A COMPARATIVE GROWTH STUDY OF CENTRAL EXCISE AND SALES TAX REVENUES

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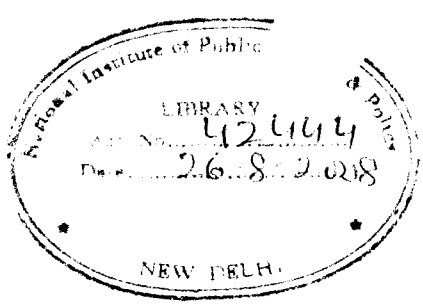

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A Comparative Growth Study of Central Excise and Sales Tax Revenues

I. Introduction

1.1 The Union excise duty and the State sales taxes are the major sources of revenue to the Government in India. The composition of indirect taxes has however undergone changes during the past two decades. The revenue share of the Union excise duty has declined while that of sales taxes increased over time. The revenue growth of the Union excise duty was also found to be decelerating over time, as compared to sales tax revenue. This has been a matter for some surprise and concern. For, the bases of the two taxes, though not identical, overlap and with around 3/4ths of sales tax revenue in most States collected at the first point now, the growth of revenue from the two taxes should, ordinarily have moved in step. As central excise constitutes the largest single source of revenue, sluggish growth of excise collection relatively to that of sales tax calls for some investigation. This is the motivation for the present study. The study was taken up by the Institute at the instance of the Central Board of Excise and Customs in November, 1988 to identify the factors adversely influencing the revenue growth of excise duty as contrasted with that of the sales tax revenue.

1.2 The structure of the study is as follows. Section 2 examines the growth differences in the Union

excise duty and sales tax revenues at the all-India level during the period, 1970-71 to 1988-89. Section 3 makes an attempt to compare excise and sales tax revenue for selected states. It also shows the importance of inter-state sales as a factor influencing the growth of sales tax revenue based on a case study of selected companies. Section 4 presents an analysis of growth rate differentials between excise and sales tax revenue considering important factors such as specific duty rates affecting tax buoyancy of union excise. This section also discusses the revenue impact of exclusions and exemptions from excise tariff as well as issues of evasion of excise duty and sales tax. Section 5 gives a summary of the findings and conclusions.

2. Divergence in Revenue Growth Rates

2.1 In 1987-88, the gross revenue from Union excise duties was Rs. 16,422 crore, while the sales tax revenue of all States and Union Territories was Rs. 11,502 crore. The percentage changes in revenue for each year are shown in Table 1 during the period 1970-71 to 1988-89.

2.2 For convenience, revenue growth rates of Central excise and sales tax have been estimated over different sub-periods during 1970-71 to 1988-89, considering relevant data. The methodology used here closely follows the estimation procedure of **spline functions** as given in the well known work on Econometrics by Johnston (1985) and has been explained in the statistical appendix. The estimated results of annual average growth rates of revenue are shown in Table 2 for different sub-periods. It may be seen from

Table 2 that the average growth rate of excise revenue significantly decelerated from 15.6 per cent a year during the period 1970-71 to 1974-75 to 11.8 per cent a year during 1975-76 to 1979-80. It may be noted that higher growth of excise revenue in the first half of the 1970s was due to a relatively small base level of revenue, viz, Rs 1759 crore in 1970-71. In the later half of the 1970s, revenue grew over a higher base level of Rs 3845 crore in 1975-76. Among other things, one important reason for revenue growth was widening of tax base, in the 1975-76 Budget, with the introduction of the tariff item 68. This item corresponded to all manufactured commodities that were not elsewhere classified. Initially, the rate of duty on item 68 was kept low at 1 per cent **ad valorem** but was raised gradually to a maximum of 12 per cent in the subsequent years. It was finally replaced in the 1986 Budget with the re-classification of the Excise Tariff Schedule and introduction of MODVAT. The annual average growth rate of excise revenue increased slightly to 13.2 per cent a year during the Sixth Plan period, 1980-81 to 1984-85 and it was around 13.6 per cent a year during the recent period, 1985-86 to 1988-89. On a year-to-year basis, the excise revenue increased from Rs 12956 crore in 1985-86 (pre-MODVAT year) by about Rs 1500 crore in 1986-87, by about Rs 2000 crore in 1987-88 and by about Rs 2100 crore in 1988-89. The growth rates work out to 16.2 per cent in 1985-86, 11.7 per cent in 1986-87, 13.5 per cent in 1987-88 and 12.9 per cent in 1988-89.

TABLE 1

Reveue Growth of Excise and Sales Tax in India,1970-71 to 1988-89

Year	Sales Tax		Excise Duty		Total indirect taxes	
	Revenue (Rs crore)	% Change	Revenue (Rs crore)	% Change	Revenue (Rs crore)	% Change
1	2	3	4	5	6	9
1970-71	782		1759		3743	
1971-72	854	9.19	2061	17.20	4404	17.66
1972-73	990	15.88	2324	12.77	5090	15.56
1973-74	1164	17.59	2602	11.96	5836	14.67
1974-75	1604	37.83	3231	24.15	7389	26.60
1975-76	2018	25.85	3845	19.01	8689	17.59
1976-77	2363	17.08	4221	9.80	9747	12.18
1977-78	2515	6.44	4448	5.36	10557	8.31
1978-79	2888	14.81	5342	20.11	12677	20.08
1979-80	3346	15.88	6011	12.53	14587	15.07
1980-81	4052	21.08	6500	8.13	16575	13.63
1981-82	5063	24.97	7421	14.16	20009	20.72
1982-83	5716	12.90	8059	8.59	22750	13.70
1983-84	6507	13.84	10222	26.84	26618	17.00
1984-85	7326	12.59	11151	9.09	30484	14.52
1985-86	8742	19.33	12956	16.19	37015	21.42
1986-87	9975	14.11	14470	11.69	42650	15.22
1987-88	11502	15.30	16422	13.49	49097	15.12
1988-89	13019	13.19	18548	12.95	55343	12.72

Note : Sales Tax figures for 1987-88 are revised estimates and for 1988-89 are budget estimates.
Excise duty figures for 1988-89 are revised estimates.

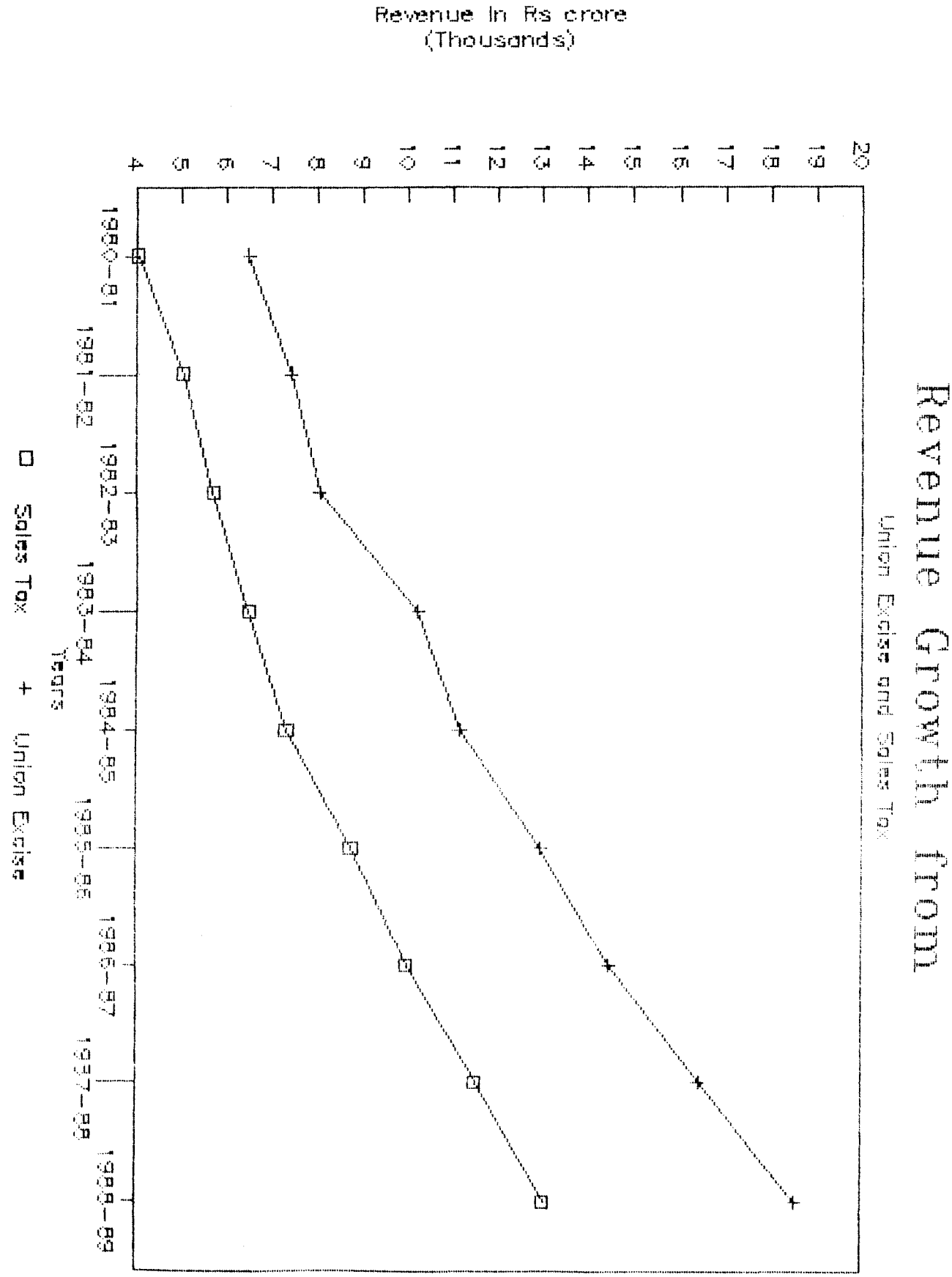
Table 2
Revenue Growth Rates Of Indirect Taxes in India
(Per cent per Annum)

Sl.No	Period	Sales Tax	Union excise Duty	Differences in growth rates
1	2	3	4	5
1	1970-71 to 1974-75	18.8	15.6	3.2
2	1975-76 to 1979-80	16	11.8	4.2
3	1980-81 to 1984-85	15.5	13.2	2.3
4	1985-86 to 1988-89	13.7	13.6	0.1

Note:See appendix for estimated growth equations

2.3 On the whole, one notices that there has been an increase in revenue every year (see Graph 1). But, there also have been fluctuations in growth rates over time in revenue of both Union excise and sales tax, (see Graph 2). Years of high growth have been usually followed by years of low growth. However, sales tax revenue grew at a higher rate of 18.8 per cent a year on the average during the period, 1970-71 to 1974-75. It was higher than the corresponding revenue growth of excise duty by 3.2 percentage points in the same period. Even in the later periods, the growth of sales tax revenue was found to be higher than that of excise duty. However, an interesting fact to observe is that the gap between their average growth rates narrowed down over time. While the growth rate of sales tax revenue declined marginally from 18.8 to around 16 per cent a year in the later half of the 1970s, excise revenue growth declined sharply from 15.8 to 11.2 per cent a year. During the period 1980-81 to 1984-85, the growth rate of sales tax revenue slightly declined to 15.5 per cent a year, while that of excise increased to 13.2 per cent. Thus the gap between the two growth rates was reduced to 2.3 percentage points. During the recent period, 1985-86 to 1988-89, this gap has become almost negligible (see Graph 2) as sales tax revenue growth witnessed a greater fall than that of excise.

Graph 1


Revenue In Rs crore
(Thousands)
4
5
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9
10
11
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14
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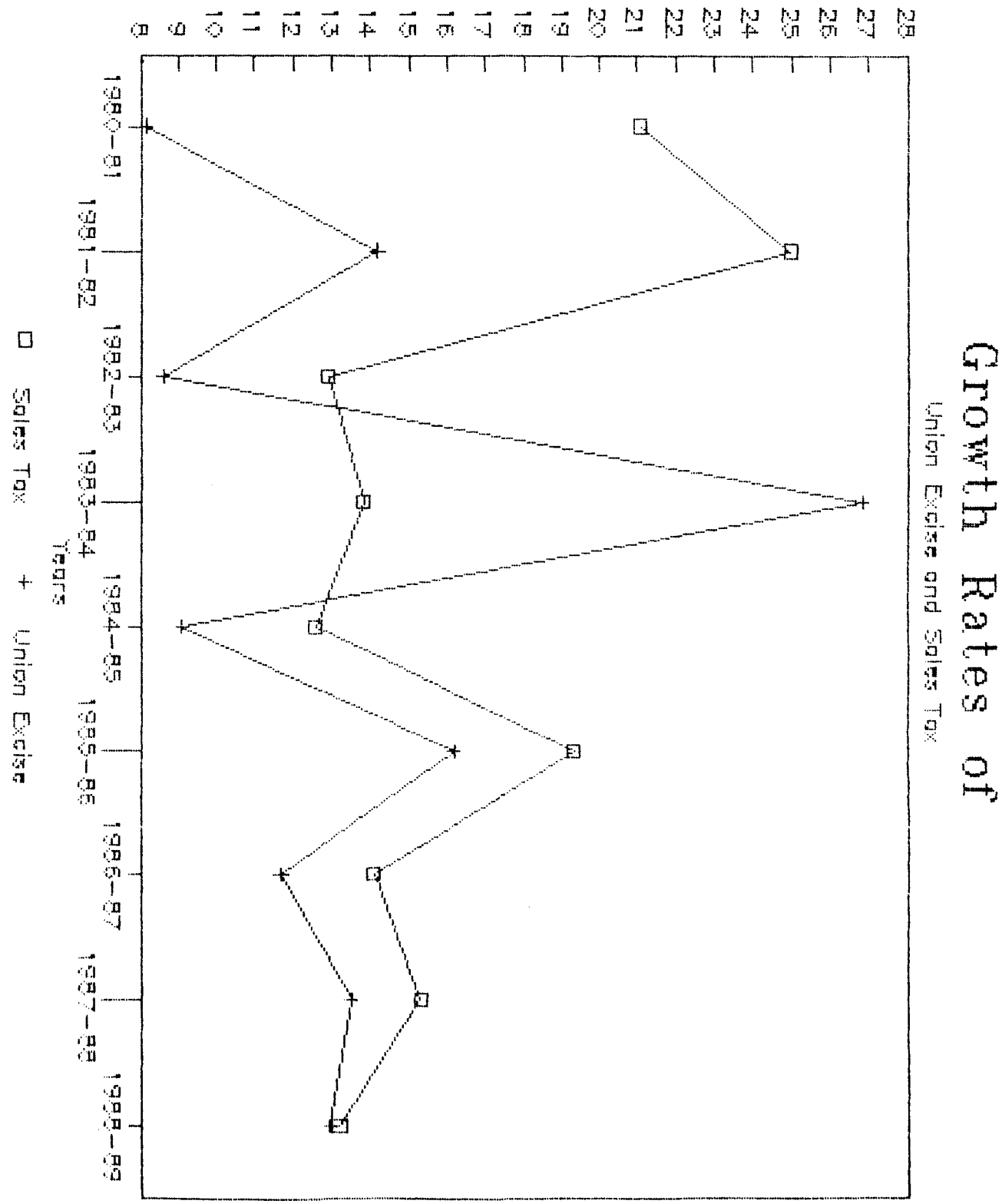
16
17
18
19
20
1980-81
1981-82
1982-83
1983-84
1984-85
1985-86
1986-87
1987-88
1988-89
Years
□ Sales Tax + Union Excise
Revenue Growth from
Union Excise and Sales Tax

Graph 2

Growth Rates



3. Growth Comparison for Selected States and Commodities

3.1 A comparative analysis of changes in revenue growth of excise duty and sales tax may be more useful at the commodity level than in the aggregate. But the disaggregated analysis appears to be difficult for several reasons. First, detailed revenue data are not available for commodities at the State level. Secondly, there are numerous differences in commodity classification among the States, which renders it difficult to arrive at comparable figures of sales tax revenue collections relating to a particular commodity. As noted in the proceedings of a symposium on sales tax harmonisation held at NIPFP, (see NIPFP, 1986), it was felt that uniformity should be brought about in classification and nomenclature of goods taxed in different States. Thirdly, no data are available in respect of inter-state movement of goods. As a result, it will be impossible to isolate the changes in revenue growth of CST which influences growth of total sales tax at the state level. Because of these deficiencies, a full dress statewise revenue comparisons cannot be carried out. However, an attempt is made below to provide a comparative picture of revenue changes for selected commodities in some states for which data are available for the period, 1983-84 to 1985-86. It should be added that these data have limited use in view of the above mentioned deficiencies.

3.2 For explaining growth differences in Union excise and sales tax revenue at the state level, it is important to consider factors influencing production, price and sales turnover, besides rate structure of Central excise

and sales tax. While the production of excisable goods in a given State depends on its industrial development, sales of commodities produced within and those imported into the State would depend on the size of the market demand in the State in question. If goods produced are consumed largely outside the State, its revenue growth would be mainly seen in CST rather than GST. Thus, it may be worthwhile to compare the growth of Union excise revenue with that of total sales tax revenue, i.e., sum of GST and CST.

3.3 Table 3 presents revenue data for the 1980s for four states, namely, Delhi, Haryana, Punjab and Himachal Pradesh, pertaining to the Union excise duty, and sales tax. For Delhi as well as Haryana States, Union excise revenue data are available separately for the last 3 years (1986-87 to 1988-89) and therefore comparison with sales tax revenue has been attempted only for this period. Furthermore, the break down of sales tax into CST and GST is not available for Punjab. Thus, growth comparisons of CST are made only for the other three states. But,it may be added that, in Punjab Union excise revenue is seen to grow faster than the total sales tax revenue during the 1980s. Secondly, sales tax revenue suffered growth fluctuations as against the Union excise,the growth of which was smoother in general over the same period.

3.4 For Delhi state, the total sales tax revenue was at Rs. 518 crore, to which the CST contributed about Rs. 184 crore (over 35 per cent). During the 1980's, the average growth rate of revenue was 13 per cent from CST, 15.4 per cent from GST and about 14.7 per cent from total sales tax.

Table 3

Comparison of Union Excise Duty and Sales Tax Collection for Selected States
1980-81 to 1988-89

Rs Crore

Years	Delhi				Haryana				Punjab		Himachal Pradesh			
	Union Excise	CST	ST	Sales Tax	Union Excise	CST	ST	Sales Tax	Union Excise	Sales Tax	Union Excise	CST	ST	Sales Tax
1980-81	-	62.62	92.38	155.00	-	44.51	55.83	100.39	97.37	155.39	1.19	0.79	10.03	10.15
1981-82	-	73.37	117.32	190.69	-	57.33	75.73	133.13	120.54	191.92	2.82	1.17	16.75	18.92
	-	(16.68)	(27.53)	(23.15)	-	(28.80)	(35.6)	(32.6)	(23.79)	(23.51)	(178.9)	(47.64)	(28.09)	(29.15
1982-83	-	77.89	134.02	211.92	-	62.22	89.54	151.76	135.25	219.93	11.36	1.44	16.62	19.76
	-	(5.37)	(13.74)	(10.54)		(8.43)	(18.23)	(14.01)	(12.03)	(14.65)	(242.17)	(23.67)	(5.49)	(6.74
1983-84	-	83.99	146.86	230.85	-	66.55	91.84	158.39	132.18	255.33	14.16	1.46	19.80	21.26
	-	(9.07)	(9.58)	(9.39)		(6.95)	(2.57)	(4.36)	(33.71)	(16.09)	(24.64)	(1.36)	(19.15)	(17.71)
1984-85	-	106.11	171.43	277.54		77.78	95.04	172.74	207.88	260.66	21.16	1.77	21.24	23.01
	-	(26.33)	(16.78)	(20.22)		(16.76)	(3.49)	(9.06)	(14.10)	(3.03)	(49.43)	(21.32)	(7.29)	(8.22
1985-86	-	122.02	203.90	325.92		95.78	125.85	221.63	259.14	319.19	27.52	2.14	36.33	38.47
	-	(14.99)	(19.04)	(17.43)		(23.27)	(32.41)	(28.30)	(21.77)	(13.83)	(30.05)	(21.50)	(23.93)	(23.72
1986-87	231.27	137.87	241.32	379.19	450.37	91.96	148.65	240.61	238.27	377.13	33.34	2.37	34.13	37.24
		(12.33)	(13.35)	(16.54)		(-3.99)	(13.11)	(8.56)	(12.37)	(20.41)	(21.14)	(42.93)	(29.32)	(30.63)
1987-88	289.79	151.35	272.18	431.73	542.65	119.17	181.30	300.47	324.85	474.23	39.62	3.01	52.81	55.82
	(3.68)	(10.13)	(15.97)	(13.85)	(20.34)	(29.69)	(22.00)	(25.08)	(12.72)	(7.12)	(18.53)	(8.07)	(-4.00)	(-3.00
1988-89	336.54	193.95	333.95	517.90	650.79	135.34	228.13	373.16	389.28	447.53	42.47	5.01	56.74	42.25
	(19.49)	(21.13)	(19.31)	(19.95)	(20.35)	(13.31)	(30.98)	(23.98)	(13.64)	(10.76)	(7.46)	(60.26)	(11.39)	(9.41
Average of Yearly Growth Rates during														
a.1980-81 to 1988-89	-	13.0	15.4	14.65	-	13	16.3	14.93	16.39	12.89	40.91	21.1	13.8	14.47
b.1980-81 to 1985-86	-	13.4	14.3	14.1	-	12.7	13.6	13.7	19.17	13.11	61.38	13.0	17.8	14.2
b.1986-87 to 1988-89	11.59	15.63	17.64	16.90	20.20	21.45	26.64	24.53	13.18	8.94	13.30	34.17	4.00	6.71

Note:1.Figures in parenthesis are percentage changes over the previous year.
2.Annual Average growth rate has been worked out by fitting data to exponential growth function.

In the recent period (1986-87 to 1988-89), the average growth rate of CST went up to 15.6 per cent, and that of GST to 17.6 per cent. However, in the case of Union excise, the average growth rate of revenue was lower at 11.6 per cent a year in this period. But, in 1988-89, the Union excise grew by 19 per cent over the previous year, almost matching the growth of total sales tax revenue (growth of CST was slightly higher at 21.1 per cent in the last year). Main reasons for the recent spurt in excise revenue from Delhi were higher growth in clearances of oil products due to opening of new oil depots, and lowering of notional (deemed) credit rate from 10 to 5 per cent and therefore a lower entitlement of MODVAT credit in general. In 1987-88, the Union excise revenue grew by 3.7 per cent over 1986-87, whereas, CST and GST experienced a growth of 10 and 16 per cent respectively.

3.5 In Haryana, the Union excise revenue grew at an average rate of 20 per cent a year, while the total sales tax revenue rose at the rate of 24.5 per cent a year during the last three years. Last year, the revenue growth of CST has slowed down, while that of GST has gone up. The total sales tax revenue was Rs 373 crore, of which CST accounted for as much as 36 per cent. The CST share was higher at 39.5 per cent in 1987-88, whereas, the Union excise revenue grew constantly at 20 per cent in both years, 1987-88 and 1988-89. It may also be noted that the growth rate of total sales tax has slowed down a little in 1988-89 as compared to the previous year.

3.6 In Himachal Pradesh, Union excise revenue grew appreciably during the 1980's, from as low as Rs one crore in 1980-81 to over Rs 42 crore in 1988-89. The average growth rate during the 1980's worked out to about 41 per cent a year. The revenue from GST and CST together grew slowly from Rs 13 crore in 1980-81 to Rs 42 crore in 1988-89, giving rise to a growth rate of 14.5 per cent a year on an average. As between CST and GST, revenue from CST grew at a faster rate (21 per cent a year) than that from GST (13.8 per cent) on an average during the 1980s. The growth rates of both Union excise and GST declined, whereas that of CST increased during the last three years, 1986-87 to 1988-89.

3.7 Inter-State Movement of Goods: A Case Study of Two Companies

3.7.1 It hardly needs to be pointed out that the growth of a state's revenue from CST depends mainly on the growth of inter-state sales and the rates of CST, which may be raised to the maximum of 4 per cent. However, the revenue growth of local sales tax depends on tax rates as well as the local sales turnover. As far as union excise revenue is concerned, the revenue growth pertaining to a state would be determined by changes in local production of excisable goods and their duty rates. To examine differences in revenue growth of union excise and sales tax at the state level, among other things it is important to examine changes in export sales turnover and branch transfers. But information regarding such data are not available at the state level. However, to examine growth differences at the company level, we have conducted a case

study of two companies situated in Himachal Pradesh.

3.7.2 Company A is a manufacturer of water filters and B is a producer of watches. The company level data relating to their value of production, sales turnover including inter-state export sales, imports and branch transfers as well as taxes paid by them were collected for three years, 1983-84 to 1985-86 and are shown in Table 4.

3.7.3 It is important to note that both companies considered here are mainly producing and exporting to units outside the State. As shown in Table 4, the sales tax revenue paid by these two companies largely constituted CST, While their domestic sales formed a negligible portion of the total value of clearances. For instance, in the year 1983-84, company A produced output worth Rs 781 lakh, of which, its domestic sales was of the order Rs 14 lakh only, whereas, its export sales were as high as Rs 905 lakh. Incidentally, the value of export sales was higher than the value of clearances in a year on account of inventory depletion. Comparing the revenue growth of excise and sales tax, we find that Union excise paid by these companies declined by 10.4 per cent in 1984-85 over the previous year mainly because the value of clearances also declined by about 11.6 per cent, while the duty rate remained constant in the same period. However, CST from company A increased by 19.7 per cent despite 2.8 per cent decline in inter-state export sales in 1984-85 over 1983-84. It was found to be due to collection of tax arrears relating to a previous period.

Table 4

Production, Sales and Taxes Paid By Two Selected Companies in Himachal Pradesh (1983-84 to 1985-86)

	Company A*			Company B		
	1983-84	1984-85	1985-86	1983-84	1984-85	1985-86
I. Production and Sales (Rs lakhs)						
1. Value of Clearances	781.12	690.04	823.08	231.64	189.92	275.46
% change		-11.66	19.28		-18.01	45.04
2. Imports	Nil	Nil	Nil	Nil	Nil	Nil
% change						
3. Branch Transfers	131.00	152.00	226.00	0.52	-	-
% change		16.03	48.68			
4. Inter-state export sales	905.14	879.56	892.72	255.00	210.00	282.00
% change		-2.83	1.50		-17.65	34.29
5. Domestic sales	14.30	19.04	19.00	5.24	3.15	2.57
% change		33.15	-0.21		-39.89	-18.41
II. Taxes paid (Rs lakhs)						
1. Central Excise (on value of clearances)	145.37	130.18	156.20	23.16	17.36	2.99
% change		-10.45	19.98		-25.05	-82.79
2. GST(on domestic sales including imports)	0.21	0.20	0.83	0.34	0.25	0.21
% change		-4.76	315.00		-26.47	-16.00
3. CST(on export sales)	38.91	46.58	49.87	10.22	6.21	17.28
% change		19.71	7.06		-39.24	178.26
4. GST+CST (2+3)	39.12	46.78	50.70	10.56	6.46	17.49
% change		19.58	8.38		-38.83	170.74

* Note: Company A manufactures water filters and B watches.

3.7.4 For company B which manufactures watches and parts, the Central excise revenue fell from Rs 23 lakh in 1983-84 to Rs 17.4 lakh in 1984-85 and to about Rs 3 lakh in 1985-86. The revenue fall in 1984-85 seem to have been caused largely by a decline in the value of clearances by about 18 per cent from Rs 231.6 lakh in 1983-84 to Rs 189.9 lakh in 1984-85. In 1985-86, however, the value of clearances increased to Rs 275.5 lakh. Yet, the excise revenue fell in that year resulting mainly from the cut in the duty rate on watches from 10 to 2 per cent in 1985-86. Export sales of company B went up by over 34 per cent and CST revenue by 178 per cent in 1985-86. It may also be noted that domestic sales in Himachal Pradesh did not increase despite appreciable reduction in Union excise duty. The upshot of the above case study is that the growth rate differences in Central excise duty and sales tax crucially depends on the inter-state sales turnover of a given product. It also shows that a considerable decline in excise duty rate (as that of watches seen above) results in substantial increase in production and a decline in price. The increase in production may or may not be large enough to offset the price decline and the excise revenue may not increase substantially.

3.8 Table 5 presents figure of revenue from excise duty and sales tax of selected states for a few commodities, during the period 1983-84 to 1985-86. For instance, in 1985-86 the commodities which exhibited a decline in excise but an increase in sales tax revenue were iron and steel in Karnataka and Rajasthan, jute and its products and medicines in Uttar Pradesh, tyres and tubes in Goa and Orissa. As can

be seen in cols 10 and 11 of Table 5, the percentage change of excise duty revenue was negative while that of sales tax was positive for all these goods (items 1 to 6) in 1985-86 over 1984-85. However, for some of these goods, there was an increase in excise duty revenue in 1984-85 over 1983-84. Such fluctuations could be possible for various reasons. For iron and steel products in Karnataka and Rajasthan, the fluctuation in excise revenue may be due to variations in local production. It may be noted that production in these two States has not been considerable to yield a high growth of Union excise revenue from this commodity. Growth rates of sales tax revenue also varied, probably, due to variations in imports of iron and steel into these two States. Unfortunately, no data are available for these States on imports of iron and steel in the period under question.

3.9 Items 7 to 9 of Table 5 indicate products for which revenue from excise duty increased, while sales tax collections declined in 1985-86 over the previous year. These products were cosmetics in Goa and Uttar Pradesh, paper in Orissa and vegetable products in Uttar Pradesh. In contrast, items 10 to 13 of this table, i.e., products like cement, tea and coffee witnessed an increase in both excise duty and sales tax revenues in 1985-86 over 1984-85. In the absence of further information regarding inter-state movement of goods and inventory, it appears not difficult to analyse identify other factors responsible for differential growth rates experienced by these states.

Table 5

Commoditywise Comparison of Revenue from Union Excise Duty and Sales Tax in India
On selected Commodities during 1983-84 to 1985-86.

Sl No	Commodity	State	Revenue Collection (Rs. Lakh.)						Percentage Change			
			Union Excise Duty			Sales Tax			1985-86 over 1984-85		1984-85 over 1983-84	
			1983-84	1984-85	1985-86	1983-84	1984-85	1985-86	Excise Duty	Sales Tax	Excise Duty	Sales Tax
1	Iron & Steel	Karnataka	714.00	899.92	819.41	841.01	1122.48	1350.85	-8.95	20.27	26.04	33.47
		Rajasthan	174.00	220.00	190.45	248.57	205.59	453.13	-10.72	50.66	31.43	10.71
2	Jute & its Products	Uttar Pradesh	257.00	201.06	275.96	179.53	252.06	266.76	-2.09	5.50	9.07	40.05
3	Kerosene	Uttar Pradesh	1590.06	1571.29	1104.63	1115.24	1170.00	1423.17	-29.76	21.55	-1.73	4.99
4	Medicines	Goa	135.00	190.69	189.07	27.74	17.67	22.02	-0.05	24.62	41.25	-30.36
		Orissa	16.06	8.09	6.20	274.11	365.94	453.07	-23.36	24.03	-49.44	35.50
		Rajasthan	11.00	5.54	5.51	415.32	453.53	494.72	-0.54	13.59	-49.64	4.07
		Uttar Pradesh	259.00	330.50	100.52	1302.99	2155.60	2465.67	-67.76	14.30	29.95	55.07
5	Paints & Varnishes	Orissa	14.00	12.45	11.43	43.46	51.20	79.41	-8.19	54.06	-11.07	10.16
		Rajasthan	2.00	9.43	8.33	92.90	99.90	110.15	-11.10	16.27	371.50	7.53
6	Tyres & Tubes	Goa	3452.00	3342.32	2400.06	57.02	56.20	60.49	-28.19	10.10	-3.10	-1.33
		Orissa	2.00	1.19	0.02	174.30	214.93	201.66	-31.09	31.05	-40.50	23.31
7	Cosmetics	Goa	57.00	60.02	84.30	4.20	9.02	9.07	24.05	-7.64	19.33	130.52
		Uttar Pradesh	350.00	851.30	1050.17	637.00	570.23	293.29	154.59	-49.20	02.95	-9.35
8	Paper	Orissa	2112.00	2243.05	2091.31	22.05	30.11	33.00	20.05	-11.15	6.24	60.20
9	Vegetable Products	Uttar Pradesh	922.00	935.33	1977.41	1947.00	2392.25	2199.14	111.41	-0.07	1.45	22.03
10	Cement	Karnataka	4095.00	4009.74	5907.31	1307.17	1509.47	2003.23	27.07	26.03	14.52	21.60
		Orissa	1710.09	1696.57	1920.20	442.10	401.41	540.00	13.00	13.43	-1.25	0.09
		Rajasthan	7100.00	7029.20	9004.57	1020.05	1610.99	1753.57	30.04	0.31	-1.94	-11.00
		Uttar Pradesh	2031.00	1977.03	2590.72	1276.42	1507.00	2104.74	31.45	37.59	-2.60	24.40
11	Paper	Karnataka	1404.00	1534.00	1752.95	345.39	403.13	500.00	14.22	7.90	3.41	34.09
		Uttar Pradesh	1009.00	012.27	1202.90	200.93	330.73	444.05	40.10	31.09	-19.50	20.57
12	Tea & Coffee	Karnataka	401.00	500.32	502.00	900.90	1104.00	1375.04	0.51	24.51	4.02	21.02
		Orissa	NA	0.02	0.03	02.30	130.09	140.54	50.00	7.60	NA	65.20
		Rajasthan	10.00	0.03	0.50	214.20	207.57	270.53	1704.07	1.11	-99.03	24.00
		Uttar Pradesh	5.00	193.59	197.31	409.09	609.05	090.03	1.92	40.27	3771.00	24.32
13	Vegetable Products	Karnataka	44.00	04.71	09.32	200.91	339.21	303.91	30.03	13.10	47.07	30.01

Sources : 1. Government of India,Central Board of excise and Customs,
Statistical Year Book(Various Issues)

2. Sales Tax Departments of Various States.

4. Analysis of Revenue Growth

4.1 At the aggregate level, major factors which could perhaps explain a good part of the observed differences in growth of excise duty and sales tax are well known. As the Jha committee report on India's indirect taxation had noted, revenue growth of excise duty is generally lower than sales tax mainly because excise duty rates are specific, while sales tax is **ad valorem**. Revenue buoyancy would also depend on changes in tariff exemptions and exclusions from respective tax bases, as well as the degree of tax compliance and loopholes for evasion. It may therefore be pertinent to consider these factors for the purpose of analysis.

4.2 The Jha committee report (1977) also provides estimates of tax buoyancy and elasticity measures of Union excise duty and sales tax revenue for the period 1963-64 to 1974-75. These estimates are given in Table 6. It shows that the sales-tax buoyancy in this period was slightly higher at 1.45 than the excise duty buoyancy which was 1.30 for the same period. Using the same methodology, estimates of buoyancy obtained for the later period, 1975-76 to 1985-86 turn out to be 1.23 for sales tax and 1.01 for excise duty. Thus, the difference was found to have increased over time to 0.22. It may also be noted that the tax buoyancy measures the percentage increase in the revenue yield when national income (NNP) increases by one per cent in nominal terms. However, a part of the revenue increase could be due to deliberate changes by the Government in tax rate or base or both, by way of additional revenue

Table 6

Estimates of Buoyancy and Elasticity With Respect To Union Excise and Sales Tax Revenues

Period	Buoyancy			Elasticity		
	Excise Duty	Sales Tax	Difference (Cols. 3-2)	Excise Duty	Sales Tax	Difference (Cols. 6-5)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1963-64 to 1974-75 (Jha Committee)	1.30	1.45	0.15	0.75	1.15	0.40
1975-76 to 1985-86*	1.01	1.23	0.22	0.76	1.12	0.36

Source: Based on estimated equations as given in Appendix

mobilisation (ARM). So as to derive the responsiveness of revenue changes net of the ARM effect, yet another measure, namely, the elasticity should be considered.

4.3 Estimates of tax elasticity of excise duty and sales tax were also found to differ by an appreciable margin. However, this difference seems to have narrowed somewhat over time. For the period 1963-64 to 1974-75, the Jha committee's estimates were 1.15 for sales tax and 0.75 for excise duty. For the later period, 1975-76 to 1985-86, our estimates were 1.12 for sales tax and 0.76 for excise duty. An interesting finding thus emerges is that the gap between the two elasticity measures has slightly narrowed over time with the elasticity of excise duty going up and that of sales tax decreasing. The gap between the two buoyancy measures has, on the other hand, widened further. Thus, it appears that the differences in revenue growth rates of these two taxes were mainly on account of the differentials, as reflected in their respective ARM measures during the period 1975-76 to 1985-86. As the elasticity of excise duty slightly increased (0.75 to 0.76) over time, it follows that the revenue growth was not adversely affected by laxity in efforts of excise revenue collections. However, because there was a fall in excise buoyancy over time, the revenue growth (1.30 to 1.01) was not brought about adequately by the increase in duty rates. As noted earlier, during the period, 1975 to 1986, the rate structure was made increasingly specific and also the tax base suffered erosion due to SSI exemptions, both inhibiting the revenue growth.

4.4 There is a reason to think that the estimates of buoyancy and elasticity measures were greater for sales tax than for excise duty. It is mainly because the sales tax rates are **ad valorem**, while the excise duty rates are increasingly specific. As Table 7 shows, the proportion of Union excise revenue from specific-rated commodities was found to have gone up considerably from about 46 per cent in 1980-81 to over 70 per cent in 1988-89. Moreover, as Table 8 would show, the specific rates of many such commodities which have considerable share in total excise revenue do not seem to have been adjusted upwards for inflation over time, resulting in revenue losses. Considering their price changes over the time, revenue loss was worked out. If these commodities were charged to **ad valorem** rates instead of specific rates, the Central excise revenue would have gone up by as much as Rs. 4906 crore as per the calculations shown in Table 8, and thereby the growth rate of excise revenue would have improved appreciably. Furthermore, the price elasticity of excise duty revenue was estimated to be lower at 0.74 than that of sales tax revenue which was 1.17. It implies that when wholesale prices go up by 1 per cent excise revenue will go up by 0.74 per cent; whereas, sales tax revenue will go up by 1.17 per cent It should also be pointed out that **ad valorem** rates, in general, promote price competition in the market; whereas, specific rates discourage price competition since they are not price based. It would also result in placing heavier tax burden on efficient firms in industry that might minimise unit costs and charge consumers a lower price, while specific rates would tend to encourage inefficient firms which are not price competitive in the market. As far as tax shifting is

Table 7

Percentage of Union Excise revenue from Specific Rated Commodities

Period	% of union excise revenue
1980-81	46.36
1982-83	47.57
1983-84	54.76
1984-85	64.40
1985-86	66.68
1986-87	65.19
1987-88	69.48
1988-89(SBE)	70.01

Sources: Government of India, Central Board of Excise and Customs.

Table 8

Commodities Subjected to Specific Excise Rates

S.NO.	COMMODITY	S.B.E 1987-88 (RS.CRS.)	PRESENT RATE OF DUTY	YEAR FROM WHICH SP.DUTY NOT ALTERED	INCIDENCE IN THAT YEAR (%)	PRESENT INCIDENCE (%)	DIFFERENCE IN INCIDENCE COL7-COL6	REVENUE LOSS DUE TO SPECIFIC RATES
1	2	3	4	5	6	7	8	9
1	MOTOR SPIRIT	900.00	RS. 2253.88 PER KL	1979	138.0	50.0	-88.00	-1584.00
2	LCV TYRES	34.00	RS.400/TYRE	1984	66.0	40.0	-26.00	-22.10
3	TRUCK TYRES	456.75	RS.1050TO1250/TYRE	1984	66.0	43.2	-22.80	-241.06
4	HIGH SPEED DIESEL OIL	645.00	RS.334.04 PER KL	1979	34.0	12.0	-22.00	-1182.50
5	JUTE MANUFACTURES	76.00	RS.660 PER MT	1967	30.0	10.1	-19.95	-150.87
6	CAR TYRES	42.00	RS.170TO 220/TYRE	1984	66.0	46.4	-19.60	-17.74
7	JEEP TYRES	20.00	RS.270/TYRE	1984	66.0	50.0	-16.00	-6.40
8	KEROSENE	250.00	RS.338.19 PER KL	1979	35.0	20.9	-14.10	-168.66
9	TRACTOR TYRES	31.50	RS.110 TO 420/TYRE	1984	27.5	16.7	-10.81	-20.40
10	BITUMEN	20.70	RS.157.55 PER MT	1979	15.3	4.7	-10.60	-46.69
11	ZINC	37.00	RS.3600 PER MT	1982	23.4	12.9	-10.50	-30.12
12	CEMENT	886.79	RS.175/205/225/MT	1985	45.0	35.0	-10.00	-253.37
13	BIRIS	157.50	RS.3.75/1000NOS.	1979	25.0	15.0	-10.00	-105.00
14	COMPRESSORS		RS.4000 FOR<7.5 TON	1986	110.0	100.0	-10.00	0.00
15	DIESEL OIL , NOS	27.00	RS. 155.72 PER KL	1979	15.0	5.4	-9.60	-48.00
16	LOOSE TEA	71.30	RS.0.50/1.50 PER KG	1970	12.0	4.0	-8.00	-142.60
17	SCOOTER TYRES	5.00	RS.28/TYRE	1984	27.5	19.8	-7.70	-1.94
18	LPG	45.00	RS.262.58 PER MT	1979	15.4	8.2	-7.20	-39.51
19	IRON AND STEEL	482.50	RS.80 TO 970 PER MT	1977	13.0	6.0	-7.00	-562.92
20	FURNACE OIL	47.00	RS. 121.05 PER KL.	1979	11.1	4.3	-6.80	-74.33
21	POLY. STAPLE FIBRE	180.00	RS. 25 PER KG	1985	56.2	50.1	-6.10	-21.92
22	SUGAR (FREE SALE)	189.00	RS. 50 PER KG	1983	14.5	9.2	-5.30	-108.88
23	TV SETS (COLOUR)	165 00	RS.1000/1500/1750	1987	30.0	25.0	-5.00	-33.00
24	COPPER	47.00	RS.3300TO 6200/MT	1982	9.5	4.6	-4.90	-50.07
25	PACKAGE TEA	11.85	RS. 1.10 PER KG.	1970	7.2	2.4	-4.80	-23.70
26	SUGAR (LEVY)	144.00	RS. 38 PER KG	1983	12.9	9.3	-3.60	-55.74
27	PAN MASALA	5.00	RS. 20 PER KG	1985	22.0	18.6	-3.40	-0.91

TABLE 8 CONTD.

Commodities Subjected to Specific Excise Rates

28	LEAD	3.18	RS. 840 PER MT	1982	6.9	4.0	-2.90	-2.31
29	CESS ON SUGAR	105.00	RS. 14 PER KG	1982	4.2	2.5	-1.70	-71.40
30	VEGETABLE PRODUCT	79.00	RS.1900 PER MT	1987	10.0	8.6	-1.40	-12.86
31	FISCOSE FILAMENT YARN	51.00	RS.3.50TO 24.00/KG	1987	17.9	16.5	-1.40	-4.33
32	REFINED VEG. OILS	29.70	RS. 750/1500 PER MT	1986	6.0	4.7	-1.30	-8.24
33	COFFEE	8.70	RS.78/105 PER QUI.	1972	5.9	4.7	-1.20	-2.22
34	COTTON YARN	164.00	AVG RS.1.34/KG.	1986	5.0	3.9	-1.10	-46.26
35	MATCHES	56.00	RS.1.6/3.5/4.15/5.85	1985	5.0	4.0	-1.00	-14.00
36	NAPHTHA (OTHERS)	11.00	RS. 26.50 PER KL	1979	4.2	3.2	-1.00	-3.44
37	TUBE LIGHTS, BULBS	25.00	RS.1.50 / 2.00	1987	10.0	9.1	-0.90	-2.47
38	TV SETS (B&W)	45.00	NIL, RS.200 &RS.300	1985	15.0	14.3	-0.70	-2.20
39	NAPHTHA (FOR FERTS)	2.00	RS. 4.50 PER KL	1979	0.8	0.2	-0.60	-6.00
40	CINEMATO.FILMS U.EXPSD	5.00	RS.0.30 PER MTR.	1986	7.0	6.7	-0.30	-0.22
41	CRUDE CESS	1800.00	RS.600 PER MT	1987	57.0	57.0	0.00	0.00
42	CIGARETTES	1655.00	RS.1.50 TO RS.6.00/10	1987	500.0	500.0	0.00	0.00
43	MAN- MADE FABRICS	389.64	RS.1.25 TO 15/SQ.MT.	1987	6.0	6.0	0.00	0.00
44	COTTON FABRICS	112.40	RS.0.10 TO1.32&16.2	1987	6.6	6.6	0.00	0.00
45	VISCOSE STAPLE FIBRE	74.00	RS. 7 PER KG	1987	37.1	37.1	0.00	0.00
46	REFRIGERATORS	65.00	RS. 250 TO 3500	1987	30.0	30.0	0.00	0.00
47	AERATED WATERS (OTHS)	62.30	RS.0.50 PER 200ML	1987	60.0	60.0	0.00	0.00
48	FLAT GLASS	44.50	RS.3.5PER MM/SQ.MT	1986	25.0	25.0	0.00	0.00
49	AIR CONDITIONERS	25.00	RS. 8000 TO 15000	1986	110.0	110.0	0.00	0.00
50	AERATED WATERS (SODA)	15.00	RS.0.30 PER 200ML	1987	72.0	72.0	0.00	0.00
51	TOUGHENED GLASS	10.00	RS.25 PERMM/SQ.MT	1987	35.0	35.0	0.00	0.00
52	LAMINATED GLASS	10.00	RS.30 PER MM/SQ.MT	1987	65.0	65.0	0.00	0.00
53	GLASS MIRRORS	10.00	RS.15 PER MM/SQ.MT	1987	55.0	55.0	0.00	0.00
54	MOLASSES	8.40	RS. 60 PER MT	1987	50.0	50.0	0.00	0.00
55	CINEMATO.FILMS EXPSD	5.00	RS.1550T015000/PRT	1987	5.0	5.0	0.00	0.00
56	NYLON FILAMENT YARN	350.00	RS.70 PER KG	1985	77.9	80.8	2.90	12.56
57	POLY. FILAMENT YARN	712.00	RS.83.75 PER KG	1985	83.2	128.1	44.90	249.56
	TOTAL OF 57 COMMS	10909.7						-4906.22
	GROSS REVENUE	16851.8						
	% IN TOTAL REVENUE	64.74						

Source: TRU.

concerned, it generally depends on the market structure, i.e., oligopoly or perfect competition etc. It is however, an empirical issue to examine whether tax shifting varies according to the type of rates i.e., as between **ad valorem** and specific rate structures, given the type of market competition.

4.5 To examine the revenue effect at a more detailed level, we have estimated revenue growth rates and the excise buoyancy of selected commodities following the same methodology as used earlier. Table 9 gives estimates of buoyancy and average annual growth rates of excise revenue of some selected commodities during the period, 1974-75 to 1987-88. Buoyancy estimates were obtained by considering separately the revenue data on basic and total excise duties of individual commodities charged to specific duty rates *viz.*, cigarettes, copper, zinc, lead, cotton yarn, sugar, tea, tyres etc., as also of air-conditioners and refrigerators which are charged partly on the **ad valorem** basis and partly at specific rates and of electrical lamps which are taxed **ad valorem**. The average growth rates in their total excise revenue were also estimated during the same period. As will be seen from Table 9, the revenue buoyancy of specific-rated commodities was also greater than unity implying, thereby, that their revenue growth was more than proportionate to changes in national income. Commodities like cigarettes, lead, zinc and tyres showed rising trend in revenue growth and buoyancy. This may be attributed to the fact that their duty rates were increased periodically keeping up with inflation. However, revenue from sugar and tea was stagnant and least buoyant of all

Table 9

Buoyancy and Revenue Growth of Union Excise Duty for Selected Commodities

Tariff No.	Commodity	Buoyancy of Revenue: Basic excise	Buoyancy of Revenue: Total excise including cess etc. if any **	Revenue contribution to total excise duty in 1986-87 * (%)	Average growth rate per annum during 1974-75 to 1987-88 (%)
2403.11	Cigarettes	1.65	2.04	10.09	19.09
74	Copper	0.95	-	0.32	11.70
52.01 to .04	Cotton yarn	0.53	2.94	1.23	5.17
85.39	Electrical lamps***	0.8	-	NA	9.80
78	Lead	1.83	-	0.02	21.36
84.18,85.90, 84.15 & 84.14	Refrigerators and Airconditioners	1.14	-	0.84	13.58
1701	Sugar	NS	0.30	2.34	Neg
9.02	Tea	NS	NS	0.61	Neg
40.11,12 & 13	Tyres	1.13	-	4.02	13.70
79	Zinc	1.51	-	0.25	16.11

Notes : Buoyancy estimates were obtained separately for basic excise and total excise revenue by regressing them on NNP for the period ,1974-75 to 1986-87
NS implies estimated coefficients are not statistically significant.
* Total revenue from excise duty on all commodities was Rs.12956 cr.in 1986-87
** Tea revenue includes cess;sugar,cigarettes and cotton yarn includes additional excise duty in lieu of sales tax apart from basic excise duty.
*** Growth period used was 1974-75 to 1985-86

those considered here, since they do not seem to have experienced much increase in their rates during the period under study.

4.6 Advocates of specific duty rates, however contend that specific rate-structure is generally less inflationary, causes less cascading of taxes and helps to plug loopholes of evasion that may arise due to undervaluation of output. As far as inflation is concerned, we have already noted that there was a revenue loss for not adjusting rates upwards. Thus loss of revenue in this regard may be viewed as the price paid for controlling inflation. Hence, the gains from containing inflation would be nullified if specific rates are attempted to be adjusted upwards periodically for revenue reasons. Thus there seems to be a trade-off between revenue growth and inflation. As for the cascading, it is true that cascading effect is less, if tax rates are specific rather than ad valorem; similarly, evasion problems of under-valuation could also be reduced, if the excise duty is specific-rated. But, both these arguments lose strength in the context of MODVAT scheme. The MODVAT report by NIPFP (1989) revealed that the cascading effect of excise duties has been reduced due to MODVAT credit. Secondly, because of its built-in checks and self-policing feature of the credit mechanism, evasion possibilities are minimised at least at the intermediate stages of the credit chain, provided that the enforcement mechanism of cross-verification of duty evidencing documents is effective. However, at the end-stage of the credit chain, MODVAT may not provide checks against evasion, and problems of undervaluation remain to be

tackled by other means. Thus specific rates may help better to reduce evasion at the end stage of credit chain. Revenue growth from these products can be kept up if their rates are adjusted upwards adequately and periodically. To test the validity of this preposition, we conducted a case study of TV sets in Delhi and examined their price variation and duty changes during the recent period, 1986 to 1989

4.7 Specific Vs Ad Valorem Duties: A Case Study of TV Sets in Delhi

4.7.1 In this case study prices of TV sets were compared over the period, 1986 to 1989 before and after the levy of excise duty. Price information was collected from six leading manufacturers in Delhi. It is known that TV sets are levied excise duty on the specific rate basis (per TV set). The duty rates varied from year to year depending on the screen size and remote control facility. Considering the prices quoted by different manufacturers as of 1st of April every year, the average price was worked out over the sample of units for each year (see Table 10). Using the average price as the base, duty rates were converted from specific to **ad valorem** basis. **Ad valorem** rates are useful to examine (i) if changes made in specific rates of different TV models reflected tax progressivity as intended and (ii) whether nor not such specific rate changes were proportionate to price changes over time.

4.7.2 It may be mentioned that no data are available on sales tax revenue from the sale of TV sets in Delhi. For the purpose of comparison with the excise revenue, we have tried to assess the revenue variations in sales tax per TV

Table 10

Producer Prices of TV sets before Excisn Duty,1986-1989

S.No	Item	Year	Televista Electronics Ltd.	Weston Electronics (Cetron)			ECP Ltd. (Dynora,Salora)		Jupiter Radios (Texla)					Average Price	% Change in Price
			Model	Model			Model		Model						
			1	1	2	3	1	2	1	2	3	4	5		
1.	Portable B&W	1986		1650			1300		1400					1450	
		1987		1650			1300		1400					1450	0.00
		1988		-			1400		1400					1400	-3.45
		1989		2220			1500		1700					1800.7	28.05
2.	20 inches B&W	1986	2000	2000			2200		1800					2000	
		1987	2350	2100			2200		1800					2112.5	5.63
		1988	2100	-			2300		1900					2100	-0.59
		1989	2200	2450			2400		2000					2282.5	7.74
3.	20 inches CTV without remote	1986	5500	6100	7700					5900				6300	
		1987	6000	5000	7700		7000			5000				6140	-2.54
		1988	8400	5000		8400	7000	5000			6000			8300	2.01
		1989	8750	5000		8400	7000	5000			5800			8325	0.40
4.	20 inches CTV with remote	1986										7500		7500	
		1987										7500		7500	0.00
		1988											8000	8000	6.67
		1989											8000	8000	0.00

Source:Sample Survey in Delhi

set by analysing their price changes over time. To explain, we have first added specific duty to the base price, in order to arrive at the price charged before sales tax. As the sales-tax rate has stayed at 10 per cent in Delhi during the period, 1986 to 1989, the variations in sales-tax revenue per unit of TV produced and sold in Delhi are largely due to their price changes but before the sales tax is levied. Table 11 presents these changes.

4.7.3 Comparing the specific rates of duty with those of **ad valorem** rates, derived on the basis of average price of TV sets, two important findings emerge. First, the tax progressivity as implied by the specific rate structure is different from what is reflected by the **ad valorem** rates. For instance, the specific duty rate on colour TV (of screen size 20") is higher if there is remote control facility (Rs 2725) than without such facility (Rs 2462.50). However in terms of **ad valorem** rates, it is seen that colour TVs without remote control facility are charged higher duty, 39 per cent in 1988 than those with remote control, 34 per cent in the same year. This anamoly seems to have arisen because prices of the latter have increased more, from Rs 7500 in 1987 to 8000 in 1988 (about 6.7 per cent increase) than those of colour TVs without the remote control facility whose average price increased marginally by 2.6 per cent from Rs 6100 in 1987 to Rs 6300 in 1988.

4.7.4 Secondly, it was found that duty rates were not adjusted for price rise proportionately. Inadequate rise in specific duty rates have caused revenue loss, other things remaining the same. On the contrary, whenever there is a

Table 11

Comparison of TV Prices Before Excise Duty and Sales Tax

S.No	Item	Year	Average Price Before Excise Duty	% Change	Excise duty Rates		Average Price Before Sales Tax	% Change	Sales Tax Rates	S.tax rev. per unit of production	% Change
					Specific	Ad valoren (% of price)			Ad valoren		
	1	2	3	4	5	6	7	8	9	10	11
1.	Portable B&W	1986	1450		100	6.90	1550		10	155	
		1987	1450	0.00	100	6.90	1550	0.00	10	155	0.00
		1988	1400	-3.45	100	7.14	1500	-3.23	10	150	-3.23
		1989	1807	29.07	100	5.53	1907	27.13	10	190.7	27.13
2.	20 inches B&W	1986	2000		400	20.00	2400		10	240	
		1987	2113	5.65	400	18.93	2513	4.71	10	251.3	4.71
		1988	2100	-0.62	415	19.76	2515	0.00	10	251.5	0.00
		1988	2203	7.76	415	18.34	2870	6.48	10	267.0	6.48
3.	20 inches CTV without remote	1986	6300		1600	25.40	7900		10	790	
		1987	6140	-2.54	1850	30.13	7990	1.14	10	799	1.14
		1988	6300	2.61	2402.5	39.08	8762.5	9.67	10	870.25	9.67
		1988	6325	0.40	2402.5	38.93	8787.5	0.20	10	878.75	8.29
4.	20 inches CTV with remote	1986	7500		1600	21.33	9100		10	910	
		1987	7500	0.00	1850	24.67	9350	2.75	10	935	2.75
		1988	8000	6.67	2725	34.06	10725	14.71	10	1072.5	14.71
		1988	8000	0.00	2725	34.00	10725	0.00	10	1072.5	0.00

price decline for one reason or the other, revenue growth is not affected adversely, since the duty rate is specific. For instance, there was a 3.4 per cent decline in the average price of portable TV (B & W) from Rs. 1450 in 1987 to Rs 1400 in 1988, while the duty rate has remained at Rs 100 per TV set. Thus, the revenue growth per unit production was not affected adversely despite a fall in its price. However, sales tax revenue per TV set experienced a decline of 3.2 per cent in the same year for the same item. In 1989, as there was an increase in price of portable TV (B & W), excise revenue growth remained constant, while sales tax revenue per unit increased by 27.1 per cent. The difference in revenue growth was mainly caused by price variations because neither excise duty not sales tax rates on TV sets have changed in Delhi over the period, 1986 to 1989.

4.8 Other Differences

4.8.1 Apart from levels of taxation, Union excise duty and sales tax systems also differ in their tax bases. Some distinguishing features of the two levies are set out below.

S.No.	Union Excise Duty	Sales Tax
1.	Excise tax is largely specific	Sales-taxes are generally **ad valorem**
2.	Charged to domestic production of manufactured goods only, while imports are subjected to customs and countervailing duties	Charged to sale of both manufactured and unmanufactured goods of domestic origin as well as imported goods
3.	Initially, small-scale units having annual production upto Rs 7.5 lakh were fully exempted. This exemption limit was	The sales tax exemption limits vary across States, but are much lower than that of excise. SSI units except new ones, are

	Union Excise Duty	Sales Tax
	increased to Rs 15 lakh for a single product and Rs 30 lakh for multiproduct units in 1986. Furthermore, SSI units with an annual turnover upto Rs 150 lakh were entitled to concessional rates of duty on their first clearances. This entitlement was recently increased to Rs 200 lakh.	not normally accorded any other preferential sales tax treatment.
4.	While exports do not attract any excise duty, all inputs duties relating to export production are refunded to exporters in the form of duty drawback on exports after adjusting for MODVAT credit. Revenue from excise duty does not include inputs duty refunded on exports, as far as MODVAT items are concerned.	While export-sales and also one stage prior to export sales are fully exempt, tax paid on inputs used in export production is not rebated except in so far as cash compensatory support (CCS) takes care of this burden. Thus sales-tax revenue includes input taxes as well.
5.	Post manufacturing expenses (PME) are not taxable under the Excise Act.	PME is included in the invoice price and is therefore subject to sales tax. Hence this base is **ipso facto** larger than that of excise and the revenue growth of sales tax depends partly on the size of PME and is influenced by the PME growth over time.

4.8.2 To quantify the impact of imports, domestic production, and consumer prices on sales tax revenue, an econometric exercise was conducted in this study considering the time-series data of sales tax revenue after adjusting for the ARM effect for the period, 1970-71 to 1985-86. The estimated equation is reported below.

$$\ln ST = -2.1310 + 0.7292 \ln IP + 0.4787 \ln CPI + 0.4353 \ln M$$
$$(-3.717)^* \quad (2.888)^* \quad (2.016)^* \quad (4.637)^*$$

R-Square = 0.99 ; D.W = 0.9242 ; S.E = 0.086.

Where IP = Index of industrial production, 1970-71 = 100
CPI = Consumer price index, 1970-71 = 100
M = Value of India's imports.
ST = Sales tax revenue cleaned for ARM effect.

All variables have been considered in logarithmic terms so that the associated coefficients estimated above can be interpreted as elasticities. Observe that all coefficients are statistically significant at 5% level as shown by the corresponding t-value, given above in parentheses. An important finding is that the sales tax revenue increases by over 0.4 per cent with a unit percentage increase in aggregate imports. It should be noted that since not all imports are charged to sales tax, an appropriate variable to explain changes in sales tax revenue would be the resale value of imports. But, we could not use the same for lack of data. The import variable used here was the nearest proxy to quantify the impact of imports on sales tax revenue growth. The elasticities of sales tax revenue with respect to industrial production and consumer prices work out to about 0.73 and 0.48 respectively. A similar equation estimated for excise duty revenue as given below shows that the coefficient of the import variable in the equation is not significant. This, as expected, is consistent with the fact that not all imports are subject to excise duties. The excise duty elasticities of industrial production and wholesale prices were found to be 1.39 and 0.49 respectively. Obviously excise duty is more responsive than sales tax revenue to growth in industrial production,

mainly because excises are largely specific while sales tax is **ad valorem**. The underlying equation estimating the responsiveness of excise duty is given below:

$$\ln ED = -0.4858 + 0.4861 \ln WPI + 1.3938 \ln IP - 0.0948 \ln M$$
$$(-0.990) \quad (2.647)^* \quad (8.242)^* \quad (-1.020)$$

R-Square = 0.99; D.W = 1.4637; SE = 0.038

where,

ED = Excise duty revenue cleaned for ARM effect
WPI = Index of wholesale prices of manufactured goods
IP = Index of Industrial production, and
M = CIF value of imports.

4.8.3 As regards exemptions, it is well-known that India's excise duty structure embraces a plethora of duty exemptions accorded to small-scale units, exempting them either fully or on a graded scale in line with the government's policy of promoting employment and growth of the SSI sector. As is the case with many large developing economies, tiny units are totally exempt from excise tax in India for administrative reasons as well. Exemptions, by and large, are linked to the level of production in a year. A notable feature that constrains the revenue growth is that the exemption limit has been raised over time on various considerations. For instance, prior to the introduction of MODVAT scheme the limit was Rs. 7.5 lakh per annum. It was doubled to Rs. 15 lakh in March 1986, when MODVAT was introduced. It was increased further to Rs. 30 lakh in 1988. Its revenue impact could not but be adverse. The extent to which this can happen is seen from the hypothetical example given in Table 12. In this example, the revenue impact of the rise in the exemption limit (from

Rs. 7.5 lakh in 1985-86 to Rs 15 lakh in 1986-87) is examined. The revenue loss, was presumably, at least equal to the marginal contribution of units whose first value of clearances were more than Rs 7.5 lakh but did not exceed Rs. 15 lakh in 1985-86. It appears that the revenue forgone as a result of the enhancement was Rs. 50 crore out of a total of Rs. 1800 crore in that year, or approximately 2.8 per cent. An important assumption underlying this estimate is that the levels of production and revenue contribution by other excisable units remain unchanged after the exemption limit is raised. This may not be true in reality. Because of increase in the exemption limit, there may be a tendency towards fragmentation by marginal units, and as a result, the revenue loss could be more. Of course, fragmentation of units could still take place even if the exemption limit was not changed. Thus, it appears that revenue invariably suffers whenever the exemption limit is raised, although it is difficult to specify exactly by how much, in the absence of data on the distribution of SSI units and the volume of clearances.

4.8.4 As compared to excise duty, the exemption limits for sales tax registration are quite low in most States. As Table 13 indicates, in 1987-88 the minimum turnover levels for registration of dealers in the general category for sales tax purposes varied between Rs. 20,000 in Assam and Rs. 2 lakh in West Bengal. The minimum turnover limit for manufacturers also varied between Rs. 20,000 in Rajasthan and Rs. 1 lakh in Haryana in the same year. The base of sales-tax is thus generally broader than the tax base of excise duty, and since the exemption limit for sales tax has

Table 12

A Hypothetical Example of Revenue Impact of Exemptions

Excisable Value of First clearances by size-groups (Rs Lakh)	Revenue Contribution (Rs Crore)	
	When Exemption limit was Rs 7.5 Lakh in 1985-86	When Exemption limit was Rs 15 Lakh in 1986-87
0-7.5	Nil	Nil
7.5-15	50	Nil
15-30	75	75
30-75	100	100
75 & above	1575	1575
All groups	1800	1750

Revenue growth in 1986-87 over 1985-86 =1750-1800/1800=-50/1800= -0.028 (or)= -2.8%

Table 13

Minimum Turnover Level for Sales Tax Registration in Different States,1987-88

(Rs'000)

State	General	Manufacturers	Importers	Other group of dealers
Andhra Pradesh	50(a)	Nil	Nil	-
Assam	20	Nil	Nil	-
Bihar	100	Nil	Nil	-
Gujarat	50 125(b)	50	50	10(IL) 125(LD)
Harayana	100	100(d)	Nil	100(H)
Jammu & Kashmir	100	-	Nil	-
Karnataka	75	-	-	-
Kerala	50 100(c)	-	-	-
Madhya Pradesh	100	20	10	100(CS) 50(WC)
Maharastra	100	30	30	-
Orissa	50	-	-	-
Punjab	100	40(d)	Nil	40(H)
Rajasthan	100	35	25	70(CS)
Tamil Nadu	75	Nil	Nil	40(WC&LT)
Uttar Pradesh	100	50	Nil	-
West Bengal	200	50	20	200(WC) 50(POC) 100(PC)

Notes:1. a) No limit for dealers dealing in goods liable to tax at the first point
b) For goods purchased from unregistered dealers
c) For dealers exclusively dealing in goods attracting multi-point sales tax
d) When manufacturers do not import any goods
(-) Indicates that the limit was not separately specified for the group of dealers in question;

IL :Importers of lottery tickets;
H :Hotels,dhabas & restaurants;
CS :Co-operative societies;
WC :Works contracts;
LT :Dealers in lease transactions;
PC :Producer of cooked food
POC :Producer of other than cooked food
LD :Lottery dealers

Source:Bagchi(et.al,1988,p.48)

not always been raised to keep pace with inflation, sales tax has recorded a faster growth than excise duty.

4.8.5 As regards exports, excise duty is not levied on exported goods while duty suffered by inputs used in export production is either adjusted for directly under MODVAT or refunded in the form of duty drawback to exporters. Thus, the amount of input duty refunded gets accounted only partly in total revenue. In the case of sales tax, however, the tax paid on inputs used in export production is refunded as a part of CCS given to all exporters in general, while the sales tax revenue includes equivalent amount of input tax as well. It is however difficult to assess the order of magnitude of revenue involved for lack of data Thus one would not know to what extent excise and sales tax revenue series have to be adjusted to allow for this factor.

4.9 Tax Evasion and Revenue Growth

4.9.1 Tax evasion if it is widespread can severely constrain revenue growth of all taxes. In the case of excise duty, a number of evasion devices are found in practice in India as revealed by earlier studies of NIPFP and others in this regard. In particular, mention may be made of empirical studies on plastics, cotton fabrics, copper as in NIPFP (1985) and on sugar as in Shankar Acharaya (et.al 1985) which had attempted to estimate broad orders of magnitude of evasion. Excise duty evasion as proportion of actual revenue collections was found to be as much as 27 per cent for copper sheets and circles and over 47 per cent for cotton fabrics in 1978-79. Although these estimates are not

firm, evasion methods deployed by taxable units were found to be typical of products manufactured. The methods often found to be in use are as follows:

a. Undervaluation of output
b. Physical suppression of output and input
c. Misclassification of goods
d. Horizontal and vertical fragmentation of units and
e. Other misuse of small scale exemptions

4.9.2 A number of anti-evasion measures appear to have been built into the excise system from time to time. A close look at the tax structure brings out the following important features. Output produced without the aid of power has been fully exempt from excise tax. Production generated with the aid of power has also been subjected to small-scale exemptions fully or partially on a graded scale. Complete exemption of small units or those not using energy minimises revenue loss that might otherwise have occurred because of problems of administration and compliance by tiny and small units Provisions exist in the Excise Act to detect evasion by large units, which include, **inter alia** sample audit of accounts; verification of input-output ratios against actual consumption of raw materials and electricity used, as well as checks against illicit removal of goods by units from the factory under the mechanism of gate-passes pre-authenticated by departmental officers. Stricter policing is also adopted by the department in the case of mass consumption goods where evasion was found to be rampant, **viz** in tobacco products, textiles, and tyres. In such cases, the manufacturing units have been required to

take counter-signatures of the excise officer concerned before clearance of goods from the factory premises. In the case of tyres, excise staff are posted at the factory gate for the purpose of physical verification of the clearances.

4.9.3 To minimise the scope for evasion through under-valuation, the excise duty structure has been made more and more specific as is evident from the fact that about 70 per cent of total excise revenue is currently collected from specific duties.

4.9.4 However, specific rates are not a panacea for evasion, for, there are other devices for evasion e.g. physical suppression of output and inputs. By this practice, industrial units can evade excise duty, sales tax and income tax. Moreover evasion may result in under-reporting of production to authorities of National Accounts Statistics (like Central Statistical Organisation DGTD etc.,). However, if duty rates are **ad valorem**, manufacturing units need not necessarily suppress physical output for, undervaluation could take place by declaring lower prices However output suppression in quantity terms cannot be fully ruled out eventhough rates are **ad valorem**. If duties are specific both output and inputs are proportionately and necessarily suppressed in quantity terms and there would be colossal revenue losses to the exchequer on all fronts. Since specific rates could necessarily result in output suppression for evasion purposes, it is not therefore advisable to rely too much on specific rates. For solving problems of valuation, the excise department may adopt other measures of detection. For instance, cross

verification of duty evidencing documents as provided in the MODVAT credit mechanism may be strengthened. Furthermore, self-policing feature of MODVAT in itself helps to constrain the cancerous growth of duty evasion, at least at the intermediate stages of the credit chain. Thus specific rates do not seem to be necessary on intermediate products. In particular intermediate goods produced in the public sector which is believed to be less prone to evasion, may, by and large, be charged to **ad valorem** rates. This would not only improve price competition on economic grounds as discussed earlier, but also boost the revenue buoyancy substantially. It would also avoid the administrative need to adjust the specific duty rates for inflation periodically. Moreover, if the rates are **ad valorem**, revenue growth would be commensurate with the rise in administered prices.

4.9.5 Consumer goods produced in the private sector may, however, continue to be charged to specific rates, but by imposing additional checks against prices and value at which these goods are being cleared and ensuring the duty revisions for price rise periodically. As noted in the MODVAT report by NIPFP, units producing such goods are likely to escape the cross-verification at the end-stages of the credit chain, Hence, checks against value of clearance also seem to be essential inspite of specific duties. In particular, the Department should insist on these units to report the value of clearances in addition to quantity of clearances in their monthly tax returns of RT-12, although their products are charged to specific duty. On the basis of such data, the Department may help to build up a better

statistical base to facilitate effective monitoring of price changes over time for designing appropriate policy to improve the revenue growth.

4.9.6 Growth of sales tax revenue was also found to be adversely effected by evasion, as revealed in empirical studies conducted by NIPFP on sales tax systems in different states (for instance, see the West Bengal study on sales tax by Bagchi and Dass, (1987, p.26) (see Table 14). One method of evasion that is distinctly important for both excise and sales tax revenue merits mention. As explained in Chelliah and Purohit (1985), output and input are suppressed under collusion by dealers by under-reporting both quantity and sales transacted. To do this, first, an invoice is issued to the buyer by a dealer with or without making carbon copies. After the safe receipt of goods consigned along with the original invoice, the buyer destroys the invoice and suppresses his input purchases by altering the figures suitably in the invoice issued to him. He then informs the seller about the same, who, in turn, makes similar alterations in his carbon copies of the invoice and suppresses his output suitably. Thus, a chain of dubious transaction were found to take place spawning sales tax evasion on a large scale. Such transactions might particularly induce fragmentation of small-scale units whose production levels happen to be within the ceiling limits prescribed for full or partial exemption from excise duty.

Table 14
Estimates of Sales Tax Evasion in Different States

State	Period Average during	Commodities	Evasion as % of Estimated Tax Potential
1.Bihar	a)1971-72 to 1975-76	Potatoes	13.1
	b)1977-78	Automobile parts	35.6
2.Gujarat	1977-78	Groundnut	17.8 to 25.6
3.Kerala	1972-73	a)Coconut & copra	40.0
		b)Coconut oil	11.3
4.Tamil Nadu	1975-76	All commodities	9.8
	1976-77	a)Eucalyptus oil	53.2
		b)Rubber latex	78.8
	1980-81	Gur(jaggery)	33.1
5.Orissa	1985-86	Automobile parts	62.7
	1984-85	Automobile parts	63.3
	1983-84	a)Rice	93.4
		b)Wheat & wheat products	74.3
		c)Pulses	34.0
		d)Edible Oil	51.8
		e)Foot-wear	44.5
		f)Washing Soaps	56.8
		g)Hosiery	59.9
		h)Automobile parts	62.7
6.Delhi	1978-79	a)Automobile parts(GST)	82.8
		b) Automobile parts(CST)	93.9
	1977-78	a) Sanitary fittings(GST)	29.4

Sources :1) NIPFP(1981), Sales Tax System in Bihar,Somaiya Publications,New Delhi as quoted in Chelliah and Purohit(1985 ,p.140)
2) Government of Gujarat (1980), Report of the Gujarat Taxation Enquiry Commission,Gandhi Nagar, as quoted in Chelliah and Purohit(1985,p.144)
3) Government of Kerala(1976),Report of the Committee on Commodity Taxation,Trivandrum as quoted in Chelliah and Purohit(1985,p.145)
4) Chelliah and Purohit(1985,pp.152-3)
5) Chelliah and Purohit(1988,pp.100-1)
6) Bagchi(et.al 1988,pp.100-1)

4.9.7 In another notorious method dealers in some States were found to evade tax by showing the first-point sale which is taxable, as the second-point transaction which is not taxable. This is often done by the so-called `bill-trading´ under collusion between registered and unregistered dealers. In this method, the principal dealer provides a fictitious purchase bill showing that he has received the goods from a registered dealer and claims exemption on his consignments under the second-sale. He even provides details such as registered number, address and the amount of sales tax supposedly paid at the alleged first-point sale by the registered dealer. However on investigation, the first seller was found to have closed down his business and therefore not traceable at all. Thus, under the guise of `benami bill-trading´ sales tax evasion was found to be all pervasive in a number of states where sales tax is levied at the first point but not at subsequent stages. This was particularly relevant for commodities such as stainless steel chillies, oil seeds oil, oil cake and pulses. See for instance, the reports of Comptroller and Auditor General (C&AG) for the years, 1976-77 to 1980-81.

4.9.8 From the aforementioned evasion factors , it is not difficult to see that the potential growth in revenue could be much higher than the observed growth rates of both excise duty and sales tax. To what extent the potential and observed growth rates differ would depend upon the degree of tax evasion. What is, however, more important is to restrict the evasion possibilities within tolerable limits by designing suitable tax structures and enforcement mechanisms both at the Centre and in the states. What seems

to be wanting is a coordinated effort among the tax departments to plug loopholes of evasion of excise duty and sales tax.

5. Summary of Findings and Suggestions

5.1 The present study is an attempt to compare the revenue growth of excise duty with that of sales tax over the period, 1970-71 to 1988-89. Using an appropriate econometric tool ("Spline functions") it examines whether there has been a significant difference between the two. The study has also analysed the factors constraining excise revenue growth in contrast with sales tax. The main findings are given below.

5.2 Revenue growth of both excise duty and sales-tax decelerated during the reference period although the growth of sales tax revenue declined only marginally during the 1980s. The average growth rate of excise duty fell significantly from 15.6 per cent a year during the period, 1970-71 to 1974-75 to about 11.8 per cent a year during the period 1975-76 to 1979-80; whereas the growth of sales tax varied between 18.8 and 16 per cent a year on an average in these two periods Since 1980-81, both excise duty and sales tax revenues fluctuated. However, the gap between their respective growth rates narrowed considerably, from about 3.2 percentage points during the earlier period, 1970-71 to 1974-75 to 2.3 points during the recent period, 1980-81 to 1984-85. The average growth rates of both excise and sales tax almost veered round 13 6 per cent in the more recent period, 1985-86 to 1988-89.

5.3 Among the factors that might explain the divergence in the growth rate of the revenue from the two taxes the more important one is the changes in respective rate structures. Differences in rate structures can affect tax buoyancy and elasticity over time and to some extent the degree of evasion. Revenue buoyancy and elasticity measures were estimated for the time period, 1975-76 to 1985-86 and were compared with similar previous estimates obtained (by the Jha committee on indirect taxation) for the earlier period, 1963-64 to 1975-76. On a comparison it was found that the revenue buoyancy of both excise duty and sales tax declined in these two periods but the decline in buoyancy was relatively more in the case of excise duty, from 1.30 to 1.03, than of sales tax, which fell from 1.43 to 1.27. Thus, the gap between the buoyancies of the two taxes widened in the period, 1975-76 to 1985-86.

5.4 As regards tax elasticities, an interesting finding that emerges is that sales tax elasticity declined from 1.15 to 1.12, while the excise elasticity slightly increased from 0.75 to 0.76. Thus, over the time, it appears that growth of sales tax revenue has become less responsive to the national income probably because the incidence of sales tax rates moved towards the first point levy in many States, which, thereby leaves a larger portion of value-added in the later stages of sales untaxed.

5.5 The question of improving revenue buoyancy of excise duty was also examined having regard to its duty structure of specific rates, small-scale exemptions and evasion. It came out clearly that one of the main reasons

for low buoyancy of excise duty is the increasing shift in government's policy towards specific rates without adequate rate adjustment for inflation. Revenue loss attributable to inadequate rate adjustment for specific duties works out to over Rs. 4900 crore by 1988-89. However, in the case of some specific-rated commodities whose rates were revised upwards periodically, **viz.**, cigarettes etc., the buoyancy was found to be relatively high. Thus, it would seem that one of the main causes of low excise buoyancy is the specific duty structures.

5.6 To improve the revenue productivity of excise duties, it is suggested that wherever possible, specific duties be replaced by **ad valorem** rates for intermediate products and particularly those produced by public sector enterprises. It would not only avoid cumbersome upward adjustment in duty rates periodically, but also encourage price competition among firms in industry. It has been contended that specific rates tend to place heavier tax burden on units that may be more price competitive than other units who are inefficient and cannot reduce price due to high costs or otherwise. Although, specific rates minimise valuation problems faced by the Revenue Department, possibilities to evade sales-tax and income-tax still exist in dubious methods such as suppression of output and inputs etc., Thus, specific taxes are not panacea for evasion. Increasing reliance of about 70 per cent of total excise revenue being collected from specific-rated goods does not seem to be desirable for the future.

5.7 Specific rates may thus be levied on a selective basis, say, on finished consumer goods that are cleared at the end-stages of the MODVAT credit chain. More importantly, a few **ad valorem** rates may also be used at final stage of production to keep in line with the objective of rationalisation of tax structure.. Evasion due to under-valuation at the stage of finished products may be contained within reasonable limits, if the system of cross-verification of duty evidencing documents is improved under the MODVAT scheme.

5.8 Increasing trends in small-scale exemptions also seem to have adversely effected the revenue buoyancy of excise duty. As the exemption limit was raised periodically, revenue loss occurred on account of the exclusion of such marginal units from the tax base, which, otherwise, would have contributed to the exchequer. As compared to excise, exemptions seem to be less extensive in the sales tax systems and this partly explains why sales tax buoyancy is higher than that of excise duty.

5.9 As in the case of excise duty, evasion seems to be widespread in sales tax also, as revealed in several of the NIPFP studies. Given the prevalence of evasion, the potential growth of sales tax revenue could be much higher than the observed growth rate. If the degree of evasion is believed to be higher in the case of sales tax than excise duty, the potential growth of sales tax would be still higher than that from excise duty. This issue needs to be investigated further in detail. However, what seems to be more urgent is an integrated approach to curb evasion by

various means, such as intensifying the coordination efforts among the tax enforcement wings of the Revenue Departments both at the Centre and States. This may go a long way to improve the revenue mobilisation of all taxes.

5.10 It must be added that a detailed statewise comparison of excise duty and sales tax revenue could not be attempted in this study because of weak data base at the state level. Some important data deficiencies have been pointed out in the report. It is suggested that efforts be made to improve the information system for monitoring inter-state movement of goods not only to take appropriate policy decisions regarding the fixation of CST rates by the Center but also to build up a stronger data base on imports and exports at the state level for the purpose of statistical analysis and to help identify factors responsible for revenue losses both in central excise and sales tax.

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STATISTICAL APPENDIX

Statistical Appendix

1. Introduction

This statistical appendix comprises two main sections. In section 2, we explain the methodology applied to estimate changes in average growth rates of revenue in different time intervals during the overall period, 1970-71 to 1988-89, and the results of estimated growth equations. In section 3, we substantiate the estimated equations of buoyancy and elasticity of revenue.

2. Estimation of Revenue Growth Rates

2.1 The methodology used in this study to quantify the changes in average growth rates of excise and sales tax revenues in different time periods closely follows the method of estimating 'spline functions' or 'piecewise linear functions' as given in Johnston (1985). The application of spline functions would be relevant, if the observed time-series of the variable in question has a changing pattern of trends during sub-intervals of the overall time-period. For instance, growth rate of excise revenue differed significantly during the plan periods, or say, before and after the introduction of a major policy change in the tax structure, viz .,introduction of the tariff item 68 in the Excise Tariff Scheme in the 1975-76 Budget, etc. In order to capture such changes in growth trend during different points of time and also to test the statistical significance of their differences, spline functions are used.

2.2 To apply the methodology of spline functions, first of all, we have sub-divided the overall time period, 1970-71 to 1987-88 into four components.

a. 1970-71 to 1974-75
b. 1975-76 to 1979-80
c. 1980-81 to 1984-85 (6th Plan period)
d. 1985-86 to 1988-89

Assuming that growth trend of excise revenue has differed in these sub-periods, the revenue growth is hypothesised to follow the model as shown below:-

(1) $\ln X_t = a_1 + b_1 t$, t = 1970-71 to 1974-75
(2) $\ln X_t = a_2 + b_2 t$, t = 1975-76 to 1979-80
(3) $\ln X_t = a_3 + b_3 t$, t = 1980-81 to 1984-85
(4) $\ln X_t = a_4 + b_4 t$, t = 1985-86 to 1988-89

where, X is the revenue of excise duty and the parameters, b's indicate revenue growth rates in different sub-periods.

2.3 To estimate growth rates at the point of change, i.e., at kinks in the overall time period, a single 'spline function' is obtained as shown below by reparameterizing the four equations given above.

(5) $\ln X_t = a_1 + c_0 t_1 + c_1 t_2 + c_2 t_3 + c_3 t_4$

where, $b_1 = c_0$

$b_2 = c_0 + c_1$; $a_2 = a_1 - c_1 \cdot k$

$b_3 = c_0 + c_1 + c_2$; $a_3 = a_2 - c_2 \cdot l$

$b_4 = c_0 + c_1 + c_2 + c_3$; $a_4 = a_3 - c_3 \cdot m$

$t_1 = t$ from 1970-71 to 1987-88

$$t_2 = \begin{cases} 0, & \text{if } t < k \\ t-a & \text{if } t > k \end{cases}$$

$$t_3 = \begin{cases} 0, & \text{if } t < l \\ t-b & \text{if } t > l \end{cases}$$

$$t_4 = \begin{cases} 0 & \text{if } t < m \\ t-c & \text{if } t > m \end{cases}$$

The values taken by 't' are defined by t=1 for 1970-71, 2 for 1971-72 and so on till t=19 for 1988-89. Thus, the points where growth rates are hypothesised to differ are :a =5 (1974-75), b=10 (1979-80) and c =15 (1984-85).

2.4 Testing the significance of c_0 or b_1 implies asking whether there was a positive (or negative) trend in the first period, 1970-71 to 1974-75. Testing the significance of c_1 implies testing for the significance of difference in growth rates as between the first and second periods. Similarly, appropriate exclusion tests can also be conducted to test whether or not revenue growth rates increased or

declined significantly in the most recent period than before.

2.5 The growth rates of excise duty, sales tax and revenues from all indirect taxes were estimated by Ordinary Least Squares methods by fitting their revenue data to the equation (5) given before. The estimated revenue growth equations are given in Table A.1. In this table, it may be noted that the statistical fits of all three equations are good, as indicated by high values of respective R-Squares and the F-statistic. Further, there does not seem to be any problem of serial correlation of errors. Thus, the estimated coefficients may be considered to be unbiased and acceptable for the purpose of revenue analysis.

2.6 Considering the excise duty equation from Table A.1, the growth rate was estimated to be 15.6 per cent a year during the period 1970-71 to 1974-75, but declined to 11.8 per cent a year in the next period, 1975-76 to 1979-80. The difference of 3.79 percentage points in the average growth rates as between these two periods was found to be statistically significant, as shown by a high t-value given in parentheses corresponding to the variable T_2 in col.2 of Table A.1. Subsequently, the excise revenue does not seem to have experienced any significant change in its average growth rate, because the coefficients of variables T_3 and T_4 were not statistically significant. The sign of T_3 was, however positive indicating an upward trend in excise duty revenue in the 6th Plan period, whereas, the sign of T_4 was negative showing a downward trend in excise revenue during the current Plan period. Since the estimated coefficients of T_2 to T_4 give only the successive differences during the relevant sub-periods, the average growth rates shown in Table 2 of the text were obtained by adding them up using the equivalence relations given under equation (5).

2.7 Column 3 of Table A.1 gives estimated growth rates of sales tax revenue at the all-India level. By contrast, the revenue growth of sales tax was estimated to be higher than excise duty, at 18.8 per cent a year on the average during the period, 1970-71 to 1974-75. Although the time coefficients for the subsequent sub-periods were estimated to be negative indicating a downward trend in revenue, but the differnces in growth rates were not statistically significant. Furthermore, the revenue decline in sales tax was only marginal in the later periods.

2.8 Column 4 of Table A.1 shows estimated revenue growth rates of all indirect taxes, together. The growth rate which was estimated to be about 17 per cent a year on the average during 1970-71 to 1974-75, declined significantly, like excise duty, by 3.27 percentage points in the next period 1975-76 to 1979-80. In the 6th Plan period, the average growth rate of all indirect taxes was found to go up marginally, but then again decreased in the 7th Plan period. The difference was however, not statistically significant as shown by a low value of corresponding t-ratios of coefficients T_3 and T_4 in colum 4 of Table A.1.

3 Estimation of Buoyancy and Elasticity

3.1 In the text Table 6, we have provided estimates of buoyancy and elasticities of excise duty and sales tax revenues at the all-India level for the period, 1975-76to 1985-86. This section substantiates as to how these estimates were obtained. As is the standard practice, buoyancy estimates were obtained by regressing revenue series on the national income (NNP) at current prices. The estimated equations for excise duty and sales tax revenue are as follows.

Excise duty buoyancy

A.1 $\ln X_t = 2.9491 + 1.0062 \ln NNP$
$(-6.251)^* \quad (24.955)^*$

R-Square = 0.99, F (1,9)= 622.8

D.W = 2.050, S.E = 0.051

Sales-tax buoyancy

A.2 $\ln X_t = -6.1094 + 1.234 \ln NNP$
$(-19.306)^* \quad (45.626)^*$

R-Square = 0.996, F(1,9) = 2081.7

D.W = 2.552, S.E = 0.034

In the above equations, X stands for actual revenue. Figures given in parentheses are t-values.

3.2 To derive tax elasticities, we first need revenue data adjusted for ARM effect on account of discretionary changes by the government from time to time. In otherwords, we would need 'cleaned series' of revenue data for excise duty as well as sales tax for the period, 1975-76 to 1985-86. To obtain 'cleaned series', two important methods have been suggested in the literature **viz.**, Prest-Mansfield method and Divisia method. The Jha committee on indirect taxation had used the Prest-Mansfield method to derive these series for the period, 1963-64 to 1974-75.To compare their estimates with ours, we have also adopted the same method for the later period, 1975-76 to 1985-86. For methodological details see Chelliah and Shyam Nath (1977). The actual and cleaned revenue series are given in Table A.2. Using these data, we have estimated the tax elasticities of excise duty and sales tax revenue by regressing 'cleaned series' on NNP. The estimated equations are as follows.

Excise duty elasticity

A.3 $\ln RX_t$ = -.5420 + .7633 ln NNP
(-.6227) (10.261)

R-Square = 0.968; F (1, 9) = 119.5
D.W = 1.818; S.E = 0.063

Sales tax elasticity

A.4 $\ln RX_t$ = -4 9213 + 1.1210 ln NNP
(-15.546) (41.432)

R-Square = 0.995; F (1, 9) = 1716.6

D.W = 2.437; S.E = .034

In the above equations, RX stands for 'cleaned' revenue series. Figures given in parentheses are t-values.

Table A.1

Estimated Spline Functions of Revenue Growth, 1970-71 to 1988-89

Independent variables	Dependent Variables (in logarithms)		
	Excise duty	Sales tax	All indirect taxes
Constant	7.3034	6.4184	8.0425
	(161.681)*	(87.303)*	(309.137)*
T_1	.1557	.1884	.1699
	(12.585)*	(9.372)*	(23.847)*
T_2	-.0379	-.0285	-.0327
	(-2.012)*	(-.911)	(-3.015)*
T_3	0.0144	-.0048	.0167
	(.937)	(-.178)	(1.877)
T_4	-.0203	-.0184	-.0055
	(-1.077)	(-.588)	(-.507)
Statistics			
R-Square	.9969	.9972	.999
F(4,14	1137.5	922.6	4701.1
D.W	1.9854	1.4229	1.9553
S.E	0.0452	.0562	.0260

Note: t-ratios are given in parentheses. '*' mark shows where indicated, coefficients are statistically significant at 5% level. The variables T_1 to T_4 are the same as defined earlier in equation (5).

Table A.2

Union Excise Duty, Sales Tax Revenue (Actual and Cleaned Series) and NNP at Current Prices
1975-76 to 1985-86

Rs Crore

Year	Union Excise Duty		Sales Tax		NNP at current prices
	Actual	Cleaned	Actual	Cleaned	
1	2	3	4	5	6
1975-76	3844.78	2838.64	2018.42	1866.93	66924
1976-77	4221.45	3165.40	2363.12	2156.94	75706
1977-78	4447.51	3297.08	2515.09	2292.96	81321
1978-79	5341.35	3809.52	2887.74	2624.64	88313
1979-80	6011.09	3769.44	3346.30	2975.58	105743
1980-81	6500.02	3983.43	4051.56	3594.59	120966
1981-82	7420.74	4530.26	5063.08	4405.97	133807
1982-83	8058.50	4801.36	5718.19	4837.27	158265
1983-84	10221.75	5803.15	6507.09	5468.22	174018
1984-85	11150.84	6558.44	7326.02	6027.89	195707
1985-86	12956.00	7435.10	8742.18	7022.13	216639

Source: For Actual series, Indian Economic Statistics, Department of Economic Affairs, Ministry of Finance (Various issues)

Note: Cleaned series were derived using the actual series and ARM data and by applying the same methodology as used in Chelliah and Shyam Nath (1977), "Buoyancy and Elasticity of Important State Indirect Taxes (1960-61 to 1974-75)", Mimeo, NIPFP, New Delhi.