# Impact of Tax Policies on Location of Industries

In the previous chapter we have analysed the structure of State and local taxes in the constituent parts of the NCR and have shown that there are variations in the rate structure of most of the taxes. In this chapter, we shall first present an analysis of the industrial structure of the constituent parts of the NCR. This is followed by an empirical analysis of the factors that affect the location of industry in the region.

Our analysis is supported by data for Meerut and Bulandshahar districts in Uttar Pradesh; Rohtak, Gurgaon, Sonepat, Karnal and Mahendragarh districts in Haryana; Alwar district in Rajasthan; and the Union Territory of Delhi. The analysis of the industrial structure is presented for the period 1979 to 1984 in terms of major groups of industries. The data source is the Annual Survey of Industries.[1]

## Industrial Structure of the NCR Region

The number of registered factories in the NCR

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[1]As the district-wise data are not published, these have specifically been obtained from the computer tapes of the Central Statistical Organisation.

## Table 4.1

## Number of Factories in Districts of NCR by Major Groups
## (During 1979 and 1984)

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 20-21 | 40 (40.0) | 68 (44.74) | 110 | 117 | 30 (26.79) | 26 (17.93) | 4 (1983) (13.33) | 4 (9.30) | 4 (16.00) | 12 (26.09) |
| 22 | 13 (13.0) | 13 (8.55) | | | | | | | 4 | |
| 23 | | | | | 47 (41.96) | 59 (40.69) | | | 4 (16.00) | 7 (15.22) |
| 24 | | | | | | | N.A. | 4 (1983) (13.33) | | |
| 26 | | | | | | | | | | |

(Contd.....)

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 27 | 7 (1980) (6.09) | 4 (2.63) | | | | | | | 4 (1982) (10.81) | 4 (1984) (8.70) |
| 28 | 6 (1980) (5.22) | 3 (1.97) | | | 5 (1983) (3.36) | 3 (1984) (2.07) | | | - | - |
| 29 | | | | | | | | | | |
| 30 | | | | | 6 (1980) (3.70) | 4 (2.76) | | | 2 | 4 (8.70) |
| 31 | 4 (4.0) | 5 (3.29) | | | 6 (1980) (3.70) | 8 (5.52) | 3 (1980) (15.00) | 3 (1983) (10.00) | 2 (13.04) | 1 (8.62) |
| 32 | - | 26 (1984) (17.11) | (19.33) | 29 (2.01) | 3 (1983) (2.07) | 3 | N.A. (.15) | 20 (16.00) | 4 (17.39) | 8 |

(Contd....)

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 33 | 13 | 4 | | | 13 | 30 | 7 (1980) | 10 | 2 (1981) | 3 |
| | (13.00) | (2.63) | | | (16.96) | (20.69) | (35) | (3.52) | (20.69) | (6.52) |
| 34 | 9 | 7 | | | 4 | 4 (1980) | 3 (1982) | 3 | | |
| | (9.00) | (4.65) | | | (3.57) | - | (20.00) | (.30) | | |
| 35 | 7 | 14 | | | 4 | 6 | N.A. | 4 (1983) | 2 (1982) | 4 |
| | (7.00) | (9.21) | | | (3.57) | (414) | - | (13.33) | (10.81) | (8.70) |
| 36 | 4 | 4 | | | | | | | | |
| | (4.00) | (2.63) | | | | | | | | |
| 37 | 3 (1981) | 4 (1982) | | | | | | | | |
| | (3.12) | (3.17) | | | | | | | | |
| Total | 100 | 152 | 113 | 150 | 112 | 145 | 10 | 43 | 25 | 46 |
| Growth Rate | 8.61 | | 6.08 | | 2.99 | | 27.07 | | 13.61 | |

Table 4.1 (Contd.)

| District industry group code | Karnal | | Mahendragarh | | Alwar | | Delhi | | N.C.R. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 20-21 | 14 (16.28) | 8 (6.25) | 35 (64.31) | 62 (54.39) | 12 (30.77) | 22 (14.57) | 109 (3.95) | 186 (5.31) | 354 (10.74) | 505 (12.22) |
| 22 | | | | | 3 (1980) (5.77) | 3 (1.99) | 15 (.54) | 22 (.69) | 28 (.85) | 28 (.92) |
| 23 | 6 (6.98) | 9 (7.03) | | | | | 32 (1.16) | 21 (.66) | 89 (2.70) | 96 (32.00) |
| 24 | | | | | 4 (1981) (5.26) | 13 (8.61) | 32 (1.16) | 43 (1.34) | 32 (.97) | 60 (1.45) |
| 26 | | | | | | | 335 (12.15) | 402 (12.55) | 335 (10.16) | 402 (9.73) |
| 27 | | | | | | | 42 (1.52) | 34 (1.06) | 42 (1.27) | 42 (1.02) |

| District industry group code | Karnal | | Mahendragarh | | Alwar | | Delhi | | N.C.R. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 28 | N.A. | 3 (1982) (3.09) | 3 (1981) (4.55) | 3 (2.63) | 5 (1980) (8.62) | 7 (4.64) | 267 (9.68) | 237 (7.40) | 267 (8.10) | 253 (6.12) |
| 29 | | | | | 3 (1981) (3.09) | 3 (1983) (3.30) | 17 (.62) | 8 (.25) | 17 (.52) | 8 (.19) |
| 30 | 4 (4.65) | 4 (3.12) | | | 5 (1983) (5.49) | 5 (3.31) | 193 (7.00) | 243 (7.59) | 197 (5.98) | 256 (6.20) |
| 31 | 9 (10.47) | 16 (12.50) | 5 (9.26) | 14 (12.28) | 7 (17.95) | 31 (20.53) | 99 (3.59) | 135 (4.21) | 124 (3.76) | 209 (506) |
| 32 | 5 (5.81) | 29 (22.66) | | | 9 (23.08) | 27 (17.88) | 44 (1.60) | 49 (1.84) | 62 (1.88) | 226 (5.47) |
| 33 | 11 (12.79) | 21 (16.41) | 6 (1981) (9.09) | 6 (5.26) | 5 (12.82) | 19 (12.58) | 185 (6.71) | 193 (6.03) | 233 (7.07) | 286 (6.92) |

| District industry group code | Karnal | | Mahendragarh | | Alwar | | Delhi | | N.C.R. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 34 | 14 | 10 | 3 | - | 3 (1980) | 3 | 322 | 311 | 352 | 334 |
| | (16.28) | (7.81) | (5.56) | | (5.17) | (1.99) | (11.68) | (9.71) | (10.68) | (8.08) |
| 35 | 12 | 13 | 5 | 4 | 6 (1982) | 6 | 290 | 287 | 318 | 334 |
| | (13.95) | (10.16) | (9.26) | (3.51) | (5.56) | (3.97) | (10.52) | (8.96) | (9.65) | (8.08) |
| 36 | 4 (1980) | 6 | | | 4 (1982) | 7 | 187 | 370 | 191 | 387 |
| | (3.96) | (4.69) | | | (5.26) | (4.64) | (6.78) | (11.55) | (5.79) | (9.37) |
| 37 | - | - | | | 3 (1980) | 5 | 263 | 264 | 268 | 275 |
| | (5.81) | (4.69) | | | (5.17) | (3.31) | (9.54) | (8.24) | (8.13) | (6.66) |
| Total | 86 | 128 | 54 | 114 | 39 | 151 | 2757 | 3203 | 3296 | 4132 |
| Growth Rate Per cent per annum | 8.47 | | 17.49 | | 27.38 | | 0.89 | | 2.66 | |

**Note:** Name of the industry with reference to code number is given in Annexure A.IV.1.

increased from 3,296 in 1979 to 4,132 in 1984 (Table 4.1). Similarly, the capital employed, rose from Rs. 39,850 lakh to Rs 64,340 lakh during the period at a growth rate of 10.95 per cent per annum and the total industrial employment in the region went up from 1,46,000 to 2,20,000 at a growth rate of 7.34 per cent per annum. The total output in the region went up from Rs 1,18,224.71 lakh to Rs 3,32,798.54 lakh, indicating a growth rate of 20.94 per cent per annum. These figures point to the substantial growth of industries in the NCR. An industry-wise analysis of the constituent districts is attempted in the following paragraphs.

The industry-wise distribution, as presented in Table 4.2, shows that the maximum output is contributed by the food and beverages industry. In 1979, the share of output of this industry was 21.51 per cent which increased to 38.88 per cent in 1984, showing a growth rate of 30.6 per cent per annum. The chemical and chemical products industry followed, with a 9.73 per cent share in output in 1979. In 1984, the second place was taken by non-metallic mineral products with 10.32 per cent share. When the industries are categorised on the basis of output share, the first category incorporates those industries which contribute upto 3 per cent share in output. Industries falling in this category in 1979 were that of tobacco, footwear, paper and paper products, leather products, rubber products, petroleum products, basic metals, and electrical machinery. The ranking of this group of industries remained unchanged in 1984. The second category comprises industries with an output share of 3 to 5 per cent; in 1979 these were metal products, printing, and non-electrical machinery. The last item was displaced in 1984 by textiles industry. Food and beverages, textiles, furniture, chemical and non-metallic industries constituted the third category in the year 1979, which contributed more than 5 per cent

## Table 4.2

## Output in the Districts of NCR by Major Groups
## (During 1979 and 1984)

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 20-21 | 190460 | 410281 | 184627 | 358588 | 230331 | | 3453 (1983) | 7373699 | 19087 | 95174 |
| | (25.1) | (33.3) | (95.86) | (83.74) | (27.17) | (29.09) | 1.40) | (97.94) | (4.11) | (11.84) |
| 22 | 4915 | 12969 | | | | | | | | |
| | (0.6) | (1.1) | | | | | | | | |
| 23 | | | | | 253048 | 568253 | | | 143513 | 150547 |
| | | | | | (29.85) | (20.66) | | | (30.92) | (18.72) |
| 24 | | | | | | | N.A. | 129148 (1983) | 326249 (1982) | 315077 |
| | | | | | | | | (53.15) | (39.19) | |

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 26 | | | | | | | | | | |
| 27 | 5606 (1980) (0.63) | 2866 (0.2) | | | | | | | 18 (1982) (0.00) | 50 (0.01) |
| 28 | 1843 (1980) (0.21) | 599 (0.1) | | | 1284 (1983) (0.06) | 1138 (1984) (0.04) | | | | |
| 29 | | | | | | | | | | |
| 30 | | | | | 5240 (1980) (0.45) | 58491 (2.13) | | | | |
| 31 | 424695 (54.3) | 677091 (54.9) | | | 17738 (1980) (1.52) | 12943 (1980) (.47) | 9922 (1983) (6.67) | 29613 (1980) (12.08) | 59626 (10.89) | 67892 |
| 32 | - | 19478 (1.6) | | 8182 (1.91) | 2601(83) (.12) | 3248 (.12) | N.A. | 6914 (0.05) | 1462 (0.32) | 152110 (18.4) |

(Contd....)

| District industry group code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 33 | 6139 (0.8) | 3864 (0.3) | | | 352958 (41.63) | 1300864 (47.30) | 48400 (32.55) | 72320 (.96) | 104595 (81) (17.68) | 69681 (8.67) |
| 34 | 30252 (3.9) | 21941 (1.8) | | | 6871 (.81) | N.A. | 6317(82) (0.52) | 4290 (.06) | | |
| 35 | 7196 (0.9) | 15879 (1.3) | | | 671 (.08) | 2470 (.09) | N.A. - | 1106(83) (0.45) | 1656(82) (0.27) | 1837 (0.23) |
| 36 | 1181 (0.2) | 1956 (0.2) | | | | | | | | |
| 37 | 46511(81) (5.40) | 54988(82) (4.92) | | | | | | | | |
| Total | 782576 (6.6) | 1232874 (3.70) | 192490 | 428197 | 847833 (7.17) | 2750317 (8.26) | 31491 | 7528797 (22.62) | 464090 (4.00) | 804062 (2.42) |
| Growth Rate Per cent per annum | 9.21 | | 23.05 | | 25.53 | | 127.39 | | 12.97 | |

(Contd....)

Table 4.2 (Contd.)

| District industry group code | Karnal | | Mahendragarh | | Alwar | | Delhi | | N.C.R. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 20-21 | 69971 (13.79) | 166018 (13.90) | 206241 (89.22) | 585381 (85.66) | (8.73) | 168156 (13.28) | 1621862 (18.82) | 3069500 (17.49) | 2542618 (21.51) | 12938865 (38.88) |
| 22 | | | | | 3483 (1980) (1.10) | 27595 (2.29) | 159136 (1.85) | 420200 (2.39) | 164051 (1.39) | 460764 (1.38) |
| 23 | 62338 (12.29) | 82965 (6.95) | | | | | 548748 (6.37) | 720100 (4.10) | 1007647 (8.52) | 1521865 (4.57) |
| 24 | | | | | 164634 (1981) (31.72) | 406341 (33.60) | 12601 (.15) | 304300 (1.73) | 12601 (.11) | 709641 (2.13) |
| 26 | | | | | | | 1037330 (12.03) | 1762700 (10.05) | 1037330 (8.77) | 1762700 (5.30) |
| 27 | | | | | | | 23967 (.2?) | 73600 (.42) | 23967 (.20) | 76516 (.23) |

(Contd....)

| District industry group code | Karnal 1979 | Karnal 1984 | Mahendragarh 1979 | Mahendragarh 1984 | Alwar 1979 | Alwar 1984 | Delhi 1979 | Delhi 1984 | N.C.R. 1979 | N.C.R. 1984 |
|---|---|---|---|---|---|---|---|---|---|---|
| 28 | N.A. | 13895 (1980) (1.59) | 11907 (1981) (3.29) | 2409 (.41) | 1754 (1980) (0.50) | 13244 (1.10) | 436591 (5.06) | 983200 (5.60) | 436591 (3.69) | 1000590 (3.01) |
| 29 | | | | | 21063 (1981) (4.06) | 3356 (1983) (0.31) | 55663 (.65) | 50400 (.29) | 55663 (.47) | 50400 (.15) |
| 30 | 3805 (0.75) | 3735 (0.31) | | | 42069 (1983) (3.92) | 49782 (4.13) | 229046 (2.66) | 753200 (4.29) | 232851 (1.97) | 665208 (2.60) |
| 31 | 11432 (2.25) | 78636 (6.59) | 17885 (7.74) | 63519 (10.77) | 16488 (11.41) | 157191 (13.03) | 697552 (8.09) | 1877700 (10.70) | 1150137 (9.73) | 2805703 (8.43) |
| 32 | 152685 (30.05) | 357724 (29.96) | | | 7848 (5.44) | 66878 (5.54) | 75944 (.88) | 139900 (.80) | 237989 (.86) | 754434 (1.33) |
| 33 | 148031 (29.13) | 348723 (29.21) | 3304 (1.02) | 54 (0.88) | 48024 (33.29) | 212274 (17.60) | 529659 (6.14) | 1717400 (9.79) | 941607 (7.96) | 3436085 (10.32) |

(Contd.....)

| District industry group code | Karnal | | Mahendragarh | | Alwar | | Delhi | | N.C.R. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 | 1979 | 1984 |
| 34 | 25755 | 51697 | 77 | N.A. | 7659 (1980) | 32521 | 286333 | 627200 | 351214 | 737649 |
| | (5.07) | (4.33) | (.98) | - | (2.19) | (2.70) | (3.32) | (3.57) | (2.97) | (2.22) |
| 35 | 18403 | 24589 | 77 | 86 | 8472 | 17857 | 438693 | 933800 | 467733 | 1004910 |
| | (3.62) | (2.06) | (1.20) | (0.93) | (0.89) | (1.48) | (5.09) | (5.34) | (3.96) | (3.02) |
| 36 | 808 (1980) | 2092 | | | 7533 (1981) | 22611 | 502678 | 2278100 | 583259 | 2304195 |
| | (0.13) | (0.18) | | | (3.45) | (1.87) | (6.75) | (12.98) | (4.93) | (6.92) |
| 37 | 8010 | 4494 | | | 14190(80) | 33029 | 323888 | 577900 | 331898 | 615423 |
| | (1.58) | (0.38) | | | (4.05) | (2.74) | (3.76) | (3.29) | (2.81) | (1.85) |
| Total | 508159 | 1194116 | 231168 | 589954 (1984) | 144254 | 1206337 | 8620410 | 17545200 | 11822471 | 33279854 |
| Growth Rate | 22.67 | | 23.60 | | 51.70 | | 17.95 | | 20.94 | |

**Notes:** Figures in the parenthesis indicate per cent to total output.
Name of the industry with reference to code number is given in Annexure A.4.1.

*Table 4.3*

## Productive Capital and Employment in the NCR (During 1979 and 1984)

| Variables / Districts | Productive capital | | Employment | |
|---|---|---|---|---|
| | 1979 | 1984 | 1979 | 1984 |
| Meerut | 370789 | 487148 | 14465 | 17263 |
| | (6.23) | (4.39) | (7.99) | (7.87) |
| Bulandshahar | 48215 | 182026 | 8999 | 10500 |
| | (0.81) | (1.67) | (4.99) | (4.79 |
| Rohtak | 181958 | 409214 | 6926 | 9739 |
| | (3.06) | (3.75) | (3.82) | (4.44) |
| Sonepat | 162884 | 218599 | 455 | 3065 |
| | (2.74) | (2.00) | (0.25) | (1.40) |
| Gurgaon | 69129 | 948194 | 6462 | 7368 |
| | (2.00) | (8.70) | (3.67) | (3.36) |
| Karnal | 165981 | 409893 | 5715 | 8773 |
| | (2.80) | (3.80) | (3.16) | (4.00) |
| Mohindergarh | 39540 | 95396 | 1619 | 6388 |
| | (0.66) | (0.97) | (.89) | (2.91) |
| Alwar | 140909 | 1068179 | 1727 | 11573 |
| | (2.37) | (9.87) | (.95) | (5.23) |
| Delhi | 1766718 | 7017600 | 521702 | 1037460 |
| | (79.33) | (64.82) | (74.40) | (65.94) |
| N.C.R. (Total) | 5950957 | 10902813 | 131111 | 219263 |
| | (100) | (100) | (100) | (100) |

**Note:**   Figures within parenthesis indicate district proportion to the total of the NCR.

to the total industrial output. In 1984 non-electrical machinery industry joined this group displacing textiles industry. Thus, during 1979 to 1984, there were only a few important changes in the industrial structure from the point of view of share in total output. The share of textiles, furniture, and leather industries showed a decline, while food and beverages, footwear, petroleum, non-metallic mineral and non-electrical machinery witnessed an increase.

In respect of employment provided (Table 4.3), the food and beverages industry ranked first over the five year period 1979-84, its share increasing from 10.74 per cent to 12.22 per cent. On the basis of the proportion of employment provided by each industry, the first group comprises industries accounting for upto 5 per cent share of employment. These industries are tobacco, footwear, chemicals, textiles, paper, petroleum and leather and fur products. Petroleum industry made a significant improvement in its share of employment from 1.88 per cent in 1979 to 5.47 per cent in 1984. The share of tobacco, footwear and leather and fur products industries was insignificant, each industry accounting for less than one per cent of the total. The second group of industries with 5 to 8 per cent share includes rubber, printing and non-metallic and non-electrical machinery. Non-electrical machinery industry's share increased significantly from 5.79 per cent in 1979 to 9.37 per cent in 1984, and the rubber industry too showed an encouraging increase in terms of employment provided. The third group of industries, raising more than 8 per cent share of employment, are food, furniture, basic metals, metal products and electrical machinery.

**Industrial Structure of the NCR States**

The industrial structure of the NCR shows uneven development of the constituent States. The Union

Territory of Delhi, as the hub of the NCR, continues to exercise strong gravitational pull on industrial activity in the neighbouring areas. A brief review of the industrial structure of the constituent States, for the period 1979-84, is presented here.

*Delhi*

Delhi has witnessed the maximum industrialisation in the NCR. The number of factories went up from 2,757 in 1979 to 3,203 in 1984. Productive capital increased from Rs 3,243.9 million to Rs 4,286.5 million with a growth rate of 6.39 per cent per annum during the same period. The total number of industrial workers increased from 106,400 in 1979 to 158,000 in 1984, recording a growth rate of 6.12 per cent per annum. Total industrial output has increased from Rs 7,059.8 million to Rs 17,545.2 million during the same period, indicating an annual growth rate of 17.94 per cent. Thus, in 1979 around 73 per cent of industrial output of the NCR was contributed by Delhi alone. This, however, declined to 69.66 per cent in 1983.[2]

Industry-wise distribution of the industrial sector in Delhi shows that the share of food and beverages industry is quite significant. The output share of this industry was 18.82 per cent in 1979 and 17.49 per cent in 1984. Among the other industries, a major contribution came from furniture, chemical products, and non-metallic mineral industries. The first two of these contributed more than 8 per cent in both 1979 and 1984 but the non-metallic mineral industry joined this group in 1984 only. Industries contributing less than 3 per cent share in 1979 were footwear, paper, leather, rubber and petroleum. The contribution of the rubber industry

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[2]As there is some discrepency in the aggregation of output data for the year 1984, we have confined our analysis in relation to share of output in the NCR, by district, upto the year 1983.

went up from 2.66 per cent in 1979 to 4.29 per cent in 1984, and of footwear from 0.15 to 1.73 per cent but declined in the case of leather product industry. The basic metal and electrical machinery industries were contributing a share of 3 to 5 per cent in both 1979 and 1984. The textile industry has joined this category because its share declined from 6.37 per cent in 1979 to 4.10 per cent in 1984, whereas the rubber industry joined this group by virtue of an increase in its share from 2.66 to 4.24 per cent. The third group comprises all those industries which contributed between 5 and 8 per cent to the total output: printing, non-metallic mineral, basic metal and non-electrical machinery.

### NCR Districts in Haryana

The districts of the State of Haryana, *viz.*, Rohtak, Sonepat, Gurgaon, Karnal and Mahendragarh contributed roughly 17.62 per cent of the industrial output in 1979 and 38.66 per cent in 1984. Of these districts, Rohtak and Karnal led the others, with the former contributing 7.17 per cent and 8.26 per cent of the output in 1979 and 1984, respectively. Among industries, the food industry accounted for 21.51 per cent in 1979 and 38.8 per cent in 1984. The textile industry's share was 29 per cent in 1979 but it declined to 20.66 per cent in 1984. The industry provides more than half of the total employment of the districts, which increased from 56.36 per cent in 1979 to 64.41 per cent in 1984. In Karnal there are a variety of industries such as food and beverages, textiles, rubber, chemical, petroleum, non-metallic, basic metal, metal products and non-electrical machinery. The petroleum as well as non-metallic industries contributed approximately 30 per cent of the industrial output of the district in 1979 as well as in 1984. The industrial output of Gurgaon district went up from Rs 464.1 million in 1979 to

Rs 804.1 million in 1984. Textile is one of the leading industries, and contributed 31 per cent of the total industrial output of the district in 1979. However, in 1984 the footwear industry emerged as a major competitor contributing almost 39 per cent of the district's output. The industrial profile of Mahenderagarh district includes food and beverages, printing, chemical, non-metallic and metal products. However, the share of these industries in the total is insignificant.

*NCR Districts in Uttar Pradesh*

The industrial development of Bulandshahar district of Uttar Pradesh has been negligible. It contributed only 1.63 per cent output to the NCR total in 1979 and 1.29 per cent in 1984. In contrast, Meerut district has been industrially active, with chemical industry contributing 54.3 per cent of the district's industrial output in 1979 and 54.9 per cent in 1984. Food and beverages with a 25 per cent share, was the second important industry in the district.

*NCR Districts in Rajasthan*

Alwar district has been witnessing industrial changes in recent years. The total industrial output of the district was only Rs 144.2 million in the year 1979 which increased eight times and went up to Rs 1,206.3 million in 1984. The footwear industry, which was started in 1981, claimed 34 per cent of total industrial production in 1984. Other important industries in the district are non-metallic, chemical and food.

**Share of Industries**

Analysing the share of each industry by district, we find that there is concentration of two industries, (viz., wearing apparel, and leather and fur products) in Alwar. The wearing apparel industry's contribution to

the NCR total output remained around 59 per cent in the year 1981 as well as in 1984. Leather and fur products contributed 40 per cent in 1981. Other industries contributing approximately 5 per cent share in 1984 were electrical machinery and basic metals (Table 4.4).

In the Haryana districts of the NCR, food industry is concentrated in Rohtak and Mahendragarh. These two districts accounted for 17.17 per cent of output in 1979 and 14.81 per cent in 1983. Textile industry is confined largely to Rohtak, Karnal and Gurgaon districts with their total share in the output amounting to 45.54 per cent in 1979 and 54.11 per cent in 1983. Wearing apparel industry, concentrated in Sonepat and Gurgaon, contributed more than half of the total output of this industry (except in 1979). Similarly, around fifty per cent of the output of non-metallic mineral industry came from Karnal and Rohtak and around 64 per cent of the output of petroleum products industry came from Karnal. Gurgaon and Karnal jointly contribute 71 per cent of petroleum products.

Thus industries' concentration in Rohtak, Karnal, Gurgaon, Sonepat and Mahendragarh in the descending order of their share in output are petroleum products, non-metallic mineral, wearing apparel, textiles and food industries. Among the two NCR districts in Uttar Pradesh, Bulandshahar has only a food industry, which contributes around 7 per cent of the total output of this industry. Meerut with its chemical and chemical products industry, contributed 37 per cent of the output in 1979, subsequently declining to 23.32 per cent by the year 1983. Other industries of some importance in the districts are food, paper, basic metal and electrical machinery, which have lost their place over time.

Unlike the States mentioned above, Delhi has a prolific industry profile. For example, in the year 1979,

*Table 4.4*

## Industry-wise Share of Output in the NCR by Districts (1979 and 1983)

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-21 | 7.72 | 5.90 | 7.26 | 7.57 | 0.06 | 6.16 | - | 0.06 | 0.75 | 1.41 | 2.75 | 4.22 | 6.11 | 8.65 | 0.55 | 1.04 | 63.79 | 64.99 |
| 22 | 3.00 | 4.30 | | | | | | | | | | | | (1980) | 0.58 | 4.14 | 97.00 | 91.48 |
| 23 | | | | | 25.11 | 39.22 | | | 14.24 | 9.78 | 6.19 | 5.11 | | | | | 54.46 | 45.89 |
| 24 | | | | | | | - | 17.22 (1982) | 58.73 (1984) | 44.43 | | | | | 59.87 | 59.00 | 100.00 | 23.71 |
| 25 | | | | | | | | | | | | | (1981) | | | | 100.00 | 100.00 |
| 27 | 13.17 | 0.30 | | | | | | | 0.04 | 0.07 | | | | | | | 100.00 | 96.70 |
| 28 (1980) | 0.32 | 0.19 | - | | - | 1.79 | (1982) | (1984) | (1982) | | 1.61 (1981) | - (1981) | 1.03 | 0.31 | 0.80 | 0.67 | 100.00 | 97.70 |
| 29 (1980) | | | | | | | | | | | | | - | (1981) | 40.17 | 4.68 | 100.00 | 95.32 |
| 30 | | | | (1980) | 1.21 | 8.77 | | | | | 1.60 | 0.50 | | | - | 5.97 | 98.37 | 84.69 |
| 31 | 36.93 | 23.32 | (1980) | | 1.13 (1980) | 0.57 (1980) | 0.63 | 1.18 | 3.81 | 2.69 | 0.99 | 3.10 | 1.56 | 1.87 | 1.43 | 4.54 | 60.65 | 64.61 |

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | - (1984) | 2.56 (1984) | - | 1.68 | - (1984) | 0.43 | - | 0.91 | 0.61 (1981) | 17.90 (1984) | 64.17 | 62.72 | 1.79 | 0.68 | 3.30 | 6.44 | 31.92 | 22.50 |
| 33 | 0.65 | 0.63 | | | 37.48 | 35.72 (1980)(1981) | 4.42 | 2.58 | 6.42 | 5.49 | 15.72 | 14.04 | 0.24 | - | 5.10 | 5.75 | 56.25 | 48.71 |
| 34 | 8.61 | 3.29 | | | 1.96 | - (1982)(1984) | 1.28 (1984) | 0.58 | | | 7.33 (1982) | 9.33 (1984) | 0.79 (1984) | 0.74 | 1.54 | 4.41 | 81.57 | 86.27 |
| 35 | 1.54 | 1.41 | | | 0.14 | 0.31 | - | 0.13 (1982) | 0.17 (1984) | 0.18 | 3.93 | 8.35 (1984) | - | 0.67 (1982)(1984) | 0.89 | 1.78 | 93.79 | 89.81 |
| 36 | 0.20 (1984) | 0.80 | | | | | | | (1980) | (1984) | 0.06 | 0.09 (1981) | (1982) | (1984) | 0.47 | 0.98 | 90.80 | 100.00 |
| 37 | 7.53 (1982) | 2.73 | | | | | | | | | 2.41 | 2.95 | (1984) | | 2.84 | 5.37 | 97.59 | 97.05 |
| Share of each district in NCR as a whole | 6.62 | 4.20 | 1.63 | 1.80 | 7.17 | 8.33 | 0.27 | 1.92 | 3.93 | 3.54 | 4.30 | 5.11 | 1.96 | 2.16 | 1.22 | 4.22 | 72.92 | 69.66 |

**Note:** Name of the industry with reference to code number is given in Annexure A.IV.1

industries localised only in Delhi were wearing apparel, furniture, paper, printing, leather, rubber, non-electrical machinery and electrical machinery. Most of these industries continued to be localised in Delhi even in 1983. Except wearing apparel, petroleum, non-metallic and textiles industries, all other industries located in Delhi contributed more than half of the output of the individual industries in the region.

## Location Quotient

To ascertain whether industries are concentrated in a particular region or are widely dispersed, we have calculated Location Quotient (LQ) which is used to compare a region's percentage share of a particular activity with its percentage share of some basic aggregate. Thus, LQ is defined as a ratio of percentage share of $i^{th}$ industry in the total sector of $j^{th}$ region to the percentage share of the $i^{th}$ industry in total manufacturing sector, i.e.,

$$LQ = \Sigma \, \frac{S_{ij}/S_j}{N_i/N}$$

where,

$S_{ij}$ = output of ith industry in jth region,
$S_j$ = total output of the jth region,
$N_i$ = output of ith industry in the NCR, and
$N$ = total industrial output of the NCR.

If the LQ is exactly unity, it can be inferred that the structure at the NCR level is more or less replicated at the district level. Also, it shows that the district has a fair share of that industry as compared to the total of the NCR. If LQ>1, the district has more than a fair share of the industrial activity, and the converse would be true if LQ<1.

Location quotient could be calculated on the basis of output, employment or capital employed. In Tables 4.4 and 4.5 we present such estimates for the years 1979 and 1984. The output-based estimates (Table 4.4) indicate contribution of that specific industry in the State's domestic product. On the other hand, LQ estimates on the basis of employment (Table 4.5) indicate existing labour absorption capacity. Similarly, LQ on the basis of capital investment would indicate its share in the particular industry of a district as compared to the NCR capital investment.

Output based LQs suggest that Meerut district had a fair share of food and beverages, chemicals, and basic metal industries. However, capital based LQ presents a revised picture, with paper, printing, and electrical machinery industries showing more than an even share. A comparison of LQs for the years 1979 and 1984 shows that in 1984 these industries achieved a greater share in comparison to the NCR total. Food and beverages industry was losing its share as regards output and capital but its absorption of employment increased in 1984. Another district of Uttar Pradesh, *viz.*, Bulandshahar, had only one industry (food and beverages) having a value of LQ>1. However, over the years, the coefficient of LQ was declining and the industry was losing its place in the district.

Among the districts of Haryana, Rohtak had more than a fair share of food, textiles, and non-metallic industries in 1979. The share of these industries declined in 1984, with the exception of textiles which had a higher LQ. The LQ for rubber industry considerably increased, showing that the industry had acquired a fairly good position in 1984. Petroleum, chemical and metal products industries of the district had LQ<1 indicating their relatively less important position in the NCR. In the Sonepat district of Haryana, most industrial

development has taken place after 1979. LQ on the basis of capital and employment was very high in non-metallic and basic metal industries in the first year but declined in later years. The footwear industry recorded a big spurt with an LQ of 17.75. Other industries such as petroleum, non-metallic and basic metals have low shares in the NCR. In Gurgaon district, textiles, footwear and non-metallic industries seemed to dominate in 1979 as well as 1984. The textiles industry has shown an improvement over the years. Those having a lower LQ are food, paper and paper products and chemical industries. Karnal is one of the districts with a significant concentration of almost all industries. Excepting a few industries such as food and beverages, rubber and rubber products, metal products, electrical machinery, and non-metallic machinery, which have LQ<1, all the other industries record an LQ>1. Mahendragarh district of Haryana has printing and publishing, petroleum products, basic metals, metal products and food industries of which only the first two have some significant share in the NCR.

Alwar, the only district of Rajasthan in the NCR, shows a gradually improving industrial profile since 1979. The district has a high LQ in footwear industry (Table 4.4). Other noteworthy industries are non-metallic, leather and fur, chemical and petroleum products. Food and beverages, tobacco, basic metals, metal products, electrical machinery, and non-electrical machinery recorded an LQ>1.

Delhi has a fairly significant LQ in the NCR, with a sizeable population of almost all industries which are found elsewhere in the region. The three industries which kept a low profile in the years 1979 and 1984 were food and beverages, textiles and non-metallic minerals. Chemical industry improved its position in 1984 over that in 1979 but petroleum and footwear

Table 4.5

## Industry-wise Share of Employees in the NCR by Districts (1979 and 1983)

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-21 | 21.40 | 24.34 | 31.51 | 32.45 | 2.59 | 2.45 | - | 0.03 | 0.42 | 0.71 | 1.25 | 5.08 | 4.40 | 8.90 (1980) | 0.29 | 1.04 | 38.14 | 95.06 |
| 22 | 4.94 | 11.16 | | | | | | | | | | | | | 4.87 | 7.37 | | |
| 23 | | | 14.91 | 22.42 | | | | | 13.74 | 13.76 | 4.99 | 5.24 | | (1980) | | | 66.36 | 100.00 |
| 24 | | | | | | | | 19.00 (1982) | 35.19 (1984) | 30.37 | | | | | 63.42 | 56.97 | 100.00 | |
| 25 | 13.30 | 3.97 (1980) | | | | | | | | | | | | (1981) | | | 100.00 | 100.00 |
| 27 | | | | | | | | (1982) | 2.63 (1984) | 0.46 | | | | | | | | 99.86 |
| 28 | 0.60 | 0.48 (1980) | | | - | 1.00 | | | - (1982) | | 0.69 (1981) | - (1980) | 1.05 | 1.04 (1981) | 1.25 | 3.58 | 100.00 | |
| 29 | | | | | | | | | | | | | | (1981) | 31.84 | 28.97 (1981) | 100.00 | |
| 30 | | | | | 2.27 | 3.32 | 1.58 | 0.93 | | | 1.95 | 0.71 | | | - | 5.89 | | 98.05 |
| 31 | 39.69 | 35.56 | | | 0.90 (1980) | 0.51 (1980) | | | 1.12 | 0.98 | 1.79 | 1.74 | 1.70 | 3.56 | 0.73 | 4.50 | 56.09 | |

Contd...

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | - (1984) | 3.02 (1984) | - | 3.72 | - (1984) | 0.10 | - | 1.82 | 0.11 (1981) | 1.00 (1984) | 10.78 | 8.12 | 0.39 | 0.16 | 1.22 | 2.18 | 16.91 | |
| 33 | 0.83 | 1.37 | 24.18 | 15.54 (1980) | 3.77 (1981) | | | 3.15 | 5.11 | 5.84 | 7.26 | 7.70 | 0.25 | - | 5.58 | 14.34 | 62.14 | |
| 34 | 19.54 | 7.49 | | | 2.09 (1982) | - | 1.26 | | | | 5.58 | 10.28 (1984) | 1.49 (1980) | 0.54 (1984) | 1.93 | 4.60 | 70.97 | |
| 35 | 2.86 | 1.52 | | | 2.09 | 0.38 | - (1982) | 0.24 | 0.38 (1984) | 0.31 | 3.69 | 6.56 | - (1982) | 10.20 (1984) | 2.09 | 2.57 | 92.00 | |
| 36 | 0.26 (1984) | 0.16 | | | | | | | (1980) | (1984) | 0.36 | 0.34 (1981) | (1984) | | 0.55 | 0.68 | 99.74 | |
| 37 | 24.76 (1981) | - | | | | | | | | | | | (1980) | (1984) | 3.57 | 13.83 | 98.12 | |
| Share of each district in NCR as a whole | 7.99 | 7.87 | 4.97 | 4.80 | 3.82 | 4.49 | 0.25 | 0.90 | 3.67 | 3.91 | 3.16 | 4.18 | 0.89 | 2.05 | 0.95 | 4.49 | 74.40 | |

**Note:** Name of the industry with reference to code number is given in Annexure A.IV.1.

*Table 4.6*

## Industry-wise Share of Productive Capital in the NCR by Districts (1979 and 1983)

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-21 | 23.35 | 4.26 | 11.80 | 17.02 | 4.80 | 5.57 | - | 0.08 | 0.44 | 0.96 | 3.70 | 4.31 | 6.44 | 9.24 | 0.52 | 4.26 | 48.95 | 54. |
| 22 | 8.77 | 19.07 | | | | | | | | | | | | | 37.54 | 23.21 | 91.23 | 57. |
| 23 | | | 21.02 | 27.03 | | | | | 7.51 | 23.78 | 6.43 | 5.57 | | (1983) | | | 65.03 | 43. |
| 24 | | | | | | | - (1982) | 28.92 (1984) | 28.70 | 66.03 (1984) | | | (1981) | | 73.71 | 62.50 | 100.00 | 8. |
| 25 | | | | | | | | | 0.19 | | | | | | | | 100.00 | 100.00 |
| 27 | 22.13 (1980) | 5.20 | | | | | 2.38 (1982) (1984) | | | | | | | | | | 100.00 | 94. |
| 28 | 0.49 (1980) | 0.11 | | | - | 1.08 | | | | | 0.53 (1981) | - (1980) | 0.91 | 0.78 | 1.46 | 13.04 | 100.00 | 84. |
| 29 | | | | | | | | | | | | | (1981) | | 68.28 | 72.53 | 100.00 | 27. |
| 30 | | | | (1980) | 2.07 | 9.87 | | | | | 1.57 | 0.88 | | | - | 10.80 | 98.43 | 78. |
| 31 | 74.50 | 34.74 | | | 1.52 (1980) | 0.17 (1980) | 5.66 | 10.90 | 1.92 | 1.74 | 1.48 | 1.49 | 3.22 | 4.18 | 4.76 | 8.73 | 55.36 | 50. |

Contd...

| Industry code | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | - | 2.15 | - | 1.65 | - | 1.07 (1984) | - | 0.88 | 0.87 | 12.22 | 62.43 | 47.59 | - | 0.93 | 5.67 | 15.06 | 32.07 | 23. |
| 33 | 0.75 | 0.69 | | | 35.60 | 21.23 (1980)(1981) | 3.02 | 2.62 | 12.70 | 7.71 (1982) | 12.39 (1984) | 14.15 | 0.74 | 0.21 | 13.54 | 21.95 | 37.72 | 31. |
| 34 | 29.29 | -6.50 | | | 1.11 | - (1982)(1984) | 0.91 | 0.28 | | | 9.37 | 21.91 | 0.23 (1980) | - (1984) | 3.62 | 4.95 | 60.00 | 84. |
| 35 | 0.83 | 2.97 | | | 0.86 | 1.79 | - | 0.79 (1982) | 0.31 | 0.26 (1984) | 5.05 | 14.60 (1984) | 1.12 (1982) | 0.56 (1984) | 14.38 | 12.14 | 92.13 | 79. |
| 36 | 0.44 (1984) | 0.11 | | | | | | | | | 0.21 | 0.18 (1981) | (1984) | | 0.40 | 3.36 | 99.56 | 100. |
| 37 | 7.43 (1982) | 15.10 | | | | | | | (1980) (1984) | | 2.10 | 2.10 | (1980) (1984) | | 14.08 | 47.70 | 97.90 | 97. |
| Share of each disrict in NCR a whole | 0.23 | 2.70 | 0.81 | 1.35 | 3.06 | 2.45 | 2.74 | 1.96 | 2.00 | 2.20 | 2.80 | 2.80 | 0.66 | 0.93 | 2.37 | 6.81 | 79.33 | 78. |

Note: Name of the industry with reference to code number is given in Annexure A.IV.1

## Table 4.7

## Location Quotient
## (Output)

| Industry code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | | Karnal | | Mahendragarh | | Alwar | | Delhi | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 |
| 20-21 | 1.17 | 0.86 | 4.46 | 2.15 | 1.26 | 0.75 (83) | .06 | 2.52 | 0.19 | 0.30 | 0.64 (81) | 0.36 | .19 | 0.01 | .45 | 0.34 | 0.87 | 0.45 |
| 22 | 0.45 | 0.76 | | | | | | | | | | | | (80) | .27 | 1.65 | 1.33 | 1.73 |
| 23 | | | | | 3.50 | 0 | | | 3.63 | 4.09 | 1.44 | 1.52 | | | | | 0.75 | 0.90 |
| 24 | 0 | | 0 | 0 | 0 | 0 | 0 (83) | 17.75 (82) | 20.56 | 18.38 | 0 | 0 | 0 (81) | (80) | 20.80 | 15.76 | 1.37 | 0.81 |
| 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.37 | 1.90 |
| 27 | 2.44 | 1.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 | 1.37 | 1.32 |
| 28 | 0.06 (80) | 0.02 | | (83) | 0.02 | 0.01 | 0 | 0 | 0 | 0 (82) | 0 | 0.40 (80) | 2.10 | 3.58 | 0.14 | 0.37 | 1.37 | 1.86 |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 (81)(83) | 13.96 | 1.11 | 1.37 | 1.90 |
| 30 | 0 | 0 | 0 | (80) | 0.17 | 0.82 | 0 | 0 | 0 | 0 | 0.39 | 0.12 | 0 (83) | 0 | 1.41 | 1.59 | 1.35 | 1.65 |
| 31 | 5.58 | 6.51 | 0 (80) | 0 (80) | 0.16 (80) | 0.06 (83) | 0.70 (80) | 1.21 (83) | 1.14 | 0.76 (81) | 0.23 | 0.78 | 0.10 | 0.10 | 1.17 | 1.55 | 0.83 | 1.27 |

| Industry code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | | Karnal | | Mahendragarh | | Alwar | | Delhi | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 |
| 32 | 0 | 1.19 | 0 | 1.44 (83) | .09 | 0.09 | 0 | 0.07 | 0.37 | 14.23 | 34.94 | 22.53 (83) | 1.01 | 1.15 | 6.33 | 4.17 | 1.02 | 0.60 |
| 33 | 0.10 | 0.03 | 0 | 0 | 5.23 | 4.58 (80) | 4.83 (81) | 0.09 | 1.96 | 0.84 | 3.56 | 2.80 | 0.12 | 0 | 4.18 | 1.70 | 0.77 | 0.75 |
| 34 | 1.00 | 0.80 | 0 | 0 | 0.27 | 0 (82) | 4.57 | 0.03 | 0 | 0 | 1.71 | 1.95 | 0.40 (80) | 0.42 | 0.72 | 1.22 | 1.12 | 1.61 |
| 35 | 0.23 | 0.43 | 0 | 0 | 0.02 | 0.03 (82) | 0 | 0 | 0 | 0.08 | 0.92 | 0.68 | 0.31 | 0.45 (82) | 0.20 | 0.49 | 1.29 | 1.77 |
| 36 | 0.03 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 (81) | 0.16 | 0.27 | 1.37 | 1.38 |
| 37 | 1.57 (81) | 0.51 (82) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.56 | 0.20 | 0 | 0 (80) | 1.88 | 1.40 | 1.34 | 1.79 |

**Note:** 1) Location equation is calculated as follows:

$$LQ \; \Sigma \; \frac{S_{ji}/S_i}{N_i N}$$

where,

$S_{ji}$ = Output variable of ith industry in jth region.

$S_j$ = Total industrial output in jth region.

$N_i$ = Output variable of ith industry in the NCR.

$N$ = Industrial output in all the industries in the NCR.

2) Name of the industry with reference to code number is given in Annexure A.IV.1.

## Table 4.8

## Location Quotient
## (Employment)

| District Industry group | Meerut 1979 | Meerut 1983 | Bulandshahar 1979 | Bulandshahar 1983 | Rohtak 1979 | Rohtak 1983 | Sonepat 1979 | Sonepat 1983 | Gurgaon 1979 | Gurgaon 1983 | Karnal 1979 | Karnal 1983 | Mahendragarh 1979 | Mahendragarh 1983 | Alwar 1979 | Alwar 1983 | Delhi 1979 | Delhi 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-21 | 2.58 | 3.11 | 6.34 | 5.34 | .68 | .53 | .03 | 3.13 | .12 | .29 | .10 | .82 (81) | .30 | .15 | .30 | .20 | .51 | .41 |
| 22 | .62 | 1.31 | | | | | | | | | | | | (80) | 1.79 | 1.00 | 1.28 | 1.28 |
| 23 | | | | | 3.90 | 5.64 | (80) | | 3.85 | 3.73 | 1.38 | 1.46 | | | | | .09 | .86 |
| 24 | | | | | | | | 21.05 (82) | 8.49 | 9.04 | | | (81) | | 20.36 | 9.25 | 1.34 | .40 |
| 26 | | | | | | | | | .63 | | | | | | | | 1.34 | 1.52 |
| 27 | 2.10 (80) | .64 | | | | | | (82) | | .14 | | | | | | | 1.34 | 1.44 |
| 28 | .09 (80) | 0.05 | (83) | | .22 | .15 | | | (82) | | - (80) | .15 | 1.63 | 1.18 | .45 | .60 | 1.34 | 1.44 |
| 29 | | | | | | | | | | | | | | (81) | 10.22 (83) | 6.45 | 1.34 | 1.52 |
| 30 | | | | (80) | .65 | .43 | | | | | .62 | .20 | (83) | | 1.31 | .99 | 1.32 | .40 |

Contd...

| Industry code | Meerut | | Bulandshahar | | Rohtak | | Sonepat | | Gurgaon | | Karnal | | Mahendragarh | | Alwar | | Delhi | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 | 1979 | 1983 |
| 31 | 4.97 | 3.51 | | (80) | .28 (82) | .17 (83) | 1.72 (84) | 1.03 (33) | .33 | .25 (81) | .57 | .54 | .35 | .23 | .76 | 1.93 | .75 | .85 |
| 32 | - | .38 | - | .78 (83) | .02 | .03 | - | 1.28 | .00 | .31 | 3.42 | ⌐.76 (83) | .67 | .08 | 1.28 | .40 | .23 | .09 |
| 33 | .10 | .04 | | | 6.32 | 3.80 (80) | 4.10 (81) | 2.51 | 1.44 | 1.30 | 2.30 | 1.62 | .28 | - | 5.86 | 3.20 | .84 | .77 |
| 34 | 2.45 | 1.04 | | | .55 | - (82) | 3.96 | .67 | | | 1.77 | 2.09 | 1.67 (80) | .19 | .71 | .87 | .95 | 1.18 |
| 35 | 0.36 | 0.41 | | | .08 | .16 | - | .26 | - | .09 | 1.17 | .81 | 4.97 | 7.26 | .40 | .89 | 1.24 | 1.36 |
| 36 | 0.00 | .02 | | | | | | | | | - (81) | .08 | | | .18 | .13 | 1.34 | 1.50 |
| 37 | 2.85 (81) | 2.95 (82) | | | | | | | | | .60 | .17 | (80) | | 1.31 | 2.62 | 1.32 | 1.30 |

Note: Name of the industry with reference to code number is given in Annexure A.IV.1.

industries recorded a decline. The other industries have done fairly well with most of them showing an increasing trend (Table 4.4). They include tobacco, furniture, printing, paper, leather, rubber, basic metals, metal products, non-electrical machinery and electrical machinery industries.

## Factors Affecting Location of Industries

The two broad factors which govern the choice of location of an industry relate to demand and supply. While demand relates to market conditions and tax incentives on finished goods, the supply factor covers production costs, *viz.*, costs of raw materials, fuel and energy, wages, transportation and taxes on inputs.

In this section, we present an empirical analysis of the effects of the relative importance of various locative influences on industries established in the National Capital Region. All the two-digit level industries in the region have been considered. The study includes the variables that affect supply, and consequently costs, and also factors that affect demand. In examining all these factors, special emphasis is laid on the effect of sales tax on the location of industry.

Using each variable, the following specification is estimated by applying the ordinary least squares (OLS) method:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

where,

$Y$ = Location quotient,

$X_1$ = Input cost per rupee of output,

$X_2$ = Wage cost per rupee of output,

$X_3$ = Effective tax rate per rupee of output,[3]
$X_4$ = Deficiency in availability of electricity.

The OLS results of the above model as obtained for the different districts of the NCR are as follows.[4]

**Meerut**

Y    =    41.3568        -45.3743$X_1$    -51.4441$X_2$
                        (-1.3734)        (-1.4210)

31.6267$X_3$ +        0.4775$X_4$** $R^2$ = 0.6468
                (-1.0235)        (2.0450)

**Rohtak**

Y    =    341.8862        -323.9240$X_1$* -570.2012$X_2$*
                        (-8.8071)        (-9.2176)
            -425.2133$X_3$* -2.0445$X_4$*    $R^2$ = 0.9949
                        (-11.1197)

**Karnal**

Y    =    108.0634        -7.4137$X_1$*    -422.14650$X_2$*
                        (-3.0917)        (-2.4411)
            173.3497$X_3$* -4.0734$X_4$*    $R^2$ = 0.8286
                        (4.0064)        (-2.2432)

**Alwar**

Y    =    -42.5381 +44.3708$X_1$+138.4723$X_2$** +
                        (1.3411)        (1.7164)

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[3]The effective tax rate has been calculated by taking weighed average of all the commodities falling under each industry group. The weights have been assigned on the basis of the proportion of the gross turn-over of the commodities under each industry. As we have used ratio of tax yield/gross turnover, it takes care of the exemptions and concessions given under the Sales Tax Laws of each State.

[4]We have presented here the results which are statistically significant. The other results are shown in Annexure A.4.2.

$$68.0862X_3* \quad -0.0211X_4 \quad R^2 = 0.4441$$
$$(2.0470) \quad\quad (0.4795)$$

**Delhi**

$$Y \quad = \quad 0.8910 + \quad 0.1070X_1 \quad -1.3351X_2 +$$
$$(0.2527) \quad\quad (0.7710)$$
$$3.7285X_3* \quad -0.0451X_4 \quad R^2 = 0.2547$$
$$(1.8687) \quad\quad (0.9533)$$

**Notes:** * Significant at 5% level
** Significant at 10% level.

These results show that input costs have prevented the location of industries in some of the districts in Haryana. Likewise, for districts of Rohtak and Karnal, the wage cost has also been a deterrent. This could, in fact, have resulted because of low availability of raw materials and labour as well as transport bottlenecks existing in these areas. In contrast to Haryana, the cheap availability of labour (as shown by a positive value of $X_2$) has been helpful with regard to establishment of industrial units in Rajasthan for its Alwar district.

An important and more interesting fact revealed by these results relates to the sales tax factor. Among the significant results produced above, this factor, except for Meerut, has shown its influence for all the districts. The positive sign of the effective tax rate (measured in terms of per rupee of output), for most of these districts, implies that exemptions and concessions provided by their parent States do have their positive bearing on the location of industries. However, any generalisation with respect to the tax factor (and for other factors too) for the entire State is unwarranted in view of the existing inter-district variations even within the same State. Considering Haryana, for instance, it can be noted that unlike Karnal its other district, namely, Rohtak seems

to have suffered from higher effective tax rates.[5] This possibly might have adversely affected the location of industries in this particular district.

Yet another significant noticeable fact in these results pertains to Haryana. The negative sign of the power deficiency variable in the related results reaffirm the fact that industrial location in Haryana (unlike in U.P. for Meerut) has been hampered because of scarcity of power.

These results, though limited by their paucity of coverage, are yet broadly indicative of the influence of sales tax rates on the location of industries in most of the States of the NCR. Besides, these results also highlight the importance of infrastructure variables namely the cost of inputs, wage costs and power deficiency.

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[5]The sign of $X_3$ is negative for this particular district.

## CORRESPONDENCE BETWEEN INDUSTRIES
## AND COMMODITIES

| Code No. | Name of industry | Items |
|----------|------------------|-------|
| (1) | (2) | (3) |
| 20-21 | Manufacture of Food | Atta, Maida, Suji, Sweet Meats, Namkin, Cooked food, Rawart, Gagak, Biscuits, Bread cakes, Pastries, and sugar products such as Sugar candy, Batasa, Getta sugar, Toys (Chini Ka Khilons) and Illaichi Dana. |
| 22 | Manufacture of Beverage, Tobacco and its products | 1. Tobacco and its products - Exemp. <br> 2. Tea pepared and coffee <br> 3. Soda water, Lemonade, Fruit juice and other soft beverages. <br> 4. Alcohol |
| 23 | Manufacture of Cotton Textile | |
| 24 | Manufacture of Wool, Silk and Synthetic Fibre Textile | |

25-26   Manufacture if Jute, Hemp. Mesta
        Textiles & Manufactures of Tex-
        tile products (including Wearing
        Apparel other than Footwear)

27      Manufacture of wood        Wood and timber of
        & its products             all kinds

28      Manufacture of Paper       1. Paper of all kinds
        and Paper Products,        2. Card Board and
        Printing, Publishing          Straw Board
        and Allied Industries

29      Manufacture of             1. Foot wear of all kinds
        leather and leather        2. Suit cases, etc.
        products

30      Manufacture of             1. Rubber hoses
        rubber, plastic and        2. Rubberised coir
        coal products                 sheet, cushions
                                      Pillow mattresses &
                                      other articles made
                                      from rubberised coir
                                   3. Plastic buckets
                                      Plastic basin
                                      Plastic soap case
                                      Plastic and other
                                   4. Coal briquettes.

31      Manufacture of             1. Chemical of all kinds
        Chemical and its              including fuel gases
        products                   2. Chemical fertilisers

32      Manufacture of             1. All kinds of mineral
        Non-metallic mineral
        products

| | | |
|---|---|---|
| 33 | Basic metals and alloy industries | 1. All kinds of ore, metals: scrap and alloys machinery sheet and circles used in the manufacture of brass. |
| 34 | Manufacture of metal products and parts except machinery and transport equipments | Metals of all kinds |
| 35 | Manufacture of machinery tools and parts except electrical machinery | Machinery and spare parts |
| 36 | Manufacture of electrical machinery, appliances & parts | All electrical goods |
| 37 | Manufacture of transport equipment and parts | Motor vehicles including motor cars, motor cycles motor vans, etc. Tractor and parts |
| 38 | Other manufacturing industries | 1. Carpets<br>2. Hosiery<br>3. Medicines |

*Annexure A.4.2*

## RESULTS OF ORDINARY LEAST SQUARES

| Years | Intercept | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $R^2$ | D.F. |
|-------|-----------|-------|-------|-------|-------|-------|------|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | **Meerut** | | | | |
| 1979 | 35.6384 | -39.571 | -44.0723 | -29.9039 | +0.02218 | 0.3320 | 2 |
| | (-0.5025) | (-6.4878) | (-0.3742) | (0.5367) | | | |
| 1980 | (-)5.9760 | 6.7974 | 2.3456 | 6.3831 | .2915 | 0.3983 | 3 |
| | (0.3632) | (0.1923) | 0.4564 | (0.7748) | | | |
| 1981 | 41.3568 | -45.3743 | -51.4441 | -31.6267 | 0.4775* | 0.6468 | 4 |
| | (1.3734) | (-1.4210) | (-1.0235) | (2.0450) | | | |
| 1982 | .68301 | 2.0917 | -.04244 | 6.2492 | -.0869 | 0.2099 | 3 |
| | | (0.509) | (-0.0962) | (0.3163) | (-0.1513) | | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|
| 1983 | -20.1382 | 23.9016 (0.8845) | 18.4736 (0.8170) | 27.9254 (0.8432) | -0.0357 (-0.0906) | 0.2804 | 3 |
| 1984 | -1.2963 | 2.8025 (0.2154) | .3778 (0.0422) | 3.7092 (0.2254) | .0205 (0.0670) | 0.0567 | 5 |

**Rohtak**

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|
| 1979 | 4.4390 | 3.4313 (0.9435) | -43.0255 (-1.1001) | -9.0196 (-0.3230) | -.06527 (-1.0458) | 0.7265 | 1 |
| 1980 | -6.2777 | 10.5876 (0.0673) | 9.5796 (0.0376) | 26.3426 (0.1562) | -.5391 (-0.5833) | 0.5840 | 1 |
| 1981 | 341.8860 | -324.9240 (-8.8071) | -570.2012 (-9.2176) | -425.2133 (-8.8333) | -2.0449 (-11.1197) | .9949 | 1 |
| 1982 | 72.6405 | -63.4739 (-1.721) | -95.0561 (1.4414) | -26.4054 (-1.3115) | -1.1057 (-3.4468) | 0.9766 | 1 |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|
| 1983 | 12.1246 | -6.6043 (-0.2242) | -24.1331 (-.4401) | -23.4230 (-.4165) | -.5174 (-1.4156) | 0.5861 | 3 |
| 1984 | 18.4024 (-.3929) | -13.3728 (-.5171) | -23.0849 (-.5646) | -18.2799 (-1.2454) | -.5420 | 0.5914 | 3 |
| **Gurgaon** | | | | | | | |
| 1984 | 21.1048 (-1.1563) | -18.8416 (-1.2111) | -52.2117 (-0.9989) | -13.6554 (0.6389) | 1.5315 | 0.4537 | 2 |
| **Karnal** | | | | | | | |
| 1979 | 484.9003 (-1.9397) | -473.7351** (-2.0836) | -839.2125** (-1.3645) | -443.8145 (-1.5684) | -2.5046** | 0.7203 | 4 |
| 1981 | 108.0634 (-3.0917) | -97.4137* (-2.4411) | -422.14650* (4.0064) | 173.3497* (-2.2332) | -4.0754* | 0.8286 | 4 |
| 1981 | 13.1026 (-.1823) | 16.1259 (-0.3033) | -45.9973 (0.6442) | 68.3141 (-.2784) | -.2635 | 0.4985 | 4 |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|
| 1982 | -9.8957 (0.3018) | 8.7782 (0.2179) | 71.0282 (0.4321) | 18.1665 (0.1753) | .5031 | 0.0388 | 5 |
| 1983 | 110.6962 (-0.7643) | -107.9899 (-0.6133) | -177.8247 (-0.5357) | -91.5175 (0.3527) | -.6314 | 0.2855 | 4 |
| 1984 | 24.2772 (0.8225) | -15.3401 (41.1853) | -155.9089 (1.9962) | 106.2973** (-1.2356) | -1.7988 | 0.459 | 5 |
| **Alwar** | | | | | | | |
| 1980 | 0.1830 (0.0570) | 2.6714 (0.4219) | 4.8362 (1.0937) | 7.0700 (0.3802) | -0.0151 | 0.3159 | 0.1915  4 |
| 1981 | 0.1342 | 2.2306 (0.3446) | 64.7705 (0.5798) | 16.2653 (1.0459) | -0.0714 (0.9431) | 0.2517 | 0.1365  5 |
| 1982 | -42.5381 | 44.3708 (1.3411) | 138.4723** (1.7164) | 68.0862 (2.0470) | -0.0211 (0.4759) | 0.4441 | 0.3674  7 |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|
| 1983 | 4.9952 (0.1640) | -16.7850 (0.2945) | 0.4483 (0.0350) | -0.1132 (0.4897) | 0.0524 | -0.0739 | 3 |
| | 1.10669 | | | | | | |
| 1984 | 54.8579 | 144.2618 | 52.8994 | -0.0307 | 0.3257 | 0.2357 | 7 |
| | -49.9060 | | | | | | |
| | | | **Delhi** | | | | |
| 1979 | -0.1825 (0.9996) | 0.5445 (0.3385) | 1.2611 (0.9862) | 0.0173 (0.3580) | 0.1507 | -0.1582 | 11 |
| | 1.1305 | | | | | | |
| 1980 | -0.2703 (0.7435) | -1.4129 (1.1320) | 0.2213 (0.8942) | -0.0241 (0.5762) | 0.1819 | -0.1156 | 11 |
| | 1.4933 | | | | | | |
| 1981 | -0.5887 (1.0003) | -1.6829 (1.2039) | 1.3946 (0.9548) | -0.0238 (0.5100) | 0.2547 | -0.0164 | 11 |
| | 1.5817 | | | | | | |
| 1982 | 0.1070 (0.2527) | -1.3351 (0.7710) | 3.7285* (1.8687) | -0.0451 (0.9533) | 0.5117 | 0.3341 | 11 |
| | 0.8910- | | | | | | |

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1983 | 4.3079 | -3.3162 (0.9619) | -5.7034 (1.1006) | -2.0879 (0.4334) | -0.0078 (0.1214) | 0.2398 | -0.0366 | 11 |
| 1984 | 0.9024 | 0.5202 (0.1062) | -1.6264 | 2.4872 (0.2261) | 0.0071 (0.5028) | 0.2551 (0.0781) | -0.0158 | 11 |

**Notes:** ** Significant at 10 per cent level.
 * Significant at 5 per cent level.