Table S1 Sector aggregation

Sectors in MRIO model	Sectors in this manuscript
Agriculture	Agriculture
Coal mining Petroleum and gas Metal mining Nonmetal mining	Mining
Food processing and tobaccos Textile Clothing, leather, fur, etc. Wood processing and furnishing Paper making, printing, stationery, etc. Petroleum refining, coking, etc. Chemical industry Nonmetal products Metallurgy Metal products	Traditional manufacturing
General machinery and specialist machinery Transport equipment Electrical equipment Electronic equipment	Strategic emerging manufacturing
Instrument and meter Other manufacturing, scrap and waste recycling	Traditional manufacturing
Electricity and hot water production and supply Gas production and supply Water production and supply	Public utilities
Construction	Construction
Transport, storage and post Wholesale and retailing Accommodation and food service activities Information and communication Finance Real estate activities Leasing and commercial services Education Human health and social work activities Arts, entertainment and recreation Other services	Services

Table S2 Definitions and categorizations of key variables in the Structural Decomposition Analysis (SDA) framework

Category	Symbol	Description & Definition	Eq.
Emission Factor	ε	Emission factor of fuel combustion, determined by fuel chemistry. It is defined as $NCV_i \times CC_i \times O_i$	(1), (4)
Energy Structure	e_s	Share of a specific energy type in total energy consumption (E_i^r / E^r)	(4)
Intensity Terms	e_i	Energy intensity: Total energy consumption per unit of economic output (E^r / X^r), indicating energy efficiency.	(4)
	F^r	Carbon intensity: Direct CO_2 emissions per unit of sectoral output. In the model, $F^r = \varepsilon e_s e_i$	(3), (4)
Leontief-Related Decompositions	l_e	Total factor productivity: Overall intermediate input required per unit of final output. A lower value indicates higher systemic efficiency.	(5)
	l_t	Sectoral input structure: Reflects technological linkages and the composition of intermediate inputs across sectors.	(5)
	l_s	Industrial transfer: Measures the geographical sourcing share of inputs, indicating the city's position in regional supply chains.	(5)
Final Demand Decompositions	y_c	Industrial structure: Composition of final demand across sectors (Y_c^* / Y_{sum}^*)	(6)
	y_l	Final demand level: Per capita final demand, approximating living standards or per capita GDP.	(6)
	p	Population scale: Total population.	(6)

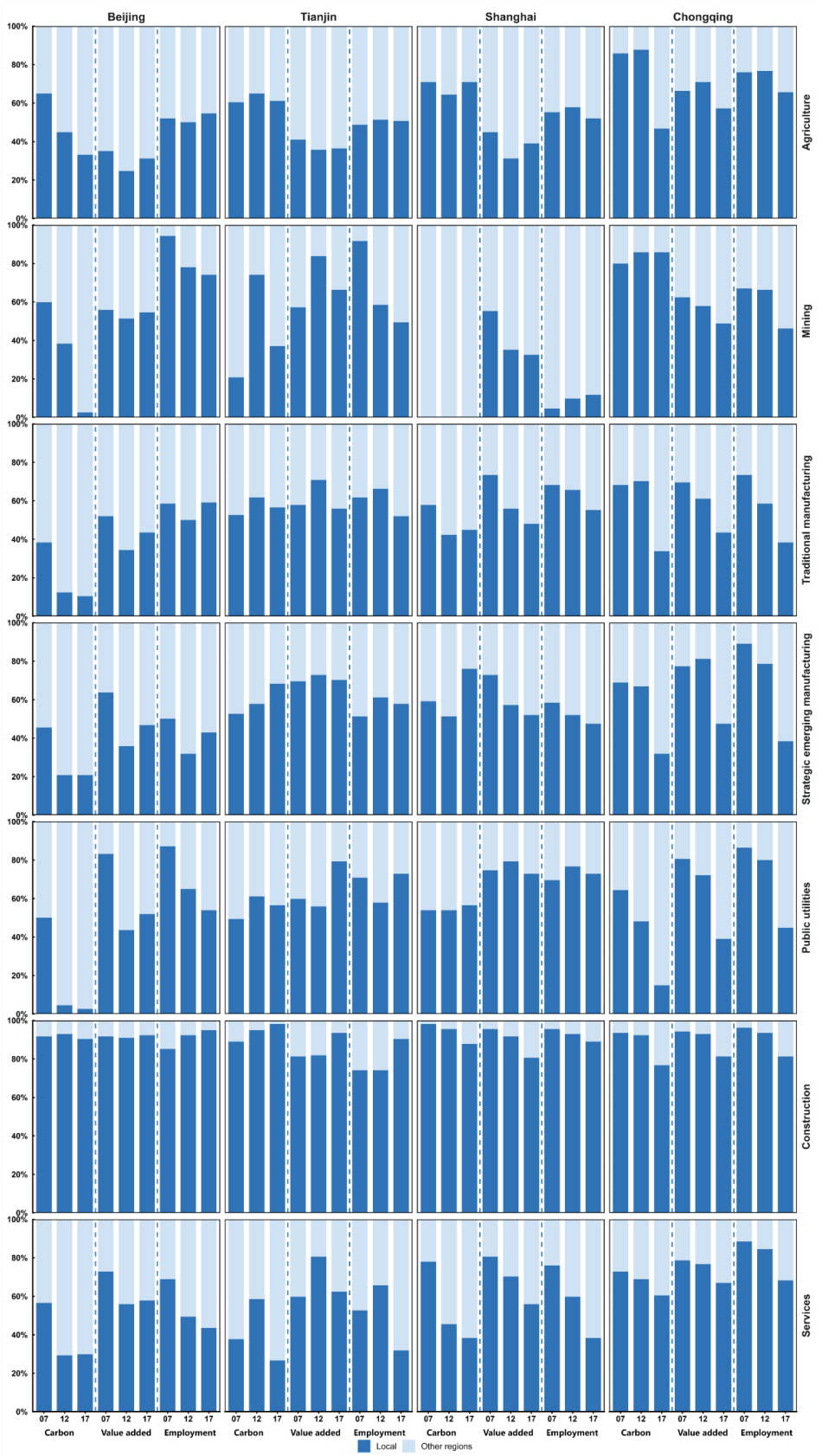

Figure S1 Proportion of sectoral outcomes in final products generated locally and in other regions