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# APPENDICES

## Appendix 1

### Dataset on the core industries' $CO_2$ emissions (in kilo tonnes)

| Year | Coal | Cement | Crude oil | Natural gas | Fertilizers | Electricity | Steel | Refinery products |
|---|---|---|---|---|---|---|---|---|
| 2005 | 721469.7 | 59686.57 | 351646.2 | 50438.62 | 82486.02 | 602380.005 | 105378.999 | 28894.67 |
| 2006 | 773565.4 | 64905.4 | 368891.2 | 49442.02 | 88459.58 | 642400.024 | 132109.13 | 31330.68 |
| 2007 | 842478.2 | 68333.26 | 391027.8 | 52695.65 | 92434.58 | 706679.993 | 145047.898 | 34575.9 |
| 2008 | 910796.5 | 73244.73 | 412316.3 | 63046.6 | 94915.43 | 725400.024 | 164157.052 | 39519.65 |
| 2009 | 983948.2 | 81267.96 | 431609.9 | 112684.8 | 98777.4 | 793390.015 | 182976.836 | 42827.9 |
| 2010 | 1015983 | 86029.24 | 438373.5 | 134244.2 | 103744.2 | 823809.998 | 168687.782 | 42456.7 |
| 2011 | 1089807 | 91314.5 | 458909.2 | 136364.2 | 108826.3 | 864630.005 | 163375.381 | 43455.85 |
| 2012 | 1244606 | 100237.2 | 488554.1 | 125604.8 | 105825.3 | 994239.99 | 184473.272 | 45905.93 |
| 2013 | 1319999 | 107819.8 | 495642.1 | 110689.2 | 105433.5 | 1011330.02 | 199866.589 | 45661.6 |
| 2014 | 1447355 | 115824.9 | 511166.2 | 109467.5 | 106554.8 | 1129400.02 | 193873.415 | 44978.75 |
| 2015 | 1487461 | 117507.9 | 554788.7 | 106870.6 | 109077.2 | 1108949.95 | 186194.169 | 46954.33 |
| 2016 | 1529990 | 123281.3 | 613165.5 | 113622.5 | 105713.7 | 1102439.94 | 213433.351 | 50124.26 |
| 2017 | 1560988 | 121047.2 | 631087.4 | 118922 | 107068.9 | 1161630 | 230155.929 | 53030.19 |
| 2018 | 1677600 | 138964.9 | 655190.3 | 126201.2 | 110910.8 | 1263020.02 | 246311.511 | 54276.58 |
| 2019 | 1677654 | 143664.1 | 674011.5 | 128676 | 117882 | 1235140 | - | - |
| 2020 | 1588060 | 122908.2 | 603602.2 | 127635.4 | 126549.1 | 1121980 | - | - |
| 2021 | 1802312 | 149001.3 | 622148.2 | 133450.8 | 121516.2 | - | - | - |

*(Author's compilation)*

## Appendix 2

## Dataset on the Index of Eight Core Industries

| Year | Coal | Cement | Crude oil | Natural gas | Fertilizers | Electricity | Steel | Refinery products |
|---|---|---|---|---|---|---|---|---|
| 2005 | 73.10 | 61.50 | 85.16 | 67.18 | 96.25 | 69.38 | 62.51 | 64.61 |
| 2006 | 77.02 | 68.73 | 88.29 | 66.78 | 99.05 | 74.41 | 69.67 | 72.15 |
| 2007 | 81.64 | 73.74 | 89.44 | 68.05 | 96.35 | 79.30 | 76.65 | 78.40 |
| 2008 | 89.14 | 79.09 | 89.18 | 69.45 | 89.59 | 81.98 | 78.08 | 81.29 |
| 2009 | 96.14 | 87.35 | 87.22 | 87.60 | 96.83 | 86.21 | 81.36 | 80.91 |
| 2010 | 98.59 | 92.25 | 96.31 | 112.02 | 98.67 | 90.76 | 90.67 | 82.13 |
| 2011 | 96.00 | 97.43 | 100.32 | 102.34 | 99.44 | 98.94 | 102.18 | 86.00 |
| 2012 | 103.70 | 105.40 | 99.70 | 89.80 | 97.70 | 103.50 | 106.00 | 105.00 |
| 2013 | 103.90 | 111.00 | 98.90 | 75.80 | 97.90 | 108.30 | 112.70 | 108.80 |
| 2014 | 110.90 | 118.20 | 98.60 | 71.60 | 98.60 | 124.00 | 122.20 | 108.80 |
| 2015 | 116.40 | 119.90 | 97.80 | 68.70 | 104.30 | 131.00 | 118.80 | 111.30 |
| 2016 | 119.30 | 126.10 | 94.60 | 65.50 | 107.30 | 140.20 | 129.80 | 119.80 |
| 2017 | 123.00 | 124.20 | 94.20 | 68.50 | 106.10 | 147.10 | 139.20 | 123.20 |
| 2018 | 131.60 | 142.80 | 91.10 | 68.40 | 105.50 | 156.40 | 145.00 | 129.00 |
| 2019 | 130.50 | 147.70 | 85.70 | 67.00 | 110.70 | 157.70 | 155.20 | 128.50 |
| 2020 | 132.00 | 126.30 | 80.80 | 59.30 | 112.30 | 154.10 | 134.60 | 116.40 |
| 2021 | 140.30 | 153.20 | 78.50 | 69.60 | 111.50 | 168.50 | 161.20 | 123.20 |

*(Author's compilation)*

## Appendix 3

### Dataset on the economic factors of industrial emissions

| Year | GDP (in trillions) | FDI (in billions) | AGR (in millions) | R&D |
|---|---|---|---|---|
| 2005 | 58.61 | 7.27 | 233.80 | 4721 |
| 2006 | 63.30 | 20.03 | 245.87 | 5686 |
| 2007 | 68.14 | 25.23 | 265.83 | 6296 |
| 2008 | 70.95 | 43.41 | 270.67 | 6425 |
| 2009 | 76.33 | 35.58 | 265.24 | 7262 |
| 2010 | 83.26 | 27.40 | 288.34 | 8853 |
| 2011 | 87.36 | 36.50 | 305.12 | 8841 |
| 2012 | 91.83 | 24.00 | 310.72 | 9553 |
| 2013 | 97.00 | 28.15 | 324.88 | 10669 |
| 2014 | 103.76 | 34.58 | 333.60 | 12040 |
| 2015 | 112.50 | 44.01 | 329.16 | 12579 |
| 2016 | 122.20 | 44.46 | 343.13 | 13199 |
| 2017 | 131.78 | 39.97 | 366.20 | 14961 |
| 2018 | 138.98 | 42.12 | 382.36 | 16289 |
| 2019 | 146.40 | 50.61 | 394.15 | 19454 |
| 2020 | 139.39 | 64.36 | 408.25 | 23141 |
| 2021 | 147.32 | 44.73 | 419.74 | 26267 |

*(Author's compilation)*

***Note**: GDP, FDI and AGR in Rupees; R&D in number of applications.*

## Appendix 4

## Dataset on the industrial factors of industrial emissions

| Year | IVA (in trillion) | EC (in thousand) | BANK (in thousand) | INDDEG |
|---|---|---|---|---|
| 2005 | 17.02 | 137.59 | 543.85 | 3407 |
| 2006 | 19.27 | 151.56 | 728.73 | 3584 |
| 2007 | 20.82 | 171.29 | 766.66 | 3873 |
| 2008 | 21.65 | 189.42 | 1018.61 | 4308 |
| 2009 | 23.57 | 209.47 | 1178.41 | 4267 |
| 2010 | 25.43 | 236.75 | 1551.03 | 4416 |
| 2011 | 26.35 | 272.59 | 1835.77 | 5156 |
| 2012 | 27.21 | 352.29 | 2114.54 | 5100 |
| 2013 | 28.24 | 365.99 | 2397.56 | 5182 |
| 2014 | 30.22 | 384.42 | 2568.66 | 6168 |
| 2015 | 33.11 | 418.35 | 2695.18 | 6829 |
| 2016 | 35.67 | 423.52 | 2579.12 | 6753 |
| 2017 | 37.76 | 440.21 | 2634.15 | 7534 |
| 2018 | 39.77 | 468.61 | 2749.38 | 8928 |
| 2019 | 39.21 | 519.20 | 2794.37 | 9381 |
| 2020 | 38.87 | 532.82 | 2760.22 | 8962 |
| 2021 | 43.38 | 508.78 | 2985.28 | 17497 |

*(Author's compilation)*

***Note**: IVA and BANK in Rupees; EC in Giga Watt Hour; INDEG in number of applications.*

## Appendix 5

## Dataset on the demographic factors of industrial emissions

| Year | POPD | URB | POV | EDU |
|---|---|---|---|---|
| 2005 | 388.3501 | 148948853 | 985356100 | 89461792 |
| 2006 | 394.3151 | 152708895 | 975772349 | 91529432 |
| 2007 | 400.1399 | 156590178 | 964090487 | 96049056 |
| 2008 | 405.8721 | 160602956 | 951276859 | 101783936 |
| 2009 | 411.5580 | 164735263 | 937452643 | 101110384 |
| 2010 | 417.2668 | 169008985 | 922774081 | 107686864 |
| 2011 | 422.9872 | 173423824 | 907207005 | 113727864 |
| 2012 | 428.6599 | 177985310 | 890619917 | 119148200 |
| 2013 | 434.2582 | 182699244 | 872971245 | 119400528 |
| 2014 | 439.6781 | 187571674 | 854076648 | 129438992 |
| 2015 | 444.9317 | 192608941 | 833998885 | 129542056 |
| 2016 | 450.2357 | 197817657 | 813167782 | 132161360 |
| 2017 | 455.4689 | 203204785 | 792534309 | 129829192 |
| 2018 | 460.4493 | 208777575 | 771775436 | 131316880 |
| 2019 | 465.1946 | 214179435 | 750111142 | 130932816 |
| 2020 | 469.6596 | 219690187 | 727523311 | 134043304 |
| 2021 | 473.4187 | 225286595 | 703442032 | 138364336 |

*(Author's compilation)*

***Note**: POPD in number of people per sq. km of land area; URB in number of people in urban agglomerations of more than 1 million; EDU in number of pupils.*

## Appendix 6

## Dataset on the demographic factors of industrial emissions

| Year | TCL | WS (in billions) | ENVTECH | CER |
|---|---|---|---|---|
| 2005 | 62504.674 | 13.5 | 162 | 48230 |
| 2006 | 67410.508 | 14.2 | 202 | 12950789 |
| 2007 | 73,906.52 | 14.9 | 213 | 21066026 |
| 2008 | 85952.756 | 15.6 | 293 | 20117353 |
| 2009 | 79202.849 | 16.3 | 364 | 18738421 |
| 2010 | 51317.106 | 17 | 462 | 9413729 |
| 2011 | 88460.359 | 17 | 515 | 44173118 |
| 2012 | 95068.558 | 17 | 486 | 3550063 |
| 2013 | 80865.736 | 17 | 498 | 26846266 |
| 2014 | 139137.75 | 17 | 458 | 11264541 |
| 2015 | 116308.12 | 17 | 538 | 8940524 |
| 2016 | 175362.34 | 17 | 526 | 12529907 |
| 2017 | 189420.97 | 17 | 545 | 15787343 |
| 2018 | 132232.99 | 17 | 541 | 9506016 |
| 2019 | 121154.44 | 17 | 556 | 4287455 |
| 2020 | 137715.54 | 17 | 758 | 4245310 |
| 2021 | 132747.59 | 17 | 510 | 12225189 |

*(Author's compilation)*

***Note**: TCL in hectare; WS in cubic metres; ENVTECH in number of patents; CER in units.*

## Appendix 7

## Dataset on the moderating variables

| Year | SECP | INDSTR |
|---|---|---|
| 2005 | 0.77 | 3.001815 |
| 2006 | 0.89 | 2.727865 |
| 2007 | 1.01 | 2.748199 |
| 2008 | 1.06 | 2.796941 |
| 2009 | 1.12 | 2.739192 |
| 2010 | 1.79 | 2.742767 |
| 2011 | 1.91 | 2.815614 |
| 2012 | 2.01 | 2.892526 |
| 2013 | 2.15 | 2.966769 |
| 2014 | 2.25 | 3.019422 |
| 2015 | 2.46 | 2.922714 |
| 2016 | 2.78 | 2.937236 |
| 2017 | 2.84 | 2.904893 |
| 2018 | 2.94 | 2.953405 |
| 2019 | 2.90 | 3.239673 |
| 2020 | 2.81 | 2.889105 |
| 2021 | 3.04 | 2.830828 |

*(Author's compilation)*

***Note**: SECP is the Environmental Policy Stringency Index; INDSTR is the ratio of Industrial Structure Improvement.*

# PUBLICATIONS AND CONFERENCES

## I. Journal Articles:

- Gogoi, N., and Hussain, F. (2023). Investigating the environmental Kuznets curve hypothesis and pollution haven hypothesis in India: an ARDL approach. *International Journal of Sustainable Economy*, 16(1):16–44.
- Gogoi, N. (2023). The growth of the Indian agro-based industry and its emissions: industrial relevance of the environmental Kuznets curve hypothesis. *Indian Growth and Development Review*, 16(3):247–267.
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## II. Book Chapters:

- Maria, M.B. and Gogoi, N. (2023). Effect of gender diversity on banking performance in India. *Conteporary Issues in Commerce Mangement and Social Sector Development*, pages 1-12, ISBN:978-81-923478-7-5.

- Gogoi, N. and Maria, M.B. (2023). A study on firm performance of the Indian Automobile Industry and its determinants, *BizQuest-Volume 4: Insights into the Paradigm Shifts in Commerce, Economy and Society*, pages 76-94, ISBN:978-81-19567-11-9. Eureka Publications.

## III. Conferences and Seminars:

- Paper presented in "Conversations on Research: IGIDR Ph.D. Colloquium" during 1-4 November 2022 entitled "*Industrial growth and environmental degradation: An industry-specific environmental Kuznets curve approach"*.

- Paper presented in 'Sustainable Development: Business Policy & Management Practices' during 5-6 May 2023 entitled "*Inorganic or organic fertilizers? Evidence from the Indian agro-based industry"*.

- Paper presented in international seminar "Research Symposium on Finance and Economic (RSFE) 2023" organized by IFMR Graduate School of Business, KREA

University during 14-16 June 2023 entitled "*Financial Development as a Means of Augmenting Economic Growth and Reducing Environmental Degradation: An Indian Perspective*".

- Paper presented in "International Seminar on Accounting, Finance, Business, and Social Sciences (ISAFBS'2023)" organized by Assam University, Alabama A& M University, and North Easter University during 14-16 September 2023 entitled "*Application of the Environmental Kuznets Curve Hypothesis in the Indian Core Industries*".
- Paper presented in "ISID National Conference Towards Industrial Transformation of India: Building an Inclusive, Sustainable, and Competitive Manufacturing Sector to Realize the 2047 Vision" during 4-6 October 2023 entitled "*Decoupling between Industrial Growth and Carbon Emission: Evidence from India's Core Industries*".
- Paper presented in "Symposium on Emerging Trends in Multidisciplinary Research" on March 18 2024 entitled "*Indian core industries and environmental degradation: Relevance of the environmental Kuznets curve hypothesis"*.