the seller, widens. As a result, the budget constraint, which has been so important in standard microeconomics, become 'fuzzy' or redundant. They begin to make efforts to cross the budget constraints to meet their aspirations for drug and identification and gratification functions in the concerned drug subculture of the drug scene by borrowing, stealing and getting involved in other crimes. This leads to a host of drug related crimes and pushing of the neophytes. Holahan (1972) has surveyed the addicts of New York city and found that nearly 45 per cent of their aspirations were fulfilled by pushing activities while 55 per cent through others, but mostly illegal activities. Baridon (1976) has provided similar evidence.

Since a price yields an income effect, *ceteris paribus*, it restricts the ability of an addict to purchase drug of his need. As

a consequence a non-pusher addict may respond more positively giving up leisure to work in order to maintain himself in his normal state, rather than responding passively by simply reducing his consumption. Thus, non-pushing addicts continue to join the work force of pushing addicts as their dependence and the price of drug increases.

Assuming that abusers are poor in the drug scene their pushing behaviour may be described as below :

$$\left(\text{Pushing}\right) = \Psi \left(\begin{array}{c}\text{price of drug, risk and punishment to}\\ \text{retailers and social status in the drug scene}\end{array}\right)$$

where,

(i) Ψ is negatively related to risk and severity of punishment to retailers.

(ii) Ψ is positively related to price and addict's 'identity' in the drug scene.

Furthermore, if we consider other drug related crimes, they too exhibit the same relationship.

$$\left(\begin{array}{c}\text{Drug related}\\ \text{crime}\end{array}\right) = \Psi \left(\begin{array}{c}\text{price, risk and punishment in}\\ \text{relation to drug related crimes,}\\ \text{identity in the drug scene}\end{array}\right) \quad \ldots (16)$$

where,

(i) Ψ is negatively related to risk and punishment.

(ii) Ψ is positively related to price and identity in the drug scene.

Though it is not easy to verify an addict's response to price empirically, it would be reasonable to think that if his $\alpha_{GA}^{(B)}$ is very high and if he is not employable outside the drug scene, he will move in one or both directions, i.e., pushing as well as crime. Moor (1973) has observed that nearly 96.3 per cent of the expenditure on drug (in the case of heroin) were financed

through illegal activities. Baridon (1976) has observed a definite increase in criminal activities by addicts following addiction. Brown and Silverman (1974) also have given similar observations.

Thus, keeping the entire drug scene in view, the determinants of the income of an addict may be indicated as

$$\left(\begin{array}{c}\text{Income of}\\ \text{abuser}\end{array}\right) = \Psi \left(\begin{array}{c}\text{his identity in the drug scene,}\\ \text{extent of his pushing behaviour,}\\ \text{drug related crimes}\end{array}\right) \quad \ldots (17)$$

where,

(i) Ψ is negatively related to his 'identity' in the drug scene.

(ii) Ψ is positively related to the extent of pushing behaviour and drug related crimes.

5.4.2 Neophyte Zone

In this zone of the G-subculture $\alpha_{GN}^{(B)}[\underline{t}]=0$ therefore, $\alpha_{GN}^{(B)} << \alpha_{G}^{(S)}$ and $\Omega_G > 1$ which implies that it is a state of pressure where the market is dominated by neophytes rather than the seller. Here, sellers search for buyers and pursuade neophytes through various ways to take a few initial doses of the drug. Unless a neophyte experiments with the drug for a minimum number of times which may be enough for the germination of psycho-physiological dependence, $\varepsilon_{GN}^{(B)}=0$; fulfilment of seller's aspiration $\mu_{G}^{(S)}<1$ while $\mu_{GN}^{(B)}\geq 1$.

The interesting feature that emerges is that a larger influx of neophytes increases the level of aggregate aspiration for the drug by fragmenting the drug scene and hence increases the dominance of the drug dealer further. It may be observed that with an increasing $\hat{\varepsilon}_{GN}^{(B)}$, $[\Omega_G(\underline{t})]<1$ implies that $[\alpha_G^{(B)}(\underline{t})] > [\alpha_G^{(S)}(\underline{t})]$; as $t\to\infty$ such that $t<t+1$, we have $[\alpha_G^{(B)}(\underline{t})] < [\alpha_G^{(B)}(t+1)]$. Thus $[\Omega_G(\underline{t})<1]<[\Omega_G(t+1)<1]$ and seller's dominance goes on increasing. Further as the dominance of the seller over the market increases, price goes up.

5.4.3 Seller's Behaviour and Supply of Drugs in the Drug Scene

In a drug scene characterised by general suction, sellers do not necessarily maximise their short run profits by applying the marginal principle. The way they set their prices can be explained partly by the rule of mark-up pricing.

Following Winter (1971b) it can be said that price determination in such a case involved two distinct stages with the intention of sales maximisation :

(i) price equal to that paid to the preceding dealer including operational costs,

(ii) a 'mark-up' which takes into account various factors like $\Omega_G, \hat{\varepsilon}_G^{(B)}$, severity of shortage, severiy of punishment, control activities, risk involved in deals and level of individual addict's aspiration with drug subculture frame of reference. These are fixed by subjective evaluation.

When $\alpha_G^{(B)}$ increases in the short run, dealers usually prefer to raise price rather than adopting a queuing policy. Here, the situation is quite different from the so called average cost pricing. In these cases, sellers have usually to adopt a queuing mechanism rather than charge higher prices because they do not know whether this suction will prevail for a long time and fear to damage their reputations by exploiting a 'temporary seller market'.

However, a high level of risk and uncertainty involved in the illicit drug trade makes it a temporary seller's market. This frees the seller from all reputational barriers even in the drug scene.

The three types of drugs viz., G, H and L which have been assumed to exist in this analysis, where G is the drug of the G-subculture, H is a substitute for G and L is a look alike. They are ordered in the drug scene as :

$$(G \geq H \sim L).$$

In such a situation major determinant of the supply of drug, say G, is dependent on the available supply channels.

Total supply = illegal supply + legal supply

Since the material cost is far less than its profit, the crucial cost in the supply of drug depends on the control by the authorities, i.e., risk and penalties suffered by those apprehended (or alternative costs of bribery) and will be a function of aggregate aspirations of the buyers. Therefore,

$$\left(\text{Supply of G} \right) = \Psi \left(\begin{array}{c} \text{price, conviction rate of illicit} \\ \text{sellers, aggregate aspiration} \\ \text{level of buyers} \end{array} \right) \quad \ldots (18)$$

Where

(i) Ψ is negatively related to the rate of convictition.

(ii) Ψ is positively ralated to price and aggregate aspiration level of buyers.

5.5 Economic Dynamics in Drug Scene

In this section an attempt has been made to consider the dynamics i.e., the effects of different economic factors like price and income on the behaviour of neophytes, addicts and sellers in the drug scene. It is to be noted that no agent possesses a constant preference ordering over the entire possible set of decision alternatives. These preferences depend crucially upon the actual sets of decision alternatives which are implementable, given their circumstances and positions in the drug scene.

In considering the economic dynamics of markets, the price and income effects are important. However, the reality is much more complex. In addition to the price and income

effects, there are other factors of considerable importance. Information of a non-price character has an important influence too.

In the drug scene, there are identification and gratification functions, continuous restratification of the consumption pattern in the drug scene, abuser's behaviour with society outside the drug scene as a frame of reference. Following the segmentation of the drug scene given in Section 5.4, the economic dynamics of addict's zone, neophyte's zone and the transition zone is considered here.

5.5.1 Economic Dynamics of Addict's Zone

Surveys made by various agencies reveal that most addicts come from lower income groups. Their increasing and high dependence and increasing dominance of sellers bring their income to zero or negative (permanent debt status). In such a monopolistic seller's market ($\Omega_G < 1$), seller is able to change the nature of drug subculture and the price which is necessarily higher than what it would have been in the state of pressure or equilibrium.

A rise in the price in a drug scene with its various determinants have a two way effect :

(i) income reducing effect on the addict;

(ii) income increasing effect on the addict.

In a given drug scene an addict spends most of his time either consuming a drug or searching for it. The more his dependence on the drug increases the greater are the chances that he would become less and less employable in the legal sectors of the economy. He is, therefore, slowly cut-off from legal avenues of earning income and yet he must have the drug. In such a situation any price rise in the drug scene would increase his dependence on the seller and either voluntarily or involuntarily he would be pushed into the criminal activity of the underworld in order to earn income to satisfy his drug needs.

5.5.2 Economic Dynamics in the Neophyte's Zone

As already mentioned, neophytes are the new comers to the

drug scene. They have not yet developed tolerance and dependence on the drug.

The neophyte's zone does not exhibit in general the state of suction but of pressure. Thus $\alpha_{GN}^{(B)} << \alpha_{G}^{(S)}$, and $\Omega_G > 1$ i.e., it is the market where sellers look for the new comers. Sellers and pushers (addicts) pursuade the neophytes for experimenting with the drug. It was seen that in the initial period $[\underline{t}], \alpha_{GN}^{(B)}[\underline{t}]=0$. If if is assumed for simplicity that

$$P_{GN} = f(\alpha_{GN}^{(B)}, \alpha_{G}^{(S)}) \qquad \textit{ceteris paribus} \qquad \ldots (19)$$

in a market characterised as $\Omega_G > 1$, it implies that $(\alpha_{GN}^{(B)} - \alpha_{G}^{(S)}) < 0$, and, therefore, there must be some advertisement (pushing for example).

When $\alpha_{GN}^{(B)}[\underline{t}]=0$, it implies from the above that $\alpha_{GN}^{(B)} - \alpha_{G}^{(S)} = -\alpha_{G}^{(S)}$ which equals the advertisement cost in the seeding of aspirations (derived through seeding of psycho-physiological dependence) in neophytes. This may be considered as a negative price which the dealer yields.

Beginning with this state, the following relations may be postulated :

$$\partial P_{GN} / \partial t = \dot{p}(\alpha_{GN}^{(B)} - \alpha_{G}^{(S)}) \qquad \ldots (20)$$

then, $P_{GN} = -\alpha_{G}^{(S)}$ when $\alpha_{GN}^{(B)}[\underline{t}]=0$; as $t \to \infty$, $(\alpha_{GN}^{(B)} - \alpha_{G}^{(S)}) \to \infty$, such that when $\alpha_{GN}^{(B)} = \alpha_{G}^{(S)}$, i.e., an equilibrium situation in the drug scene where $\Omega_G = 1$, $\alpha_{GN}^{(B)} = \alpha_{G}^{(S)} = \omega_{GN}^{(B)} = \omega_{G}^{(S)}$. Up to this point

in period $[t]$, $[\underline{t} < t \leq t]$, there had been a state of equilibrium or pressure and dealers were happy to supply drugs of their drug subculture free of cost to the neophytes, with an intention of germinating dependence in them. Up to this point $\varepsilon_{G}^{(S)} = \varepsilon_{GN}^{(B)}$, $\mu_{GN}^{(B)} = \mu_{G}^{(S)} = 1$ and $\Omega_G \geq 1$.

But since the intake of drugs up to this point of time has created and increased the tolerance and dependence in neophytes it can be seen that

$$\alpha_{G}^{(S)} > \alpha_{GN}^{(B)} > 0.$$

Under the effect of the drug we find that

$$\partial(\alpha_{GN}^{(B)}) / \partial t > 0$$

$$\partial^2(\alpha_{GN}^{(B)}) \partial t^2 > 0. \qquad \ldots (21)$$

After a period of time, $(\alpha_{GN}^{(B)} - \alpha_{G}^{(S)}) > 0$, which implies that the neophyte's aspiration for drug has increased, dealers begin to charge prices for drugs they provide. This gradual shift in the market dominance from buyers to sellers, results in the transition of the market from the state of pressure to that of suction. As dependence of neophytes (now addicts) increases, the intensity of suction. As dependence of neophytes (now addicts) increases, the intensity of suction increases and sellers gain more and more dominance over the market in the drug scene and neophytes turn to fulfledged addicts.

When $\Omega_G = 1, \partial P_G / \partial t = 0$ but as soon as market moves towards suction $\Omega_G < 1; \partial P_G / \partial t > 0$ and with the effect of increasing tolerance and dependence since $\partial^2(\alpha_{G}^{(B)}) / \partial t^2 > 0$, *ceteris paribus*, $\partial^2 p_G / \partial t^2 > 0$. Economic dynamics of the drug

scene reflects a circular relationship of dependence-price-productivity which can be sketched as follows :

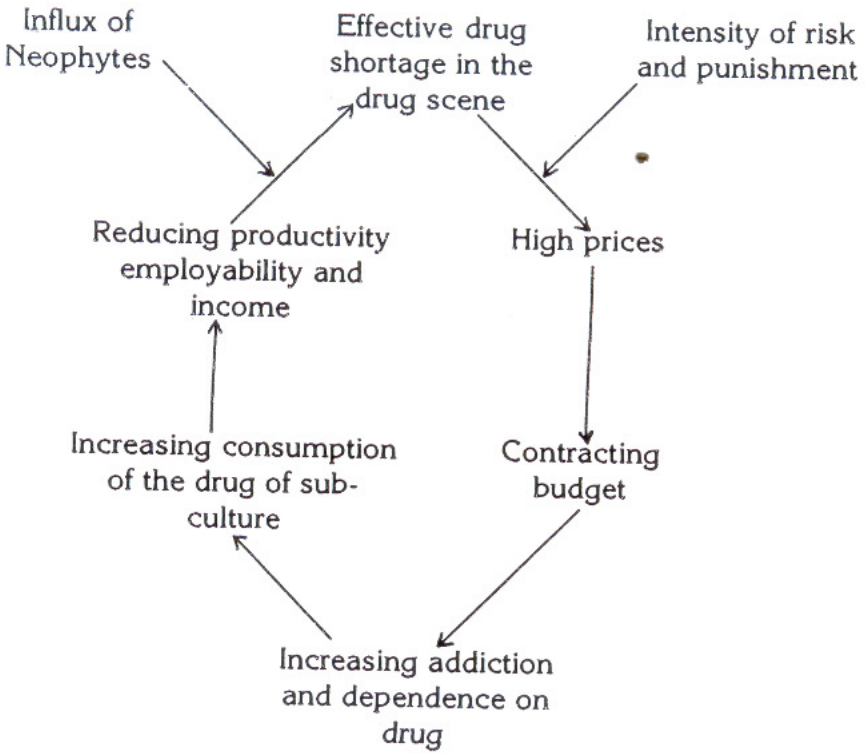

Fig. 5.2

It is important to understand that the analysis of trafficking in drugs in this chapter is, in many ways, tentative in character. It hopes only to promote a new research field and to contribute to freeing economic theory from a situation where efforts to improve aximatization and to enlarge models are hindered by narrow, ingenuous representations of individual behaviour.

Further, arguments on accuracy of observation and the possibility of observation at all, and inherent weaknesses of traditional adjustment process, and possible alternatives, which have been surveyed in earlier chapters, suggest forcefully for a need to think afresh in economic theory. In that respect, it may be a modest milestone on the road leading to a more realistic economic theory.

6

OVERVIEW AND CONCLUDING OBSERVATIONS

Although several aspects of the black economy have been studied extensively in India as also internationally, studies relating to the creation, operation, and implications of black markets are few and far between. In India, considerable attention has been given to the estimation of black money in the economy and the related problems of tax evasion and avoidance. The focus of the present study, however, is on black markets which provides an important segment of the parallel economy and need to be studied as distinct entities in their own right. The term 'black' has been used in economic literature to indicate hidden, unobserved, submerged, parallel, unofficial or illicit transactions in the economy. *All these terms appear to imply illegality and have been used interchangeably although they may have shades of differences.*

The genesis of black markets lies in shortages in relation to pressures of demand which may be created by regulation and intervention by the public authorities or because of other rigidities. Classical and neo-classical economic theories have placed considerable reliance on the market mechanism as being capable of producing optimal results if it is allowed to operate without intervention and if certain other conditions are fulfilled including perfect price flexibility and responsiveness of demand and supply to price changes.

However, in practice, there are many reasons and circumstances when intervention and regulation may become necessary.

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