THE BEHAVIOUR OF THE INTER-SECTORAL TERMS OF TRADE IN THE INDIAN ECONOMY: 1965 to 1990

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I hereby affirm that the research for this dissertation titled **"The Behaviour of the Inter-sectoral Terms of Trade in the Indian Economy: 1965 to 1990"** being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy, was carried out entirely by me at the Centre for Development Studies, Trivandrum.

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Certified that this dissertation is the bonafide work of A.Subramanian and has not been considered for the award of any other degree by any other University.

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Chapter I

INTRODUCTION

The aim of the study is to examine the behaviour of inter-sectoral terms of trade in the Indian economy since the introduction of New Agricultural Strategy in the mid 60's. It is widely held that the government intervention in the agricultural sector governs of the behaviour of the inter-sectoral terms of trade in the Indian economy. It is this hypothesis which is examined in this study.

This chapter highlights the theoretical and empirical issues on the debate over the behaviour of inter-sectoral terms of trade. An outline of this chapter is as follows: the first section brings out the theoretical insights in to the problem; section two delineates the empirical issues on the debate over inter-sectoral terms of trade in the Indian economy; section three characterises the economy from the structuralist point of view; and, the fourth section gives a simple two sectoral model of the determination of inter-sectoral terms of trade as an alternative to the existing theoretical postulates.

I. Theoretical Insights into the Problem:

Inter-sectoral terms of trade have been traditionally viewed as a policy instrument for the extraction of surplus from the agricultural sector for industrialisation in the early stages of development. During the 'Soviet industrialisation debate' of the 1920s, it was Preobrazhensky who first formulated the analytical argument underlying this view. He emphasised that a surplus has to be extracted from the agricultural sector to provide resources for

industrialisation by means of price control of agricultural products[1].

Theoretically, two contrasting views on the behaviour of inter-sectoral terms of trade can be identified. While one argues for higher prices for agriculture to stimulate agricultural growth, the other view calls for a favourable price relation for industry to ensure a high rate of industrial accumulation and growth. However, in the Indian context, debate has largely been centered on the ex-post understanding of the inter-sectoral terms of trade.

According to one line of reasoning, (the rural bias argument) articulated especially by Mitra, the shift in the inter-sectoral terms of trade in favour of agriculture is brought about by the political coalition between the rural oligarchy and industrial bourgeoisie. This process, as it is envisaged, may be set out in the following simplified form. In the arrangement between the industrial bourgeoisie and the rural oligarchy, the latter receives benefits in the form of higher product prices, subsidized inputs, special fiscal rebates and so on. In exchange, the bourgeoisie obtains the prerogative to exercise unfettered jurisdiction over industry, trade, as well as over the management of foreign exchange and of monetary and fiscal instruments. So the developing shift in the inter-sectoral terms of trade in favour of the agricultural sector is the major price paid by the industrial bourgeoisie to cement their political coalition with the rural oligarchy[2].

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[1] See Maurice Dobb (1942).

[2] For a detailed account of the cause for shift in the inter-sectoral terms of trade, refer Mitra (1977).

The urban bias theorist seeks to prove that if there was a growing class bias it was against agriculture and hence class forces biased in favour of industries shift the inter-sectoral terms of trade against agriculture. Both these lines of argument regarding the cause for shift in the inter-sectoral terms of trade do not adequately describe the complex dynamics of the Indian economy. The influence operating from the industrial sector has been ignored[3].

The oligopolistic nature of the industrial sector makes it prone to a high degree of price stickiness. Price rises caused by an escalation of costs are inflexible downwards in the short run. Moreover, the existence of monopoly control over industrial prices[4], makes it difficult to accept that movements in the inter-sectoral terms of trade can be predominately brought about by the farm lobby.

The rural bias argument of Mitra rests merely on the empirical observation of the direction in which the inter-sectoral terms of trade has shifted during a specific period 1967-1973, without considering the nature of price formation in the agricultural sector. Using another methodology, Tyagi and Kahlon show that the inter-sectoral terms of trade were favourable to industrial sector

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[3] The influence operating from the industrial sector on terms of trade is emphasized by Kumar (1988) which he attributes to high capital-output ratio, a probable reflection of high cost pushing up industrial prices, since the relevant cost is the variable cost or prime cost going into industrial prices. The argument of Kumar do not hold good.

[4] A detailed account of this is provided in the later part of this chapter.

after 1970-71, except for two years, reflecting urban bias. However, there is a consensus between the two groups that shifts in the inter-sectoral terms of trade are brought about by class bias.

All these conclusions are based on the premise that government intervention in the agricultural sector shifts the inter-sectoral terms of trade. This assumption is however, questionable. The government fixes the procurement prices for certain commodities which ofcourse influences the absolute level of agricultural prices[5]. The inter-sectoral price ratio (relative prices) however, could be influenced by other factors as well. This is evident when one considers the oligopolistic nature of Indian industrial sector, which by its superior market power resists any compression in its real income by countering the rise in agricultural prices through a cost induced increase in industrial prices.

II. Focus on Empirical issues:

At the empirical level, the debate primarily reflects on the statistical question of the movements in the inter-sectoral prices. This usually involves comparing prices of the exports of one sector with the prices of its imports from the other sector. In comparison, the magnitude of inter-sectoral prices show differences depending on the methodology employed by researchers.

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[5] The impact of procurement by the government on market prices change depending on the source of procurement of food-grains (import, internal procurement). For a detailed account, refer Balakrishnan (1991).

An important methodological issue is the choice of the base year for the construction of index numbers. Since the number of commodities exchanged between the two sectors would invariably be more than one and the comparison has to be made over time, an appropriate method of construction of indices of unit value of exports and imports is necessary.

Different approaches are used for the estimation of the inter-sectoral terms of trade. Of these, two main approaches can be distinguished in the literature[6]. Method (a) estimates or infers the movements of terms of trade from a direct comparison of the index numbers of price for such subgroup as manufactures and agricultural commodities. Method (b) instead of relying on the weights already assigned in the construction of wholesale price index for combining various commodities into subgroups, groups, etc., attempts to derive separate weights for commodities depending on the importance of each of these in the inter-sectoral trade and applies these weights on estimates of inter-sectoral flows to derive the net barter terms of trade. The first method was used by Ashok Dar and Dantwala whereas the second method was employed by Thamarajakshi.[7]

However, these methods have been avoided by Kahlon and Tyagi[8] on the basis that they lead to an overestimation of the prices of

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[6] A detailed account of this is given in Chapter III. Also, refer Kahlon and Tyagi (1980).

[7] See Kumar (1988) for an overall account of the various methodologies used in the calculation of inter-sectoral terms of trade.

[8] See Kahlon and Tyagi (1980,83).

agricultural commodities[9]. The indices of the two main approaches - Thamarajakshi, Kahlon and Tyagi, are presented in Table 1.1.

Table 1.1: Estimates of the Indices of Inter-sectoral Terms of Trade: A comparison.

Years	Thamarajakshi 1978-79=100	Kahlon and Tyagi 1970-71=100
1965-1966	96.8	
1966-1967	106.2	
1967-1968	107.9	115.6
1968-1969	100.4	105.1
1969-1970	108.5	101.8
1970-1971	109.9	100.0
1971-1972	104.0	97.5
1972-1973	106.8	103.6
1973-1974	115.7	108.3
1974-1975	112.4	99.6
1975-1976	101.5	84.6
1976-1977	99.9	89.3
1977-1978	104.5	90.8
1978-1979	100.0	85.4
1979-1980	95.9	88.6
1980-1981	89.7	87.3
1981-1982	89.9	82.9
1982-1983	91.7	84.7
1983-1984	97.0	86.1
1984-1985	97.0	
1985-1986	91.6	
1986-1987	91.1	
1987-1988	98.5	

Source: Thamarajakshi (1990), Kahlon and Tyagi (1980).

It is seen from Table 1.1 that the inter-sectoral terms of trade have been in favour of agriculture from the mid-60's to mid-70's. Since then, it has reversed in favour of industry. This becomes apparent in terms of the levels. The movements in the inter-

[9] The reasons given by Kahlon and Tyagi are as follows: First methodology employs index numbers of wholesale prices which are of limited use since for groups such as manufacturing - for which wholesale prices are available, are inclusive of many commodities which are not transacted between the two sectors. The second method concentrates on products exchanged for final and intermediate use. The details available on consumption expenditure survey restricts the number of items identified or purchased by the agricultural sector for final consumption.

sectoral terms of trade in either direction reflect that no sector has complete control over the inter-sectoral prices to shift it in their favour. Thus, it appears that Government intervention in the agricultural sector does not have complete control over the terms of trade. This brings us to doubt the common perception that bias in favour of agricultural sector brings about shifts in the inter-sectoral terms of trade.

And moreover, all studies in the debate while calculating agricultural terms of trade, include commodities where there is no government intervention for the group of commodities sold to the agricultural sector. To infer class bias[10] - via government intervention in the agricultural sector, from a study of group of commodities that include commodities having no government intervention is not convincing.

Thus, the theoretical and empirical grounds for the arguments put forth in the existing literature pertaining to inter-sectoral terms of trade appears to be rather weak. It is in this context that the present study gains significance. The study seeks to examine afresh the probable causes for the shift in inter-sectoral terms of trade.

The problem so posed takes an important role in the area of inter-sectoral pricing addressing the question of the determination of the inter-sectoral terms of trade in the Indian economy. The determination of the inter-sectoral price ratio depends on the

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[10] Mitra (1977) and Kahlon and Tyagi (1980) are the two major proponents of this view referred here.

nature of price formation in both the sectors and subsumed in this is the causation for shift in the inter-sectoral terms of trade. This can be better understood from the nature of price formation in both sectors. In this regard, we study the structuralist characterisation of the economy for the nature of price formation in both sectors in the next section.

III. Sectoral price formation: An insight from Structuralist macro economics:

Sectoral price formation in a structuralist perspective is an outcome of the characterization of the economy as delineated below:

a. Consider an economy consisting of two sectors, agriculture and industry. Agricultural sector is characterized as prices clearing the market, while output in the industrial sector adjusts to clear the market. Agricultural supply is assumed to be fixed in the short run as the production process is seasonal and with a long time lag between input decisions and output, while the industrial sector is assumed to have excess capacity with enough flexibility to adjust to changes in demand for its products.

b. Economically powerful actors, that is, 'institutions' such as organized labour are not price takers. They can influence price and\or quantity changes in certain markets. The sources of power differ from economy to economy, and change with local institutional arrangements and history.

c. In the industrial sector, production is concentrated in the hands of large corporations where prices are administered by the

producers themselves and adjustment of production to changes in demand takes place independent of price changes, through a stock-adjustment mechanism.

In the agricultural sector in India, demand and supply forces determine the open market price. However, these forces cannot be separated from the influence of government intervention in the agricultural sector in the form of the New Agricultural Strategy introduced in 1965. Thus, administered prices set by the government too influences the inter-sectoral terms of trade. The lack of any consistent trend in the inter-sectoral terms of trade over the long run strongly suggest that 'single factor' explanation, such as the one mentioned above, leave out a large part of the story.

For a more complete analysis, an understanding of factors such as production conditions in agricultural sector is necessary which exerts influence on inter-sectoral prices. As put by Mundle[11], "Prices in agriculture are generally assumed to be flexible, fluctuating from year to year in response to fluctuations in output so as to match demand and supply". He then goes on to say that given the conditions of demand, agricultural prices will be lower in a situation where productivity in agriculture is higher as compared to one where it is lower. The rise in agricultural prices will have a very powerful influence operating on the cost side in the industrial sector. The rise in the price of basic raw materials going from agricultural sector to the industrial sector

[11] See Mundle (1985).

is passed on to the final price with an exaggerated effect through various stages of production.[12]

The upshot of this argument is that the production conditions existing in agricultural sector brings about changes in industrial prices through changes in the agricultural prices[13]. This has an impact on the inter-sectoral terms of trade between agriculture and industry. Therefore, neither sector has complete control over the inter-sectoral terms of trade as agricultural and industrial prices have mutually reinforcing effect on each other.

Therefore, due to lack of an explicit framework for the determination of inter-sectoral terms of trade, Mitra misses two important determinants namely, the demand and supply forces in the agricultural sector and the superior market power wielded by the industrial sector.

VI. A simple model of the determination of inter-sectoral terms of trade:

In this section, we outline a short run two sector model to demonstrate the nature of price formation in both the sectors and the possible factors involved in bringing about shift in the inter-sectoral terms of trade[14].

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[12] See Kaldor (1976).

[13] This is examined in the next section with the help of a simple model.

[14] The Government as an agent bringing about shifts in the inter-sectoral terms of trade has not been accommodated since here is an attempt to identify the other possible institutions apart from Government intervention in the agriculture sector.

The private sector of the economy is composed of two sectors, Industrial (Y) and Agricultural (X). The essential difference between the two sectors is with regard to their response to excess demand. In the agricultural sector, it is price which adjusts to excess demand for food, while in the industrial sector it is output which responds to excess demand. An associated difference between the two sectors is with regard to output. The agricultural sector is generally insensitive to variations in prices in the short-run, while there exist excess capacity in the industrial sector and is characterized by mark-up pricing.

With these characterizations, let us, for sake of simplicity, consider agricultural output `Xa' to be determined exogenously in the short run.

In the agricultural sector, the following are the market-clearing equations. The demand for agricultural commodities is given by

$$D_a = a\ (P_a,\ P_i,\ Y_i),\quad a_1 < 0;\ a_2 > 0;\ a_3 > 0 \qquad (1.1)$$

where `$P_a$' is price of agricultural commodities, `P_i' is the price of industrial commodities and `Y_j' is the industrial output. Supply of the agricultural commodities are assumed to be exogenous determined therefore

$$S_a = X_a \qquad (1.2)$$

Since $D_a = S_a$ (1.3)

substituting (1.1) and (1.2) in (1.3), 'P_a' may be written as

$$P_a = p\ (P_i,\ Y_i,\ X_a), \quad p_1 > 0;\ p_2 < 0;\ p_3 < 0 \qquad (1.4)$$

In the industrial sector, output is assumed to be demand determined and, therefore, the equation for industrial output is given as

$$Y_i = e\ (X_a,\ P_a,\ P_i), \quad e_1 > 0;\ e_2 > 0;\ e_3 < 0 \qquad (1.5)$$

where 'X_a'is agricultural output.

Prices in the industrial sector are set by oligopolistic producers applying a mark-up 'r' on unit cost of nominal wages per worker and the price per unit of imported material output. The price equation can be written as follows:

Let 'C_w' be the wage cost and 'C_m' be the raw material cost and 'r' the mark-up. Then

$$P_i = (C_w + C_m)\ (1 + r) \qquad (1.6)$$

$$C_w = (b.w) \qquad (1.7)$$

where 'w' is the nominal wage per worker and 'b' is the labor requirement per unit of output. Wages in the industrial sector depends on the cost of living index, where the weight of the agricultural price is predominant. Any increase in agricultural price will lead to an increase in wage as laborers demand for higher wages. This can be represented in the following way

$$w = (\bar{w} + ß\ P_a) \qquad (1.8)$$

where '$\bar{w}$' is that part of wages which does not depend on the price of agricultural commodities. Here, we isolate that part of wages which depends on agricultural prices highlighting the nature of wage determination in the industrial sector. 'C_m' is the cost of imported inputs. As the emphasis in this model is to bring out the relationship between agriculture and industry, 'C_m' is left unexpanded. Therefore, substituting (1.8) in (1.7) we get

$$C_w = [b\ (\bar{w} + ß\ Pa)] \tag{1.9}$$

Now substituting (1.9) in (1.6), we get

$$P_i = [b\ (\bar{w} + ß\ P_a) + C_m]\ (1 + r) \tag{2.1}$$

Therefore, the sectoral prices are as follows

$$P_a = p\ (P_i,\ Y_i,\ X_a) \tag{2.2}$$

$$P_i = [b\ (\bar{w} + ß\ P_a) + C_m]\ (1 + r) \tag{2.3}$$

The first equation (2.2) shows that industrial prices determine the level of agricultural prices. The second equation (2.3) shows that industrial prices depend, among other factors, on the agricultural price. Both equations show that inter-sectoral prices are mutually dependent. A stimulus to one will have an effect on the other.

Suppose government intervenes in the agricultural sector by way of fixing administered price, specifically through procurement price policy as a market support scheme. Empirical evidence shows that

this policy will have an impact on the open market price[15]. This has ex-post implications for the model, as industrial prices depend on agricultural prices. An increase in open market price due to government intervention will be reflected on the industrial prices, as industrial sector has an oligopolistic market structure and the prices adjust to increase in costs. This makes one to doubt that the absolute increase in agricultural prices brought about by the power of any farm lobby - as Mitra puts it, could by themselves have engineered a shift in the inter-sectoral terms of trade in favour of agriculture or keeping down farm prices could on their own shift the inter-sectoral prices in favour of industrial sector[16].

Assuming demand (especially for foodgrain) in the agricultural sector to be relatively price inelastic, the impact of supply shocks on agricultural prices are important in influencing the inter-sectoral prices. This model, therefore shows that class forces in either sector do not have complete control over the inter-sectoral terms of trade.

To summarise, two determinants of the movements in the inter-sectoral terms of trade can be identified from the above model. One economically powerful determinant is the forces of demand and

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[15] See Krishnaji (1975) for an impact on open market price at the aggregate level and for a micro level study see Balakrishnan (1991).

[16] See Kaldor (1976) for an exposition of the nature of market and interaction between agriculture and industrial sector as a cause for inflation in the world economy.

supply in the agricultural market. The other institution is the oligopolist in the industrial sector.

Another institution as hypothesized by Mitra, is the state in the agricultural sector. As the model does not invalidate this hypothesis, the government as an institution is included as a factor in bringing about shift in the inter-sectoral terms of trade in our empirical investigation. However, though the model does not explicitly bring in government intervention, its impact on inter-sectoral terms of trade can be analyzed by a simple econometric test which involves comparing two periods, the pre 1965 period when there was no government intervention and post 1965 period marked by government intervention. Hence, there are altogether three major factors which could bring about shifts in the inter-sectoral terms of trade.

Objectives of the study:

With this theoretical exposition of the probable cause for shift in the inter-sectoral terms of trade, our study seeks to examine the behaviour of inter-sectoral terms of trade in the Indian economy since the introduction of the New Agricultural Strategy. The objective of the study is therefore two fold: first, to calculate afresh the indices of inter-sectoral terms of trade with commodities having Government intervention for the group of commodities sold to non-agricultural sector and second, to examine the behaviour of inter-sectoral terms of trade in the Indian economy since mid 60s.

Scheme of the chapters:

In chapter two, the debate on inter-sectoral terms of trade in the Indian economy is reviewed. Chapter three details out the methodological issues, providing the corrected indices of inter-sectoral terms of trade and also highlights some of the probable causes for the shifts in the inter-sectoral prices. The fourth chapter outlines the major findings of the study.

Chapter II

THE DEBATE ON THE BEHAVIOUR OF THE INTER-SECTORAL TERMS OF TRADE IN INDIA: A REVIEW

I. Introduction:

The focus of the debate on Inter-sectoral terms of trade has been on the question of extraction of surplus from the predominant sector to the sectors that intends to promote economic development. Central to this lies the postulate that accumulation is basic to growth. The inter-sectoral terms of trade were viewed as a policy instrument to extract surplus from the predominant sector. In the Indian economy, the debate is with regard to the direction of shift in the inter-sectoral terms of trade. In this chapter an attempt is made to review the debate over the inter-sectoral terms of trade.

This issue led to an heated debate over the movements of the inter-sectoral terms of trade between agriculture and industry in India. Which served to buttress rival arguments on whether the shift in the inter-sectoral terms of trade is due to urban bias or rural bias. In the debate over the inter-sectoral terms of trade two contrasting views can be identified. One of the views argue for higher prices for agriculture to stimulate agricultural incentives and growth. The other view calls for price relation to favour industry to ensure a high rate of industrial accumulation and growth. The former view is supported by Kahlon and Tyagi[1], for they argue that over the years due to urban oriented strategy of

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[1] See Tyagi (1979) and also Kahlon and Tyagi (1980,1983).

development, resources have been diverted from the country side to the town where they would primarily benefit an urban elite. They ask for higher agricultural prices to stimulate agricultural growth as well as higher income for agriculture with increase in wages for wage laborers. The latter view is supported by Mitra[2], who calls for higher industrial prices so that the process of accumulation can proceed uninterrupted where by marketed surplus from agriculture is transferred to the town on favorable terms to industry. Mitra describes the class relations in the economy and tries to relate it to the power structure.

He then focusing his attention towards the economic polices of the government and their manifestations on the inter-sectoral terms of trade through changes in the inter-sectoral prices. This has been brought about, Mitra tells us, by the power of the rural oligarchy who, in alliance with the industrial bourgeoisie are able to manipulate inter-sectoral prices in their favour. This fact is established first by showing empirically that inter-sectoral terms of trade were favorable to agriculture during 60s and early 70s and then attributing this shift to the Government policies in the agricultural sector during that period. This empirical observation is questioned by Tyagi and Kahlon on the methodological front.

Using another methodology Tyagi and Kahlon tried to refute the notion of pro-agriculture bias put forward by Mitra. What they do is an exercise in recalculation of the net barter terms of trade. The calculated index showed no evidence of favourable shift in the

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[2] Refer Mitra (1977).

relative price position of agricultural sector. This was further viewed critically by Vittal[3] in the pursuit to rescue Mitra.

Vittal criticises Tyagi and Kahlon by pointing out that the problem in the choice of base year is well known. As with the use of different base years, the levels in net barter terms of trade change and Tyagi has no evidence of any consistent anti-agriculture bias. And also that he resorts to no theoretical model supported by new data but merely to an exercise in the re-calculation of the net barter terms of trade. However, Kumar[4] questions Mitra's thesis by pointing out that the influence on inter-sectoral price ratio also comes from the industrial sector. Hence introducing the question of the determination of inter-sectoral terms of trade and thereby linking movements in inter-sectoral terms of trade to the performance in the industrial sector. This chapter brings forth the debate on inter-sectoral terms of trade in the Indian economy addressing issues in greater detail though an overview of the debate was sketched in the previous chapter.

II. Terms of trade debate in the Indian economy:

In the Indian economy the emphasis by Mitra is on the importance of the agricultural marketed surplus being transferred to the towns on favorable terms for industry so that the process of accumulation can proceed uninterrupted. The crises of the Indian economy is accordingly blamed on the steady deterioration of the inter-sectoral terms of trade faced by the industrial sector. This has

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[3] For a detailed account, see Vital (1986 and 1990).

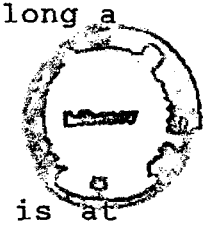
[4] See Kumar (1988).

been brought about, Mitra shows that, by the power of the rural oligarchy, who in alliance with the industrial bourgeois are able to manipulate inter-sectoral prices in their favour. In this class arrangement, the bourgeoisie are offered the substantial rural voting strength and are therefore assured of continued governmental power. In return, the rural rich peasants get high support prices, a range of agriculture inputs at subsidized prices and exemption from taxation. Whereas high agricultural prices may imply a shift in real incomes in favour of the farming community and away from the town. The resulting gains are however exclusively monopolized by surplus-raising farmers, who are net purchasers of grains from the market and have been at best marginal.

Mitra first establishes the role of class forces in regulating the growth and distribution of national and sectoral incomes and when established he goes on to the internal contradictions in these classes by way of three sets of terms of trade, constantly engaged in trying to effect the pattern of income distribution and therefore the process of accumulation and growth: the terms of trade between agriculture and industry, between the rich peasant on the one hand and small peasant and farm worker on the other hand and finally between the bourgeoisie and industrial labor. A series of struggle constantly engages the class. Each strives to tilt the terms of trade vis-a-vis the other class in their favour. In the process, the economy is rendered in to a battle ground with skirmish between different classes occurring all the while. The outcome of each skirmish is reflected in the shift in terms of trade. These shift in turn determines the pattern of shift in the distribution of income.

The terms of trade becomes the instrumentality for articulating these class interest, and the outcome of the tussle over terms of trade signals changes in relative economic position. In these unceasing rounds of welfare and continuous adjustment of the terms of trade in response to oscillations in the relative bargaining power of different classes, the state could hardly remain passive or a neutral entity. It reflects the concentration of power and authority. This authority can be directly deployed for affecting the terms of trade between classes and thus for reordering the structure of relative prices.

The objective can be achieved through an authoritarian setting of prices, but it can also in part be accomplished through the intermediary of other instruments, such as monetary and fiscal measures, policy on trade and tariff, investment decision, licensing and control etc. They have seized power not for its own sake, the seizure of power has a purpose which is to affect the structure of asset and income distribution in the society along a particular direction.



Mitra further contends that the political authority as it is at present exercised in India reflects the duopolistic arrangement between the rural oligarchy and the industrial bourgeoisie. The bourgeoisie controls the industrial sector and exercise a dominance over the organized working class. An alliance of convenience is thus struck with the rural oligarchy. With this schematics of class relation, Mitra provides, from the annals of recent Indian economic history certain empirical foundation for the hypotheses on the interaction between terms of trade and class relation.

Mitra acknowledges that terms of trade becomes the instrument for articulating class interest. The authority of the intermediate regime can be directly deployed for affecting the terms of trade between classes and thus for reordering the structure of relative prices. This is possible only under circumstances when both industrial prices and agricultural prices or in other words relative price are set by the state. While in the agricultural sector, the procurement price brings about changes in the market price, cost plus pricing is followed in industrial sector. However, it is true that class bias reflects itself in the Government intervention, there is no evidence of it shifting the inter-sectoral terms of trade.

Mitra empirically shows that inter-sectoral terms of trade shifted in favour of agricultural sector and argues that the shift in favour of agricultural sector is brought about by the state. This perception of the cause for shift is doubtful when the question of the determination of agricultural and industrial prices is addressed. The determination of inter-sectoral prices are not as perceived by Mitra. The monopoly power of the Government in setting procurement price is emphasized by Mitra to bring about shifts in the inter-sectoral terms of trade. Mitra then discusses the modalities of official intervention for raising farm prices and tilting the terms of trade against non-farm goods. He emphasizes the role of administered price policy as an instrument in bringing about shift in the inter-sectoral terms of trade. Procurement prices as delineated by him have been repeatedly pushed upwards. This push in the price of agricultural products is approximated to the shift in the inter-sectoral terms of trade. While inter-

sectoral terms of trade also depends on industrial prices. The above premise is falsified when we shift the focus to link increase in agricultural price due to higher setting of procurement price and increase in industrial price as a result of increased cost of raw materials. This puts to doubt Mitra's theoretical framework.

Empirically he showed that the weighted terms of trade between agriculture and industry have over the period moved by close to 50 percent in favour of agriculture. This shift in the inter-sectoral terms of trade towards the direction of agriculture reflects the extent of decline in the relative unit value of farm production. Mitra in effect does not show the precise mechanism by which the shift in the inter-sectoral terms of trade is brought about. He says that the state had played a crucial role and pressures has been applied at various levels to influence official decision making. At the purely populist level, the sentiment built around the fact that agriculture constitutes the principle economic activity in the country and provides the means of livelihood for the majority of the population and therefore has been exploited in the past quarter of a century. The farm sector has been continuously harped up-on and was neglected in the past. Therefore, a number of special incentives must be offered to it to make up the lost ground and more so since the nation has adopted the objective of self-sufficiency in agriculture.

Scarcely, any opportunity has been missed to stress the point that farm growth is equally vital for industrial progress, since it provides, on the supply side, the wage goods and the necessary raw material for processing. On the demand side, a major part of the

potential market for finished manufactured goods. The trend towards shifting the relative price in favour of agriculture and against industry was reinforced by the ideological ferment engendered by the so called New Agricultural Strategy. A major adjunct of the strategy is across the board subsidies - direct as well as indirect, including the so called incentive prices for the entire range of farm output.

Apart from fiscal and monetary measures, the instrument which has been most effectively deployed for the purpose during the past decade is the administered price policy for the farm sector. Both minimum support prices intended to ensure the producers a minimum price covering cost of production in the eventuality of a crash in market prices and procurement prices which are prices at which official agencies are expected to purchase either a grain or a cash crop for serving the objective of either public distribution or building buffer stock have been repeatedly pushed upwards since 1964-65. He shows that "what government does or does not do is in the nature of an early warning signals for others. If government raises administered prices, it stimulates prices over the entire range of market operations. If it marks down administered prices, its decision acts as a depressant which again cast its spell over the rest of the market. As long as the belief is promoted that government is the price setter, what ever the objective reality in the initial stages, the administered prices become after an interval of time, the actual price setter for all effective purposes".

Mitra proceeds by looking at the data from the Indian economy to see if shifts in the inter-sectoral terms of trade favourable to agricultural sector has brought about any spurt in farm output. He concludes that rising levels of prices have made little impression in the trends in output of major food grains and also for commercial crops.

With the above analysis, Mitra concludes that "shift in the inter-sectoral terms of trade has implied a shift in real income in favour of the farming community considered in aggregate vis-a-vis the rest of nation, the resulting gain has been exclusively manipulated by the surplus raising farmers and there trading partners; landless labor and small farmers, who are net purchasers of grain from the market have been as adversely affected by the rise in farm prices as the non agriculture class in general".

He then goes on to discuss inter-crop discrimination in pricing decision, relating it to class bias. He concludes that the governments discriminatory attitude in fixing administrative prices are not due to any specific regional political bias which has been at work, but the much more fundamental bias which stems from the operation of class forces.

Mitra's thesis relies on the simplification of the complex realities. The force of the argument largely depends on establishing the direction of the price shift to be unambiguous. Mitra succeeds in attributing class bias to shifts in the inter-sectoral terms of trade by showing inter-sectoral terms of trade to favour agricultural sector.

This is brought about by the coalition between industrial bourgeois and rural oligarch through state machinery by the intervention in the agricultural market. The basis for this conclusion depends on his success in showing the direction and cause for shift in the inter-sectoral terms of trade, which he attributes to class bias, to favour the same sector. This empirical basis of Mitra depends on Thamarajakshi's study[5] which represents export prices by a composite index of agricultural products purchased by the non-agricultural sector for intermediate and final consumption, and similarly import prices by a composite index of price of all non-agricultural products purchased by the agricultural sector for intermediate and final uses. The value of the inter-sectoral purchases of the relevant commodities is then estimated for the base year in order to be used as weights in the construction of the composite indicator of the prices for the basket of goods purchased by each sector from the other.

The literature also includes another methodology, used by Ashok Dar and Dantwala where they inferred the movements in the inter-sectoral terms of trade from a direct comparison of index number for such subgroup as 'manufacturing' and 'agriculture'.[6]

Tyagi and Kahlon criticise the use of these methodologies to be incomplete and misleading and ultimately resulting in the overestimation of the price of agricultural commodities. Using another methodology they separate out the effects of exogenous

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[5] See Thamarajakshi (1969).

[6] See Kahlon and Tyagi (1983).

changes in say supply or demand elasticities from those of non market intervention. More specifically, they claim that the first category, employing index numbers of wholesale prices, is of limited use because many groups such as manufactures for which wholesale price indices are available are inclusive of commodities which are not transacted between the two sectors. Therefore using these indices does not give an accurate picture of the inter-sectoral trade actually or potentially taking place. While studies in the second category concentrates on products actually exchanged, whether for final use or intermediate use. Because of this dissatisfaction with the existing approaches, Kahlon & Tyagi develop and employ a new methodology of their own for measuring inter-sectoral shifts in relative prices.

Further, Mitra surmises that accumulation is determined by the price relations between agriculture and industry. Agriculture as a whole receives prices in excess of what its products merit and since mid 60s this trend has visibly become stronger. That is, the inter-sectoral terms of trade have become entrenched by a shift of nearly 50 percent in favour of agriculture between 1951-1952 to 1953-54. This is the result of class bias in the agriculture price policy. The net effect of such high farm prices is industrial recession. According to Mitra class forces control the growth and distribution of national and sectoral incomes and the three sets of terms of trade are engaged in trying to effect the pattern of income distribution, and there by the process of accumulation and growth. These three sets of terms of trade operate between agriculture and industry between rich and small peasantry and landless labors, and between the industrial bourgeois and labor.

Thus, depending on the dominance of one or the other of the four classes - the four classes are surplus producing farmers, industrial bourgeois, poor peasant and industrial labor, would the terms of trade shift in their favour in order to redistribute national and sectoral income. This dominance is not immutable rather the economy is a battle ground in which changing class interest are articulated through terms of trade. In this battle ground however, it responds to the decisions of the class forces on the movements of relative prices. This framework is made use of by Mitra for the determination of inter-sectoral terms of trade in India.

Inter-sectoral terms of trade were in favour of agricultural sector since the mid 60s till the early 70,s. This according to Mitra is due to the state playing an active role in ensuring the dominance of agricultural sector. The net effect of this has been the industrial recession and national economic stagnation.

The first effect of rising agricultural prices is on industrial profit through increased cost. If industrial prices rise, demand is likely to fall given the high elasticity of demand for manufactures. Rather than face this danger, industrialists choose to hold industrial wages in the face of rising cost of living. Since the fifties, the share of wages as a proportion of value of total output has declined steadily. Yet, stagnation in the rate of profit has not been avoided. The weighted terms of trade moved by nearly 50 percent in favour of agriculture over industry. Mitra refers to the net barter terms of trade- the straight comparison of prices. These relative prices are used by him to bring out his

point of class ascendancy. His argument is with regard to accumulation in an economy which is emerging from a semi-feudal agriculture and general economic stagnation. It is evident that Mitra's canvas is broad. He sees prices as one of the means by which class relations are articulated. He traces similarities between the present-day Indian situation and the Russian one during the 1920s and derives the conclusion that the inter-sectoral terms of trade have favoured agriculture and therefore it is rural bias which is brought about by government intervention. And what Tyagi does is to chose a methodology to demolish Mitra's empirical conclusions without questioning the theoretical basis of the whole analysis. And there by concludes that inter-sectoral terms of trade has moved against agricultural sector showing urban bias, which is contrary to Mitra's conclusion about the nature of bias.

Tyagi questions the methodology used in the calculation of net barter terms of trade.[7] The key objection is with regard to the price series used, which according to him is deeply flawed because the official price index overestimates the rise in the price of agricultural commodities and simultaneously underestimates the rise in industrial prices.

Further, Tyagi argues that Mitra uses the 18th round of the NSS data to show dependence of small peasants and landless laborers on the market for foodgrains thereby showing that high farm prices are against their interest. Tyagi concedes that this may be true for the period under consideration. But over the years, however labor

[7] These issues will be addressed in greater detail in the next chapter.

and small farmers actually benefit, since the value of their wages paid in kind increased with rising food prices. In any case says Tyagi, Mitra is summarily wrong in discerning any shift in the terms of trade in favour of agriculture. Indeed, no such shift is visible if viewed over a long period. The shift apparent in the short run is explicable by the faulty index used by Mitra.

Tyagi begins his counter argument by pointing out that indices are constructed on the basis of officially recognised prices which may not reflect prices paid or received by either sector. He adopts for illustrative purposes, the case of wheat and rice which together account for about 25 percent by value of all agricultural commodities. The index that describes the price movement is valid only if its estimates in the base year are correct (1961-62), its estimates for the subsequent years are correct and if the distribution of marketing centers actually reflect the quantity marketed or produced in the region.

The last point that Tyagi mentions is that the index for grain price is derived from price quotations submitted by various marketing centers around the country which may actually trade in different volumes of grains. In which case giving all these reporting centers equal weight will completely distort the index. Tyagi considers wheat and rice to show that official price index for wheat and rice has risen much faster than actual price. The official price index for manufactured goods is similarly biased in the opposite direction for Tyagi to refute the notion of pro-agriculture bias put forward by Mitra.

Vittal rescues Mitra by countering Tyagi. The first objection raised is with regard to the fine distinction between the use of issue price as opposed to free market prices and in calling for a representative distribution of price-reporting trading centers. Quoting Krishnaji, Vittal shows that by the mid-70's, seasonal lows had all disappeared and prices saw a steady upswing. Thus if an average difference is taken over the years, it would be far lower than Tyagi's estimated difference for a single year. The difference shown is evident for the years he has chosen but over the years, the difference has ceased to exist. The same obtains in the case of rice where season-wise fluctuations are evened out over the years. Vittal also shows that the difference between issue price and market price is evident for the years Tyagi has chosen. But by 1970, the difference had virtually disappeared. Thus, an average difference taken over the years would be far lower than Tyagi's estimated difference for a single year.

Another criticism by Vittal is with regard to the use of farm harvest price as a better proxy for prices received by farmers than the wholesale prices used for constructing the index. Vittal mentions two problems. One is that farm harvest prices across the country is difficult to collect and more over these are based on a very small sample of what is called the farm-gate price. The second criticism is that minority of farmers who are the biggest surplus producers do not sell at the time of harvest but hold on to sell maximum in the lean season in order to benefit from high prices.

The above methodology was further questioned by Raj[8] as he pointed out that one cannot assume that all the categories of farmers succeed in securing the reported harvest price and how much of their market output is in fact sold at these prices is a matter for separate investigation. In the absence of such studies, the use of farm harvest price rather then wholesale prices may produce a biased inter-sectoral price series.

Therefore, the debate is with regard to the methodology used in calculating the inter-sectoral terms of trade. More specifically with regard to the limited coverage in the trade between the two sectors, use of improper weights, use of inappropriate price indicators and adoption of incorrect methods for estimating the volume of exports, etc.

Kumar on the other hand shows that the evidence provided by both Mitra and Tyagi does not support the strong political claim that have been advanced of either a bourgeois-oligarch coalition or of an alliance of anti-rural interests ruling the roost. He surmises that the Mitra and Tyagi visions does not adequately describe the complex mechanism of contemporary Indian society and the lack of any consistent trend in the inter-sectoral terms of trade over the long-run strongly suggest that such explanations leave out a large part of the story. He then goes on to say that in the context of Indian economy, the primary determinant of movement in the inter-sectoral terms of trade come from the industrial sector.

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[8] See Raj (1983).

Mitra's thesis relies on simplification of a complex reality to achieve its effect. The force of the argument depends on establishing that the direction of the price shift has been unambiguous. It would appear that from a methodological point of view, a consideration of this proposition is necessary before links are made between price shifts and economic power. Class bias is introduced by Mitra through linking two phenomenon, government intervention and shifts in the inter-sectoral terms of trade. This link is put together by an assumption that the determination of the inter-sectoral terms of trade is in the agricultural sector. So the class bias reflects itself in the procurement price set by the government and hence bring about shift in the terms of trade. This is because of the determination of inter-sectoral terms of trade in the agricultural sector. Kumar questions this assumption of the determination of the inter-sectoral terms of trade in the Indian economy. He points out that the influence on the inter-sectoral terms of trade also comes from the industrial sector.

III. On the question of the determination of the inter-sectoral terms of trade:

Mitra's thesis relies on simplification of a complex reality to achieve its effect. The force of the argument depends first on establishing that the direction of the price shift has been unambiguous and then on the nature of government intervention. Mitra brings in class bias from the above mentioned (two) facts by showing that the inter-sectoral terms of trade has favoured agricultural sector which he says is brought about by the government intervention in the agriculture sector reflecting class bias in setting administered prices.

Kumar focusing his attention on the industrial sector surmising that such an explanation leaves out a large part of the story and that shift in the inter-sectoral prices are best seen as arising from the play of diverse, and often conflicting forces operating in the economy. He tries to link movements in the inter-sectoral terms of trade to the influence operating from the industrial sector with three empirical evidence.

1. Comparing the movements of both industrial and agricultural prices from early 1950s till the middle of 1960s. He shows that the upward pressure on industrial prices were few combined with steady agricultural price. This resulted in no discernable trend in the inter-sectoral terms of trade combined with steady agricultural prices.
2. In the following period, till 1970-71, productivity in the industrial sector declined. The inter-sectoral terms of trade moved in favour of agriculture. However, the effect on industrial prices was out weighted by the imports of agricultural prices on the inter-sectoral terms of trade.
3. Inter-sectoral terms of trade continued to favour agriculture in the beginning of 1970, but later on turned against the agricultural sector from 1973-74. He link this to the effect of high import prices following the oil price hikes on industrial prices.

With these empirical evidences he concludes that price formation in the industrial sector may be predominant in influencing the terms of trade. This conclusion has implications for the methodological question raised as to whether inter-sectoral terms of trade shifts

even when significant could conceivably become the powerful secondary influence on the economy as envisaged by Mitra. Based on these arguments he further questions the phenomenon of inter-sectoral terms of trade slashing industrial profits causing industrial deceleration on the count that; now that the inter-sectoral terms of trade has moved in favour of industry, why signs of industrial recovery are not manifest. With this he rejects the direct links between improvements in the agricultural terms of trade and decline in industrial profitability, which throws the whole basis of Mitra's analysis into doubt.

Continuing with the explanation for the retrogression that began in the middle of 1960, he takes a look at disproportion between sectors which binds the process of growth in the sectors. Citing Prabhat Patnaik[9] he delineates the possible reasons for industrial retrogression to be the inability of agriculture sector to grow at a rapid enough pace. This to him is the key to the question of why industrial growth has exhibited the symptoms of long term deceleration. He further suggests that, rather than concentrating on the recessionary effect on industry of adverse price movements, more explanatory powers can be gained by analysing the disproportions created - on both demand and supply front by a slow rate of growth of agriculture.

Kumar links the movements in the inter-sectoral terms of trade to the performance in the industrial sector. In doing so, he links the high capital-output ratio to the movements in the inter-

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[9] See Prabhat Patnaik (1972).

sectoral terms of trade. As inter-sectoral terms of trade is the ratio of agricultural price to industrial price, the nature of price formation in the industrial sector has an important implication for Kumar's arguments. In the formation of industrial price, it is prime cost or the variable cost which is important and not the fixed cost. Hence, Kumar's postulates of the links between variations in fixed cost and movements in the inter-sectoral terms of trade suffers from insufficient theoretical basis.

Kumar points out that in an economy like India, with a growing industrial sector characterised by mark-up pricing, the inter-sectoral price relation could be determined outside the agricultural sector more specifically in the industrial sector. However, it was pointed out in the previous chapter with a simple model that inter-sectoral prices are determined simultaneously. More specifically the demand and supply factors in the agricultural sector were emphasised apart from the influence from the industrial sector. These factors influencing the inter-sectoral prices are ignored by Kumar.

With this review of the issues involved in the debate, the next chapter sorts out the appropriate methodology for the calculation of indices of inter-sectoral terms of trade.

Chapter III

THE BEHAVIOUR OF THE INTER-SECTORAL TERMS OF TRADE IN THE INDIAN ECONOMY: 1965 TO 1990

In view of the limitations of the estimates adopted in estimating the indices of inter-sectoral terms of trade, we propose an alternative approach to the calculation of inter-sectoral terms of trade. This chapter takes a fresh look at the statistical question of the calculation of inter-sectoral terms of trade. Here, we employ a different methodology to arrive at the new series for agricultural terms of trade.

Before we embark on the calculation of the net barter terms of trade, it is necessary to make clear certain conceptual issues with regard to the development of the concept of net barter terms of trade for a two sector model which evolved in the studies of international trade.

In section I, we trace the development of the concept of net barter terms of trade and discuss the data requirements for its application to the two sector model i.e., agriculture and non-agriculture. In section II we identify the relevant products exchanged between the two sectors followed by details of an alternate methodology. Section III provides the method for computation of agricultural terms of trade using the revised methodology with different base year weights. In section IV, we identify the causes for shift in the inter-sectoral terms of trade in light of the newly constructed indices of terms of trade.

I. On the concept of net barter terms of trade:

The terms of trade is the ratio of the prices of export to the prices of imports. The concept of the terms of trade evolved as an analytical tool in the comparative cost theory of International Trade.[1] Further, out of the several concepts of terms of trade, from the point of view of simplicity and practicability, it is the commodity or net barter terms of trade that remains the most widely accepted indicator of gains from international trade. Tt is for this reason that almost the entire discussion of terms of trade has in the past been a consideration of relative prices of exports for its imports.[2] Thus, other things remaining the same, a change in a country's relative export prices would reflect a change in the capacity of a unit of its exports to fetch in return a certain quantity of imports. In other words, all other things given, a rise in the countries relative export prices will enhance the purchasing power of a unit of exports in terms of imports and thus, the movements in terms of trade will be considered as favourable to the exporting country. What follows, therefore, is that for estimating agricultural terms of trade, prices of only those products should be compared that are actually exchanged between agriculture and non agricultural sectors.

The requisite information and the data for the estimation of terms of trade between the two sectors of an economy are[3]:

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[1] For an detailed discussion on the concept of terms oftrade see Viner (1937).

[2] See Dorrance (1949).

[3] See Kahlon and Tyagi (1980).

(1) List of products exchanged between the two sectors.

(2) Relative share of each item of 'exports' in the total exports and also the share of each imported item in the total imports.

(3) Prices at which the products were exchanged.

As the number of commodities/products exchanged between the two sectors would invariably be more than one and since the comparison has to be made over time, an appropriate method of construction of indices of unit value of export and imports is necessary. The emphasis here is on net barter terms of trade[4] as it takes on from Mitra who emphasis the behaviour of net barter terms of trade to reflect class bias. The terms of trade between the two sectors compare prices of exports of one sector with the prices of imports from the other sector. This comparison of exports and imports prices are denoted as Px/Pm, where Px is the composite price of commodities exported from agricultural sector and Pm is the composite price of commodities imported to agricultural sector, for the two-sector case viz, agricultural and non-agriculture.

II. Pattern of trade:

The degree of accuracy of the estimates of terms of trade depends on the comprehensive treatment of the pattern of trade between agricultural and non-agricultural sector. For a comprehensive treatment, the entire gamut of inter-sectoral flows would have to be taken into account as recognized in the debate. The basis of inclusion of commodities involved all the commodities transacted

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[4] Since the emphasis here is on the inter-sectoral relationship reflected by net barter terms of trade rather than on income terms of trade, which is a measure of the welfare impact of changing inter-sectoral prices

between the two sectors with out giving due emphasis to the nature of commodities Mitra was emphasizing. The emphasis by Mitra was on commodities having Government intervention in the group of commodities sold to non-agricultural sector.

The essentials of arriving at the appropriate indices of inter-sectoral terms of trade with reference to the question addressed by Mitra as bias deliberately maintained by the Government will depend on the commodities to be included for the group of commodities sold to non-agriculture. Under this group the commodities included are those involving government intervention in the form of administered prices introduced in 1965. Mitra emphasised that "the trend towards shifting the relative prices in favour of agriculture and against industry was reinforced by the ideological ferment engendered by the so called New Agriculture Strategy ___". He then goes on to "explicitly discuss the modalities of official intervention for raising farm prices and tilting the inter-sectoral terms of trade against non-farm goods. Apart from fiscal and monetary measures, the instrument which has been most effectively deployed for the purpose during the past decade is the net work of administered price policy for the farm sector". It essentially means that the shift in the inter-sectoral terms of trade is brought about by the government intervention in the agricultural sector. Taking a look at Mitra's thesis (specifically the above mentioned paragraph) would provide clues about the nature of commodities to be included in the group: commodities sold to the non-agricultural sector. Mitra's conclusion of class bias depends on the nature of government intervention in the agricultural sector, so what becomes important as a sole criterion for judging

biasedness is to evaluate Mitra's hypothesis based on the methodology involving commodities having government intervention in the agricultural sector sold to non-agricultural sector.

The correct choice of methodology would involve commodities having Government intervention in the form of administered prices sold to the non-agricultural sector. This criterion is confined to the group of commodities sold to non-agriculture and for the purchases made from non-agriculture, all the possible commodities are included subject to the availability of consumption statistics. Table 3.1 gives the commodities that are traded between agriculture and non-agriculture for each of the two uses, viz, intermediate and final.

The products having Government intervention that are purchased by the non-agricultural sector from the agricultural sector includes cereals, pulses, jute, sugarcane, tobacco, cotton, groundnut, rape and mustard, soyabeen, sunflower, safflower, toria and copra[5]. Due to non-availability of price statistics (farm harvest price) for all commodities, the commodities included are cereals, pulses, jute, sugarcane, tobacco, cotton, groundnut and rape and mustard.

The commodities purchased by the agricultural sector includes commodities like oil and oil seeds, tobacco products, clothing, footwear, fuel & power, purchase of transport equipment, chemical fertilizer, feed for livestock, electricity, pesticides and

[5] Refer the Economic Survey, 1992-93 for the identification of commodities involving Government intervention in the form of procurement and minimum support prices.

insecticides and diesel oil. The identification was based on National Accounts Statistics given by the Central Statistical Organisation (CSO).

The commodities transacted between the two sectors for capital formation have not been included. The exclusion of this series does not affect the final trend in the net barter terms of trade series since the rise in the indices of price paid by agriculture for all commodities was mostly determined by the rise in the indices of final consumption goods and intermediate products inspite of the sharper increase in the price of goods for capital formation for the period of their study.[6] In a latter paper Tyagi[7] mentions that as regards purchases made for capital formation, there are several data gaps and therefore it is very difficult to generate precise estimates.

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[6] See Thamarajakshi (1990).

[7] See Tyagi (1987).

Table 3.1: Items of Inter-Sectoral Exchange for Intermediate and Final Consumption

Purchase by Agriculture from Non-Agriculture	Sales by Agriculture to Non-Agriculture
For Intermediate Consumption	
1. Fertilizer	1. Jute
2. Electricity	2. Sugarcane
3. Diesel Oil	3. Tobacco
4. Pesticides and Insecticides	4. Cotton
5. Oil Cakes	5. Groundnut
6. Feed for Livestock	6. Rape and Mustard
For Final Consumption	
1. Edible Oil*	1. Cereal**
2. Clothing	2. Pulses
3. Footwear	
4. Fuel and Power	
5. Tobacco Products	
6. Purchase of Transport Equipment	

Notes: * includes oilseeds and ** includes bread.

Source: Thamarajakshi (1990)

2. Appropriate price series: Since agricultural terms of trade is the ratio of agriculture to non-agricultural prices, one hardly needs to elaborate the over whelming importance of price indicators that are used in constructing the inter-sectoral terms of trade index. In the case of prices paid by agriculture for non-agricultural products for intermediate and final consumption, the use of their retail prices would have been more appropriate. However, in the absence of time series data for retail prices of these products for the country as a whole the use of their wholesale prices as price indicators may be considered appropriate. The controversy is with regard to the appropriate indicator of prices received by the producers for food and non-food crops sold to the nonagricultural sector.

In all the earlier studies[8] including that of Thamarajakshi, the index number of wholesale prices were used to reflect the prices received by agriculture for food and non-food crops. The limitations in using these index numbers in the construction of the indices of inter-sectoral terms of trade, as rightly pointed out by Tyagi[9] is that official index numbers tend to overestimate prices received (by farmers) and underestimate the prices paid. The factors responsible are[10] : (a) equal weights attached to all the centers selected for getting price quotations (b) use of issue price as price quotations for certain centers (c) use of single year as base year and (d) equal weights attached to all the weeks. The over estimation was of the order of 10 to 15 percent in a period of 10 to 12 years and that of the underestimation in prices of manufacturing was 5 percent.

However, in rescuing Thamarajakshi's methodology Vittal points out that faulty indices fault in all directions: not just those discovered by Tyagi. By 1970's the difference between issue prices and wholesale prices gradually died out.[11] Thus, the difference was evident for the years Tyagi has chosen which by the early 70's virtually disappeared. Tyagi attributes the apparent rise in net barter terms of trade for agriculture to widening differences in prices between surplus and deficit states. For example he argues,

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[8] Kahlon and Tyagi (1980) were the first to use farm harvest prices as prices received by the agricultural sector for goods sold to non-agricultural sector.

[9] See Tyagi (1979).

[10] As discussed by Kahlon and Tyagi (1980).

[11] See Krishnaji (1975).

the biggest producer of wheat (Punjab) experience very low prices while the smaller producing states experience higher prices -- since there are not as many price reporting centers as there should be in Punjab given its high proportion of national wheat output, the index in reality reflects the high prices and price rise of the deficit states who are assigned more reporting centers than they deserve.

So rise in price in the poorly producing areas forces up the index: the rise in the price index is therefore an artificial one. Thus, the real culprit of high rises in the price index of agricultural product is increasing disparity in prices between surplus and deficit states. This is also, in part, an argument by Tyagi against Zoning which presumably allows such growing price differences between high and low producing states.

Vittal objects to this for in those years when multi-state zones operated, inter-zone price disparity were obviously far lower than during the years when single state zones operated. In addition, zoning did not operate at all for certain years. Therefore, she concludes that choosing of an artificially inflated index is not borne out.

Further, referring to Tyagi's observation that surplus areas show low prices as cause for price difference boosting the price index; Vittal taking the case of rice in West Bengal as it has the biggest weight in all agricultural products, shows the flaws in Tyagi's argument. Since what is important is not high production that influences prices but excess supply, i.e,. marketed surplus as West

Bengal is a deficit state by virtue of its consumption exceeding its production irrespective of it being the highest producing state.

However, Tyagi[12] in his rejoinder shows that despite Krishnaji being right, the wholesale price index constructed on the basis of giving equal weights to different centers including those in the case of which issue prices were taken as price quotations remains that the wholesale price index would show increase of higher order than the increase in prices realised by the farmers. The important point he mentions is that issue prices need not necessarily move parallel to prices realised by the farmers and therefore an index in the construction of which issue price are also considered cannot be taken to represent the change in the price received by the farmers.

With regard to the Zonal restrictions, Tyagi has dealt with Vittal's objection. In this regard the most relevant point made by him is that the wholesale price index would tend to increase at a faster rate than the rate at which the price realized by the farmer would increase. This is because of the manifestation of the policy changes from free movement to zonal restriction which are not uniform over the years. These are some of the limitations of wholesale prices highlighted in the debate. Therefore, in view of these limitations of the wholesale prices, the appropriateness of the use of farm harvest prices needs to be considered.

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[12] See Tyagi (1988).

Kahlon and Tyagi were the first to use farm harvest prices[13] for food crops such as oilseed, cotton, jute, sugarcane and tobacco, etc. Tyagi asserts that farm harvest price is a better proxy for prices received by farmers than wholesale price used for constructing the index. Vittal mentions two problems with regard to the use of farm harvest price. One, farm harvest prices across the country are difficult to collect and moreover these prices are based on a very small sample of what are called 'farm gate prices'. She further emphasises the importance of the fact that minority of the farmers who are biggest surplus producers do not sell at the time of harvest: they hold on the produce, selling the maximum during the lean season in order to benefit from high prices.

With regard to the first contention, Tyagi highlights the fact that farm harvest prices are based on a more representative sample than the wholesale prices. Vittal in her rejoinder to this, notes that "the more important indication of representativeness is the ability of units (village markets) to hold the quantity of grains. Not merely grains produced, some of which are sold in distress and brought back in greater distress, but grain traded, therefore it is the giant 'mandis' which dominate the trade. Thus, the markets are not only quantitatively more representative as unit of observation, but are more appropriate as a unit to study the volume of wheat exported from rural areas". In this process Vittal overlooks one important fact that the price referred to here should represent what the farmers get including what they get when they sell without

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[13] The farm harvest price of a commodity is defined as the average wholesale price at which the commodity is disposed of by the producer to the trader at the village site during the specified harvest period (Directorate of Economics and Statistics, 1975).

exceptions to distress selling or distress buying as well as grains traded. In this view what becomes important is the farm harvest price as it is more representative in terms of what price the farmers get.

The authors themselves constructed all-India index of farm harvest prices for each of these commodities. This was done by using the weighted average price of state farm harvest prices. The weights are the share of each states production in the all-India production of the respective commodities.[14] The choice of price series for the construction of the indices of inter-sectoral terms of trade depends on two things; firstly, when do the bulk of the marketable surplus of food-grains disposed off and secondly, when do big farmers dispose bulk of their surplus. Broad generalisations are possible without restricting to each and every crop.

It is in this context that Tyagi's assertion of "who sells: big or small" becomes relevant. It seeks further justification from the fact that the inter-sectoral terms of trade are estimated not for any specific category of farmers (big or small), but for the entire agricultural sector vis-a-vis non-agricultural sector. In this context what becomes important is, when does the majority of the agricultural products gets disposed of in the market? The bulk of the market arrivals take place immediately during the post harvest period. This is true in case of the state like Punjab where farmers are relatively better off and where their holding capacity is also greater, the bulk of the sales of wheat (about 60 percent)

[14] See Kahlon and Tyagi (1980).

takes place within three months after the harvest.[15] As the bulk of the market produce is sold immediately after the harvest period, what becomes apparent from this is that even big farmers must be disposing off the bulk of their produce generally during the harvest period. Thus, for the agricultural sector as a whole, the relevant marketing period is one when the lion's share of the marketable surplus of agricultural produce gets disposed off, i.e., the farm harvest period irrespective of who sells, as two third of the market arrivals take place during this period.

Now, if the bulk of the agricultural products are disposed off during the farm harvest period, analytically it becomes the relevant period. Hence, it is the farm harvest price that is relevant for indicating the prices received by the agricultural sector.

Having referred to the relevance of farm harvest prices for indicating the prices received by the agricultural sector, the appropriateness of wholesale price as a substitute for farm harvest price needs to be considered. The difference between farm harvest price and wholesale price is not uniform across time. This in conjunction with the fact that the bulk of the market arrivals of agricultural products take place during the farm harvest price would invariably overstate the prices received by the producers. This will be more so if more and more of the marketable surplus is disposed during the harvest period[16].

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[15] See Mungekar (1993).

[16] The argument presented here is very similar to that of Mungaker (1993).

Another limitation mentioned by Vittal is that farm harvest prices are collected for a few weeks after each harvest while wholesale prices are collected through out the year. She further notes that the relevant period for consideration lasted for twelve months till into the seventies for wheat in Punjab and Haryana, so wholesale price would be more representative as prices received by farmers. However, to trace the effect of Government intervention on the price (what the farmers get), the relevant period is the time when Government intervenes in the agricultural market for procurement of commodities. Nevertheless, Government intervention is immediately after the harvest, therefore the relevant price would be the farm harvest price which are collected for a few weeks after each harvest while wholesale prices are collected through-out the year.

In other words, the obvious answer to the choice of appropriate price is the price existing immediately after the harvest when government procures commodities from the agricultural market. Therefore the relevant price is the price existing at the time of government intervention - the farm harvest price. This is relevant only for commodities sold to nonagricultural sector. Hence for these reasons, the most appropriate price series considered is the farm harvest price.

Farm harvest prices are available at the state level for the commodities jute, sugarcane, tobacco, cotton, groundnut, rape and mustard, rice, jowar, bajra, maize, ragi, wheat and barley. For the commodities jute, sugarcane, tobacco, cotton, groundnut, rape and mustard, state farm-harvest prices are applied to production shares in the respective states for each commodity to derive the

all-India farm harvest prices covering the period 1965 to 1990. For deriving all-India farm harvest price for cereals - rice, jowar, bajra, maize, ragi, wheat and barley were combined together weighted by their respective shares of production in the respective states. For the commodities purchased from non-agriculture, the wholesale price series were used due to non-availability of time series for retail prices. The All-India farm harvest prices thus derived are presented in Table 3.2.

Table 3.2 : Farm harvest prices

Years	Sugarcane	Tobacco	Groundnut	Rape & Mustard	Cotton	Jute	Cereal
1965-66	19.99	47.03	32.33	28.97	43.85	67.76	44.74
1966-67	33.02	49.32	38.13	39.94	52.31	70.34	55.00
1967-68	57.81	59.74	30.59	32.22	48.66	60.14	55.86
1968-69	38.25	54.93	32.67	33.73	55.29	79.47	52.52
1969-70	28.73	61.55	40.16	36.90	60.68	79.19	53.55
1970-71	32.19	61.36	41.43	39.88	81.07	82.59	51.81
1971-72	40.50	60.93	37.68	41.11	56.81	78.98	53.96
1972-73	53.55	65.00	48.64	48.69	61.89	82.74	60.56
1973-74	53.43	71.99	68.95	74.39	69.75	72.73	83.21
1974-75	56.44	70.19	75.03	57.84	92.74	84.00	105.88
1975-76	50.09	104.04	52.19	41.89	79.93	80.60	77.25
1976-77	53.95	86.35	66.42	82.61	140.41	83.21	78.87
1977-78	45.97	70.16	71.81	77.27	127.49	104.82	82.52
1978-79	39.60	85.98	61.40	69.90	112.18	107.12	77.52
1979-80	49.32	84.26	83.13	90.62	109.69	107.97	90.06
1980-81	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981-82	78.45	122.88	98.67	92.19	110.12	102.27	107.03
1982-83	70.87	119.69	114.54	98.54	151.24	118.98	120.16
1983-84	84.24	125.26	123.98	116.27	159.42	169.65	122.24
1984-85	93.58	125.49	123.79	99.31	159.88	408.07	123.60
1985-86	102.98	128.51	118.80	106.02	147.45	163.02	129.78
1986-87	99.68	125.83	155.07	147.53	174.19	140.03	131.11
1987-88	101.20	211.63	174.44	170.06	228.95	153.30	138.24
1988-89	111.77	206.60	156.33	139.44	219.49	216.71	150.51
1989-90	129.96	190.19	192.33	143.29	157.06	262.22	122.39

Notes : Index numbers with base 1980-81=100

Source: 1. For Production shares, 'Area and Production of crops in India', Directorate of economics and statistics, Various issues.

2. For Farm Harvest Price, 'Agricultural Situation in India',Directorate of Economics and Statistics, various Issues.

3. Derivation of consumption weights: Thamarajakshi equates the marketed surplus with the realised demand, less imports of the non-agricultural sector for farm products. She uses two sets of data to prepare the time series for marketed surplus for intermediate and final consumption: national income data published by CSO, Central Statistical Organization, and consumer expenditure data published by the National Sample Survey (NSS). CSO's national income data are used to derive the time series of private consumer expenditure at current prices.

Sixteen rounds of NSS data covering the period 1951 to 1961 were 'recombined' to yield estimates of the pattern of consumer expenditure for the years 1951-52 to 1966-67.[17] Population estimates were derived for the agricultural sector and for the less organized sub-sector of the non-agricultural sector. These were assumed to represent the pattern of consumer expenditure observed by the NSS in the rural and urban areas as true for the rest of the non-agricultural sector. Then NSS data on per capita consumer expenditure were used to arrive at the sector-wise expenditure on agricultural goods and non-agricultural goods. The population of the less organized sub-sector in non-agriculture such as street vendors, urban domestics and 'casual worker' in the informal work-force were assumed to follow the consumption-expenditure pattern of the agricultural sector. Hence, non-agricultural consumption was deemed to be that of the organized sub-sector of non-agricultural sector. There by arriving at the non-agricultural sector's

[17] The last round of availabe survey was for the year 1960-61, therefore it was assumed that for the subsequent years viz, 1961-62 to 1965-66, the pattern of consumer expenditure that prevailed in 1960-61 was generally unchanged.

expenditure on agricultural products as a ratio of the entire economy's expenditure on all products.

This ratio was applied to the CSO - generated time series of values of private consumer expenditure in the respective years. This resulted in the aggregate expenditure of the non-agricultural sector on agricultural products, i.e., the marketed surplus for final consumption at current price. This was deflated to obtain the time series of the final-use marketed surplus at 1960-61 constant prices. In the absence of systematic collection of data on retail prices, the deflator used was the composite index number of wholesale prices paid for farm products by the non-agricultural sector.

The purchases made by agriculture for intermediate use from non-agriculture for 1951-52 and 1960-61, have been taken from the publication of the CSO. This has been further netted of the imports in the respective years.

For the final use of the agricultural commodities, the percentage of agriculture's expenditure on each of the individual products purchased from non-agriculture for final consumption to the economy's total consumer expenditure was estimated using NSS data and the sectoral estimates of population. These percentages were then applied to the estimates of private consumer expenditure in the respective years and the value (gross of imports) of purchases by agricultural household from the non-agriculture for final use derived for each of the two years 1951-52 and 1960-61 assuming that the imports of the respective products were consumed by the two

sectors in the same ratio as their total value (gross of imports), the value of agriculture's purchases from domestic production of non-agricultural products for final use were estimated. Thus, Thamarajakshi makes use of both NSS and CSO consumption data for deriving the weights.

A significant objection by Kahlon and Tyagi relates to Thamarajakshi's use of estimates of consumer expenditure (NSS) for agricultural commodities. As these were based on retail prices and therefore do not reflect the price received by the farmers owing to wide price-spreads in different agricultural commodities. Though she makes adjustments by netting-out imports into the country from the final consumption estimates of such items as food grains[18]. Therefore, the weights derived directly on the basis of final consumption estimates would thus tend to overestimate the share of those items in case of which the difference between final retail prices and the producers prices were low.

Kahlon and Tyagi derived weights by considering the shares of each of the commodity groups in the overall value of total purchase or sale. The weights were worked out separately for NSS and CSO data, with adjustments made with regard to the home grown component NSS data. These indices were constructed for prices paid to agriculture, of prices received by agriculture, and of their ratio, the net barter terms of trade. Each of these have been worked out

[18] Though no explanation for an adjustment required on this account has been provided.

using Laspeyre's (price) index using NSS data, Laspeyre's (price) index using CSO data and Paasche's (price) index using CSO data.

Using these approaches and the weights derived from the CSO data, in comparison to NSS, showed that Paasche's approach with weights based on CSO data were more appropriate since use of Laspyers' index would underestimate the rise in the prices paid by the agriculture sector. In comparison, the use of NSS and CSO estimates for deriving weights, net barter terms of trade based on NSS were near identical with those based on CSO estimates for the relevant periods, calculated by Tyagi.

However, looking at the appropriateness of the alternative sources, viz., CSO and NSS, the use of 26th round of NSS which gives information about the pattern of consumption expenditure for only rural cultivator households is questioned by Mungekar. As the consumption pattern relating only to the cultivator households are considered as representative for all expenditure class in the rural area. In this respect he points out that "the consumption pattern applicable to the rural cultivator household may be appropriate if terms of trade is estimated for cultivator rural household vis-a-vis the rest of the economy. Since, the concern here is with respect to agricultural terms of trade, the consumption pattern of all the heterogeneous rural economic class would be better indicated if we take into account the all India average expenditure of all the rural expenditure classes".[19]

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[19] See Mungekar (1993).

The use of NSS consumption pattern applied to sectoral population may not, however be appropriate as consumption pattern across different expenditure classes varies. Here per capita consumption applied to the sectoral population does not identify the relevant consumption 'cohort', as the basic premise involved here is that those dependent upon agriculture for their livelihood do not depend upon the market for consumption of agricultural produce, clearly, this is untrue for it is well known that small farmers often sell a great deal of their cash dealings and buy back from the market at a later stage in the crop cycle. A more obvious case of the violation of the above premise is that of landless agriculture laborers.

In reference to these limitations of the various approaches, the appropriate source of consumption estimate would be the National Accounts Statistics published by CSO[20], data which takes into account the total consumption in the economy reflecting consumption pattern of different expenditure classes subsumed in the estimates. Although there are serious limitations in using CSO, it is the most appropriate consumption statistics available in the light of the limitations of NSS, mentioned above.

For the commodities sold to non-agricultural sector, Cereal and Pulses are noted from the private final consumption of the National Accounts Statistics published annually by CSO. For rest of the commodities Jute, Sugarcane, Tobacco, Cotton, Groundnut and Rape and Mustard the consumption expenditure is not available in the

[20] Also emphasized by Mungaker (1993).

CSO, therefore total production (applied to farm harvest prices) of these commodities with compensation for self consumption and wastage were taken as the consumption expenditure on the commodities. A detailed account of the derivation of weights however is provided in the next section. In Table 3.3, is presented the marketed surplus of agricultural products and in Table 3.4 the purchases made by the agricultural sector for final and intermediate use.

Table 3.3: Marketed Surplus of Agricultural Products for Intermediate and Final Use.
(At constant (1980-81) Prices, Rs crores)

Years	(1) Cereal	(2) Pulses	(3) Jute	(4) Sugar cane	(5) Tobacco	(6) Cotton	(7) Ground Nuts	(8) Rape & Mustard	(9) Total
1965-66	13393	1904	118.13	3092.57	159.64	217.59	1290.75	478.06	20653.74
1966-67	13605	1598	141.31	2426.23	187.68	225.33	1368.29	466.63	26018.48
1967-68	15308	2317	166.99	2503.72	197.71	249.32	1749.64	587.49	23079.87
1968-69	15880	1995	77.44	3281.26	193.58	235.19	1413.75	504.67	23580.90
1969-70	16577	2276	148.19	3437.96	181.35	239.24	1570.28	570.21	25000.24
1970-71	16750	2263	130.47	3320.83	194.92	217.69	1864.71	740.23	25481.86
1971-72	16493	2064	150.18	2975.19	224.36	317.63	1885.14	536.93	24646.43
1972-73	15715	2250	131.53	3265.83	199.43	262.12	1247.70	677.46	23749.07
1973-74	16721	1942	164.35	3692.57	247.31	288.32	1808.05	638.64	25502.24
1974-75	16248	2047	118.12	3766.51	194.33	327.02	1557.98	843.81	25102.76
1975-76	18558	2524	117.30	3687.46	187.04	271.90	2060.47	725.43	28131.60
1976-77	17070	2702	141.44	4054.08	224.20	266.86	1605.94	581.12	26645.64
1977-78	19959	2861	141.66	4687.54	264.36	331.03	1857.44	618.22	30720.25
1978-79	19973	2739	170.95	4025.68	242.91	363.68	1894.32	697.06	30106.61
1979-80	16400	2443	160.42	3349.23	234.66	349.51	1760.02	535.14	25231.97
1980-81	20176	2736	171.95	3648.85	257.34	320.37	1526.38	863.52	29700.40
1981-82	20196	2955	179.34	4810.16	278.47	360.30	2203.50	892.45	31875.22
1982-83	20121	3163	157.09	4876.80	318.20	352.68	1694.08	926.48	31609.33
1983-84	21714	3230	167.11	4450.96	264.10	291.87	2163.20	977.37	33258.61
1984-85	21685	3180	172.56	4354.00	260.56	388.76	1964.88	1151.59	33157.35
1985-86	23203	3422	287.61	4358.64	236.59	398.84	1563.53	1004.50	34474.70
1986-87	23760	3082	194.27	4749.15	247.63	315.58	1793.76	976.10	35118.48
1987-88	24360	2826	153.05	5033.42	197.01	291.67	1787.10	1294.56	35942.81
1988-89	25470	3385	175.04	5235.19	263.51	396.95	2913.69	1639.62	39479.00
1989-90	26631	4055	187.90	5695.50	284.90	521.63	2469.33	1544.02	41388.43

Source: Column 1 to 2 from 'National Accounts Statistics', Ministry of Planning, various issues.

Column 3 to 9 are calculated from, 'Area and Production of Principal Crop's in India', Directorate of Economics and Statistics, various issues.

Table 3.4: Purchase of Individual Commodities by Agricultural households from the non-Agricultural Sector for Intermediate and Final Use

(At constant (1980-81) Prices, Rs crores)

Years	Edible Oil (1)	Tobacco and Products (2)	Clothing (3)	Footwear (4)	Fuel and Power (5)	Purchase of Transport Equip. (6)	Chemical Fertilizer (7)	Feed for Livestock (8)	Electricity (9)	Pesticides and Insect (10)	Diesel Oil (11)	Total (12)
1965-66	2698	2166	4696	332	3168	192	430	6330	31	53	23	20119
1966-67	2724	2263	5350	308	3128	223	576	6461	37	110	52	21232
1967-68	3172	2064	5490	305	3233	259	717	7227	44	108	77	22696
1968-69	2886	2295	5771	351	3368	296	830	6881	58	113	89	22938
1969-70	3108	1883	5583	353	3345	343	655	7178	66	126	98	22738
1970-71	3671	1908	5908	380	3391	398	797	7233	81	133	168	24068
1971-72	3550	2016	6556	387	3498	447	1072	7314	89	142	199	25270
1972-73	3459	2192	6660	367	3488	460	1175	7026	106	159	225	25317
1973-74	3696	2089	7173	351	3534	504	1131	7289	113	189	252	26321
1974-75	3403	1775	7566	381	3628	555	1209	7295	141	169	256	26378
1975-76	3667	1722	7833	414	3661	613	1193	7267	163	220	290	27043
1976-77	3150	1713	9066	433	3674	697	1604	7181	180	242	311	28251
1977-78	3941	1913	9539	493	3896	770	1871	7229	189	205	351	30397
1978-79	4366	2106	9981	637	4042	835	2067	7428	223	232	394	32311
1979-80	3628	2207	9355	734	4004	891	2313	7585	245	285	452	31699
1980-81	4670	2518	10215	926	4403	1111	2412	8067	268	250	451	35291
1981-82	5377	2634	10568	899	4506	1277	2633	8166	279	280	505	37124
1982-83	4939	2688	11721	858	4499	1468	2670	8120	329	290	538	38120
1983-84	5856	2582	12805	863	4693	1701	2970	8403	339	270	563	41045
1984-85	6248	2517	12848	920	4916	1902	3521	8343	373	294	603	42485
1985-86	5324	2157	13553	1005	5140	1988	3780	8062	392	331	699	42431
1986-87	5762	2077	15261	915	5904	2367	4212	8089	477	302	729	46095
1987-88	6672	2248	16199	900	6181	2863	3683	7972	611	315	776	48420
1988-89	8051	2378	18163	886	6478	3316	4777	8301	732	394	822	54298
1989-90	9715	2516	20365	900	6789	3841	6196	8644	877	493	871	61207

Source: Various issues of ` National Accounts Statistics', Ministry of Planning.

III. Calculations of the net barter terms of trade:

Since all-India farm harvest prices are not available, they are derived from the state farm-harvest prices as discussed in the previous section. State farm harvest prices are applied to the share of each state in the total all-India production of the respective commodities. Ideally, the appropriate weights would be the all-India index of marketed surplus of the commodities. Due to non-availability of state-wise estimates of marketed surplus, the

production shares have been taken as weights. Farm harvest prices are derived for Sugarcane, Tobacco, Groundnut, Rape and Mustard, Cotton, Jute and Cereals. As farm harvest prices for the commodities Sunflower and Soyabean are not available, the wholesale prices from the Economic Adviser's index numbers are assumed to approximate the prices received by the farmers in sale to non-agriculture sector. Both farm harvest prices and wholesale prices are made comparable by bringing them to the same base-period, taking 1980-81 as base year (presented in Table 3.2).

Since no estimates for exports to and imports from the agricultural sector are available, the consumption estimates are used to derive the consumption weights. In view of the limitations of the use of NSS data as mentioned in the previous section, CSO data on private final consumption have been taken for Cereals and Pulses. For the commodities Sugarcane, Tobacco, Groundnut, Rape and Mustard, Cotton and Jute, estimates of consumption are not available. Therefore, an assumption has been made that whatever is produced is consumed after compensating for self consumption and wastage. These are then applied to the farm harvest prices available in Rs per quintal. These are then made comparable with the production statistics available to derive the total consumption. For commodities Oil, Oilseeds, Tobacco products, Clothing, Footwear, Fuel and Power, Purchase of Transport Equipment, Chemical Fertilizer, Feed for Livestock, Electricity, Insecticides and Pesticides and Diesel oil, the private final consumption was noted from the National Accounts Statistics.

This gives the marketed surplus at constant prices for the period 1965 to 1990. These are presented in Tables 3.3 and 3.4. Table 3.5 provides the exchange of products between the two sectors for both intermediate and final consumption for the years 1971-72, 1978-79 and 1980-81 to be used as weights.

Table 3.5: Exchange of Products Between the two Sectors: For Intermediate and Final Consumption, 1971-72 1978-79 and 1980-81.

(At constant (1980-81) prices, Rs crores)

Purchase by Agriculture from Non-Agriculture				Sales by Agriculture to Non-Agriculture			
	1971-72	1978-79	1980-81		1971-72	1978-79	1980-81
For Intermediate Consumption							
1. Fertilisers	1072	2067	2412	1. Jute	150.18	170.95	171.95
2. Electricity	89	223	268	2. Sugarcane	1789.27	2421.03	2194.41
3. Diesel oil	199	394	451	3. Tobacco	224.36	242.91	257.34
4. Pesticides and Insecticides	142	232	250	4. Cotton	317.63	363.68	320.37
				5. groundnut	1885.14	1894.32	1526.38
5. Feed for Livestock	7314	7428	8067	6. Rape and Mustard	536.93	697.06	863.52
Total	8816	10344	11448		4903.51	5789.95	5353.97
For Final Consumption							
1. Edible oil	3550	4366	4670	1. Cereal	16492	19973	20176
2. Clothing	6556	9981	10215	2. Pulses	2064	2739	2736
3. Footwear	387	637	926				
4. Fuel and Power	3498	4042	4403				
5. Tobacco Products	2016	2106	2518				
6. Purchase of Transport Equipment	447	835	1111				
Total	16454	21967	23843	Total	18556	22712	22912
Grand Total	25270	32311	35291	Grand Total	23459.51	28501.95	28245.97

Indices of farm harvest price for the period 1965-66 to 1989-90 for Cereals, Pulses, Jute, Sugarcane, Tobacco, Cotton, Rape and Mustard and Groundnut have been derived and given in Table 3.2. For commodities Edible oil, Clothing, Footwear, Fuel and Power, Tobacco products, Purchase of Transport Equipment, Fertilizer, Electricity,

Diesel oil, Pesticides and Insecticides and feed for Live Stock, wholesale price indices from the Economic Adviser's series of index numbers of wholesale prices have been noted for the period 1965-66 to 1989-90.

Then, using the actual value of purchases by each sector from the other sector for 1971-72,1978-79 and 1980-81 as weights (vide table 3.4), the prices paid and prices received for the agriculture sector are derived by applying these weights to the index of prices (farm harvest or wholesale prices respectively). Using these index of prices received and prices paid, the composite price indices of terms of trade have been calculated which are presented in Table 3.6 to 3.8 with different base year weights. The table shows that though the levels vary depending on the weighing pattern, the shifts remain the same. This is explicitly seen in graph 3.1. The indices of terms of trade vary depending on the weights highlighting the issue mentioned by Kahlon and Tyagi as crucial to the whole analysis of the calculation of terms of trade. Using different weights, the levels vary but the direction of shift over the years irrespective of levels remain comparable.

Table 3.6: New index of Net Barter Terms of Trade*
(1980-81 weights)

Years (1)	Indices of prices Received (2)	Indices of prices Paid (3)	Terms of prices Trade (4)
1965-66	38.89	35.60	109.26
1966-67	48.61	38.69	125.65
1967-68	52.84	39.23	134.68
1968-69	47.21	38.64	122.20
1969-70	47.53	40.59	117.10
1970-71	47.17	42.24	111.67
1971-72	49.51	44.49	111.29
1972-73	57.27	48.63	117.77
1973-74	75.64	55.39	136.55
1974-75	92.64	67.29	137.67
1975-76	69.93	70.03	99.86
1976-77	72.92	72.32	100.83
1977-78	76.37	75.05	101.76
1978-79	72.33	77.94	92.80
1979-80	83.65	87.68	95.40
1980-81	100.00	100.00	100.00
1981-82	102.59	113.31	90.54
1982-83	111.54	121.99	91.43
1983-84	117.55	131.78	89.20
1984-85	122.51	139.23	87.99
1985-86	126.97	148.59	85.45
1986-87	129.73	162.35	79.91
1987-88	140.29	177.78	78.91
1988-89	152.76	192.20	79.48
1989-90	137.88	206.37	66.81

Notes:
*. Includes commodities with Government intervention in sale to agriculture

Col 2 a. Farm harvest prices are used.
b. Production figures are used as weights.

Col 3 a. Wholesale prices are used as weights.
b. consumption figures are used as weights.

Table 3.7: New Index of Net Barter Terms of Trade*
(1978-79 weights)

Years (1)	Indices of Price Received (2)	Indices of Price Paid (3)	Terms of Trade (4)
1965-66	38.59	35.93	107.40
1966-67	48.29	39.26	123.02
1967-68	52.71	41.14	128.15
1968-69	46.97	41.83	112.27
1969-70	47.23	45.02	104.91
1970-71	46.96	48.94	95.96
1971-72	49.28	50.24	98.07
1972-73	57.15	52.32	109.22
1973-74	75.23	60.08	125.21
1974-75	92.08	72.76	126.55
1975-76	69.57	72.41	96.08
1976-77	72.60	76.43	94.99
1977-78	75.96	81.30	93.42
1978-79	71.82	81.94	87.64
1979-80	83.16	89.64	92.78
1980-81	100.00	100.00	100.00
1981-82	102.27	111.14	92.02
1982-83	111.13	116.49	95.40
1983-84	117.24	122.28	95.88
1984-85	122.33	129.40	94.48
1985-86	126.69	133.35	95.01
1986-87	129.69	140.65	92.16
1987-88	140.16	153.38	91.38
1988-89	152.45	161.43	94.44
1989-90	138.52	174.11	79.56

Notes:

*. Includes commodities with Government intervention in sale to agriculture

Col 2 a. Farm harvest prices are used.
b. Production figures are used as weights.

Col 3 a. Wholesale prices are used as weights.
b. consumption figures are used as weights.

Table 3.8: New index of Net Barter Terms of Trade*
(1971-72 weights)

Years ()	Indices of Prices Received (2)	Indices of Prices Paid (3)	Terms of Trade (4)
1965-66	38.92	36.92	105.41
1966-67	48.56	40.35	120.33
1967-68	52.48	42.44	123.64
1968-69	47.10	43.16	109.13
1969-70	47.58	46.44	102.45
1970-71	47.29	50.59	93.47
1971-72	49.41	51.64	95.69
1972-73	57.24	53.66	106.66
1973-74	75.61	61.04	123.88
1974-75	92.60	72.82	127.16
1975-76	69.82	73.09	95.52
1976-77	73.05	77.90	93.77
1977-78	76.44	82.66	92.48
1978-79	72.16	83.11	86.82
1979-80	83.72	90.30	92.71
1980-81	100.00	100.00	100.00
1981-82	102.58	111.36	90.01
1982-83	111.91	116.61	95.97
1983-84	117.87	122.63	96.12
1984-85	122.81	129.62	94.74
1985-86	126.85	133.94	94.70
1986-87	130.35	141.79	91.93
1987-88	141.08	154.79	91.14
1988-89	152.76	163.32	93.54
1989-90	138.83	175.30	79.20

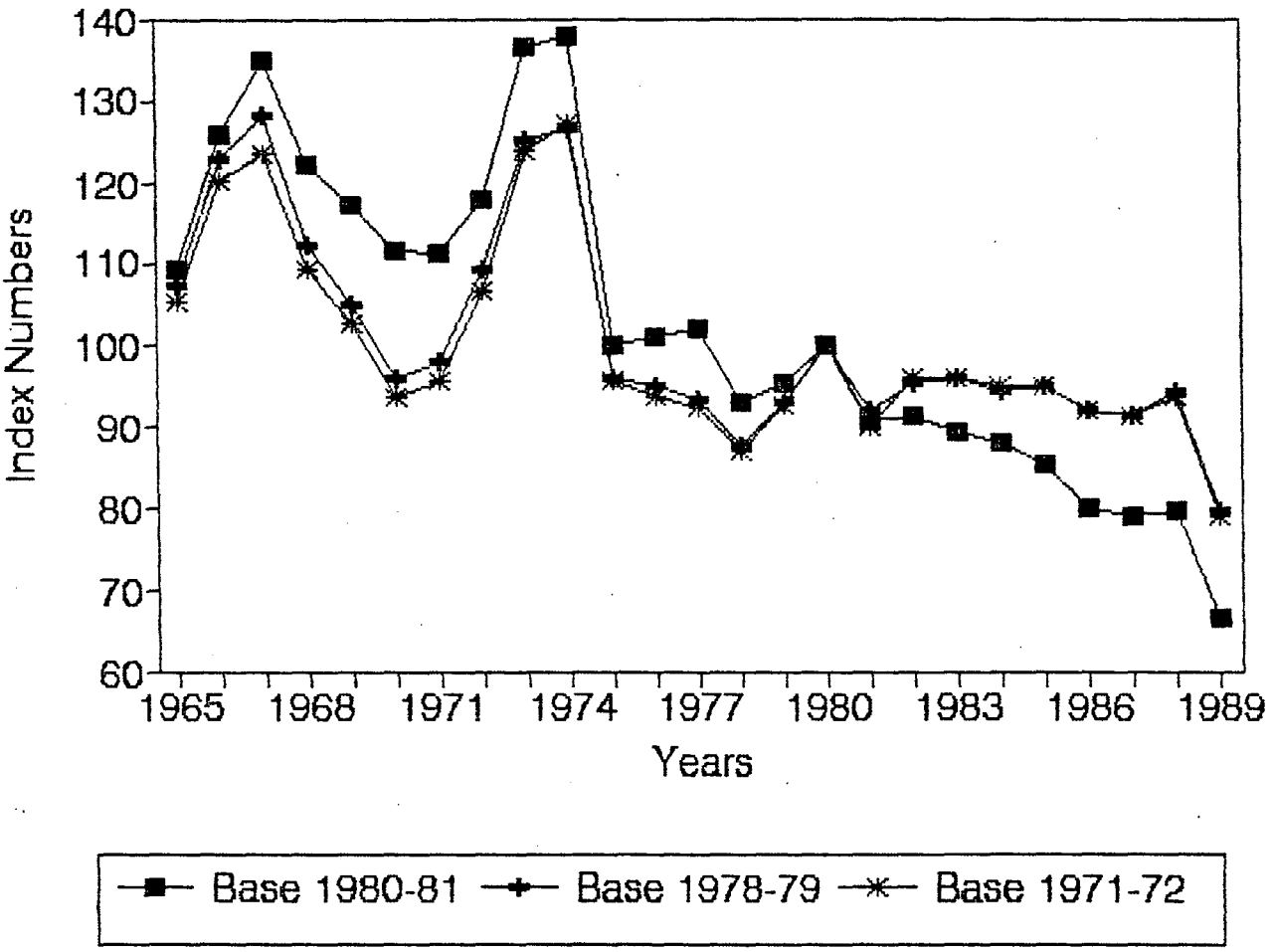
Notes : *. Includes commodities with Government intervention in sale to agriculture

Col 2 a. Farm harvest prices are used.
b. Production figures are used as weights.

Col 3 a. Wholesale prices are used as weights.
b. consumption figures are used as weights.

Figure 3.1

AGRICULTURAL TERMS OF TRADE



Having differentiated between changes in levels and shifts in the behaviour of inter-sectoral terms of trade, we now attempt to test for the influence of government intervention on levels inter-sectoral prices in the economy. Price intervention, the use of procurement policy as a market support mechanism in particular, is likely to have led to changes in the inter-sectoral terms of trade, as put by Mitra. With shifts in the inter-sectoral terms of trade considered latter, here we test for the changes in levels. Since government intervention was introduced in 1965[21], we have two periods. One with government intervention and the other without government intervention. A simple econometrics test is used to test the above suggested arguments. This is a test of shift in the intercept for the relative price, following the introduction of producers price intervention. A 'dummy' is introduced taking the value zero for the period 1950-1965 for no government intervention and value one for the period 1966-1990 with government intervention.

The coefficient of the dummy is positive, indicating an upward shift in the intercept for the period since mid sixties. An F-test was carried out to check for the difference in the intercept for the two periods. The F value for the test turned out to be $F(1,37) = 8.39$, which is statistically significant at one per cent level.

With regard to shifts, the relative price position of agricultural and industrial products have been changing from year to year. In

[21] The index of farm harvest price with 1960-61 as base year weights and terms of trade for pre 1965 is given in the Appendix. The methodology used is the same as the objective of this excercise is to compare the series between post and pre 1965.

some years, the prices of agricultural commodities increased at a faster rate, while in other years it lagged far behind the rise in prices of industrial products. On the whole, however the inter-sectoral terms of trade series seem to shift in favour of industrial sector except for a brief period in the initial years of the introduction of Agricultural price policy. This behaviour of the inter-sectoral terms of trade over the period 1965 to 1990 bears out Mitra's hypothesis that terms of trade has shifted in favour of agricultural sector due to a collusion of the rural oligarchy with the industrial bourgeoisie. On the other hand, the results support Kahlon and Tyagi's view that inter-sectoral terms of trade over the years has shifted against agricultural sector. They attribute this to urban bias. Therefore, in the next section an attempt is made to identify the cause for such a behaviour of inter-sectoral prices relating it to the sectoral performance.

IV. Agricultural terms of trade in the Indian economy: An overview of Trends

It is widely held that the inter-sectoral shift in terms of trade is brought about by the existence of political bias in the Indian economy. Looking at graph 3.1 casts a doubt about this hypothesis as there exists no conclusive movement in either direction. However, in the long run the movements in the inter-sectoral terms of trade seem to favour industrial sector. The upward and downward trajectories of the movements of inter-sectoral terms of trade is essentially short run.

Table 3.9: Terms of Trade and Agricultural Production.
(1981-82 = 100)

Years (1)	Index of Inter Sectoral Prices (2)	Index of Agricultural Production (1981-82=100 (3)
1965-66	126.1	51.3
1966-67	147.6	51.1
1967-68	164.6	63.8
1968-69	144.2	66.6
1969-70	127.6	70.0
1970-71	123.4	74.6
1971-72	123.1	76.0
1972-73	130.2	69.9
1973-74	150.3	75.8
1974-75	150.4	71.6
1975-76	110.6	86.1
1976-77	123.8	77.9
1977-78	112.6	93.6
1978-79	103.4	97.4
1979-80	103.7	80.4
1980-81	113.4	96.5
1981-82	100.0	100.0
1982-83	101.5	92.6
1983-84	99.7	110.1
1984-85	98.5	106.5
1985-86	95.3	114.3
1986-87	89.9	109.3
1987-88	94.3	106.6
1988-89	94.8	129.4
1989-90	82.2	132.0

Notes: (1) 1981-82 weights have been used for the construction of index of inter-sectoral prices.
(2) Index of Agricultural production includes commodities having government intervention.

Source: col (3), Agricultural Situation in India, Februrary, 1992.

Figure 3.2

TERMS OF TRADE AND AGRICULTURAL PROD

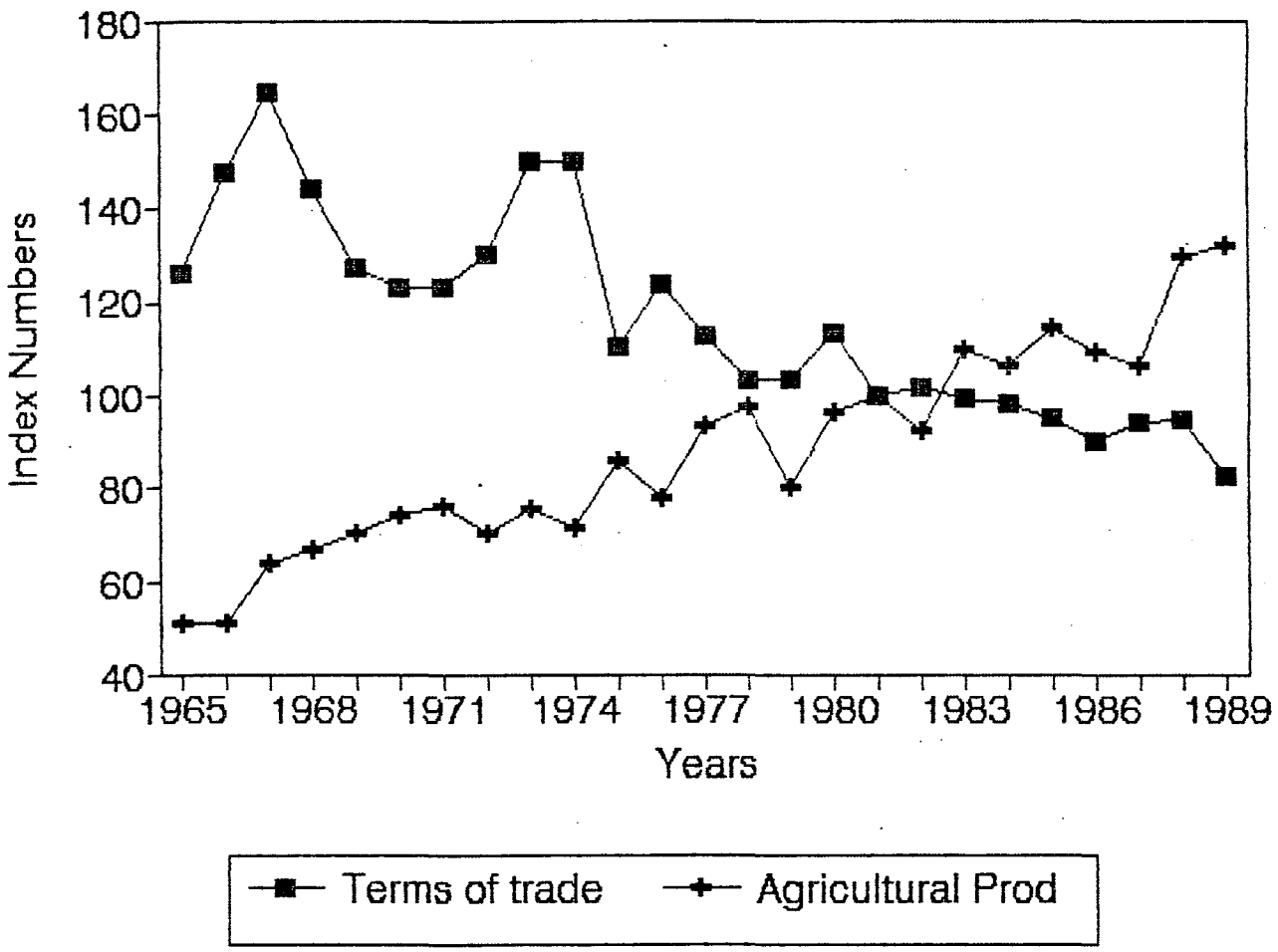


Table 3.9 gives the Indices of inter-sectoral terms of trade and production for commodities having government intervention in the agricultural sector. The same table is represented graphically in graph 3.2. It can be seen that the behaviour of inter-sectoral terms of trade closely corresponds to the production performance in agricultural sector.

Certain broad conclusions can be drawn from this figure. Inter-sectoral terms of trade shifted towards industry since the mid sixties with yearly fluctuations. This shift corresponds to increasing production in the agricultural sector with yearly fluctuations.[22]

Three broad phases can be identified i.e., 1965-66 to 1974-75, 1975-76 to 1979-80 and 1980-81 to 1989-90. One, a contractionary phase during which inter-sectoral terms of trade shifted towards industry corresponding to an increase in production in the agricultural sector. In the second phase, the inter-sectoral terms of trade shifted towards agriculture and then shifted towards industry for a year (1980-81 to 1981-82) which again coincides with the trends in agricultural production. The third phase reflects a diverging trend with inter-sectoral terms of trade shifting towards industry and increasing agricultural production.

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[22] The regression equation for relative price on agricultural product with single year lag gives the best fit (Standard error is given in the parenthesis):

$$RP_t = 181.7 - .88\ AP_{t-1}$$
$$(17.2) \quad (.23)$$
$$R^2 = .55 \qquad DW = 1.86$$

We now try to link sectoral performance to the shift in the inter-sectoral terms of trade. Due to severe drought during 1965-66 and 1966-67, the inter-sectoral terms of trade shifted in favour of agriculture. This had economy wide repercussions leading to the introduction of a fair degree of liberalisation in the economy which was gradually reversed during the late 1960s. Large devaluation of rupee was introduced in 1966, which led to export growth and a sharp reduction in the trade deficit from a high of Rs 905 crores in 1966-67 to Rs 178 crores in 1969-70 with import restrictions also imposed.

The agricultural terms of trade shifted in favour of industry after 1967-68, as public investment was cut primarily in response to fiscal pressure which arose following the drought. Public expenditure increased, where as revenue fell partly because of the slow down of industrial production. The increase in exports and continued import restrictions following the devaluation lead to a marginal increase in foreign demand. Private domestic demand for industrial goods declined sharply, leading to idle capacity in the industrial sector pushing down gross profit margins. This is because of the possible increase in overhead charges and the prices of raw materials.[23]

It was only in the 1970s and particularly after 1975-76 that the industrial sector showed signs of recovery. Earlier, in the period 1972-75, the economy experienced a severe short fall in agricultural production. On an average, agricultural production

[23] See Storm (1992).

was about 5 percent below the trend level. The oil price shock between September 1973 and April 1974 did have an impact on industrial prices. However, the effect of this on the terms of trade was subdued due to fall in agricultural production.

The inter-sectoral terms of trade shifted in favour of agriculture till 1974-75. In the year after 1974-75, the economy was able to adjust to the impact of oil shock. 1975-76 witnessed a bumper harvest with agricultural output rising by 13.8 percent over the previous years while agricultural prices dropped by over 7 per cent.

The year 1979-80 marks another watershed in the Indian economic front, marked both by an agricultural failure and the second oil price shock. Therefore, agricultural terms of trade shifted marginally in favour of agriculture, as total impact of the fall in agricultural production was compensated partially by the oil price shock causing industrial prices to rise. After 1979-80, there was a recovery in agricultural production. The agricultural terms of trade shifted in favour of industry. Unlike the earlier post oil shock recovery, the recovery from the second oil shock was slow in the early 1980s.

Immediate adjustment was aided by a reduction in oil based imports made possible by the rise in indigenous oil production, and by a recovery of agricultural production after the drought of 1979-80. The inter-sectoral terms of trade shifted in favour of industry in 1980-81 and 1981-82. In the year after 1981-82, agricultural production fell, shifting the inter-sectoral prices in favour of

agriculture. In 1984-85, the production fell but the inter-sectoral terms of trade continued to favour industrial sector.

Therefore, since demand for agricultural products generally increase more than supply[24] in periods of economic upswings, agricultural prices increased, triggering off an increase in industrial prices and forced the inter-sectoral terms of trade to shift. In the light of the above explanations for the behaviour of the inter-sectoral terms of trade, it is possible to generalise broadly that the shift in inter-sectoral terms of trade is brought about by supply shocks in the agricultural sector. However, there may be other factors which in conjunction with the supply shocks in agricultural sector bring about shifts in the inter-sectoral terms of trade. But the predominant factor as shown by the graph is the supply shocks in agricultural sector. To capture this phenomenon better, we now attempt to relate agricultural production with rainfall.

[24] See Storm (1992).

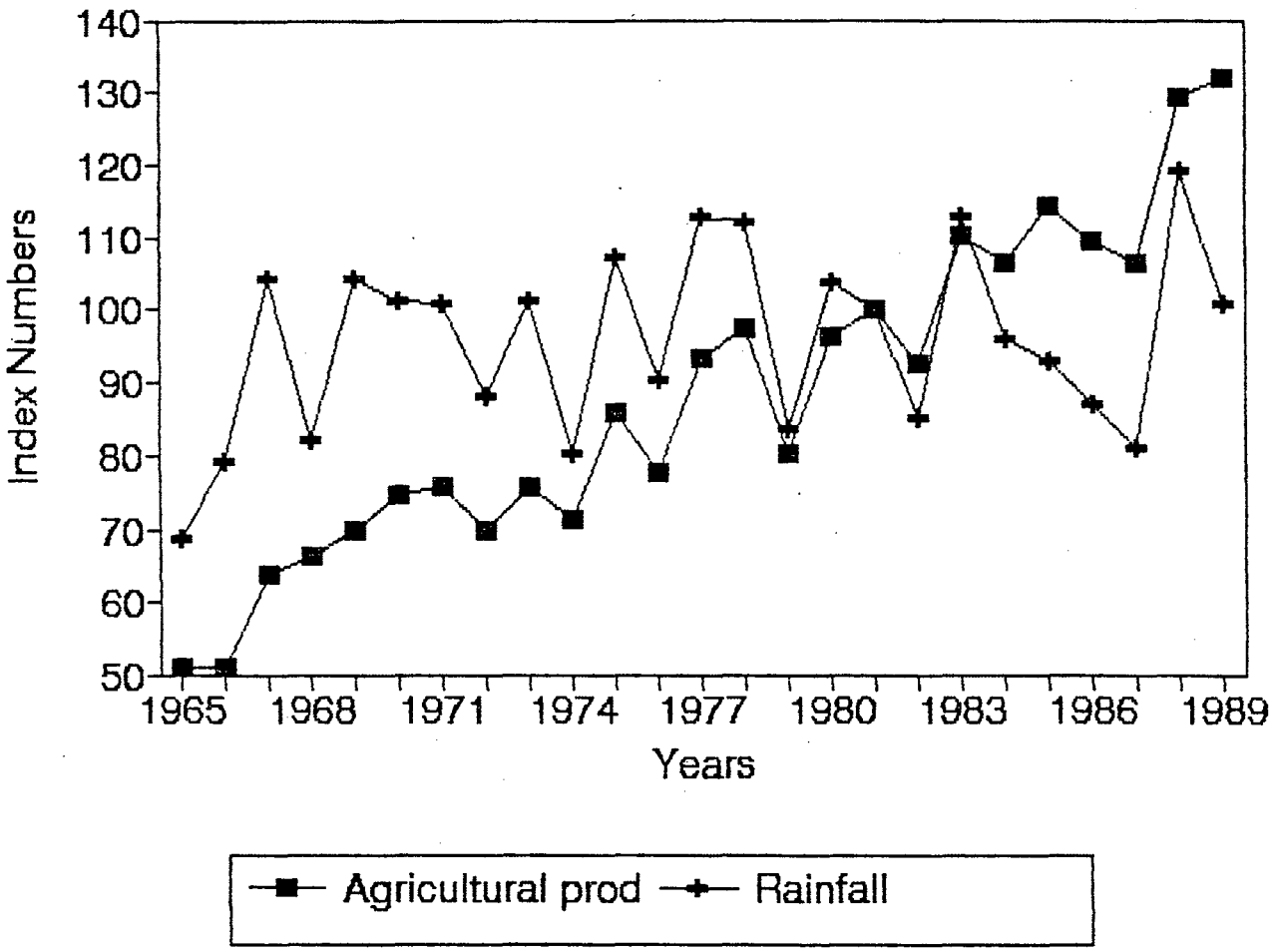
Table 3.10: Agricultural Production and Rainfall.

Years (1)	Index of Agricultural Production (2)	Index of Rainfall (normal=100) (3)
1965-66	51.3	68.90
1966-67	51.1	79.20
1967-68	63.8	104.20
1968-69	66.6	82.30
1969-70	70.0	104.30
1970-71	74.6	101.20
1971-72	76.0	100.80
1972-73	69.9	88.20
1973-74	75.8	101.30
1974-75	71.6	80.30
1975-76	86.1	107.20
1976-77	77.9	90.50
1977-78	93.6	112.90
1978-79	97.4	112.00
1979-80	80.4	83.70
1980-81	96.5	104.00
1981-82	100.0	100.00
1982-83	92.6	85.00
1983-84	110.1	113.00
1984-85	106.5	96.00
1985-86	114.3	93.00
1986-87	109.3	87.00
1987-88	106.6	81.00
1988-89	129.4	119.00
1989-90	132.0	101.00

Source: Col (3), Various issues of Economic Survey.

Figure 3.3

AGRICULTURAL PRODUCTION AND RAINFALL



Thus, shifts have been broadly identified as arising due to supply shocks in the agricultural sector. It is known that agricultural sector is sensitive to variations in rainfall. This sensitiveness has increased with the introduction of high yielding variety technology during the mid sixties. With the introduction of HYV the technological and input bias has improved considerably. The complementarily between such inputs and rainfall seems to have become stronger.[25] Agricultural production has become more sensitive to variation in rainfall. Table 3.10 shows strong correspondence between agricultural production and rainfall. With regard to the availability of food-grains, government intervention to build up buffer stocks has not been effective. The bounty of good harvest is being used more for stock building rather than to augment the decline in production.[26] Therefore, given inelastic demand for agricultural commodities, the output in the agricultural sector strongly fluctuates with changing weather conditions. This acts as a source of instability in the economy, bringing about shifts in the inter-sectoral terms of trade. Apart from the supply shocks in the agricultural sector, influence on shift in the inter-sectoral terms of trade also comes from the demand for increase in wages which is added to the cost in the formation of industrial price. Another factor could be the monopoly power of the industrialist, reflected by the mark-up as pointed out previously.

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[25] For evidence, see Hanumantha Rao, Ray and Subba Rao (1989).

[26] See Krishnaji (1990)

However, given the large proportion of raw material costs in the total variable cost of manufacturing, fluctuations in industrial prices are to a considerable extent due to fluctuations in agricultural prices.[27] The correlation between fluctuations in agricultural prices and industrial prices is strengthened by the fact that changes in the wage rates earned in registered manufacturing are themselves directly related to agricultural price changes. Therefore, it is supply shocks bringing about fluctuations in agricultural price which are thereby transmitted to industrial price bringing about fluctuations in the inter-sectoral terms of trade.

Thus, it appears that shifts in the inter-sectoral prices since mid 60's is not an outcome of the dynamics of class relations as widely held but due to supply shocks in agricultural sector. This is in contrast to the hypothesis that class bias involved in fixing administered prices in the agricultural sector brings about shifts in the inter-sectoral terms of trade.

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[27] See Storm (1992).

Chapter IV

CONCLUSION

The aim the present study was to analyse the behaviour of inter-sectoral terms of trade in the Indian economy, since the introduction of the New Agricultural strategy in the mid 60's. It essentially examined the widely held hypothesis that shifts in the inter-sectoral terms of trade were brought about by class bias through the intervention of government in the agricultural sector. Further, on critically examining the existing methodologies, the study arrived at a more appropriate series of the indices of inter-sectoral terms of trade.

One of the objectives of the New Agricultural Strategy of the mid 60's was the fixation of administered prices on a regular basis for agricultural commodities. This had an impact on the open market price of agricultural commodities. Some studies on the behaviour of inter-sectoral terms of trade have argued that the administered prices have an in-built bias, more specifically rural bias, which shifted the inter-sectoral terms of trade in favour of agricultural sector.

However, other studies, who also agreed that government intervention influence the inter-sectoral prices, have observed that inter-sectoral terms of trade have shifted against agricultural sector attributing this shift to be an outcome of urban bias. A common framework for all these studies was the influence of government intervention in the agricultural sector which brings about shift in the inter-sectoral terms of trade, assuming that government has complete control over the inter-

sectoral prices. Although these studies highlighted the behaviour of inter-sectoral terms of trade, they failed to examine the nature of price determination in both the sectors, crucial for the behaviour of the inter-sectoral term of trade. Hence, the present study argued that the behaviour of inter-sectoral terms of trade depends on the nature of price determination in both agriculture and industrial sector.

The theoretical exposition showed that while agricultural prices respond directly to demand and supply forces, industrial prices are based on cost plus pricing. Prices in the agricultural sector are generally assumed to be flexible, fluctuating from year to year in response to fluctuations in output so as to match demand and supply under given conditions of demand. In the industrial sector, prices directly respond to cost and therefore, any increase in agricultural prices will add to cost in the industrial sector because of the increase in the price of raw materials and changes in money wages.

Given this nature of determination of sectoral prices, three determinants of inter-sectoral prices were identified. Demand and supply were the operative forces behind the determination of price in the agriculture sector and thus, it is the response of agricultural price to supply shocks which influences the behaviour of terms of trade, given the inelastic nature of demand. The other determinants identified are the monopoly power of the industrialist and the bargaining power of wage earners in the industrial sector.

To analyse the behaviour of the inter-sectoral terms of trade an appropriate series of indices of terms of trade was arrived at. This involved consideration of three issues. First, it was pointed out that only those agricultural commodities which are subject to government intervention were to be included, as the existing indices included agricultural commodities free of government intervention.

Second, in a bid to arrive at the appropriate price series, a relative comparison of retail price, index of wholesale price, and farm harvest prices were made. Though the most appropriate price series would be the retail price, due to its non availability, the choice was restricted to the rest of the series. Between index of wholesale price and farm harvest, it was shown that the most appropriate price series is the farm harvest price because the government procures agricultural commodities immediately after the harvest.

Third was with regard to the choice of the source of consumption weights required for the construction of appropriate weights for surplus flows between the sectors. Given the limitations of the use of NSS consumption pattern which does not reflect the consumption pattern across different classes, using the consumption weights arrived at from the National Accounts Statistics (CSO) became necessary.

With the above considerations the indices of terms of trade were constructed using different base year weights which showed differences in levels, however, not in the direction of shift.

The behaviour of inter-sectoral terms of trade was analysed based on their levels and shifts. With regard to levels, a simple econometric test showed that the government intervention had a significant impact on the inter-sectoral price ratio.

With regard to shift, three phases were identified. During the first phase, from 1965/66 to 1974/75, it was observed that inter-sectoral terms of trade shifted in favour of industrial sector. This shift corresponded to increasing production in the agriculture sector. The behaviour of inter-sectoral terms of trade in the second phase, from 1975/76 to 1979/80, corresponded with changing agricultural production. The third phase, between 1980/81 and 1989/90, reflected diverging trends between inter-sectoral terms of trade and increasing agricultural production.

Focusing attention on the performance of agricultural sector, it may be pointed that agricultural sector is a source of instability in the economy as agricultural output strongely fluctuates with changing weather conditions. Changes in agricultural supply induce strong price fluctuations with demand being relatively price inelastic. Thus, given this nature of demand, short falls in agricultural production results in increasing the prices of agricultural commodities. As industrial sector is characterised by cost plus pricing, such an increase in agricultural price is transmitted to industrial prices, and this, in turn, had shifted the inter-sectoral terms of trade in favour of industry. It can, therefore, be said that supply shocks in the agricultural sector is the factor responsible for the behaviour of inter-sectoral terms of trade in the Indian economy.

Appendix

Table A.1 : Farm harvest prices

Years	Sugarcane	Tobacco	Groundnut	Rape & Mustard	Cotton	Jute
1951-52	na	na	na	na	na	na
1952-53	na	na	na	na	na	na
1953-54	na	na	na	na	na	na
1954-55	77.0	93.1	59.1	46.2	77.0	43.5
1955-56	84.3	87.4	59.1	65.9	83.0	50.6
1956-57	93.1	62.7	68.3	77.3	71.0	69.3
1957-58	99.7	69.4	69.9	74.0	82.9	54.4
1958-59	119.3	96.7	77.1	73.9	85.9	57.2
1959-60	130.6	100.8	87.4	78.8	91.7	59.5
1960-61	100.0	100.0	100.0	100.0	100.0	100.0
1961-62	102.6	100.7	101.4	97.3	99.6	75.6
1962-63	320.7	262.2	260.0	216.0	293.4	144.5
1963-64	464.1	331.9	284.2	296.0	305.7	150.6
1964-65	833.3	321.4	356.0	357.1	308.4	481.5

Notes : Index numbers with base 1980-81=100

Source: 1. For Production shares, 'Area and Production of crops in India', Directorate of economics and statistics, Various issues.

2. For Farm Harvest Price, 'Agricultural Situation in India',Directorate of Economics and Statistics, various Issues.

Table A.2: Index of Net Barter Terms of Trade*

(1960-61 weights)

Years (1)	Indices of prices Received (2)	Indices of prices Paid (3)	Terms of prices Trade (4)
1951-52	78.73	89.35	88.11
1952-53	74.64	81.18	91.94
1953-54	72.12	83.41	86.46
1954-55	71.64	79.94	89.62
1955-56	71.54	77.09	92.81
1956-57	88.53	86.72	102.09
1957-58	92.12	89.11	103.38
1958-59	100.99	88.65	113.92
1959-60	100.01	91.20	109.66
1960-61	100.00	99.89	100.11
1961-62	98.52	102.51	96.11
1962-63	142.40	104.95	135.68
1963-64	168.79	112.52	150.01
1964-65	232.23	121.01	191.91

Notes: *. Includes commodities with Government intervention in sale to agriculture

Col 2 a. Farm harvest prices are used.
b. Production figures are used as weights.

Col 3 a. Wholesale prices are used as weights.
b. consumption figures are used as weights.

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