The Employment Profile of Cities around the World: Consumption vs. Production Cities and Economic Development

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Abstract

Census data for 7,000 cities – three fourth of the world's urban population – reveal that cities of the same population size in countries with similar development levels differ substantially in terms of their employment composition, especially in the developing world. Using these data, we classify cities into *production cities* with high employment shares of *urban tradables* (e.g., manufacturing or business services), *consumption cities* with high employment shares of *urban non-tradables* (e.g., retail and personal services), or *neutral cities* with a balanced mix of urban tradables and non-tradables. After establishing stylized facts regarding the sectoral distribution of employment in our global sample of cities, we discuss the various paths by which developing nations may urbanize through production cities – via industrialization or tradable services (as, for example, in Asia) – or consumption cities – via resource exports (Africa or the Middle East) or premature deindustrialization (Latin America). Country and city-level data corroborate our hypotheses. Results on the construction of very tall buildings also provide suggestive evidence on the relationship between resource exports and consumption cities. Importantly, consumption cities seem to present lower growth opportunities than production cities, diminishing the role of cities as "engines of growth." Understanding how sectoral structure mediates the urbanization-growth relationship and how consumption cities become production cites is thus highly relevant for policy.

Keywords: Structural Transformation; Urbanization; Consumption Cities; Industrialization; Natural Resources; Deindustrialization; Sectoral Employment; Informality; Construction

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Key messages:

- Production cities with high employment shares of urban tradables emerge via industrialization or expansion of tradable services.
- Consumption cities with high employment shares of urban non-tradables emerge via resource exports, agricultural exports, or deindustrialization.
- Cities in industrialized countries have more employment in urban tradables and more wage employment.
- Cities in resource-rich and de-industrializing countries have more employment in urban non-tradables and self-employment.
- Countries with mostly consumption cities appear to have lower growth opportunities than countries with mostly production cities.

While the developing world is half urban today, it will be two-thirds urban by 2050 (United Nations, 2018). This growth will be driven by sub-Saharan Africa, where the urban population will grow from 40 to 60 percent, followed by increases in urbanization in Asia from 50 to 67 percent and Latin America from 80 to 90 percent. It is crucial to understand how urbanization shapes the economic structure of developing countries' cities and the type of jobs available to their residents. Yet, little is known on how much, and why, cities across the world differ in terms of sectoral or informal employment.

Promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, and *making cities and human settlements inclusive, safe, resilient and sustainable* are U.N. Sustainable Development Goals 8 and 11, respectively. However, there is a "good jobs challenge" in many developing countries (Danquah et al., 2021; Danquah and Sen, 2023; Fields et al., 2023; Danquah, 2023). This paper contributes to understanding the spatial dimensions of this challenge.

Traditionally, the urbanization process has been linked to a virtuous circle between economic development and urbanization (World Bank, 2008; Henderson, 2010; Duranton, 2015; OECD, 2022) and it has been seen as a by-product of structural transformation, since people move out of agriculture to engage in urban-based manufacturing and service activities (Rodrik and McMillan, 2011; McMillan et al., 2014; Herrendorf et al., 2014). Urbanization can also proceed *without* growth (Fay and Opal, 2000; Fox, 2012; Glaeser, 2014; Jedwab and Vollrath, 2015; Castells-Quintana and Wenban-Smith, 2020).

Structural change occurs due to *Green Revolutions*, which increase food productivity and push labor out of agriculture (Gollin et al., 2002; Restuccia et al., 2008; Yang and Zhu, 2013; Gollin et al., 2018), and *Industrial* or *Service Revolutions*, which increase manufacturing or service production and pull labor out of agriculture (Hansen and Prescott, 2002; Lucas, 2004; Alvarez-Cuadrado and Poschke, 2011; Lin, 2011; Lin and Xu, 2018).

Gollin et al. (2016) (henceforth GJV16) show that only some developing countries have followed the path of urbanization with industrialization historically observed in richer nations. In these countries, manufacturing and tradable services agglomerated in *production cities* whose growth was driven by their *production* capacity. In others, the spending of resource rents on urban goods and services led to *consumption cities* whose growth was driven by increased *consumption* capacity. Since manufactured goods and tradable services – *urban tradables* – are often imported, non-tradable services – *urban non-tradables* – dominate their sectoral composition. The concept of consumption cities has been frequently used by international organizations to describe Africa's process of urbanization (UN, 2015; UNECA, 2015; UN-Habitat, 2020, 2022).

Whether urbanization is occurring with or without structural transformation, and through production or consumption cities, is central to understanding a country's ability to meet the SDGs. Productivity in urban tradables varies little across countries, and productivity catch-up in these sectors explains some of the large gains in aggregate productivity across countries (Duarte and Restuccia, 2010). Hence, low productivity in urban non-tradables in developing economies, and the lack of catch-up in this sector, might contribute to explaining the lack of international convergence. Returns to education and work experience, i.e. the rates of human capital accumulation at work, may also vary across sectors (Islam et al., 2019). Likewise, agglomeration economies may vary by sectors (Turok and McGranahan, 2013; Venables, 2017; Burger et al., 2022).

We show that for a given population size and a given level of economic development, cities dramatically vary in their sectoral composition across the world. Using census microdata, we obtain the sectoral composition of 7,000 cities comprising three-fourths of the world's urban population. Classifying them as production, consumption, or more diversified, neutral cities, depending on their employment share of manufacturing and tradable services, we establish novel stylized facts on the global distribution of urban employment. In contrast, GJV16 did not study cities due to lacking geospatial city-level data at the time.

We next discuss how countries can urbanize because of: (i) industrialization (including tradable, or "industrialized", services); (ii) fuel, mining, and high-rent agricultural exports; and (iii) other agricultural exports that despite the use of rural labor generate enough resource rents for the country to urbanize due to rapid agricultural productivity growth or strong external demand. Urbanization generated by resource rents differs from industrialization-led urbanization in that cities have different employment shares of tradables. Many countries have also experienced deindustrialization (Rodrik, 2016; Schindler et al., 2020; Atolia et al., 2020; Gillespie and Schindler, 2022), which may not cause de-urbanization. Yet, since the country deindustrializes, its cities do so as well. Thus, in this case, formerly industrialized cities become consumption cities because they lose their production capacity. Ultimately, industrialization-led urbanization leads to production cities with employment predominantly in sectors producing tradables whereas the other types of urbanization lead to consumption cities with employment mostly in non-tradable activities.

Using a sample of 116 developing countries and long-difference and panel regressions for the period 1960-2020, we confirm GJV16's results that (i) higher urban shares are found in countries with higher GDP shares of manufacturing & services, a proxy for industrialization broadly defined (including industrialized/tradable services); and (ii) countries exporting fuel and mining products are also more urbanized. Unlike GJV16, we also show that countries can also urbanize through agricultural exports and that urban shares remain mostly unchanged when countries deindustrialize.

We then take advantage of newly available data, including the Integrated Public Use Micro Series (IPUMS) census data for about 60 countries over time and the *International Income Distribution Database* (I2D2) household survey data for about 90 countries over time, to examine the correlations between the sectoral structure of urban areas and industrialization, resource exports, and deindustrialization.[1] We improve on the initial work of GJV16 by: (i) using consistent individual-level census data for 60 countries and household survey data for 90 countries;[2] (ii) studying the effects of deindustrialization on the urban employment structure; (iii) examining sectoral differences in employment, including informality and other sectors not covered in GJV16, in countries that followed different paths to urbanization; (iv) exploring how these differences vary along the city size distribution; and (v) relying on panel and not just cross-sectional regressions (as in GJV16). Our results suggest that cities in industrialized countries have more employment in urban tradables (UT) and more wage employment, while cities in resource-rich and deindustrializing nations have higher shares of urban non-tradables (UNT) and self-employment. The observed differences across countries are stable across city sizes. Thus, the origin of the urbanization process may impact the largest cities, hence countries' "engines of growth" (World Bank, 1999, 2008).

As we do not have data directly linking resource exports to sizeable consumption effects in cities, we employ novel data on construction across countries to explore whether

[1]The World Bank's I2D2 consists of individual-level information from 1,500 household surveys.

[2]GJV16 had to combine the IPUMS data that was available for few countries a decade ago with summary tables in reports of the census or household survey of other countries, causing consistency issues.

the spending of resource rents generates "white elephant" projects and alters not only the economic but also the physical structure of cities. This remarkable data set inventories all the world's tall buildings with a height above 80 meters (20 floors) and provides information on their year of construction. We find that exporting natural resources correlates with the construction of tall buildings whose economic rationale might be questionable.[3]

Finally, while GJV16 does not provide evidence on the growth effects of these different types of urbanization, we find that consumption cities may present lower growth opportunities than production cities. Based on evidence on the number of years of schooling, education quality, and the returns to education in urban areas globally, de-industrialized consumption cities have less human capital than production cities. Furthermore, urban returns to experience are lower in countries with more consumption cities, suggesting less human capital accumulation at work. Additionally, for a given level of human capital, consumption cities have higher employment in non-tradables and the informal sector, implying that their human capital is employed in less productive sectors. Indeed, we find large conditional wage gaps between tradables and non-tradables.

We contribute to the literature on the determinants, characteristics, and consequences of urbanization across countries (Gollin et al., 2014; Christiaensen and Todo, 2014; Zhao et al., 2017; Gollin et al., 2021; Huang et al., 2023; Randolph and Storper, 2023). We study not only the links between changes in economic and export structures and the nature of the urbanization process at the country level, but also structural change at the city level. In addition, we examine how the "origin" of the urbanization process may shape the relationship between urbanization and growth via the type of cities that emerge and the available urban human capital. In that, our study connects with studies on the relationship between urbanization and development (Beall and Fox, 2009; Fox, 2014; Turok and McGranahan, 2013; Castells-Quintana, 2017; Mijiyawa, 2017; Ingelaere et al., 2018; Jones et al., 2020; Sheng et al., 2022; Turok et al., 2023). Much like the macro-development literature, we use a model of structural change and data to establish new stylized facts regarding the development process. We consider the potential effects of various factors rather than focusing on identifying a causal effect for one of them, which

[3] Studies on construction include Collier et al. (2016); Kirchberger (2020); Kirchberger and Beirne (2021).

would not be credible anyway since we compare countries.[4]

We also contribute to the literature showing that developing countries may deviate from the "standard" path of structural transformation according to which economies experience declines in agricultural employment, then a rise and fall of manufacturing concomitant with a continuous expansion of their service sector. Rodrik (2016) and Atolia et al. (2020) show how countries in Latin America and elsewhere have experienced premature deindustrialization. Sen (2019), Kaba et al. (2022), Huang et al. (2023) and Danquah and Sen (2023) describe how workers in many African countries are moving directly from agriculture to non-tradable services, a less dynamic sector than manufacturing. Kruse et al. (2023) and Mijiyawa (2017) show that countries can experience a "manufacturing renaissance" where manufacturing falls and rises again, for example in Africa due to rising labor costs in China (Xu et al., 2017; Lin, 2018). However, Africa's manufacturing renaissance appears driven by firms in the informal sector, which is often found to be a "dead end" sector rather than a "stepping-stone" towards formal employment (Turok and Borel-Saladin, 2018; Danquah et al., 2021). We study the effects of resource exports, agricultural exports, and deindustrialization on urbanization and examine sectoral employment *in* cities.[5]

The paper is structured as follows. Section 1. discusses the data and methodology for classifying cities into production, consumption, or neutral cities. Section 2. discuss the paths by which countries urbanize through the emergence of production or consumption cities. Section 3. examines the respective roles of natural resources, industrialization, agricultural exports, and de-industrialization in urbanization. Section 4., 5. and 6. study the role of these factors for urban employment, construction, and growth, respectively. Section 7. offers some concluding remarks.

1. The Global Sectoral Composition of Cities

Since the work of GVJ16, many countries have added censuses to the IPUMS repository (Minnesota Population Center, 2020) and GIS files of the second level administrative

[4]See Huang et al. (2023) for a causal analysis of the local effects of mining booms.

[5]You et al. (2023) finds that higher agricultural endowment per capita can impede structural transformation out of agriculture locally. In our case, agricultural exports tend to lead to urbanization nationally through rents generated because of growing agricultural productivity or strong demand for agricultural exports. We, however, find weaker correlations in our panel regressions than in the long-difference framework, as agro-towns take time to emerge when agricultural exports increase.

units in which a household is located (e.g., *municipalities* in Latin American countries). Furthermore, the Global Human Settlements Layer database (GHSL) provides geocoded polygons of city boundaries for the world c. 2015 (Schiavina et al., 2019). More precisely, they identify "Functional Urban Areas" (FUAs), i.e. commuting zones of at least 50,000 residents. Combining the data sets, which include 76 countries and 191 country-years (1960-2015), allows us to obtain the sectoral composition of most world cities and classify each city as a *production city*, a city with a disproportionately high share of tradables, a *consumption city*, a city with a disproportionately low share of tradables, or a *neutral city*, which has a more balanced employment mix.

1.1. Data

We process the data as follows. First, we select urban observations. Second, we use the information on the resident's second level administrative unit to identify their FUA. Third, we focus on observations in manufacturing (MFG) and financial services, insurance, business services and real estate (FIRE), which are part of IPUMS' 16-group employment classifications, and which we use as proxies for urban tradables.

To ensure that we have enough countries for our comparison, we select for each country-FUA the closest year to the year 2000 (within the 1990-2015 period). We are left with 6,865 FUAs in 74 countries, which include 3 billion people and account for 75% of the world's urban population. Lastly, GHSL reports their population size c. 2000.

1.2. Methodology

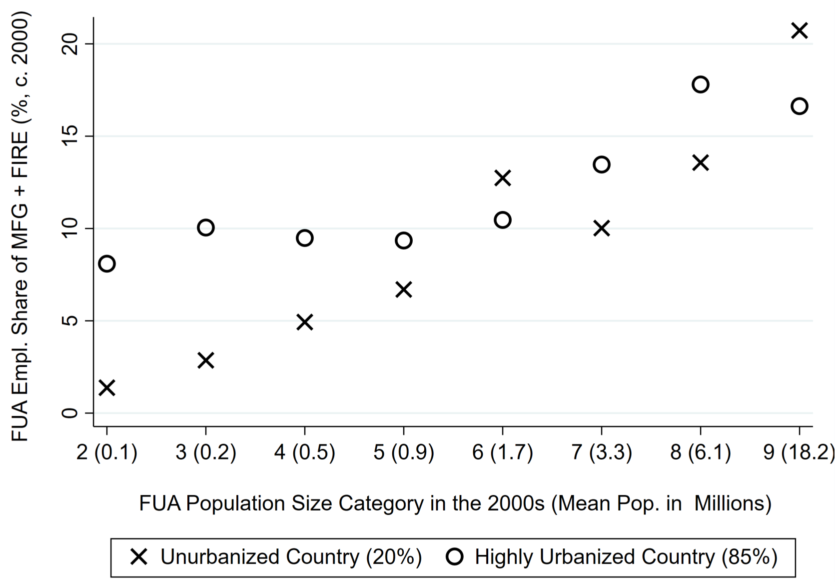
To identify the cities with high shares of tradables (MFG+FIRE) relative to other cities of the same size and for a given level of urban economic development, we categorize the FUAs in 10 deciles. Based on a range of log population from 10.8 (50K) to 17.2 (30 million), the thresholds are: 95K, 180K, 341K, 648K, 1,227K, 2,306K, 4,377K, 8,351K, and 15,570K. We aggregate the top two bins because they have too few FUAs and run a regression relating the FUA's employment share in MFG+FIRE (%) c. 2000 to 8 size category (CAT) dummies (omitting the lowest size category) and their interactions with the 2000 urban share (URB) of the country. We add a dummy for the capital city (CAP). For FUA a in country c and population category p, the model is:

$$\text{MFGFIRE}_{a,c,2000} = \alpha + \Sigma_{p=2}^{9} \beta_p \mathbb{1}(\text{CAT}_a = p) + \Sigma_{p=2}^{9} \gamma_p \mathbb{1}(\text{CAT}_a = p) * \text{URB}_c + \delta \text{URB}_c + \zeta \text{CAP}_a + \mu_a$$

Finally, we use the FUA population values as weights.[6]

Figure 1 shows the implied relative employment share in MFGFIRE of each FUA population size category for a mostly unurbanized country (we choose 20% for the urban share) and a highly urbanized country (85%) (Appx Table D.1 shows the coefficients). Urbanized countries have higher urban shares of MFGFIRE. The share is higher for smaller cities since MFG leaves larger cities as countries develop. The regression residual measures to what extent the FUA has a high or low MFGFIRE share (%), given its size and its country's economic development. The 5th, 10th, 25th, 75th, 90th and 95th percentile values are ≈ -15, -10, -5, 5, 10 and 15.

Figure 1: Employment Share of Urban Tradables by City Size, Cross-Section (%), c. 2000



Notes: The numbers in parentheses on the x-axis are the mean population size (millions) of the population category.

In our classification, a *production city* is any FUA with a residual – or *production city index* (PCI) – above 5, indicating a city with a disproportionately *high* share of employment in tradables. Our definition further distinguishes production cities with a "low" (5-10), "medium" (10-15) or "high" (15+) PCI. A *consumption city* is any FUA with a PCI below -5, also distinguishing consumption cities with a "low" (-5;-10), "medium" (-10;-15) or "high" (-15+) PCI. Cities in the [-5; 5] range are *neutral* as they have a more

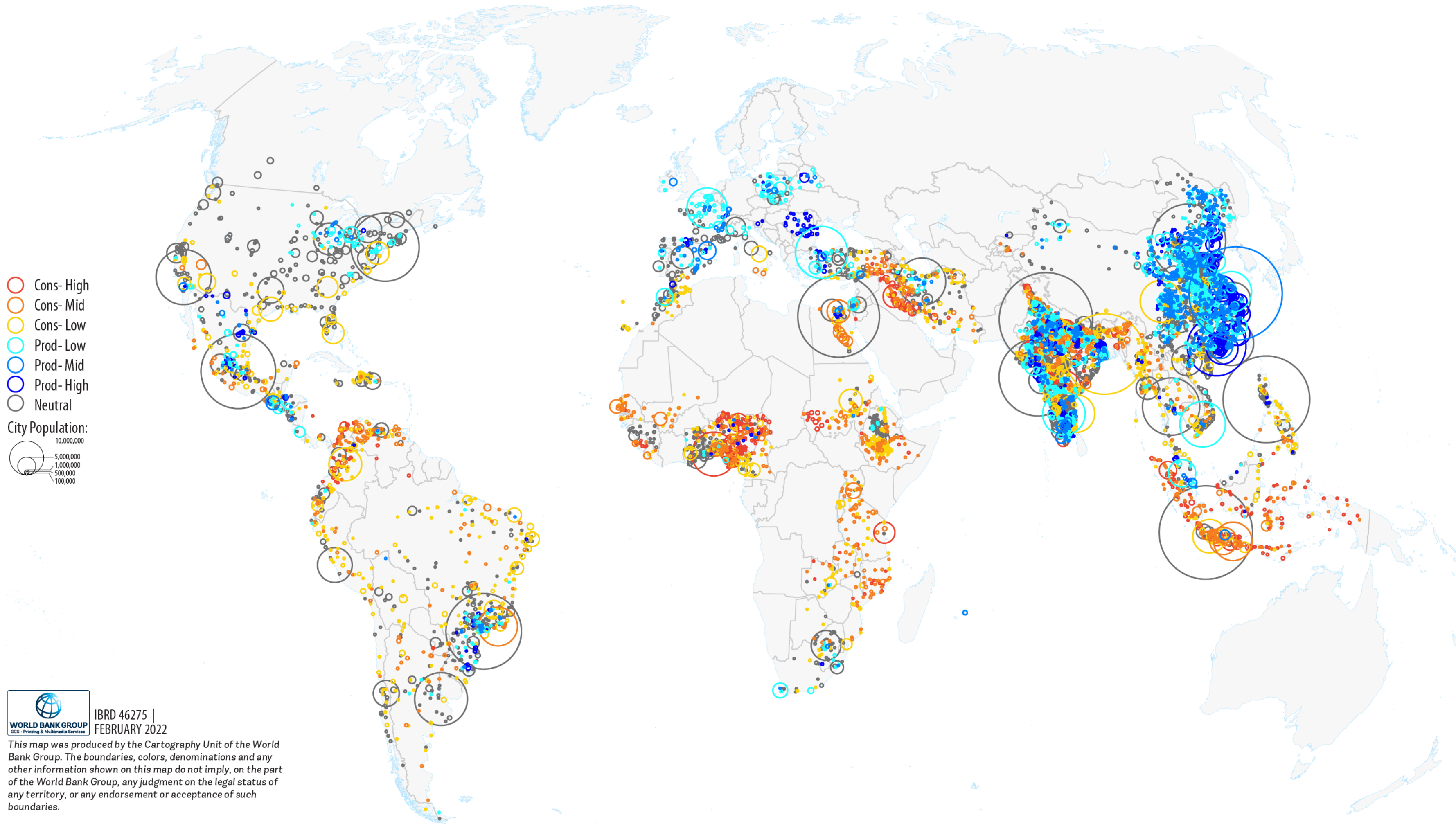
[6]Some large, developed countries are missing in IPUMS. To increase sample representativeness, we divide all the countries in the world into ten deciles based on their per capita GDP (PPP). We then obtain the share of each decile in the world's urban population and compare these shares to the shares in our sample. Based on the differences, we modify the weights to oversample richer countries.

balanced employment mix, i.e. a more diversified employment structure.[7]

Note that the estimated residuals are very strongly correlated with the residuals we obtain if we (Appx. Section A): (i) include the square, cube, and perfect fourth of the urban share, and their interactions with the population dummies, in case there are non-linearities; (ii) use log per capita GDP instead of the urban share or control for the urban definition used by each country; (iii) compare the raw (non-residualized) employment shares; (iv) use other weights; (v) consider other classifications for the population dummies; and (vi) study urban non-tradables or informal employment.

[7]The coefficient for the Capital City dummy is -5.43**, implying that they are less well-ranked than other cities in terms of production city-ness. 5 is the "distance" used to distinguish the different cut-offs.

Figure 2: Production Cities and Consumption Cities, 74 Countries, c. 2000



Notes: Production cities (blue), neutral cities (grey), and consumption cities (yellow/orange/red). High / Mid / Low = high / medium / low values.

Table 1: Country- and Region-Level Production City Index (PCI) c. 2000

Panel A: Developed and Developing Economies with Data on Sectoral Structure in IPUMS

Rank	Country	PCI	Rank	Country	PCI	Rank	Country	PCI
1	Romania	24.6	26	**South Africa**	1.4	51	Peru	-4.7
2	Lesotho	20.3	27	Togo	1.0	52	Ecuador	-5.0
3	Slovenia	18.6	28	Jamaica	0.7	53	Myanmar	-5.3
4	Mauritius	14.7	29	Papua New Guinea	0.2	54	Haiti	-5.6
5	Ireland	12.4	30	Morocco	0.2	55	**Ethiopia**	-5.6
6	Belarus	12.0	31	**Thailand**	-0.1	56	**Egypt, Arab Rep.**	-5.7
7	Honduras	10.8	32	**India**	-0.6	57	Malawi	-6.2
8	**China**	8.8	33	**Philippines**	-0.9	58	Venezuela, RB	-6.4
9	Malaysia	8.2	34	Chile	-1.0	59	Rwanda	-7.5
10	Costa Rica	8.2	35	Dominican Rep.	-1.2	60	Zambia	-7.7
11	Israel	6.7	36	Benin	-1.4	61	Cameroon	-8.3
12	Poland	6.2	37	**Italy**	-1.4	62	Colombia	-9.7
13	**France**	6.0	38	**United States**	-1.9	63	Cambodia	-10.2
14	Portugal	5.9	39	Guinea	-2.0	64	Sudan	-10.3
15	Spain	5.5	40	Armenia	-2.3	65	Uganda	-10.3
16	Guatemala	4.5	41	Botswana	-2.5	66	**Indonesia**	-10.5
17	El Salvador	4.3	42	Paraguay	-3.1	67	Mozambique	-10.8
18	Lao PDR	3.8	43	**Brazil**	-3.1	68	Mali	-11.0
19	Fiji	3.6	44	Bolivia	-3.2	69	Liberia	-11.3
20	Nepal	2.9	45	Argentina	-3.3	70	Senegal	-12.1
21	**Turkey**	2.7	46	Panama	-3.6	71	Sierra Leone	-14.5
22	**Vietnam**	2.7	47	**Iran, Islamic Rep.**	-3.6	72	**Tanzania**	-14.8
23	Canada	2.3	48	Ghana	-3.8	73	**Nigeria**	-15.0
24	**Mexico**	2.2	49	Jordan	-3.8	74	Iraq	-17.2
25	Nicaragua	1.9	50	Kyrgyz Republic	-4.2			

Panel B: Considering Developing Economies Only

Rank	Region	PCI	Rank	Region	PCI	Rank	Region	PCI
1	Asia	2.3	3	Latin America	-2.3	5	Sub-Saharan Africa	-9.2
2	Oceania	0.8	4	Middle-East & North Africa	-7.4			

Rank	U.N. Subregion	PCI	Rank	U.N. Subregion	PCI	Rank	U.N. Subregion	PCI
1	Eastern Asia	8.8	5	Caribbean	-2.6	9	Eastern Africa	-8.2
2	Central America	2.8	6	South America	-4.3	10	Middle Africa	-8.3
3	Southern Africa	1.5	7	South-Eastern Asia	-5.1	11	Western Africa	-12.2
4	Southern Asia	-0.8	8	Northern Africa	-5.6	12	Western Asia	-14.6

Notes: Panel A: We highlight countries that are among the 25 most populated countries in the world today.

1.3. Results

Fig. 2 shows the distribution of production cities (in blue), consumption cities (red), and neutral cities (grey) c.2000. Paler shades of the blue and red colors indicate lower residual values for the extent to which a city can be classified as a production or consumption city. Production cities are mostly located in Asia, Europe, and North America.

Unlike China, India has a mix of specialized production and consumption cities. Apart from some large production cities in Malaysia and Vietnam, other Asian cities are either consumption or neutral cities (Appendix Figure D.1 focuses on Asia).

With the exception of South Africa, most African cities are consumption cities, with more extreme consumption cities (in red) in Nigeria, Sierra Leone, or Sudan, alluding to the important role of resource exports (Appendix Figure D.2).

North America (Appx. Fig. D.4) has many production cities located in the North-East of the U.S. and the North and Center of Mexico (due to maquiladoras or Mexico City). Production cities are seen in Central America, where production sharing brought in manufacturing activities from the U.S. (or Mexico) following reforms in the 1990s.[8]

In South America (Appx. Fig. D.5), only the Southeastern areas of Brazil have production cities. In the rest of Brazil, Argentina, and Chile, cities are either neutral or consumption cities. Colombia, Peru, and Venezuela have more consumption cities.

Table 1 shows the (pop.-weighted) average PCI for the 74 countries in our sample, highlighting the ones among the 25 most populated countries in the world. High-PCI developing economies include China, but also Turkey, Vietnam, Mexico, and South Africa. Low-PCI ones include Nigeria, Tanzania, Indonesia, Egypt, and Ethiopia.

Considering developing nations only, Asia has more production cities (PCI = 2.3), whereas sub-Saharan Africa (SSA) has more consumption cities (-9.2), followed by the Middle East and North Africa (-7.4), and Latin America (-2.3) (Panel B of Table 1).

Focusing on the subregional classification of the U.N. (same panel), we find that Eastern Asia (8.8), Central America (2.8) and Southern Africa (1.5) have production cities. Western Asia (-14.6), Western Africa (-12.2), Central Africa (-8.3), and Eastern Africa (-8.2) are the regions with a disproportionately high share of consumption cities.

Figure 3 below separately considers MFG and FIRE, classifying production cities

[8]Productive urbanization increases and consumption cities disappear as one moves away from the "edge" of Europe, i.e. Southern Spain or Eastern Turkey (Appx. Fig. D.3).

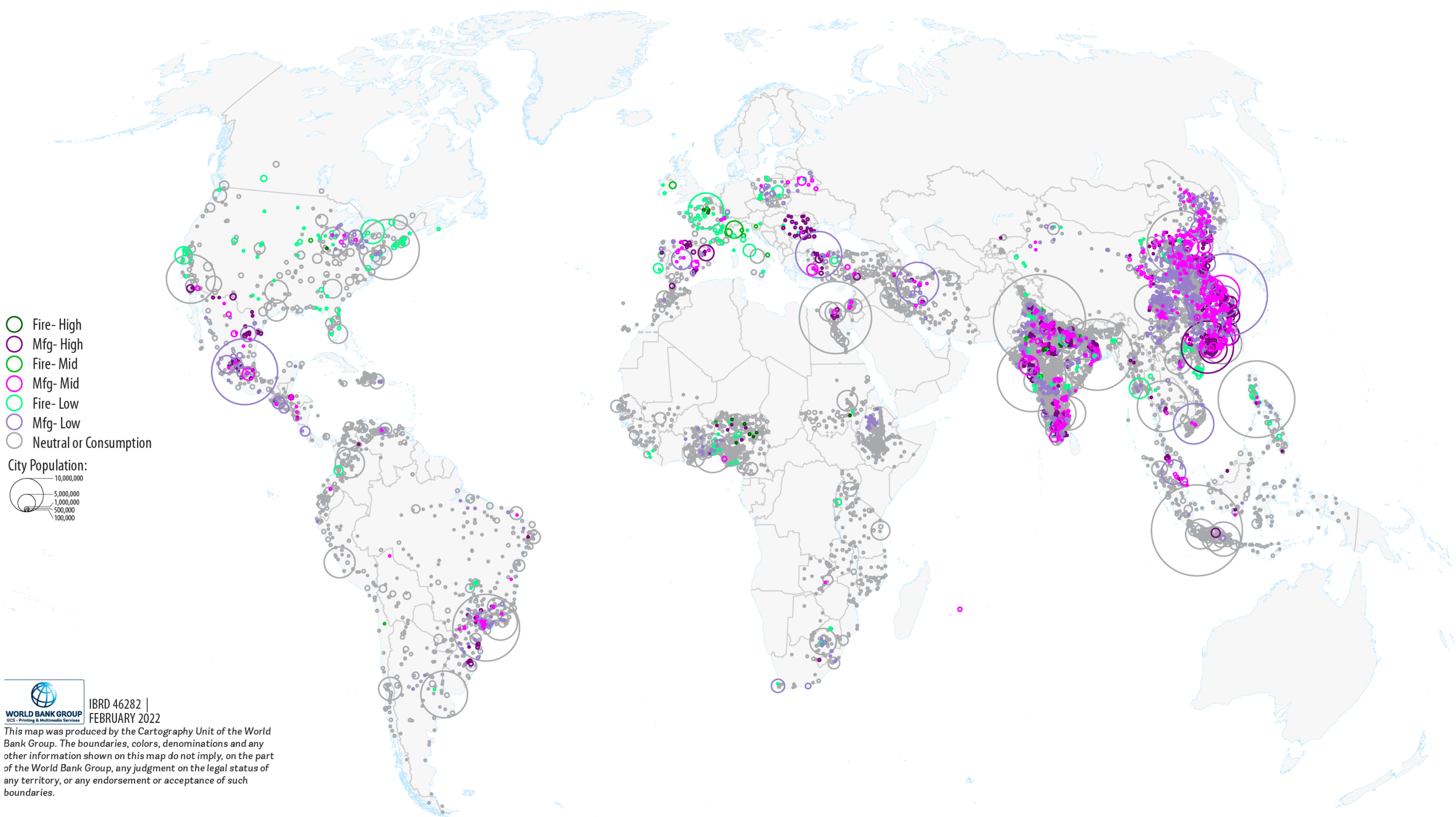
according to their leading sector. While cities in green are production cities because of their high MFG shares (e.g., Guangzhou and Ho Chi Minh), cities in purple have high shares of tradables services, proxied with FIRE (e.g., Bangalore and Paris). Most production cities in developed countries appear to be FIRE cities and in developing countries, MFG cities.

Lastly, Table 2 classifies 27 FUAs with ten million or more residents. Ho Chi Minh, Bangalore, Istanbul, and Paris, as well as all Chinese megacities are production cities. Kolkata, Chennai, Lagos, Rio de Janeiro, and Surabaya are consumption cities.

Table 2: Production/Consumption City Classification for the Largest World Cities, c. 2000

Rank	Name	Category	PCI	Pop. 2000s (Mil.)	Country
1	Delhi	Neutral	-2.0	30.1	India
2	Jakarta	Neutral	-4.8	29.8	Indonesia
3	Shanghai	Prod-Mid	10.3	26.9	China
4	Manila	Neutral	1.3	25	Philippines
5	Cairo	Neutral	-1.0	23.5	Egypt
6	Kolkata	Cons-Low	-5.7	23.1	India
7	Mumbai	Neutral	-2.0	22.3	India
8	Sao Paulo	Neutral	0.5	21.7	Brazil
9	Mexico City	Neutral	1.4	21.4	Mexico
10	Beijing	Neutral	2.7	21.3	China
11	New York	Neutral	-4.4	19.5	USA
12	Guangzhou	Prod-High	15.8	16.7	China
13	Bangkok	Neutral	1.0	16.3	Thailand
14	Los Angeles	Neutral	-2.5	15.7	USA
15	Buenos Aires	Neutral	0.0	15	Argentina
16	Istanbul	Prod-Low	6.3	14.8	Turkey
17	Tehran	Neutral	0.9	13.4	Iran
18	Ho Chi Minh	Prod-Low	6.7	12.8	Vietnam
19	Jieyang	Neutral	-3.1	12.7	China
20	Lagos	Cons-High	-18.0	12.3	Nigeria
21	Bangalore	Prod-Low	5.3	11.9	India
22	Chengdu	Cons-Low	-6.7	11.7	China
23	Suzhou	Prod-Low	9.9	11.4	China
24	Paris	Prod-Low	7.4	11.2	France
25	Rio de Janeiro	Cons-Mid	-10.1	10.8	Brazil
26	Surabaya	Cons-Mid	-12.7	10.8	Indonesia
27	Chennai	Cons-Low	-8.7	10.6	India

Figure 3: Production Cities in Manufacturing or FIRE, World, c. 2000



Notes: Production cities based on MFG (purple), neutral production cities (grey), and production cities based on FIRE (green).

1.4. National vs. City-Specific Factors

If all cities of countries with more employment of urban non-tradables are consumption cities, then national factors are at play. But if such countries also have some large production cities in them, then local factors play a role. Based on (pop.-weighted) Theil decompositions, half of the global variation in city-level PCIs comes from differences within countries. Local factors are thus as important as national factors.

Alternatively, we estimate the degree of statistical dispersion (Gini index) of the PCI within each country (Table 3). India has a higher Gini than China.[9] Nigeria and Indonesia have higher Ginis than Brazil and Mexico. The urban system of high-Gini countries is chronically "dualistic", or it is transitioning. Low-Gini developing nations with a more uniform urban system include South Africa, Thailand, Vietnam, and the Philippines.

Table 3: Gini Index of the Production City Index c. 2000

Rank	Country	Gini	Rank	Country	Gini	Rank	Country	Gini
1	**Nigeria**	0.31	26	Botswana	0.10	51	Jamaica	0.06
2	Colombia	0.24	27	Myanmar	0.10	52	Senegal	0.05
3	**India**	0.20	28	Mozambique	0.10	53	Cambodia	0.05
4	**Indonesia**	0.19	29	Iraq	0.10	54	Portugal	0.05
5	**Tanzania**	0.16	30	Ecuador	0.10	55	El Salvador	0.05
6	**Iran, Islamic Rep.**	0.16	31	Argentina	0.09	56	Paraguay	0.05
7	**Egypt, Arab Rep.**	0.15	32	**United States**	0.09	57	Belarus	0.04
8	Venezuela, RB	0.14	33	**Vietnam**	0.09	58	Ghana	0.04
9	**Brazil**	0.14	34	Bolivia	0.08	59	Uganda	0.04
10	**Mexico**	0.14	35	**South Africa**	0.08	60	Nepal	0.04
11	**Turkey**	0.14	36	Lao PDR	0.08	61	Togo	0.04
12	**Ethiopia**	0.14	37	Peru	0.08	62	Armenia	0.03
13	Sudan	0.14	38	**Philippines**	0.08	63	Israel	0.03
14	Malaysia	0.13	39	**Thailand**	0.08	64	Liberia	0.03
15	Guatemala	0.13	40	Jordan	0.07	65	Mali	0.03
16	**China**	0.12	41	Benin	0.07	66	Haiti	0.03
17	Spain	0.12	42	Sierra Leone	0.07	67	Guinea	0.02
18	Morocco	0.12	43	Panama	0.07	68	Rwanda	0.02
19	Papua NG	0.12	44	Romania	0.06	69	Ireland	0.02
20	**Italy**	0.12	45	Chile	0.06	70	Slovenia	0.01
21	Honduras	0.11	46	Dominican Rep.	0.06	71	Costa Rica	0.00
22	Cameroon	0.11	47	**France**	0.06	72	Fiji	0.00
23	Kyrgyz Republic	0.11	48	Canada	0.06	73	Mauritius	0.00
24	Zambia	0.11	49	Poland	0.06	74	Lesotho	0.00
25	Nicaragua	0.11	50	Malawi	0.06			

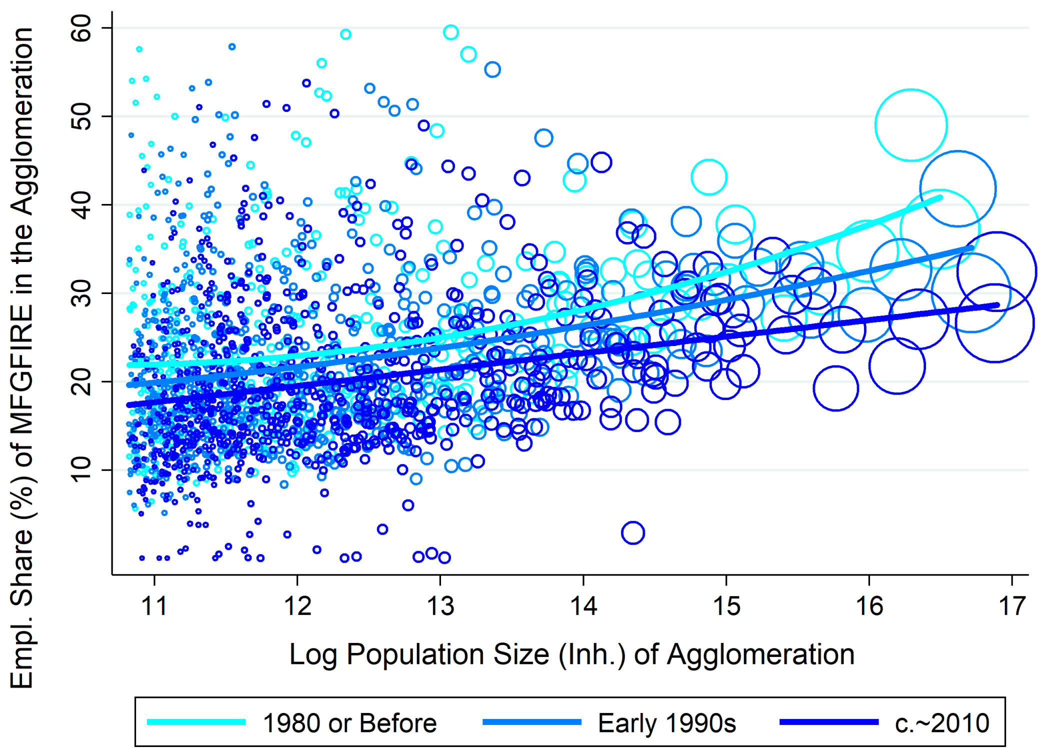
Notes: We highlight countries among the 25 most populated countries in the world today.

Finally, Figure 4 shows how, for a given size, cities in Latin America and the Caribbean

[9] But China's Gini is not among the lowest, as China has both extreme and moderate production cities.

(LAC) have experienced dramatic sectoral employment changes over time (only LAC has good coverage since the 1970s in IPUMS). Using data for 8 countries, we estimate LAC's mean (pop.-weighted) urban employment share of tradables for the periods "pre-1980", "early 1990s" and "c.2010". Employment in tradables has declined over time, especially in the largest cities (-15 p.p.). Large LAC cities have thus increasingly become consumption cities, possibly due to deindustrialization and strong demand for resource and agricultural exports in China and other foreign markets.

Figure 4: MFGFIRE Employment in Cities, LAC, 1960s-2010s



Notes: The figure was created using FUA-specific data for 8 countries: Argentina ('80 '91 '01), Bolivia ('76 '92 '12), Brazil ('80 '91 '10), Chile ('82 '92 '02), Colombia (73 '93 '05), Ecuador ('62 '90 '06), Guatemala ('81 '94 '02), Mexico ('70 '90 '10), Panama ('80 '10), Paraguay ('82 '92 '02), Peru ('93 '17), Venezuela ('81 '90 '01).

2. Paths to Consumption Cities

We summarize our macro-economic model of structural change from Appx. Section B that delivers several predictions regarding the rise of consumption cities.

We consider four sectors: (i) *urban tradables* (MFGFIRE); (ii) *urban non-tradables* (e.g., wholesale & retail trade + personal services); (iii) *agriculture*, which produces a tradable agricultural good (e.g., crops and livestock); and (iv) *natural resources*, which generate foreign exchange earnings and include fuels and mining products, but also cash crops characterized by high rents (e.g., cash crops whose production requires little labor). The model offers three paths to urbanization through consumption cities.

(A) A resource boom due to a resource discovery or a boost to commodity prices on account of strong external demand (e.g., for oil or copper) boosts resource revenues and influences urbanization through two channels: (i) an income effect, which through non-homotheticities in the domestic demand for food – i.e., the fact that the consumption share of urban goods and services increases as incomes increase – pulls workers into urban sectors; and (ii) export earnings increase domestic demand for non-tradable services and pull workers away from agriculture and urban tradables. Indeed, as urban tradables can be imported, the export earnings are typically used to cover the cost of imported food and urban tradables, which comes at the expense of their domestic production. Therefore, consumption cities arise because of these countries' increased consumption capacity.

(B) An agricultural boom due to agricultural productivity growth or a boost to agricultural prices on account of strong external demand (e.g., for soybeans or beef) has an income effect and a foreign earnings effect. Both result in a disproportionate increase of urban non-tradables, while the increase in foreign earnings enables the importing of urban tradables, whose share in employment may decrease. Hence, cities are more likely to be consumption cities. When the country has relatively low agricultural productivity, the stronger external demand must be met by increased agricultural labor, which slows down migration from rural to urban areas. If agricultural productivity is high enough and less rural labor is needed, the urban share can increase on net.

(C) De-industrialization occurs due to the removal of import-substitution industrialization policies, trade competition, or labor-saving technologies that reduce the share of manufacturing employment. Production cities in already urbanized economies gradually become consumption cities if urban residents leave the manufacturing sector (and FIRE) and find employment in urban non-tradables. As we show in the next section, de-urbanization following de-industrialization is unlikely.[10]

Finally, our country-level model cannot inform us about the growth of specific cities. Future work could add a government sector to the model. The government then could

[10]In the appendix model section B, Proposition 2 (related to productivity growth in agriculture and consumption cities) and Proposition 4 (related to deindustrialization and consumption cities) are new compared to Gollin et al. (2016). They already studied the roles of industrialization and mining-fuels.

recycle resource rents through government spending in the largest/capital city, which could lead to its fast growth and could potentially transform it into a consumption city.

3. Resources, (De-)Industrialization, and Urbanization

We study 116 countries with a developing status as of 1960, for which data on urbanization, resource exports, and (de-)industrialization, are available from 1960 to date. We obtain urban population shares (%) from the United Nations (2018) and the export share of fuel and mineral (FM) products for the period 1960-2010 from GJV16, who rely on data from USGS (2020) and World Bank (2021). We extend their data until 2020. The export shares of agricultural (AG) products come from FAO (2020). Knowing from World Bank (2021) the export-to-GDP ratio of each country in each year, we calculate NRX/GDP = (AGX+FMX)/GDP (%), as in Sachs and Warner (2001). Lastly, we construct the GDP share of manufacturing + services (MFGSERV) over time by relying on World Bank (2021), Central Intelligence Agency (2021), and United Nations (1960-1980, 2020b).

Appx. Section C provides more details on the choice of these variables and explains why we cannot use MFG + FIRE, and must use MFG + SERV, for our baseline analysis. FIRE GDP is only available for two thirds of countries c. 2020 (source: United Nations (2020b)). For the 1960s, we only know FIRE GDP for 25 countries. However, our cross-sectional model requires us to control for initial conditions ca. 1960. Likewise, our panel model requires us to have consistent data for all countries over time. Regardless, for 78 sample countries for which we have data on both SERV GDP and FIRE GDP ca. 2020, the correlation between the two is about 0.7. Thus, countries with more employment in the highly-productive FIRE sector tend to have more employment and higher productivity in the overall service sector in general. The correlation between MFG+SERV GDP and MFG+FIRE GDP is then about 0.8 (see Appx. Section D and App. Fig. D.6 for details).[11]

For countries c, we estimate the following cross-sectional model:

$$\text{URB}_{c,20} = \alpha + \beta\text{MFGSERV}_{c,20} + \gamma\text{NRXGDP}_{c,60-20} + \delta\text{DEINDU}_{c,80-20} + X_c\pi' + \mu_c. \quad (1)$$

URB is the urban population share (%) in 2020, NRXGDP – the mean export-to-GDP ratio (%) of natural resources in 1960-2020, MFGSERV – the GDP share of MFG+SERV (%)

[11] The main cross-sectional results for urbanization, urban sectoral employment, urban informality and urban human capital hold when using MFG+FIRE GDP for a smaller number of countries (not shown). One caveat is that the results on tall building construction do not hold when relying on MFG+FIRE, likely due to a composition effect in the sample of resource-rich countries used for the analysis (Ibid.).

in 2020 (proxying for structural change due to manufacturing or tradable services), and DEINDU – the absolute decline in manufacturing's GDP share (%) between 1980 and 2020 transformed so that a positive value indicates *more* deindustrialization (= 0 if no decline is observed). High-NRXGDP countries include resource-rich countries like Nigeria, Saudi Arabia, and Venezuela. High-DEINDU countries include deindustrializing economies like Brazil, the Philippines, and South Africa. Summary statistics for the main variables are provided in the notes of Appx. Table D.3. X_c includes controls for: (i) country size: log area and log population in 2020, and their squares, and a dummy if the country is a small island country; (ii) the urban definition used;[12] and (iii) initial conditions, i.e. URB, NRXGDP and MFGSERV c.1960. Our regression is thus a long-difference regression.[13]

Row 1 of Figure 5 Panel A below shows similar coefficients of about 1 for MFGSERV and NRXGDP, implying that one more percentage point of each variable is associated with one more point of urbanization.[14] Alternatively, a one standard deviation (SD) increase in MFGSERV (i.e., a 10 percentage points higher GDP share of manufacturing and services) is associated with a 0.57 SD in urbanization (or about 11 percentage points of urbanization given that URB's SD is 19%). One SD in NRXGDP (i.e., a 9 percentage points higher export-to-GDP ratio of natural resources) is associated with a 0.49 SD in urbanization (which is about 9 percentage points of urbanization).

No correlation is observed for DEINDU, as cases of de-urbanization are rare. For 116 countries x 13 years (1960, 1965...), 94% of country-years showing an economic decline do not show a decline in their urban share. Also, while economic declines can be large (mean = -2.6%; p10 = -5.5%), urbanization declines are tiny (mean = -0.16 p.p.; p10 = -0.24).[15]

Next, we examine the correlations in a panel framework with country c and year t fixed effects:

$$\text{URB}_{c,t} = \alpha + \beta \text{NRXGDP}_{c,t-1} + \gamma \text{MFGSERV}_{c,t} + \delta \text{DEINDU}_{c,1980-t} + \kappa_c + \theta_t + X_{c,t}\pi' + \mu_{c,t}. \quad (2)$$

We use NRXGDP in t-1, as we expect that resource rents affect urbanization with

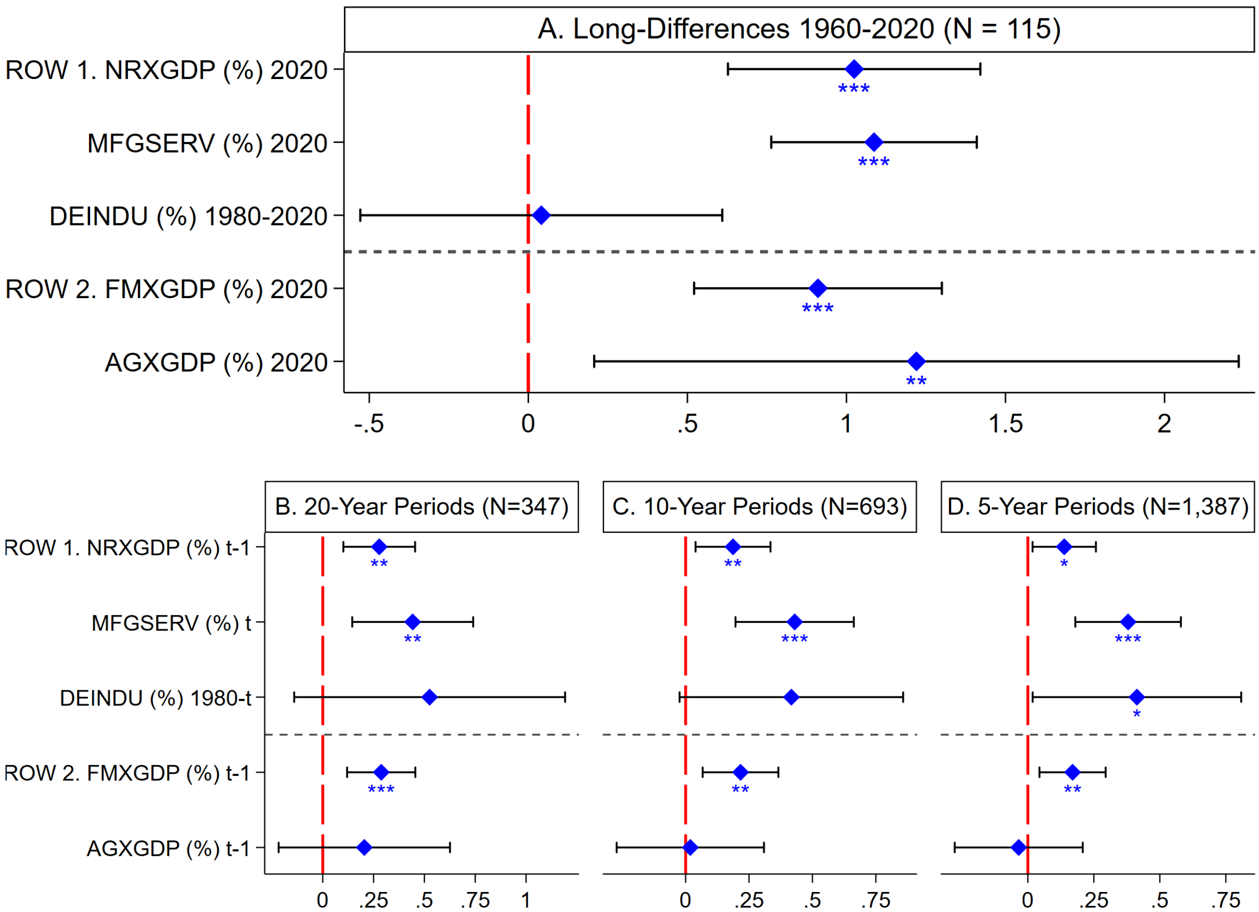
[12]We include dummies identifying whether the definition is based on a population threshold, an administrative function, another condition, or a combination of these, and the threshold (U.N., 2011).

[13]Since the world's urbanization depends on the urbanization of countries with large populations, we use as regression weights the total population of each country in 2020.

[14]Appendix Table D.3 presents the results in table form.

[15]Due to housing being durable, cities grow more quickly than they decline as negative shocks decrease housing prices more than they reduce population (Glaeser and Gyourko, 2005). Furthermore, urban-born workers may particularly value urban amenities or may be particularly unproductive at agriculture.

Figure 5: Resources, (De-)Industrialization, & Urbanization, 1960-2020



Notes: 116 countries. PANEL A: Long-difference correlations between urbanization (%) and the variables shown at left. See text for details on the controls. Robust SE. PANELS B, C and D: Panel correlations for periods of 20, 10 and 5 years, respectively. We include country and year fixed effects. See text for details on the controls. Robust SE clustered at the country level. ROW 1: We simultaneously include NRXGDP (natural resource exports / GDP; %), MFGSERV (manufacturing & services in GDP; %) and DEINDU (deindustrialization; %). ROW 2: We replace NRXGDP by FMXGDP (fuel & mining exports / GDP; %) and AGXGDP (agricultural exports / GDP; %). 90% confidence intervals. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

some delay because it takes time to build cities. MFGSERV is defined in t since manufacturing/FIRE activities take place in cities, where they have by construction a contemporaneous effect on urbanization. DEINDU measures the absolute decline in the GDP share of manufacturing between 1980 and t transformed so that a positive value indicates *more* deindustrialization (0 is assigned if no decline is observed or if $t \leq 1980$). We control for log population and its square and cluster standard errors (SEs) at the country level.

Row 1 of Panels B, C, and D considers data 20-, 10-, and 5-year panel specifications, respectively. The panel estimates of MFGSERV are 60-65% smaller than the long-difference estimates. For NRXGDP, they are 75-85% lower, and decrease in magnitude for shorter periods. These results are expected given the delayed effect of increases in NRXGDP on urbanization. Lastly, DEINDU's coefficient is small but positive. DEINDU countries saw their MFGSERV share increase in the past, which still generates urbanization in the shorter run as urbanization begets urbanization. Controlling for past urbanization, DEINDU's coefficient becomes tiny (not shown).

In Row 2, we replace NRXGDP by the export-to-GDP ratios of fuel & mining (FMXGDP) and agricultural products (AGXGDP). The long-difference regression of Panel A suggests that urbanization correlates with both (we do not report the coefficients of MFGSERV and DEINDU). The coefficient is higher for AGXGDP. However, that is not the case when standardized, as one standard deviation in FMXGDP (7.5%) and AGXGDP (2.7%) is associated with a 0.40 and 0.22 standard deviation in urbanization, respectively. Confidence intervals are also wider for AGXGDP, implying that some agricultural exports are less associated with urbanization, due to lower generated rents and/or more rural labor required for their production. In the panels (Panel B), only FMXGDP survives.[16]

Appx. Table D.4 examines further how urbanization correlates with the *timing* of industrialization and resource booms (using the 10-year panel). All lags of MFGSERV have significant coefficients. In contrast, urban shares increase 20-30 years after resource booms (AGXGDP lags have positive but insignificant coefficients, suggesting agro-towns develop slowly). Leads are tiny and not significant, reinforcing the idea that urbanization follows industrialization/FIRE-ization and resource booms, not the other way around.

Finally, the panel results generally hold if we also include a lag of the urbanization

[16] Appx. Table D.2 shows stronger correlations for MFG than for SERV, and FIRE or non-FIRE services.

rate (results not shown) as urban construction is durable. However, given dynamic panel bias (Nickell, 1981), we do not include a lag in our baseline specification.

The next section examines whether the mechanism of the urbanization process influences the employment composition of urban areas.

4. Resources, (De-)Industrialization, and Urban Employment

4.1. Country-Level Analysis

We rely on IPUMS census microdata for 62 sample countries accounting for almost two-thirds of the world's total urban population. In total, we obtain 184 census samples during the period 1990-2015. For our cross-sectional analyses, we then select for each country (c) the closest year to the year 2000 and estimate:

$$\text{EMP}_{c00} = \alpha + \beta\text{MFGSERV}_{c00} + \gamma\text{NRXGDP}_{c60-00} + \delta\text{DEINDU}_{c80-00} + \epsilon\text{URB}_{c00} + X_c\kappa + \mu_c \quad (3)$$

EMP is a sector's labor share. The variables of interest are also defined with respect to 2000: MFGSERV (2000), mean NRXGDP (1960-2000), and DEINDU (1980-2000).

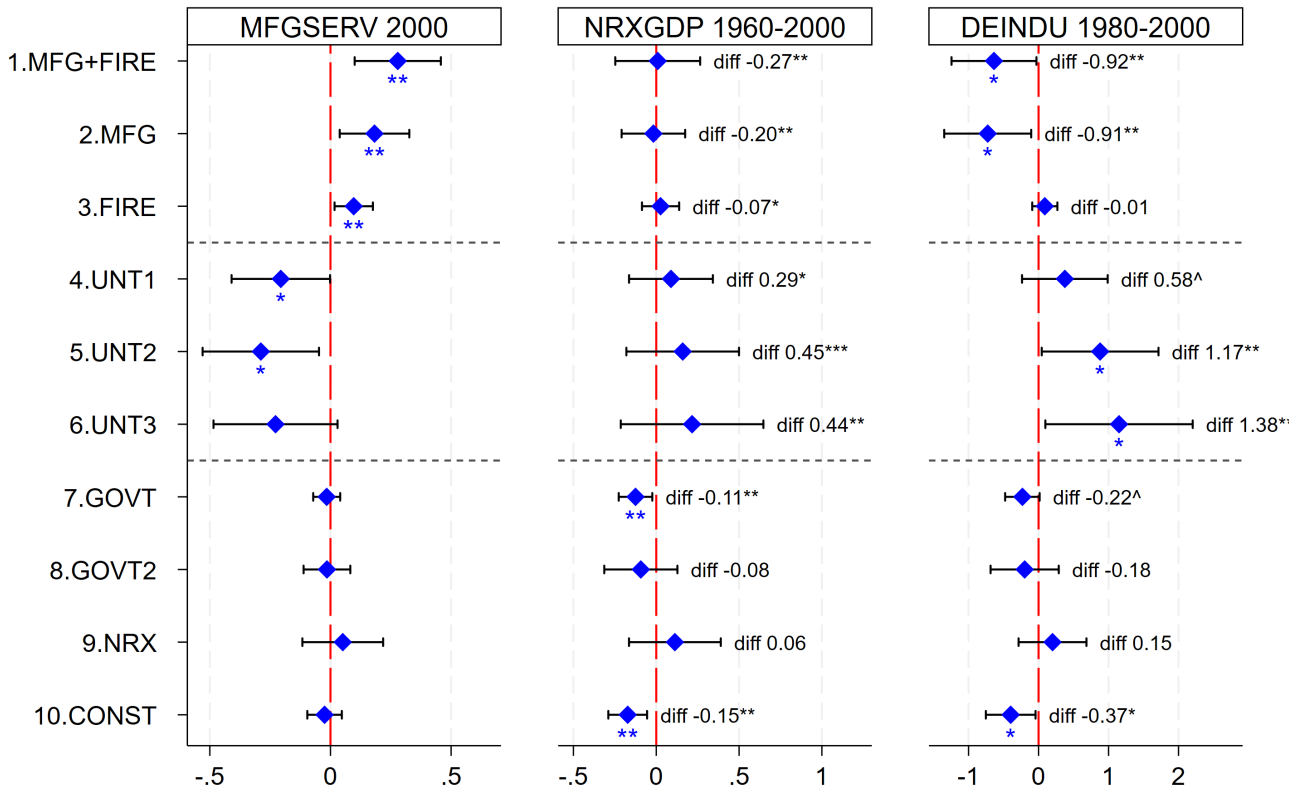
To compare countries with *similar* levels of urban economic development and focus on urban economic structure *only*, we control for the urban population share (URB) in 2000. We can then ignore the initial conditions in 1960 but add the controls for area, population (2000), small islands, and urban definitions. We use country population weights.

As seen in Figure 6 Panel (a), for a given urbanization rate, urban areas in MFGSERV countries (first column) have significantly more employment in tradables (MFGFIRE) and less employment in non-tradables (UNT) than NRXGDP countries (2nd column) or DEINDU countries (3rd column). This is best seen by looking at the "diff" measure in the 2nd an 3rd columns, which shows for NRXGDP and DEINDU how significant the difference in coefficients is with respect to MFGSERV. Thus, in eq. (3), "diff" is equal to γ - β for NRXGDP and δ - β for DEINDU (the stars below the point estimates instead show how significantly different from 0 each coefficient is). Here, a ten-point higher increase in NRXGDP vs. MFGSERV is associated with a 2.7 p.p. decrease in the employment share of urban tradables (whose mean is 18.7% and SD 7.5%), and a 2.9-4.4 p.p. increase in the employment share of non-tradables (different definitions) (mean = 22.0-32.4; SD = 7.4-10.5).[17]

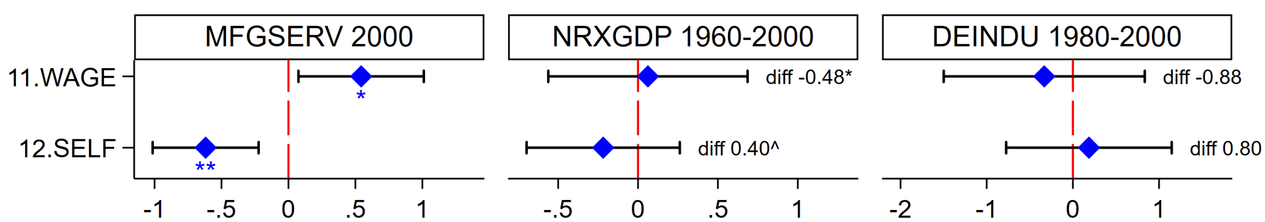
[17] Appendix Table D.5 shows the results in table form.

Figure 6: Resources, (De-)Industrialization & Urban Employment, IPUMS, c. 2000

(a) Sectoral Employment in Urban Areas (N = 61 Countries)



(b) Informal Employment in Urban Areas (N = 55 Countries)



Notes: Each row represents a separate regression and shows the cross-sectional correlations between the share of each type of employment in urban areas c. 2000 in IPUMS (%) and NRXGDP (natural resource exports / GDP; %), MFGSERV (manufacturing & services in GDP; %) and DEINDU (deindustrialization; %), also defined with respect to 2000. MFG = manufacturing. FIRE = financial services, insurance, business services, and real estate. UNT1, UNT2, UNT3 = non-tradables (different definitions). GOVT = government (different definitions). NRX = natural resources. CONST = construction. WAGE = wage employment. SELF = self employment. See text for details on the controls. Robust SE and 90% confidence intervals. *** $p<0.01$, ** $p<0.05$, * $p<0.10$, $\wedge$ $p<0.15$ (which we also report due to the very small sample size).

Note that UNT1 is a non-tradable sector corresponding to domestic *Wholesale and retail trade*. UNT2 also includes *Other services* corresponding to domestic commerce-related activities. UNT3 further adds *Household services* to UNT2. We find proportionately more government workers (GOVT) in MFGSERV countries. The differences lose significance when adding education and health (GOVT2). This result is not surprising since structural adjustment programs were implemented in NRXGDP and DEINDU countries in the 1990s. The results suggest proportionately more resource workers (NRX) in NRXGDP countries, but the difference is not significant, and less construction (CONST) in NRXGDP and DEINDU countries.

One issue with using sectoral GDP or employment data is that a sector that is "low-tech" in one country could be "hi-tech" in another country (e.g., manufacturing). That is less the case when only focusing on developing economies. Nonetheless, differences could still be observed among our sample countries. We thus examine how the type of urbanization correlates with urban informal employment, hence employment "quality".

More precisely, our sample includes 55 sample countries for which we know whether the urban worker earns a wage, is self-employed, or works without pay (these are the only informality measures available in IPUMS). We focus on the first two categories. MFGSERV countries have more wage employment and less self-employment than NRXGDP and DEINDU countries (Panel (b)). In particular, a ten-point higher increase in NRXGDP vs. MFGSERV is associated with a 4.8 p.p. decrease in the employment share of wage employment (whose mean is 58.0 and SD 14.2). However, differences are only significant at 10-15% for NRXGDPe. Point estimates are then large and confidence intervals wide for DEINDU, implying not a lack of correlation but heterogeneity among deindustrializing nations (a ten-point higher increase in DEINDU vs. MFGSERV is associated with a 8.8 p.p. decrease on average in the employment share of wage employment).

Appx. Table D.6 then tests whether tradables – proxied by MFG – or non-tradables – proxied by UNT1 (domestic wholesale & retail trade) – have higher informality rates.[18] Both MFG and UNT are more informal in the urban areas of NRXGDP and DEINDU countries but differences are only significant for the UNT sector. Relatedly, not all jobs in

[18] Appx. Table D.7 shows most panel results are consistent with the long-difference results (since we select countries with at least three years of data, the sample size reduces to 124 country-years).

the urban non-tradables sector should be seen as "low-tech". With the globalization of the trading sector (e.g., with Amazon), the UNT sector could become more "high-tech" over time, which could erode to some extent the distinction between consumption and production cities. We focus on developing economies where this phenomenon is likely still marginal. However, the results on informality within the UNT sector suggest that not all UNT jobs are equal. For MFG, the observed differences are on average large, but the high standard error suggests heterogeneity in the degree of urban informality among resource-rich countries and deindustrializing nations (sample size is also small for all columns).

Another data source is the World Bank's *International Income Distribution Database* (I2D2), which consists of 1,500 individual-level household surveys. I2D2 offers consistent information on sectoral employment in about 1,000 survey samples for 100 countries.[19] It allows us to obtain for each country the *mean* employment shares in urban areas in 1990-2015. We then use the same cross-sectional model as for IPUMS (eq.(3)). Since 2005 is the mean population-weighted year in I2D2, the variables of interest are defined relative to 2010. One advantage of I2D2 is that it allows us to include more countries. One disadvantage is that surveys are not representative as censuses.

We observe a strong correlation (≈0.9) between the observed results for I2D2 and IPUMS for MFGFIRE; it is weaker (0.55) for urban non-tradables UNT due to the way I2D2 has been harmonized.[20] NRXGDP and DEINDU countries have lower employment shares of MFG in their urban areas than MFGSERV countries (see Figure 7, but the difference is not significant for DEINDU). For MFGFIRE, the difference is large and significant for NRXGDP countries only. No correlations are observed for UNT1 ("UNT" in I2D2). However, DEINDU countries have significantly higher shares of UNT2, which includes UNT1 as well as household services & personal services. Finally, we find higher self-employment in NRXGDP and DEINDU countries. While I2D2 allows us to use more countries, one caveat is that the database consists of surveys. Sectoral definitions likely vary much more across countries in I2D2 than in IPUMS, which increases SEs and

[19] The data was initially compiled by the World Bank's *World Development Report* unit.

[20] During the harmonization process, sectors had to be aggregated together due to the different classifications in different surveys. *Wholesale & retail trade* and *Hotels & restaurants* were merged together by I2D2, while we ignored the latter in IPUMS due to the lack of correlations with our variables of interest. "UNT" in I2D2 might also include other sectors depending on the country.

complicates the analysis.[21]

Notwithstanding, relying on various measures, specifications, and databases, the evidence presented here suggests that cities in NRXGDP and DEINDU countries might be disproportionately consumption cities relative to the cities in MFGSERV countries.

4.2. City-Level Analysis

We use the city-level residualized *Production City Index* (PCI; Section 1.3.) to examine if the observed country-level patterns are driven by larger and/or smaller cities. For 6,211 FUAs a, belonging to 59 sample countries, indexed with c, we regress PCI c.2000 on the country-level variables of interest – MFGSERV (2000), NRXGDP (mean 1960-2000) and DEINDU (change 1980-2000), their interactions with the 8 city size categories used before, p, and the controls X of model (3). We use the FUAs' populations in 2000 as weights:

$$\text{PCI}_{a,c} = \alpha + \beta \text{MFGSERV}_c + \gamma \text{NRXGDP}_c + \delta \text{DEINDU}_c + \Sigma_{p=2}^{9} \zeta_p \text{MFGSERV}_c * \mathbb{1}(\text{CAT}_a = p) + \Sigma_{p=2}^{9} \theta_p \text{NRXGDP}_c * \mathbb{1}(\text{CAT}_a = p) + \Sigma_{p=2}^{9} \lambda_p \text{DEINDU}_c * \mathbb{1}(\text{CAT}_a = p) + X_c \kappa + \mu_a \quad (4)$$

We consider two PCI measures capturing tradables (MFG+FIRE) and non-tradables (UNT2). We plot the obtained correlations for each PCI-size category in Figures 8(a)-8(b). MFGSERV countries have higher shares of employment in urban tradables (MFG+FIRE) and lower shares of UNT2 employment for all city sizes. DEINDU countries exhibit reverse patterns. In contrast, in NRXGDP countries, UNT2's employment share increases with city size.

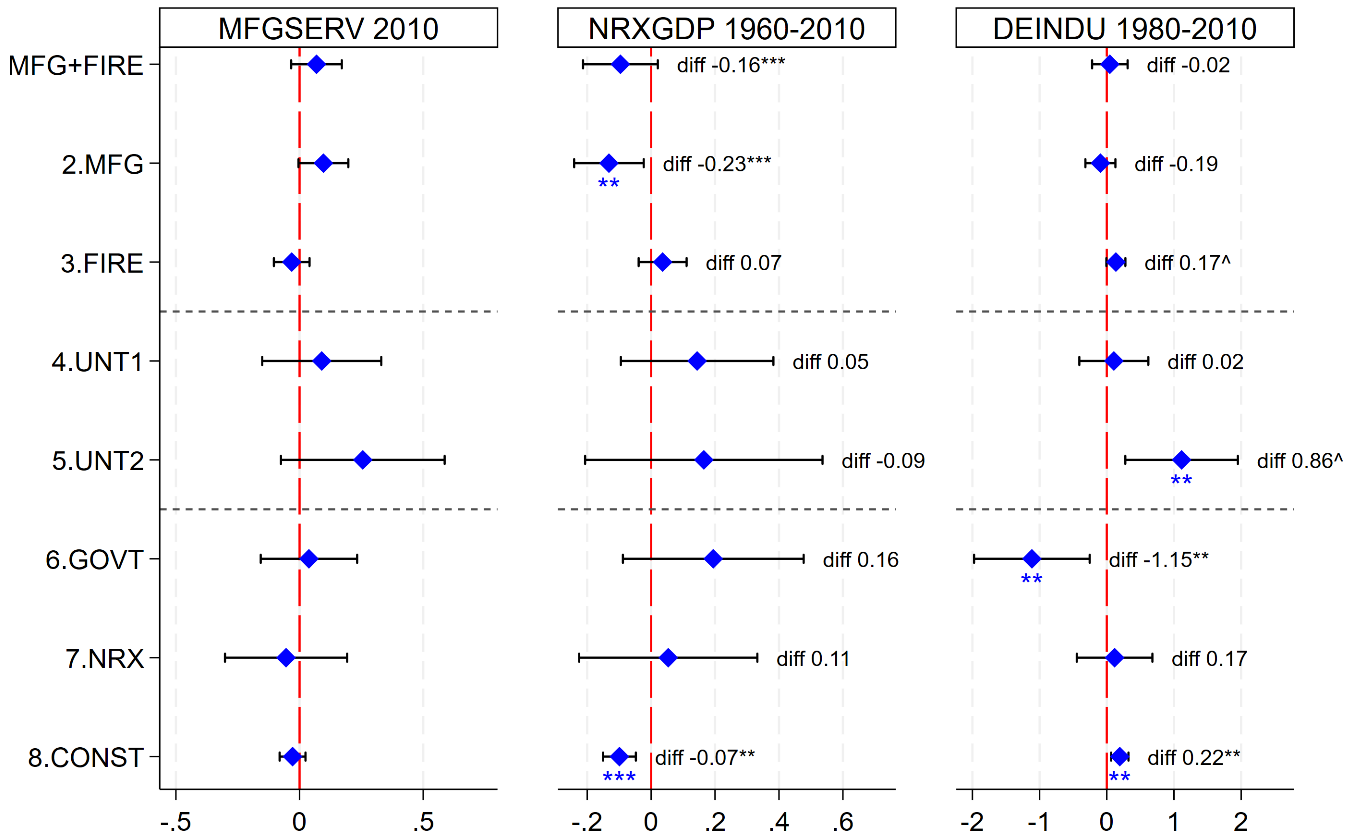
This analysis suggests that the whole urban system in the deindustrializing countries has experienced a shift from manufacturing to non-tradable services. In contrast, in resource-rich countries only larger cities have substantially higher shares of non-tradable services, likely because resource rents are disproportionately spent there.

Interestingly, resource-rich countries do not have higher urban primacy rates than industrialized nations whether we use long-difference or panel regressions at the country level, or panel regressions at the city-level interacting the main variables with a dummy for being the largest city or one of the largest cities in the country (Appx. Section E and Appx. Tables D.9-D.11). While in resource-rich countries governments may invest more resources in their largest city (Bates, 1981; World Bank, 2020), industrialization/FIRE-ization also leads to the disproportionate growth of the largest city if it requires resources

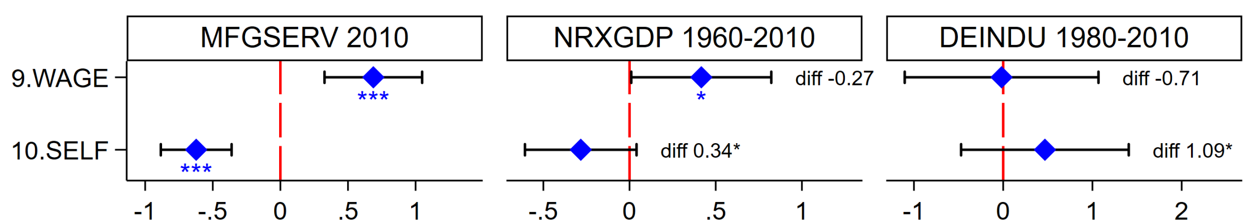
[21] Appx. Table D.8 shows the results in table form.

Figure 7: Resources, (De-)Industrialization & Urban Employment, I2D2, c. 2010

(a) Sectoral Employment in Urban Areas (N = 94 Countries)



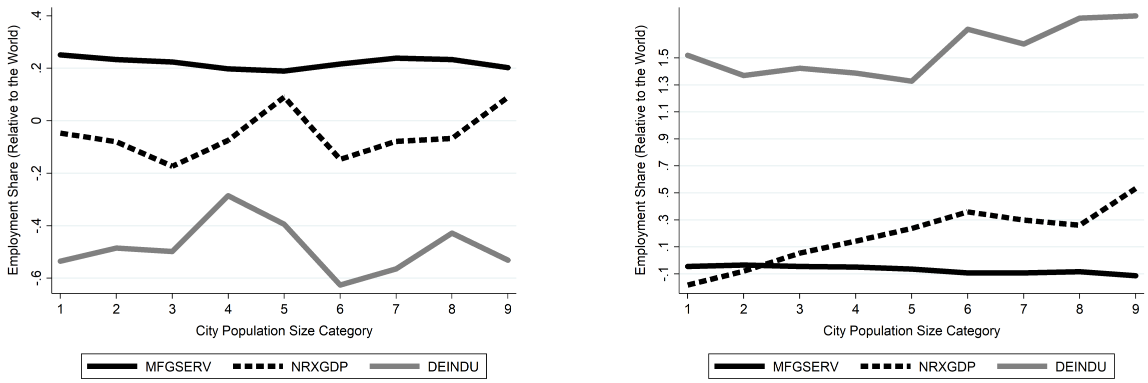
(b) Informal Employment in Urban Areas (N = 94 Countries)



Notes: Each row represents a separate regression and shows the cross-sectional correlations between the share of each type of employment in urban areas c. 2010 in the I2D2 database (%) and NRXGDP (natural resource exports / GDP; %), MFGSERV (manufacturing & services in GDP; %) and DEINDU (deindustrialization; %), also defined with respect to 2010. MFG = manufacturing. FIRE = financial services, insurance, business services, and real estate. UNT1, UNT2 = non-tradables (different definitions). GOVT = government (different definitions). NRX = natural resources. CONST = construction. WAGE = wage employment. SELF = self-employment. See text for details on the controls. Robust SE and 90% confidence intervals. *** p<0.01, ** p<0.05, * p<0.10, ∧ p<0.15 (which we also report due to the small sample size).

Figure 8: City Size & Urban Sectoral Shares for Each Group, Cross-Section, c. 2000

(a) Urban Tradables = MFG+FIRE **(b)** Urban Non-Tradables = UNT2



Notes: Mean pop. (000s): 1 = 76; 2 = 134; 3 = 250; 4 = 479; 5 = 921; 6 = 1,737; 7 = 3,268; 8 = 6,140; 9 = 18,184.

found there (e.g., skilled labor or an airport) or if there are strong agglomeration economies in the urban tradables sector (Venables, 2017). Moreover, resource exports cause the growth of mining towns (Huang et al., 2023) or agro-towns (Jedwab, 2013) in other regions.

Related to this, if we compute a measure of regional urban inequality based on the distribution of total urban populations across regions, we find *less* regional inequality in resource-rich economies (see Appendix Table D.16 for details).

We then find a higher Gini index of production city-ness in resource-rich economies (see Appendix Table D.16 for details), which suggests that their urban production system is on average more diversified.[22] However, the observed differences are not significant, which implies heterogeneity. As such, it appears that some resource-rich economies have more cities in different regions, and while the majority of these cities are consumption cities, some of the cities are production cities (alternatively or in addition, they have consumption cities with widely different levels of production city-ness).

Finally, incomes "at the top" may grow sufficiently to alter the economic structure of larger cities in resource-rich countries without increasing their relative population size, especially in a context of binding land-use regulations and migration controls. Indeed, if regional urban inequality is based on the distribution of urban lights, we find no difference between resource-rich economies and industrializing nations (see Appendix

[22]One can also see that in figures 8(a)-8(b) which show essentially flat lines for industrializing nations (MFGSERV) whereas the lines for resource-rich economies (NRXGDP) are not flat.

Table D.16) for details.[23]

This brings us to our next set of results on building construction that provides evidence on the consumption mechanism and may corroborate the idea of high levels of inequality in the building sector of resource-rich countries.

5. Resource Rents, Tall Building Construction & Consumption Cities

International differences in construction may stem from "white elephant" projects financed by resource rents. In the absence of global historical data on "white elephants", we examine whether natural resource exports correlate with the construction of buildings whose economic rationale might be questionable, focusing on the observed correlations for NRXGDP vs. MFGSERV rather than the ones for DEINDU.

We use a data set that inventories all the world's "tall buildings", with information on their year of construction and height. The database, maintained by the *Council on Tall Buildings and Urban Habitat*, is available online.[24] The database mostly captures buildings above 80 meters (∼20 floors). Since some countries have no such buildings, to avoid having their height stock equal to 0 when using logs, we also consider for each country their 10 tallest buildings, even when they are below 80 m.[25]

We study the long-difference correlations between log urban height density (LUHT), computed as the total sum of tall building heights (meters) divided by urban population (millions), c. 2020 in country c, and MFGSERV (2020), NRXGDP (mean in 1960-2020) and DEINDU (change in 1980-2020):

$$\text{LUHT}_{c,20} = \alpha + \beta\text{MFGSERV}_{c,20} + \gamma\text{NRXGDP}_{c,60-20} + \delta\text{DEINDU}_{c,80-20} + X_c\kappa + \mu_c. \quad (5)$$

X_c includes the controls for initial conditions (incl. log urban height density in 1960) and the controls for area and population in 2020, small islands and urban definitions. To capture excesses in construction per capita for a *given* level of urban economic

[23] However, this could also be due to mining and fuel and gas extraction being more lights-intensive.

[24] According to their website (www.skyscrapercenter.com), the data have been "collected by the Council for more than 40 years [...] The Council relies on its extensive member network [of academics, land developers, architectural firms, builders, city administrations, and banks] to maintain" the database with the help of "an Editorial Board".

[25] We have access to data from 02-26-2020. The data set includes 25,214 buildings, out of which 19,883 are above 80 m. Once we only select completed 80 m+ buildings, we get 16,447 buildings. We only know the height of the building, not its volume or total floor area. Developing economies such as Brazil, China, India, Mexico, and South Africa have 781, 2,451, 273, 143 and 74 80m+ buildings, respectively. Most buildings are between 80 m (1st percentile) and 325 m (99th percentile).

development, we control for the urbanization rate and log per capita GDP (in PPP) in 2020 and average log per capita GDP in 1960-2020 (since past development also matters).

The results suggest that the urban areas of NRXGDP countries have higher stocks of non-residential towers than the ones of MFGSERV countries (Figure 9 Panel (a)), with this correlation being driven by office and retail towers. In particular, given a "diff" of 0.05, a ten-point increase in NRXGDP vs. MFGSERV is associated with a 50% increase in non-residential urban height density. In other words, for a given level of urban economic development and focusing on tall office buildings only (i.e. buildings above 80 m), the office skyline of NRXGDP countries is 50% taller on average than the office skyline of MFGSERV countries. Interestingly, no differences are observed for government towers (7. Govt), suggesting that private-sector companies directly or indirectly affiliated with the government and/or fuel, mining or agricultural firms use the tall buildings.[26]

Panel (b) employs as the dependent variable log urban height density constructed using only non-residential buildings above a certain threshold. In the data, 125, 140, 160, 200 and 240 meters are the median, the mean, the 75p, the 90p and the 95p value in height. NRXGDP countries have significantly more *very tall* buildings. Given a "diff" of 0.11, a ten-point higher increase in NRXGDP vs. MFGSERV is associated with a 110% increase in the urban height density of supertall office towers above 200 meters.[27]

The excess of tall buildings in NRXGDP countries may be accompanied by lower occupancy rates. Without occupancy data, we examine how overall construction is affected. For 80 countries, the annual cement production from 1970 to date is provided by the U.S. Geological Survey. Cement production proxies for cement use because cement is rarely traded (World Cement, 2013). In COMTRADE data, trade only accounted for 3.5% of world cement production during the period of study. Therefore, cement production proxies for cement use.

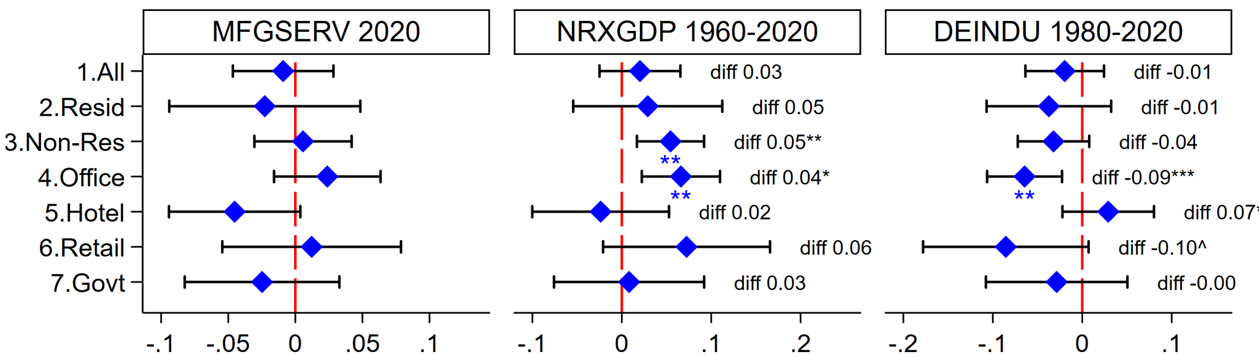
Employing the same long-difference model as for tall buildings, we use as our dependent variable the log sum of cement production (or consumption) or

[26] Panel B of Appx Table D.12 shows the results in table form. The panel correlations are weaker than the long-difference ones (Panel C), implying that construction does not respond instantaneously to economic changes. Abstracting from significance issues, the correlation remains higher for NRXGDP.

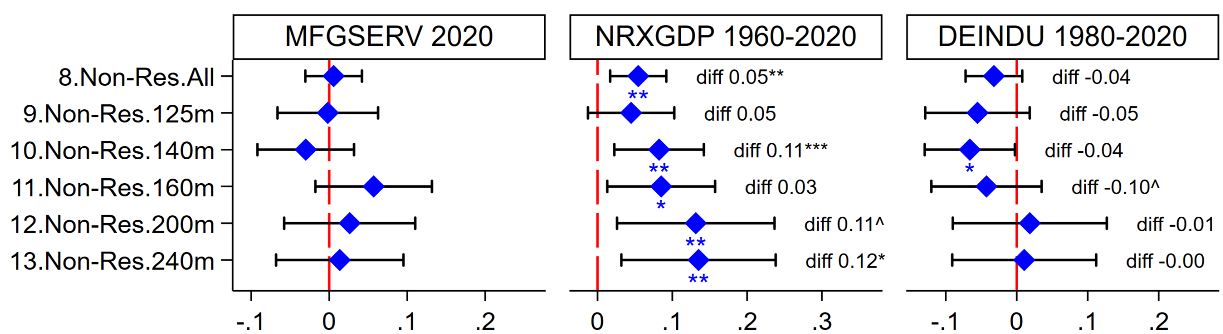
[27] Appx. Table D.13 show the results in table form. Similar correlations appear with the 10-year panel (Panel B of Appx. Table D.13). Note that we find stronger correlations for NRXGDP if we consider a *construction vanity* index, more precisely the log sum of the differences (in meters) between height at the tip and the height of the top occupied floor (not shown).

Figure 9: Resources, (De-)Industrialization & Tall Building Construction, c. 2020

(a) Type of Tall Buildings (N = 115 Countries)



(b) Heights of Non-Residential Buildings (N = 115 Countries)



Notes: Each row represents a separate regression and shows the long-difference correlations between measures of tall building construction c. 2020 (for tall buildings $\geq$ 80 meters $\approx$ 260 ft $\approx$ 20 floors) and NRXGDP (natural resource exports / GDP; %), MFGSERV (manufacturing & services in GDP; %) and DEINDU (deindustrialization; %), also defined with respect to 2020. See text for details on the controls. Robust SE and 90% confidence intervals. *** p<0.01, ** p<0.05, * p<0.10, $\wedge$ p<0.15.

construction GDP over the period 1970-2020 while controlling for log urban population in 1970 and 2020 (thus capturing *construction per urban capita*) and urban economic development.[28] No differences are observed between NRXGDP and MFGSERV countries (Appx. Table D.14).[29]

Therefore, although NRXGDP countries have more tall buildings, especially concrete towers, they do not use more cement, which might imply displacement effects within the construction sector, potentially worsening access to resources in the building sector for some groups in society by leaving less cement for use in public infrastructure projects and for private use in the residential housing sector. However, one important caveat with these analyses is that both cement use and construction include infrastructure.

6. Consumption Cities & Economic Growth

What are the nationwide economic implications of an urban hierarchy dominated by consumption cities? If they are not as growth-enhancing as production cities, are they doomed to remain so, or can they evolve into production cities? A factor that can shed light on these questions is *urban human capital*. Indeed, cities with a bigger stock of human capital may manage to grow and transform their structure.

6.1. Human Capital

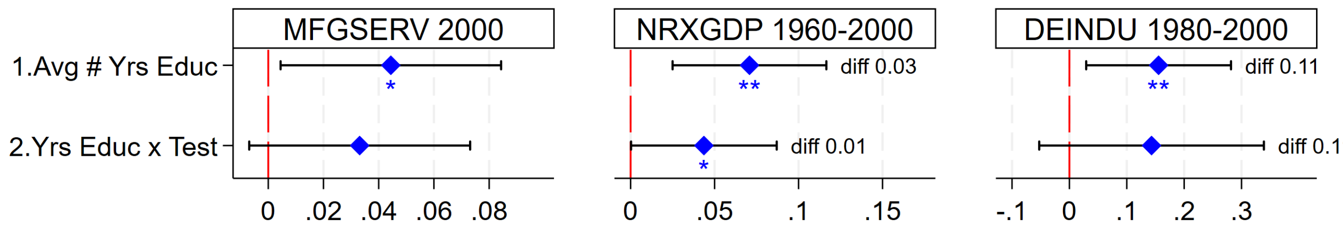
We assess how urban human capital correlates with our variables of interest by obtaining from IPUMS the *average number of years of education* of adults (ages 25-65) living in the urban areas of 53 countries among the 116 sample countries for the year closest to 2000. We use the same cross-sectional model as for employment (eq.(3)) and include MFGSERV (2000), NRXGDP (average in 1960-2000) and DEINDU (change in 1980-2000), and the urbanization rate (2000) to compare similarly urbanized nations. Figure 10 Panel A suggests that the urban residents of NRXGDP and DEINDU countries are as educated as the urban residents of MFGSERV countries ("diff" is small and not significant).[30]

Results hold with panel regressions using 151 country-years and for younger cohorts (not shown). Likewise, at the city level, we find weak correlations between the production city index and similarly estimated residuals for educational achievement (not shown). Thus, urban tradable employment and human capital stocks seem *unrelated*.

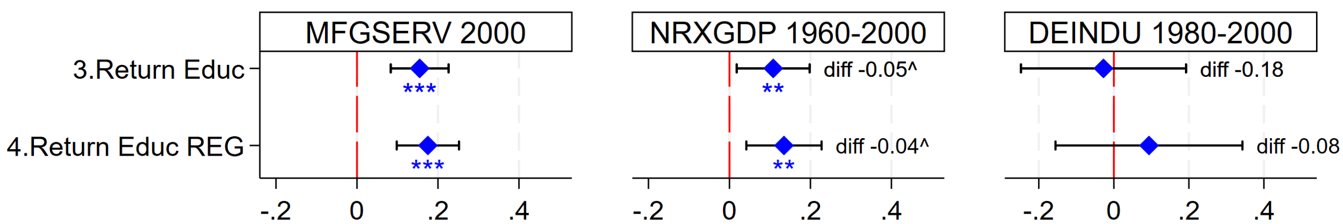
[28] From United Nations (2020b) we know the GDP share of construction over time.
[29] We find no significant differences in panel regressions (not shown).
[30] Appx. Table D.15 provides the results in table form.

Figure 10: Resources, (De-)Industrialization & Urban Human Capital, c. 2000

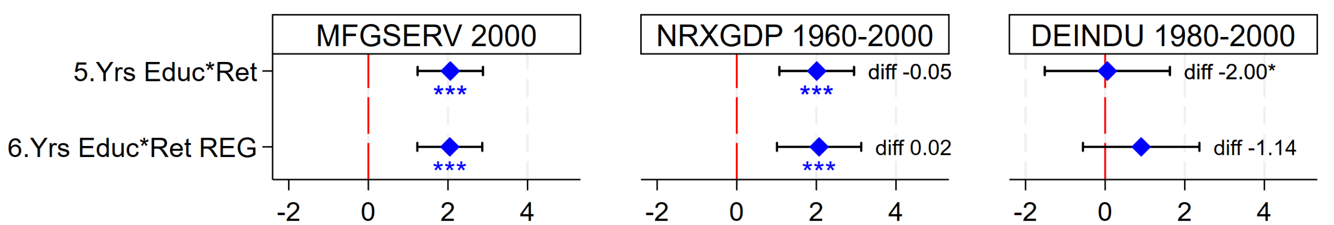
(a) Urban Number of Years of Education (N = 53, 51 Countries)



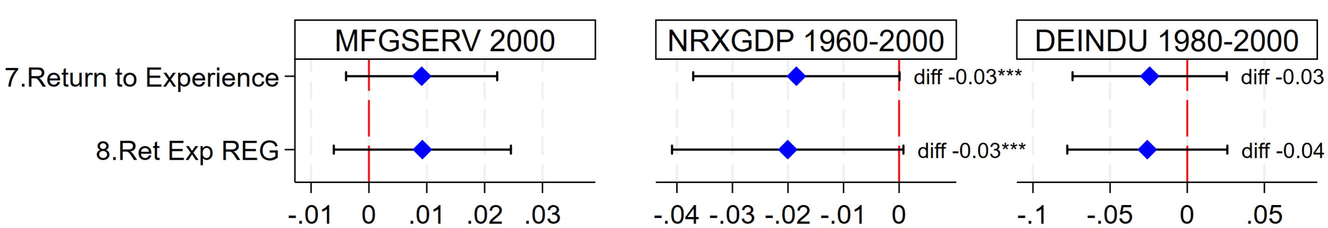
(b) Urban Returns to Education (N = 84, 66 Countries)



(c) Urban Returns to Education*Years of Education (N = 48, 40 Countries)



(d) Urban Returns to Experience (N = 84, 66 Countries)



Notes: Each row represents a separate regression and shows the cross-sectional correlations between measures of urban human capital c. 2000 and NRXGDP (natural resource exports / GDP; %), MFGSERV (manuf. & serv. in GDP; %) and DEINDU (deindustrialization; %), also defined with respect to 2000. See text for details on the controls. Robust SE. 90% confidence intervals. *** p<0.01, ** p<0.05, * p<0.10, ∧ p<0.15.

Angrist et al. (2019) provide for 101 countries a measure of education quality that is built on globally harmonized test scores. If we use the *learning adjusted years of education* (number of years of education*test score), we again find no significant differences between the different countries (Figure 10 Panel A and Appx. Table D.15).

Another proxy for education quality is the *return to education*, the increase in earnings from an extra year of education. A lower education quality reduces the wage gains from higher attainment. We use the I2D2 data (1990-2017) and follow the methodology of Lagakos et al. (2018) and Jedwab et al. (2023) to estimate the returns to education and work experience for urban areas. The *return to experience* is the increase in the earnings from an additional year of employment as human capital can be accumulated on the job.[31]

For individual i and country-year-sample s, we estimate the following model for *each* country one by one (considering 18-67 year-old "urban" workers only):

$$lnW_{is} = \alpha + \sum_{e=1}^{7} \beta_e exp_{ise} + \gamma edu_{is} + \theta_s + \varepsilon_{is}. \tag{6}$$

In eq. (6), lnW_{it} is the log of earnings and experience is categorized into bins (exp_{ite}): [5-9 years] (which we call 5), [10-14] (10), [15-19] (15), [20-24] (20), [25-29] (25), [30-34] (30), and [35+] (35). We omit [0-4] and samples without at least 10 observations per bin and include the number of years of education (edu_{it}) and country-year-sample fixed effects (θ_s).

Parameter γ measures the returns to education. To estimate the returns to experience we follow Jedwab et al. (2023). For each bin one by one (5, 10, etc.), we estimate an annualized return, and take the mean of the annualized returns across the seven bins.

Panel B of Figure 10 shows that urban returns to education are lower in NRXGDP and DEINDU countries. A ten-point increase for NRXGDP (DEINDU) vs. MFGSERV is associated with a 0.4-0.5 (0.8-1.8) point lower urban return to education (given a mean return of 7%) in NRXGDP (DEINDU) countries. However, differences are only significant at 15% for NRXGDP countries, and not significant for DEINDU countries, implying heterogeneity among deindustrializing nations. Row 4 includes country-year-sample-region fixed effects in the first-step regression analysis (eq.(6)).[32] This allows us to compare individuals residing in the same regional urban labor market.[33]

[31] We calculate *experience* as follows: (i) For individuals with at least 12 years of education, experience = age - years of education - 6; (ii) For individuals with less than 12 years of education, experience = age - 18.

[32] Regions correspond to first level administrative areas.

[33] Appx. Table D.15 provides all the results of this section in table form.

If we use the product of the years of schooling and the returns (Panel C), to obtain a measure of the *value* of education, we see a lower value of schooling in DEINDU countries. A ten-point higher increase for DEINDU vs. MFGSERV is associated with a 20 point lower value of education (given a mean value of 68 in the sample). However, the difference with respect to MFGSERV countries is not significant with the region fixed effects (row 6). No clear difference is observed for NRXGDP countries.

Finally, we find significantly lower urban returns to experience in NRXGDP countries compared to MFGSERV countries (Panel D; difference of 0.03***). We find equally lower, but not significantly so, urban returns to experience in DEINDU nations (0.03-0.04). For these countries, confidence intervals are wide, implying heterogeneity. More generally, a ten-point higher increase in NRXGDP or DEINDU vs. MFGSERV is associated with a 0.3 point decrease in the urban return to experience (given a mean of 2.1 in the sample).

Overall, it appears that consumption cities in deindustrializing nations might have less education- and experience-based human capital than production cities in nations specialized in industrial goods or services. This might prevent them from becoming production cities again. However, the observed differences with respect to industrializing nations are not always significant, suggesting that this observation may not apply for a subgroup of deindustrializing nations that do not lack urban human capital.

The results for resource-rich countries are also mixed. Their cities do not have that much less education-based human capital, but they exhibit lower returns to experience, which may capture how dynamic their labor markets are. Investing in education is easier than investing in experience-based human capital as the latter is done by school investments that resource rents can finance whereas the former results from a thriving private sector, which may benefit from resource-related investments (e.g. in infrastructure and education) but may be hurt by Dutch Disease effects which skew relative prices and create disincentives for the expansion of urban tradables.

6.2. Sectoral Wage Gaps

A related question is whether the human capital that workers have "pays off" as much in the urban non-tradables sector (UNT) as it does in the urban tradables sector (UT). Higher wages for jobs in UT relative to UNT could imply that workers in UT are more productive than workers in UNT. If most cities in a country are consumption cities with disproportionately low employment in UT, this might have negative implications for labor productivity in the aggregate.

Inspired by Gollin et al. (2014), we use I2D2 to study wage gaps between the two sectors. For individual i and country-year-sample s, we estimate the following model for *each* country one by one, restricting the sample to urban workers in the UT or UNT sector:

$$lnW_{is} = \alpha' + \delta T_{is} + X_{is}\lambda + \theta'_s + \varepsilon'_{is}. \quad (7)$$

In eq. (7), lnW_{it} is the log of monthly earnings (lnW_{it}). T_{it} is a dummy if the worker belongs to the UT sector, and δ measures the wage premium from working in the UT sector. We examine the gaps without including human capital controls (X); then we re-estimate the gaps after controlling for human capital and sorting (workers self-select into specific locations). If we find large wage gaps, then UT provides "better" jobs overall.

Focusing on the sample countries (data available for 54 countries in I2D2), the unconditional wage gap is 22%. Controlling for gender, years of education, and the experience dummies, it is 13%. If we additionally control for spatial sorting by including first-level administrative area fixed effects, we get 17%. Thus, we find large wage gaps in favor of UT even when we compare workers with similar human capital levels residing in the same regional urban labor market.

6.3. Economic Growth

What are the implication of having consumption cities for growth? Comparing the returns to experience for UT and UNT is one way to answer the question. If the returns to experience capture human capital accumulation at work and the dynamism of labor markets and firms, and UT is more dynamic than UNT, we could observe higher returns to experience in UT than in UNT. Yet, we do not find differences in the returns to experience in the two sectors. If we estimate eq. (6) separately for UT and UNT, we find similar returns at around 2% (N = 59-67).

Yet, the overall lower urban returns to experience in the aggregate in the cities of resource-rich and deindustrializing countries (Section 6.1.) and the lower wages in UNT relative to UT (Section 6.2.) suggest that the lower returns to experience observed there may be due to more general factors in consumption cities than their sectoral structure, i.e., their specific employment shares of UNTs and UTs.

Another way to answer the question about the growth implications of consumption cities would be to globally estimate separately the agglomeration economies (AEs) for

UT and UNT. We cannot estimate AEs by sector using I2D2 because we cannot identify cities in the database. Since this paper identifies an average production city index for many countries, we could obtain from the literature and compare AEs estimates for countries whose cities are mostly consumption cities and countries whose cities are mostly production cities. Chauvin et al. (2017) estimated the AEs for China (mostly production cities) at 16%, for India and the US (mix of production and consumption cities) at 8% and 5%, respectively, and for Brazil (many consumption cities) at 3%. The fact that AEs decrease as consumption cities become more dominant in a country's urban hierarchy suggests that economic growth might be weaker.

Other studies corroborate the potential negative growth implications of countries' having an urban hierarchy dominated by consumption cities. Venables (2017) show theoretically that the supply-side benefits of co-location should be small for UNT firms. Glaeser and Resseger (2010) find for the U.S. that AEs are strong in cities with higher levels of skill and nonexistent in less skilled metropolitan areas. The skill structure of U.S. cities then likely strongly correlates with their sectoral structure. Burger et al. (2022) use firm-level data to estimate AEs for 98 developing economies. They regress log labor productivity on log urban density, finding an average AE of 10-15%. They then interact density with dummies proxying for whether the firm belongs to UT, finding AEs that are twice higher than in UNT. Lastly, trade promotes innovation (Melitz and Redding, 2021).

7. Discussion

Census data for 7,000 cities reveal that cities of the same population size in countries with similar development levels differ substantially in terms of their employment composition. We classify cities into *production cities* with high employment shares of *urban tradables* or *consumption cities* with high employment shares of *urban non-tradables*. After establishing stylized facts regarding the global sectoral distribution of cities, we discuss the various paths by which developing nations may urbanize through production cities – via industrialization or tradable services – or consumption cities – via resource exports, agricultural exports, or deindustrialization. Analyses with country and city-level data corroborate our hypotheses. The results are not causal but taken together they seem to suggest that countries with mostly consumption cities have lower growth opportunities than countries with mostly production cities. Finally, we improve on the initial work of

GJV16 by: (i) also considering the roles of agricultural exports and deindustrialization; (ii) using consistent census and household survey data; (iii) considering informality; (iv) relying on panel and not just cross-sectional regressions; and (v) identifying which parts of the city size distribution are affected by the type of urbanization process.

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WEB APPENDIX NOT FOR PUBLICATION

A Robustness for the Mapping Analysis

Non-Linearities. We obtain similar residuals if we also include the square, cube, and perfect fourth of the urban share in 2000, and their interactions with the population dummies (coef. of correlation = 0.99), in case there are non-linearities in the relationship between MFG+FIRE employment, urban economic development, and city size.

Per Capita GDP. We obtain a coefficient of correlation of 0.97 if we use log per capita GDP in 2000 (PPP and constant international dollars) instead of urbanization (including the square, cube, and perfect fourth of log per capita GDP, and their interactions with the population dummies). This is not surprising since urbanization rates and log per capita GDP are highly correlated cross-sectionally (correlation of 0.91 in 2000; N = 178).

Omitting Urbanization. The correlation is 0.99 if we do not control for the urban share and do not interact the population dummies with it. We then do not allow the relationship between city employment and size to change with urban economic development.

Using the Raw Employment Shares. We obtain a coefficient of correlation of 0.89 if we simply consider the raw, i.e. non-residualized, city-specific employment shares. While the residualization was a priori important to ensure we compare apples with apples, the very high correlation indicates the residualization is not entirely necessary.

Weights. We obtain a coefficient of correlation of 1.00 if we do not modify the weights so as to over-weigh developed countries (which are under-represented in IPUMS). In that case, the weights are only based on the FUAs' population levels c.2000. We obtain a coefficient of correlation of 1.00 if we do not use weights at all.

Alternative City Categorizations. If we do not combine the top two population categories into one category, we obtain a coefficient of correlation of 1.00. If we use 5 population categories instead of 10 categories, we still get a correlation of 0.99.

Urban Definition. We can control for the urban definition used by the country c.2010. We include dummies identifying whether the definition is based on a population threshold, another condition, an administrative function, or a combination of these, and the log of the threshold (U.N., 2011). We then interact these variables with the population dummies. The correlation of the residuals remains very strong (about 0.9). Another related question is whether we could instead of focusing on urban observations in FUAs consider all observations in administrative units with a population density above a certain threshold. However, this would include rural workers. In addition, population densities in urban areas are much higher in developing countries than in developed countries (Jedwab et al., 2021). It is likely similar in rural areas. A high threshold would exclude rich country cities. A low threshold would then include rural areas/workers in poorer countries.

Urban Non-Tradables. The correlation with the residuals when the dependent variable is the employment share of the non-tradable domestic "wholesale and retail trade" sector (DWRT) is -0.51 (we include "other services" as it appears that IPUMS mistakenly reclassified some DWRT activities for a few countries). Adding "household services", it becomes -0.53. It is lower than -1.00 as other sectors see their share increase when MFG+FIRE decreases. Also including "public administration", it becomes -0.60.

Informality. The correlation with the residuals when the dependent variable is the self-employment share (estimated including unpaid workers) is about -0.45. It is lower than -1.00 because self-employment is an imperfect proxy for informality. Indeed, high-skilled workers of the MFG+FIRE sector could be self-employed despite belonging to the formal sector. Nonetheless, the fact that the correlation is almost equal to -0.5 is reassuring.

B Model Appendix

B1. Model: Introduction

We consider four sectors. The urban economy has a *tradable sector* (e.g., MFG + FIRE) and a *non-tradable sector* (e.g., wholesale & retail trade + personal services). The rural economy has an *agricultural sector*, which produces a tradable agricultural good (mostly crops, but also livestock). A *natural resource* R is an endowment that is internationally traded and is a source of foreign exchange earnings. Natural resources include fuels and mining products but also, for the sake of simplicity, cash crops characterized by high rents.

The model offers several paths to consumption cities. A commodity boom due to a resource discovery or a boost to commodity prices on account of strong external demand boosts resource revenues R and influences urbanization/cities through two channels: (i) an income effect, which through non-homotheticities in the domestic demand for food pulls workers into urban sectors; and (ii) export earnings increase domestic demand for non-tradable services and pull workers away from agriculture and urban tradables.

We also consider faster productivity growth in agriculture, which has an income effect and a foreign earnings effect if the country exports agricultural products, which increases demand for, and employment in, urban non-tradables. However, if the level of agricultural productivity is not high enough, this increase may pull workers back to agriculture in order to meet the food sufficiency requirement. Some crops then "behave" as a pure natural resource, in which case their effects go through R. Regardless of whether the country urbanizes on account of fuels/mining or agricultural exports, its employment share of urban non-tradables increases and its cities become consumption cities.

De-industrialization can occur due to the removal of ISI policies or due to increased trade competition from industrializing nations. We discuss why such cases may not lead to de-urbanization, but "consumption" cities in already somewhat urbanized nations.

B2. Model: Set-Up

We assume a log-linear utility function over the consumption of rural agricultural products (c_f), urban tradables (c_m), and urban non-tradables (c_n):

$$U = \beta_f ln(c_f - \underline{c}_f) + \beta_m ln(c_m) + \beta_n ln(c_n) \tag{B.8}$$

where expenditure shares β_f, β_m, and β_n are between 0 and 1 and sum up to 1, and $\underline{c}_f$ is the subsistence level of agricultural consumption. With income elasticity for agriculture less than one, any income increase drives up the budget shares of urban tradables and non-tradables. For the sake of simplicity, production in each sector only requires labor:

$$Q_j = A_j L_j^{1-\alpha}. \tag{B.9}$$

L_j is the share of workers in each sector $j \in \{f, m, n\}$, and A_j is sector-specific productivity. Agricultural commodities produced mostly for export and mostly with land or capital and little labor are included in resource endowments R. Thus, the agricultural sector comprises other agricultural subsectors, including subsistence food crops. The prices of urban tradables and agricultural products are assumed to be exogenous (*) and the budget constraint of the individual is: $z = p_f^* c_f + p_m^* c_m + p_n c_n$.

Since the household first covers its agricultural subsistence requirement and urban non-tradables are produced only domestically, the total expenditure on urban non-tradables equals the value of their production:

$$\beta_n(z - p_f^* \underline{c}_f) = p_n Q_n \tag{B.10}$$

Assuming balanced trade, the following accounting relationship must hold, where R is the revenue from exporting natural resources and both agricultural products and urban tradables can be produced domestically, imported from the rest of the world, or exported:

$$(\beta_f + \beta_m)(z - p_f^* \underline{c}_f) + p_f^* \underline{c}_f = R + p_f^* Q_f + p_m^* Q_m \tag{B.11}$$

With perfect labor mobility, wages equalize across any two sectors j and $k \in \{f, m\}$:

$$(1-\alpha) p_j^* A_j L_j^{-\alpha} = (1-\alpha) p_k^* A_k L_k^{-\alpha} \tag{B.12}$$

The above relationships are used to determine the implicit function for the allocation of labor in the non-tradable urban sector:

$$L_n = \beta_n \left(1 + \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right). \tag{B.13}$$

$\underline{A} = \left[(p_m^* A_m)^{\frac{1}{\alpha}} + \left(p_f^* A_f\right)^{\frac{1}{\alpha}}\right]^\alpha$ is a composite measure of agricultural productivity and productivity in urban tradables. Given L_n, the rest of labor is allocated to the tradable sectors in proportion to the relative productivity in agriculture and tradable non-agriculture:

$$L_m = (1 - L_n) \left(\frac{p_m^* A_m}{\underline{A}}\right)^{\frac{1}{\alpha}} \tag{B.14a}$$

$$L_f = (1 - L_n) \left(\frac{p_f^* A_f}{\underline{A}}\right)^{\frac{1}{\alpha}} \tag{B.14b}$$

The urbanization rate, U, is then simply $U = L_m + L_n$.

B3. Model: Summary of the Main Predictions

We obtain four predictions (Model Appendix B4. below provides details and proofs):

<u>Proposition 1</u> (Urbanization through commodity rents and "consumption cities")

$$\frac{\partial U}{\partial R} > 0, \frac{\partial L_n}{\partial R} > 0, \frac{\partial L_m}{\partial R} < 0, \frac{\partial L_f}{\partial R} < 0$$

Proposition 1 reiterates GJV16's result that resource revenues R offer a path to urbanization U and the emergence of consumption cities. Indeed, employment in urban non-tradables L_n is increasing in R whereas employment in manufacturing and tradable services L_m is decreasing in R. In other words, a positive shock to R (a resource windfall) leads to the rise of consumption cities. The effect on urbanization U is also positive.

Proposition 2 (Productivity growth in agriculture and "consumption cities")

So long as $R < p_f^* \underline{c}_f$, given $y = p_f^* A_f$, it follows that:

$$\frac{\partial L_n}{\partial y} > 0,\ \frac{\partial L_m}{\partial y} < 0$$
$$\frac{\partial U}{\partial y} < 0,\ \frac{\partial L_f}{\partial y} > 0,\ if\ \alpha(p_f^* A_f)^{\frac{1}{\alpha}} < (p_m^* A_m)^{\frac{1}{\alpha}}$$
$$\frac{\partial U}{\partial y} > 0,\ \frac{\partial L_f}{\partial y} < 0,\ if\ \alpha(p_f^* A_f)^{\frac{1}{\alpha}} > (p_m^* A_m)^{\frac{1}{\alpha}}$$

Faster productivity growth in agriculture has an income effect *and* a foreign earnings effect if the country exports agricultural products. Both result in a disproportionate increase of urban non-tradables, while the increase in foreign earnings enables the importing of urban tradables, whose share in employment decreases. If the level of agricultural productivity is high enough, the urban share increases as the urban non-tradable effect dominates the urban tradable effect. However, if the level of agricultural productivity is not high enough, an increase in agricultural productivity pulls resources back to agriculture in order to meet the subsistence requirement. Then the urban share decreases. However, we will show that urban shares almost never decrease.

Proposition 3 (Urbanization through industrialization and "production cities")

$$\frac{\partial U}{\partial p_m^* A_m} > 0, \frac{\partial L_n}{\partial p_m^* A_m} > 0,\ \frac{\partial L_m}{\partial p_m^* A_m} > 0,\ \frac{\partial L_f}{\partial p_m^* A_m} < 0$$

so long as R-$p_f^* \underline{c}_f$<0 and agricultural productivity is high enough: $\alpha(p_m^* A_m)^{\frac{1}{\alpha}} < (p_f^* A_f)^{\frac{1}{\alpha}}$.

Increasing MFG-FIRE productivity leads to an expansion of urban tradable employment. Thus, a MFG or FIRE revolution causes urbanization and production cities.

Proposition 4 (de-industrialization without de-urbanization and the transformation of existing production cities into consumption cities)

When $\underline{L_f}$ is fixed, by definition $\underline{U} = 1 - \underline{L_f}$ is also fixed, implying that a productivity shock that decreases (increases) employment in manufacturing would lead to a corresponding increase (decrease) in employment in non-tradables.

Proposition 4 says that shocks to the manufacturing or FIRE sector can cause existing production cities to become consumption cities when de-urbanization is unlikely. In the next section, we show that urbanization rates almost never decrease and discuss why.

B4. Model: Proofs

In this appendix subsection, we explain how we obtain propositions 1-4.

B4.1. Resource Revenues and Consumption Cities

Our Proposition 1 reiterates GJV16's result that resource revenues R offer a path to urbanization U and the emergence of "consumption cities". Indeed, employment in urban non-tradables L_n is increasing in R whereas employment in manufacturing and tradable services L_m is decreasing in R. In other words, a positive shock to R leads to the emergence of "consumption cities". The overall effect on urbanization is also positive.

Proposition 1 (Urbanization through commodity rents and "consumption cities")

From (B.23), (B.17), (B.19) and (B.21) below, we have the following:

$$\frac{\partial U}{\partial R} > 0, \frac{\partial L_n}{\partial R} > 0, \frac{\partial L_m}{\partial R} < 0, \frac{\partial L_f}{\partial R} < 0$$

Proof: From (B.13) we have the following implicit function for L_n:

$$F = L_n - \beta_n \left(1 + \frac{(1-L_n)^{\alpha}}{\underline{A}} \left(R - p_f^* \underline{c}_f \right) \right) = 0 \tag{B.15}$$

From the implicit function theorem:

$$\frac{\partial L_n}{\partial R} = -\frac{F_R}{F_{L_n}} \tag{B.16}$$

The partial derivatives of F with respect to R and L_n are respectively:

$$F_R = -\beta_n \frac{(1-L_n)^{\alpha}}{\underline{\text{A}}} \tag{B.16a}$$

$$F_{L_n} = 1 + \beta_n \alpha \frac{(1-L_n)^{(\alpha-1)}}{\underline{\text{A}}} (R - p_f^* \underline{\text{c}}_f) \tag{B.16b}$$

From (B.16) we obtain that:

$$\frac{\partial L_n}{\partial R} = \frac{\beta_n \frac{(1-L_n)^{\alpha}}{\underline{\text{A}}}}{1 + \beta_n \alpha \frac{(1-L_n)^{\alpha-1}}{\underline{\text{A}}} (R - p_f^* \underline{\text{c}}_f)} \tag{B.17}$$

Both the numerator and the denominator are positive. The denominator is positive not only when the country is resource rich and $R - p_f^* \underline{\text{c}}_f > 0$, but also when $R - p_f^* \underline{\text{c}}_f < 0$ because in this case we can show that the following inequality holds using the fact that since both $\alpha < 1, \beta_n < 1$ then $\alpha\beta_n < 1$. Replacing $\alpha\beta$ with 1 results in a smaller expression because $R - p_f^* \underline{\text{c}}_f < 0$. Then from (B.13) and because both $L_n < 1$ and $\beta_n < 1$ we have:

$$1 + \alpha\beta_n \frac{(1-L_n)^{\alpha-1}}{\underline{A}} \left(R - p_f^* \underline{c}_f \right) > 1 + \frac{(1-L_n)^{\alpha-1}}{\underline{A}} \left(R - p_f^* \underline{c}_f \right) = \frac{L_n (1-\beta_n)}{(1-L_n)\beta_n} > 0$$

After substituting (B.13) in (B.14a), we obtain:

$$L_m = \left[1 - \beta_n \left(1 + \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right)\right] \left(\frac{p_m^* A_m}{\underline{A}}\right)^{\frac{1}{\alpha}} \tag{B.18}$$

Differentiating with respect to R, from (B.18) we obtain:

$$\frac{\partial L_m}{\partial R} = -\beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(\frac{p_m^* A_m}{\underline{A}}\right)^{\frac{1}{\alpha}} < 0 \tag{B.19}$$

Eq.(B.19) shows the (urban) Dutch Disease effect of an increase in resource revenue. The effect is larger for countries with small non-tradable sectors (these are mostly low-income countries) and for countries with relatively productive tradable urban activities.

Substituting (B.13) in (B.14b) we obtain:

$$L_f = \left[1 - \beta_n \left(1 + \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right)\right] \left(\frac{p_f^* A_f}{\underline{A}}\right)^{\frac{1}{\alpha}} \tag{B.20}$$

Differentiating (B.20) with respect to R we get:

$$\frac{\partial L_f}{\partial R} = -\beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(\frac{p_f^* A_f}{\underline{A}}\right)^{\frac{1}{\alpha}} < 0 \tag{B.21}$$

Resource windfalls shift resources away from agriculture. The shift is stronger the smaller the non-tradable sector and the higher agricultural productivity is relative to the average in the country. Now we turn to the urbanization rate. From (B.13) and (B.18) we have:

$$\begin{aligned} U = L_n + L_m = \beta_n \left(1 + \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right) \\ + \left[1 - \beta_n \left(1 + \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right)\right] \left(\frac{p_m^* A_m}{\underline{A}}\right)^{\frac{1}{\alpha}} \end{aligned} \tag{B.22}$$

Differentiating (B.22) with respect to R we obtain:

$$\frac{\partial U}{\partial R} = \beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left[1 - \left(\frac{p_m^* A_m}{\underline{A}}\right)^{\frac{1}{\alpha}}\right] > 0 \tag{B.23}$$

End of Proof: Resource windfalls cause de-industrialization, but enable urbanization and the shift from rural and urban tradables to urban non-tradables in "consumption cities".

B4.2. Agricultural Growth and Consumption Cities

Faster productivity growth in agriculture has an income effect *and* a foreign earnings effect if the country exports agricultural products. Both result in a disproportionate increase of urban non-tradables, while the increase in foreign earnings enables the importing of urban tradables, whose share in employment decreases. Lastly, if the level of agricultural productivity is high enough, the urbanization rate increases as the urban non-tradable effect dominates the urban tradable effect. However, if the level of agricultural productivity is not high enough (especially relative to urban tradables), an increase in agricultural productivity may have an effect of pulling resources back to agriculture in order to meet the agricultural sufficiency requirement (in which case more of the urban tradable consumption is provided internally). Then the urbanization rate decreases. While this is possible, we discuss below why we think that de-urbanization is unlikely.

For brevity in exposition and for the sake of simplicity, we define x and y as follows: $x = p_m^* A_m$ for urban tradables and $y = p_f^* A_f$ for urban non-tradables. This allows us to explore not only the effect of productivity changes on urbanization and employment, but also the effect of price shocks affecting the agricultural and manufacturing sectors. For example, agricultural exports could increase because of productivity, A_f, increases and/or because of increases in world demand, and therefore the world price (p_f^*) for the country's agricultural product. It is important to clarify that, in our mind, the world agricultural price, p_f^*, in the agricultural subsistence constraint, differs from the world price for the agricultural commodities exported by the country. The price in the subsistence constraint represents the price for the basket of goods consumed locally which can be assumed to be fixed or to change less in response to global demand changes than the prices of the country's main agricultural exports.

Proposition 2 (Productivity growth in agriculture and "consumption cities")

So long as $R < p_f^* \underline{c}_f$, from (B.26), (B.27), (B.29) and (B.30) below, it follows that:

$$\frac{\partial L_n}{\partial y} > 0,\ \frac{\partial L_m}{\partial y} < 0$$

$$\frac{\partial U}{\partial y} < 0,\ \frac{\partial L_f}{\partial y} > 0,\ if\ \alpha(p_f^* A_f)^{\frac{1}{\alpha}} < (p_m^* A_m)^{\frac{1}{\alpha}}$$

$$\frac{\partial U}{\partial y} > 0,\ \frac{\partial L_f}{\partial y} < 0,\ if\ \alpha(p_f^* A_f)^{\frac{1}{\alpha}} > (p_m^* A_m)^{\frac{1}{\alpha}}$$

Proof: From (B.15) and the implicit function theorem and noticing that $y = p_f^* A_f$, we have:

$$\frac{\partial L_n}{\partial y} = -\frac{F_y}{F_{L_n}} \tag{B.24}$$

From (B.15) the partial derivatives of F with respect to y is respectively:

$$F_y = \beta_n \frac{(1-L_n)^\alpha}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^{\alpha+1}} y^{\frac{1}{\alpha}-1} \left(R - p_f^* \underline{c}_f\right) \tag{B.25}$$

From (B.16b), (B.24) and (B.25), we have:

$$\frac{\partial L_n}{\partial y} = \frac{-\beta_n \frac{(1-L_n)^\alpha}{\left(x^{\frac{1}{\alpha}}+y^{\frac{1}{\alpha}}\right)^{\alpha+1}} y^{\frac{1}{\alpha}-1} \left(R - p_f^* \underline{c}_f\right)}{\left(1 + \beta_n \alpha \frac{(1-L_n)^{\alpha-1}}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)\right)} \tag{B.26}$$

As long as $R < p_f^* \underline{c}_f$, i.e. the country is not particularly resource rich, the increase in agricultural productivity shifts resources into non-tradables ($\frac{\partial L_n}{\partial y} > 0$). In this case, the numerator is positive and, as shown above, the denominator is positive too. Differentiating (B.18) with respect to y, we get:

$$\frac{\partial L_m}{\partial y} = \frac{1}{\alpha} \frac{x^{\frac{1}{\alpha}} y^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(\beta_n - 1) + \beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)(1+\alpha)\right] \tag{B.27}$$

The first term in the brackets in (B.27) is negative and so is the second one in resource poor countries as $R - p_f^* \underline{c}_f < 0$. Therefore, $\frac{\partial L_n}{\partial y} < 0$

Differentiating (B.22) with respect to y, we obtain:

$$\begin{aligned}\frac{\partial U}{\partial y} = &\left(-\beta_n \frac{(1-L_n)^\alpha y^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^{\alpha+1}} \left(R - p_f^* \underline{c}_f\right)\right) \\ &+ \frac{1}{\alpha} \frac{x^{\frac{1}{\alpha}} y^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(\beta_n - 1) + \beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)(1+\alpha)\right]\end{aligned} \tag{B.28}$$

Rearranging the terms in (B.28) we get:

$$\frac{\partial U}{\partial y} = \frac{y^{\frac{1}{\alpha}-1}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} \left[\frac{1}{\alpha}(\beta_n - 1) \frac{x^{\frac{1}{\alpha}}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} + \beta_n (\frac{1+\alpha}{\alpha}) \frac{(1-L_n)^\alpha}{\underline{A}} (R - p_f^* \underline{c}_f)(\frac{x^{\frac{1}{\alpha}}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} - \frac{\alpha}{1+\alpha})\right] \tag{B.29}$$

From (B.29) we see that the effect of agricultural productivity growth on urbanization is negative in resource-poor countries where $R - p_f^* \underline{c}_f < 0$ and manufacturing productivity is relatively high ($\frac{x^{\frac{1}{\alpha}}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} > \frac{\alpha}{1+\alpha}$). In this case, the first and second terms in the square brackets are negative and there is a shift in employment away from urban areas ($\frac{\partial U}{\partial y} < 0$). However, when manufacturing productivity is low, the first term is small and the second term is positive. In this case, the agricultural productivity shock spurs urbanization ($\frac{\partial U}{\partial y} > 0$). Differentiating (B.20) with respect to agricultural productivity y, we obtain:

$$\frac{\partial L_f}{\partial y} = \frac{1}{\alpha} \frac{y^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(1-\beta_n) x^{\frac{1}{\alpha}} + \beta_n \frac{(1-L_n)^{\alpha}}{\underline{A}} \left(R - p_f^* \underline{c}_f\right) \left(\alpha y^{\frac{1}{\alpha}} - x^{\frac{1}{\alpha}}\right) \right] \tag{B.30}$$

In resource-poor countries (i.e. $R - p_f^* \underline{c}_f < 0$) with sufficiently high manufacturing productivity so that $\alpha\, y^{\frac{1}{\alpha}} - x^{\frac{1}{\alpha}} < 0$, a productivity boost in agriculture shifts resources into rural areas. In this case, $\frac{\partial L_f}{\partial y} > 0$. Please note that whenever condition $\alpha\, y^{\frac{1}{\alpha}} - x^{\frac{1}{\alpha}} < 0$ is satisfied so is $\frac{x^{\frac{1}{\alpha}}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} > \frac{\alpha}{1+\alpha}$, which ensures that the productivity boost in agriculture has an opposite effect on urbanization, i.e. $\frac{\partial U}{\partial y} < 0$. However, when manufacturing productivity is low (i.e. $\alpha\, y^{\frac{1}{\alpha}} - x^{\frac{1}{\alpha}} > 0$ and $\frac{x^{\frac{1}{\alpha}}}{x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}} < \frac{\alpha}{1+\alpha}$. the first terms in (B.29) and (B.30) are small so the second terms dominate. In (B.29) the second term is positive implying a shift of labor into urban areas, i.e. $\frac{\partial U}{\partial y} > 0$, while in (B.30) the second term is negative, implying a shift of labor away from agriculture, i.e. $\frac{\partial L_f}{\partial y} < 0$.

End of Proof: In sum, if the level of agricultural productivity is high enough, agricultural development leads to de-industrialization but enables urbanization and the shift from rural and urban tradables to urban non-tradables in "consumption cities".

B4.3. Industrial and/or Service Revolution and Production Cities

We discuss how a manufacturing/FIRE revolution leads to production cities.

Proposition 3 (Urbanization through industrialization and "production cities")

From (B.33), (B.34), (B.35), and (B.36) below, we have:

$$\frac{\partial U}{\partial p_m^* A_m} > 0, \; \frac{\partial L_n}{\partial p_m^* A_m} > 0, \; \frac{\partial L_m}{\partial p_m^* A_m} > 0, \; \frac{\partial L_f}{\partial p_m^* A_m} < 0$$

so long as $R - p_f^* \underline{c}_f < 0$ and agricultural productivity is sufficiently high: $(\alpha (p_m^* A_m)^{\frac{1}{\alpha}} < (p_f^* A_f)^{\frac{1}{\alpha}})$.

Proof: From (B.15) and the implicit function theorem and noticing that $x = p_m^* A_m$:

$$\frac{\partial L_n}{\partial x} = -\frac{F_x}{F_{L_n}} \tag{B.31}$$

The partial derivatives of F with respect to x is:

$$F_x = \beta_n \frac{(1-L_n)^{\alpha}\, x^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^{\alpha+1}} \left(R - p_f^* \underline{c}_f\right) = \beta_n \frac{(1-L_n)^{\alpha}\, x^{\frac{1}{\alpha}-1}}{\underline{A}\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)} \left(R - p_f^* \underline{c}_f\right). \tag{B.32}$$

Using (B.16b), (B.31), and (B.32), we obtain the following result:

$$\frac{\partial L_n}{\partial x} = -\frac{\beta_n \frac{(1-L_n)^\alpha x^{\frac{1}{\alpha}-1}}{\underline{A}\left(x^{\frac{1}{\alpha}}+y^{\frac{1}{\alpha}}\right)} \left(R - p_f^* \underline{c}_f\right)}{1 + \beta_n \alpha \frac{(1-L_n)^{\alpha-1}}{\underline{A}} \left(R - p_f^* \underline{c}_f\right)} \tag{B.33}$$

The numerator in (B.33) is negative because R is low in resource-poor countries; as shown before, the denominator is positive. Thus, (B.33) is positive and $\frac{\partial L_n}{\partial x} > 0$, implying that a positive productivity shock in manufacturing shifts resources into non-tradables.

Differentiating (B.18) with respect to x, we obtain:

$$\frac{\partial L_m}{\partial x} = \frac{1}{\alpha} \frac{x^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(1-\beta_n) y^{\frac{1}{\alpha}} + \beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right) \left(\alpha x^{\frac{1}{\alpha}} - y^{\frac{1}{\alpha}}\right)\right] \tag{B.34}$$

The first term in the square brackets is positive. The second term is positive when the country is resource poor, i.e. $R - p_f^* \underline{c}_f < 0$, and agricultural productivity is high enough so that $\alpha\, x^{\frac{1}{\alpha}} - y^{\frac{1}{\alpha}} < 0$. The latter reflects the importance of the Green Revolution for industrial development. Industrialization in countries with low agricultural productivity is slower than in countries with higher agricultural productivity. Thus, the effect of a positive productivity shock in manufacturing is an expansion of employment in manufacturing and tradable services, i.e. $\frac{\partial L_m}{\partial x} > 0$. This suggests that productivity growth in manufacturing and/or tradable services in resource poor countries fosters an expansion in the total employment of these sectors.

Differentiating (B.22) with respect to x and using (B.34), gives us the following expression:

$$\begin{aligned}\frac{\partial U}{\partial x} = & -\beta_n x^{\frac{1}{\alpha}-1} \frac{(1-L_n)^\alpha}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^{\alpha+1}} \left(R - p_f^* \underline{c}_f\right) \\ & + \frac{1}{\alpha} \frac{x^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(1-\beta_n) y^{\frac{1}{\alpha}} + \beta_n \frac{(1-L_n)^\alpha}{\underline{A}} \left(R - p_f^* \underline{c}_f\right) \left(\alpha x^{\frac{1}{\alpha}} - y^{\frac{1}{\alpha}}\right)\right]\end{aligned} \tag{B.35}$$

Both terms in (B.35) are positive when countries are resource-poor ($R - p_f^* \underline{c}_f < 0$) and agricultural productivity is high enough. In this case, productivity growth in manufacturing and/or tradable services fuels urbanization. Finally, from (B.20) we get:

$$\frac{\partial L_f}{\partial x} = \frac{1}{\alpha} \frac{x^{\frac{1}{\alpha}-1}}{\left(x^{\frac{1}{\alpha}} + y^{\frac{1}{\alpha}}\right)^2} \left[(\beta_n - 1)\, y^{\frac{1}{\alpha}} + \beta_n \frac{(1-L_n)^{\alpha}}{\underline{A}} \left(R - p_f^* \underline{c}_f\right) \left(y^{\frac{1}{\alpha}} - \alpha x^{\frac{1}{\alpha}}\right) \right] \tag{B.36}$$

End of Proof: In (B.36), if agricultural productivity is sufficiently high, then both terms in the square brackets are negative. Thus, a productivity boom in manufacturing / tradable services leads to a shift of resources away from agriculture and into urban tradables.

A shock that reduces the country's relative level of manufacturing productivity should reduce manufacturing employment according to (B.34). For instance, it could be that manufacturing productivity decreases (A_m) or that manufacturing productivity stays the same but other countries' manufacturing productivity increases, thus lowering manufacturing prices (p_m^*). In both cases, ($x = p_m^* A_m$) would decrease. Of course, this applies to both manufacturing and FIRE.

Various factors could account for a decrease in x. First, many countries, in particular in LAC, have adopted in the past ISI policies that artificially increased manufacturing productivity and employment at the expense of other sectors, and also raised the urbanization rate. When these policies were removed, productivity A_m declined, but urbanization rates decreased little. Second, increased trade competition in the world, especially with the growth of China (e.g., in manufacturing) and India (e.g., in business services), reduced the world price levels of urban tradables. In countries where urban tradable productivity was initially unchanged, x likely decreased, resulting in the same effects as the removal of ISI policies. Third, the production functions of eq. (B.9) implicitly assume complementarities between technology and labor. However, new labor-saving technologies have appeared over time in urban tradable sectors, especially in more developed countries. While our model does not explicitly account for this mechanism, it could be interpreted in our model via a lower x, with again the same consequences. In the end, regardless of the "origin" of the reduction in x, production cities see their sectoral composition change as employment in urban tradables declines. If we assume that urban residents do not migrate to rural areas, for example because skills acquired in the urban sectors have no value in the agricultural sector or because agricultural productivity is high, a negative shock to manufacturing will not shift resources from urban to rural areas (as in Proposition 3). Instead, it will shift resources from urban tradables to non-tradables, resulting in the transformation of a production city into a consumption city. Thus, we formulate Proposition 4.

C Data Creation: Aggregate Data

Sample. We focus on 116 countries that were still "developing" countries (i.e., had not reached high income status) in 1960. We obtain data every 5 years between 1960 and 2010. The full sample thus consists of 116 countries times 13 years = 1,508 observations.

GDP Share of Manufacturing and Services. When available we obtain the GDP *share of manufacturing* and the GDP share of manufacturing and services from the Beta version of the World Development Indicators (WDI) database of the World Bank (2021).[34] More recent versions of the WDI do not report these GDP shares for earlier decades, only the older versions of the WDI do. The Beta version has the merit of showing all available yearly estimates simultaneously for all versions of the WDI. For each country-year, we then take the mean of the available estimates. To maximize the number of available estimates for the years 1960, 1965, ..., 2015, 2020, and in order to minimize fluctuations due to year-specific measurement issues, we rely on five-year moving averages.

After doing so, out of the 1,508 observations in our data, for 189, 159 and 195 observations we still do not have an available estimate for the GDP share of MFG, services (SERV), and MFG+SERV, respectively. For the 2010-2020 period, we complete the data using estimates from Central Intelligence Agency (2021) and reports from international organizations or governmental agencies. Even after doing this, for 188, 153 and 189 observations we still do not have an available estimate, respectively.

For the long-difference regressions, we need data c.1960-1970. For these years, we use United Nations (1960-1980). However, for 87, 75, and 88 observations, we do not have an available estimate for the GDP share of MFG, SERV, and MFG+SERV, respectively.

The *System of National Accounts* (SNA) - *Analysis of Main Aggregates* (AMA) database of United Nations (2020b) reports the GDP share of aggregated sectors, including MFG and services, for all countries from 1970 to 2020. When needed, we use this database to complete the missing country-years of our main data set, after verifying that the newly

[34]For manufacturing, we use the series "Manufacturing, value added (% of GDP)". For services, we use as our baseline the series "Services, etc., value added (% of GDP)". When estimates of the service share are not available, we rely on another WDI series: "Services, value added (% of GDP)".

added estimates are consistent with the estimates that we already had for other years.[35]

GDP Share of FIRE. The *National Accounts Official Country Data database* of United Nations (2020a) reports when available the GDP share of various sectors – using both the ISIC Revision 3 and Revision 4 – from the 1960s to date. The data are patchy, however, and we employ them only to obtain the GDP share of FIRE c.2020 (observations from 2015-2020).

D Choice of the Variables for the Empirical Analysis

From Theory to Empirics. The urban share and the employment composition of urban areas should depend on the resource windfall R, (tradable) agricultural productivity ($p_f^* A_f$), and urban tradable productivity ($p_m^* A_m$). In our econometric analysis, we focus on the period 1960-2020 and 116 countries that were still "developing" economies in 1960.[36]

We do not have reliable historical measures of A_m. It is also not obvious which price levels should be used for p_m^*. FIRE GDP is only reported for some countries and recent years (previous ISIC classifications did not separate FIRE). MFG and FIRE employment is likewise only measured for some countries and years when there is a census or a labor force survey (surveys were rare before 1990). Productivity could then be high because employment is low and/or "selected", for example if a country has a few MFG/FIRE firms and these belong to high-productivity subsectors or are politically connected. Given such issues, we use the GDP share of manufacturing and services (MFGSERV). Web Appx Fig. D.6 shows that countries with a high GDP share of MFG+FIRE are countries with a high GDP share of MFGSEFV today, thus validating this proxy (correlation of 0.78).

It is also unclear how to distinguish agricultural products belonging to R (those generating high rents) from agricultural products belonging to $p_f^* A_f$. In addition, productivity and yields are typically poorly measured for the latter and it is not obvious which price level to use. Since we aim to measure the fact that a country is urbanizing because it is exporting fuels and mining products or agricultural products, and given the difficulty in separating agricultural products in different categories, we aggregate them together and use as a proxy the ratio of natural resource exports (NRX) to GDP.[37]

[35]We do not use SNA-AMA as our baseline database. Indeed, when comparing WDI + the yearbooks and SNA-AMA, it appears that many SNA-AMA estimates were extrapolated.

[36]The sample excludes a few ex-communist countries due to the lack of pre-1989 data.

[37]NRX/GDP differs from the GDP share of natural resources, for which we have no historical data for too many countries. Furthermore, NRX/GDP has the advantage of attributing to NRX the "value" of any input used in producing the resources, as such inputs also directly contribute to urbanization.

Finally, for deindustrialization, we use as a proxy the decline in the GDP share of MFG over time. Indeed, if MFG productivity decreases relative to the world, MFG employment should decrease. The GDP share combines information on productivity and employment.

E Mechanisms: Urban-Biased Policies and Consumption Cities

Cross-Sectional Regressions: Country-Level. We use model (1) to study the correlations between the primacy rate – the share of the country's urban population that lives in the largest city (source: World Bank (2021)) – in 2020 and the variables of interest: MFGSERV (2020), NRXGDP (mean 1960-2020) and DEINDU (change 1980-2020). We control for initial conditions, i.e. primacy, MFGSERV, and NRXGDP in 1960, thus capturing *long-difference* correlations. We control for the urban share in 2020, add the controls for area, population, small islands and urban definitions, and use populations in 2020 as weights.

As seen in Col. (1) of Appx. Table D.9, only slightly higher primacy rates are observed in NRXGDP and DEINDU countries relative to MFGSERV countries. The differences are not significant.[38] In Col. (2), we decompose NRXGDP into the export-to-GDP ratios of fuel & mining (FMXGDP) and agriculture (AGXGDP). The results do not show particularly high primacy rates in FMXGDP countries, but they show less primacy in AGXGDP countries. Yet, the high SEs suggest that it is not the case for all agricultural exports.

Panel Regressions: Country-Level. We use the same 10-year panel regression as before (eq.(2)) but now the dependent variable is the primacy rate in year t (116 x 7 = 812 obs.). The variables of interest are again MFGSERV (t), DEINDU (change 1980-t), and NRXGDP (t-1) (or FMXGDP and AGXGDP). In Cols. (3)-(6), we consider either three lags or four lags of the variables of interest (i.e., two or three extra lags in addition to the contemporaneous lag) and show the overall correlations across the various lags. We control for the urban share in t, include controls for populations in t, and cluster standard errors at the country level. Again, we find no significant correlation.

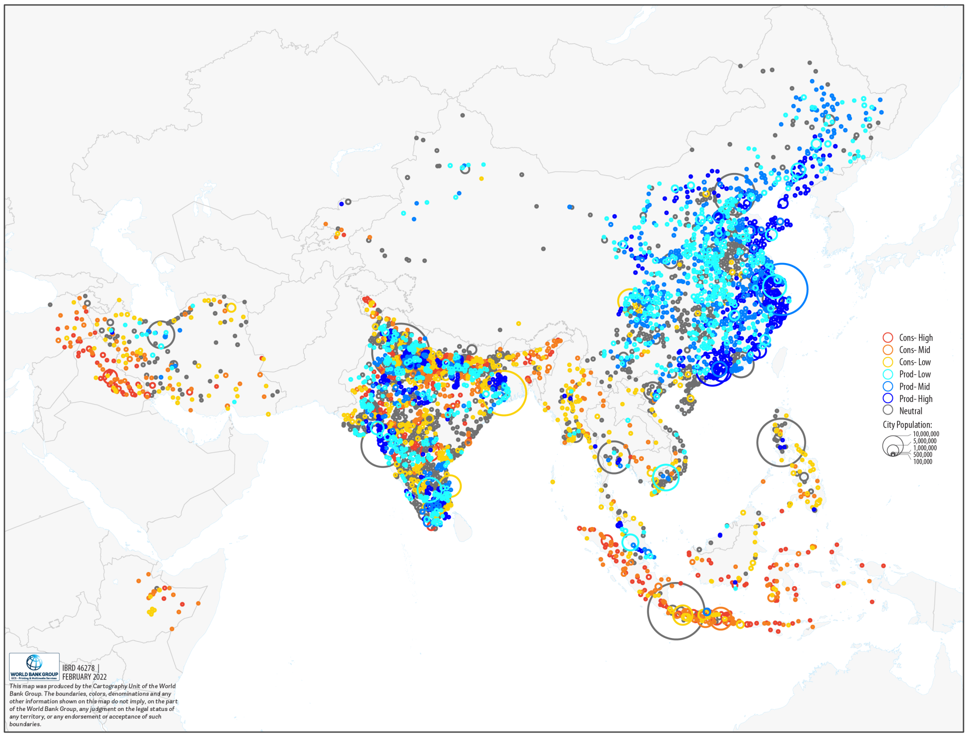
City-Level Results. We use the Functional Urban Area (FUA)-level data of the GHSL database to study whether the *largest cities*, not just the *largest city*, grow differently than other cities depending on the country's "type". We have population estimates for 7,422 FUAs c.1975, 1990, 2000 and 2015 in 115 sample countries. We regress the log growth of

[38] While some resource-rich countries such as Angola, Ivory Coast and Malaysia have high urban primacy rates (30-40%), resource-poor countries such as Bangladesh, Japan and Thailand have similarly high rates. Argentina, Egypt and Peru – countries with intermediary levels of resource richness – also have high rates.

their population between 1975 and 2015 – log (pop. + 1) 2015 - log (pop. + 1) 1975 – on the (country-level) variables of interest and their interactions with a dummy for whether the FUA is the capital/largest city (2015; we call this dummy "top 1"). We also consider the capital city and the two (top 2) or five (top 5) largest cities, or the capital city only (top 0) as well as add the controls of the long-difference regressions at the country level.

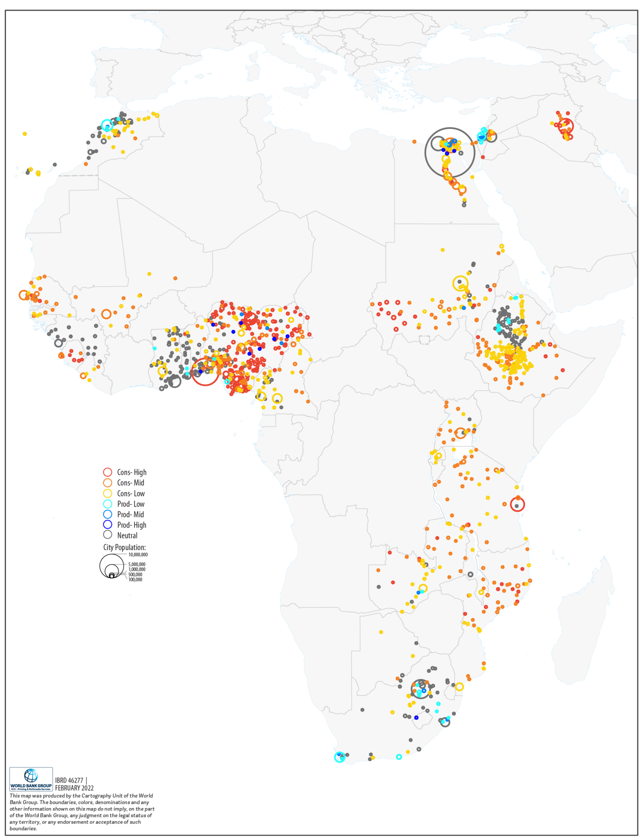
As seen in Web Appx. Table D.10, there are no significant correlations. However, point estimates suggest that the top cities in countries specialized in agricultural exports indeed grow slower relative top cities in industrialized countries. Yet, differences are not significant. We also do not find any significant correlation in a 10-year panel framework with one or two extra lags included (see Web Appx. Table D.11).

Figure D.1: Map of Production, Neutral, and Consumption Cities, Asia, c. 2000



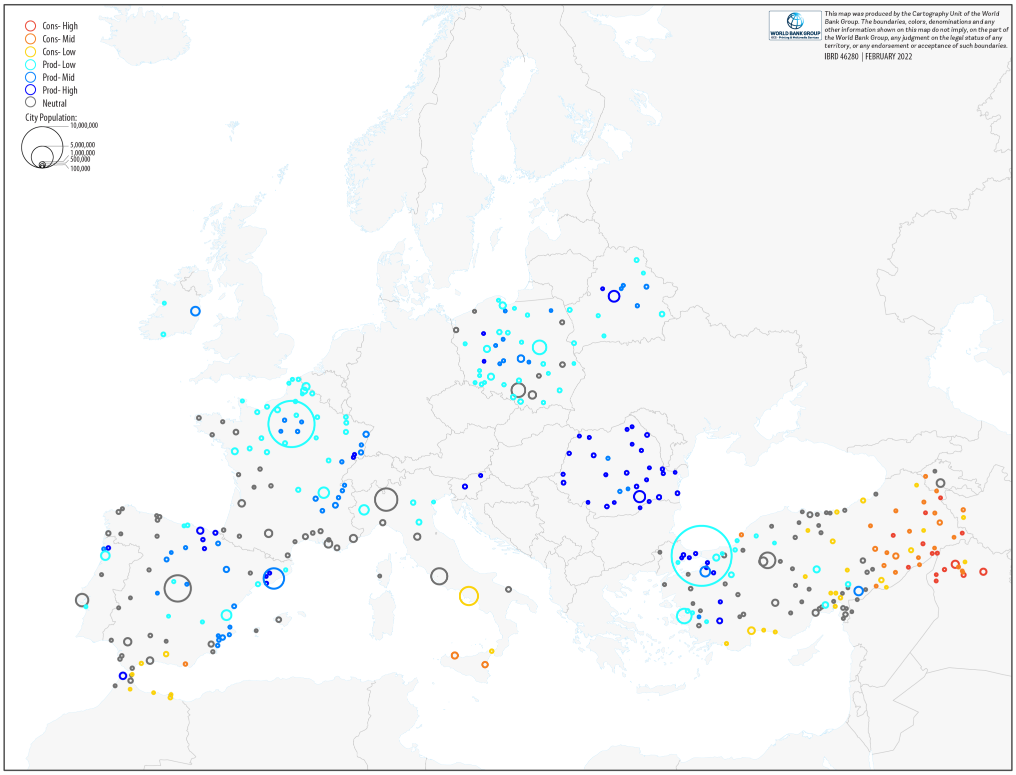
This figure shows production (Prod., blue), neutral (grey) and consumption cities (Cons., yellow-red).

Figure D.2: Map of Production, Neutral, and Consumption Cities, Africa, c. 2000



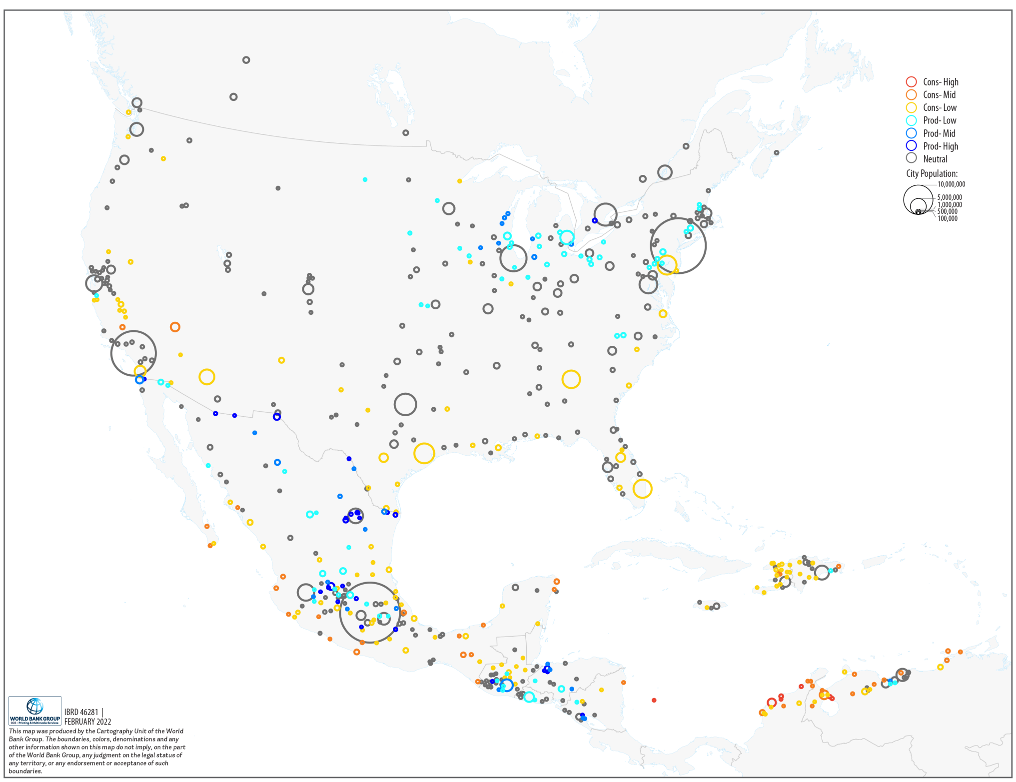
This figure shows production (Prod., blue), neutral (grey) and consumption cities (Cons., yellow-red).

Figure D.3: Map of Production, Neutral, and Consumption Cities, Europe, c. 2000



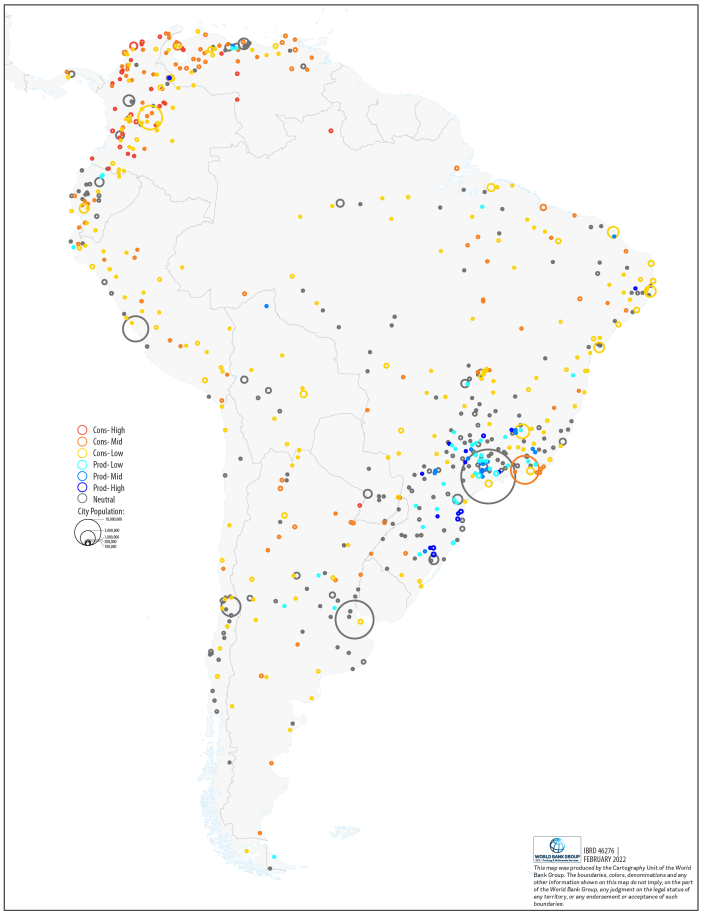
This figure shows production (Prod., blue), neutral (grey) and consumption cities (Cons., yellow-red).

Figure D.4: Map of Production, Neutral, and Consumption Cities, North America, c. 2000



This figure shows production (Prod., blue), neutral (grey) and consumption cities (Cons., yellow-red).

Figure D.5: Map of Production, Neutral, and Consumption Cities, South America, c. 2000

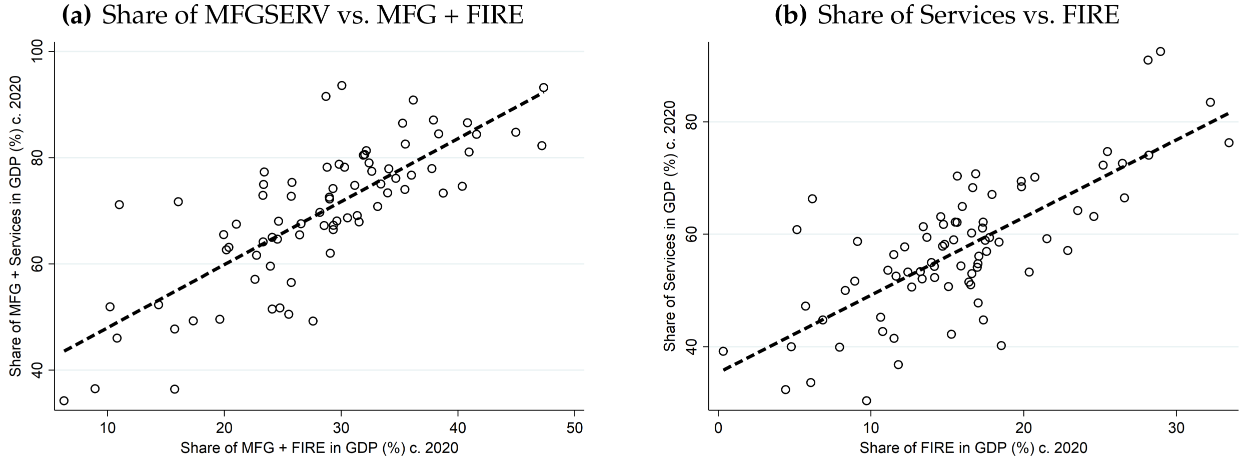


This figure shows production (Prod., blue), neutral (grey) and consumption cities (Cons., yellow-red).

Figure D.6: GDP Share of MFGSERV vs. GDP Share of MFG+FIRE, c. 2020 (N = 78)

(a) Share of MFGSERV vs. MFG + FIRE

(b) Share of Services vs. FIRE



Notes: The left panel shows that countries with a high GDP share of MFG+FIRE today are countries with a high GDP share of MFGSERV today, thus validating this proxy. Indeed, the right panel shows that countries with a high GDP share of FIRE today are countries with a high GDP share of services today.

Table D.1: Employment Share of Urban Tradables by City Size, Cross-Section, c. 2000

Dep. Var. = MFGFIRE$_{a,00}$	Coef.	SE		Coef.	SE
Capital City$_a$ (CAP)	-5.43**	(2.43)	URB$_c$	0.03	(0.05)
Pop. Size CAT$_a$ = 2	-0.66	(1.42)	URB$_c$ * Pop. Size CAT$_a$ = 2	0.07**	(0.03)
Pop. Size CAT$_a$ = 3	1.03	(2.35)	URB$_c$ * Pop. Size CAT$_a$ = 3	0.08*	(0.04)
Pop. Size CAT$_a$ = 4	3.69	(3.99)	URB$_c$ * Pop. Size CAT$_a$ = 4	0.04	(0.06)
Pop. Size CAT$_a$ = 5	5.79	(4.41)	URB$_c$ * Pop. Size CAT$_a$ = 5	0.01	(0.07)
Pop. Size CAT$_a$ = 6	13.09***	(4.10)	URB$_c$ * Pop. Size CAT$_a$ = 6	-0.06	(0.06)
Pop. Size CAT$_a$ = 7	8.59*	(4.50)	URB$_c$ * Pop. Size CAT$_a$ = 7	0.03	(0.07)
Pop. Size CAT$_a$ = 8	11.70*	(5.98)	URB$_c$ * Pop. Size CAT$_a$ = 8	0.05	(0.10)
Pop. Size CAT$_a$ = 9	21.76***	(5.35)	URB$_c$ * Pop. Size CAT$_a$ = 9	-0.09	(0.08)
Constant	16.25***	(4.02)			

Notes: Obs. = 6,865 urban agglomerations. R2 = 0.20. The dependent variable is the employment share of MFG+FIRE in each urban agglomeration a belonging to country c circa 2000. The other variables are also defined in 2000. Robust SE clustered at the country level in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table D.2: Additional Correlations for the Long-Difference Regressions

Dependent Variable:	**Urbanization Rate (%) in 2020**		
	(1)	(2)	(3)
NRXGDP (%) (Mean 1960-2020)	1.02***	0.74***	0.74***
	[0.239]	[0.236]	[0.275]
MFGSERV (%) (2020)	1.09***		
	[0.195]		
DEINDU (%) (1980-2020)	-0.04	-0.70	-0.88
	[0.343]	[0.480]	[0.628]
MFG (%) (2020)		1.57***	1.06***
		[0.279]	[0.395]
SERV (%) (2020)		0.41*	
		[0.244]	
FIRE (%) (2020)			0.69**
			[0.327]
SERV (non-FIRE) (%) (2020)			0.57*
			[0.303]
Beta Coef. MFGSERV	0.57		
Beta Coef. MFG		0.62	0.22
Beta Coef. SERV		0.16	
Beta Coef. FIRE			0.14
Beta Coef. SERV (non-FIRE)			0.16
Controls	Y	Y	Y

Notes: Obs. = 115. We control for initial conditions c. 1960 – i.e., the urban share and the value of the variables c. 1960 (except for FIRE and SERV (non-FIRE) since there is no existing data for the FIRE sector in the 1960s – and add the controls for area, population, small islands, and urban definitions. Robust SE in parentheses.

Table D.3: Resources, Industrialization, Deindustrialization & Urbanization, 1960-2020

Specification:	**Long-Diff.**	**Panel Analysis (Country FE & Year FE)**		
Dep. Var. : Urban Share URB (%) in ...	2020	Year t	Year t	Year t
Timing for the Panel: Every ...		20 Years	10 years	5 years
Panel A: Baseline	(1)	(2)	(3)	(4)
NRXGDP (%) (1): 2020; (2)-(4): t-1	1.02***	0.28**	0.19**	0.14*
	[0.239]	[0.106]	[0.089]	[0.072]
MFGSERV (%) (1): 2020; (2)-(4): t	1.09***	0.44**	0.43***	0.38***
	[0.195]	[0.179]	[0.141]	[0.121]
DEINDU (%) (1): 1980-2020; (2)-(4): 1980-t	0.04	0.53	0.42	0.41*
	[0.343]	[0.402]	[0.266]	[0.238]
Beta Coef. NRXGDP	0.49	0.16	0.10	0.07
Beta Coef. MFGSERV	0.57	0.26	0.26	0.24
Beta Coef. DEINDU	0.01	0.10	0.07	0.07
Panel B: Decomposing NRXGDP	(1)	(2)	(3)	(4)
FMXGDP (%) (1): 2020; (2)-(4): t-1	0.91***	0.29***	0.22**	0.17**
	[0.235]	[0.101]	[0.090]	[0.076]
AGXGDP (%) (1): 2020; (2)-(4): t-1	1.22**	0.20	0.02	-0.03
	[0.610]	[0.254]	[0.175]	[0.070]
Beta Coef. FMXGDP	0.40	0.15	0.11	0.08
Beta Coef. AGXGDP	0.22	0.05	0.00	0.00
Obs.; Controls; Country FE, Year FE	115; Y; N	347; Y; Y	693; Y; Y	1,387; Y; Y

Notes: Robust SE (clust. at the country level in cols. (2)-(4)) in parentheses. The six variables have the following summary statistics in col. (1): URB: mean = 52.1; SD = 19.0; min = 13.3; max = 100.0; NRXGDP: mean = 7.9; SD = 9.0; min = 0.4; max = 63.9; MFGSERV: mean = 70.5; SD = 9.9; min = 34.2; max = 93.6; DEINDU: mean = 4.6; SD = 5.0; min = 0.0; max = 21.3; FMXGDP: mean = 4.4; SD = 7.5; min = 0.0; max = 59.8; and AGXGDP: mean = 2.2; SD = 2.7; min = 0.0; max = 37.1. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table D.4: Timing of the Correlations btw Urbanization & the Measures, 10-Year Panel

Dependent Variable:	**Urbanization Rate (%) in Year** t				
Correlations with:	Baseline	1 Lead	1 Lag	2 Lags	2 Lags
NRXGDP (%) t		0.05			
		[0.062]			
NRXGDP (%) t-10	0.19**	0.18***	0.12*	0.03	
	[0.089]	[0.065]	[0.065]	[0.080]	
NRXGDP (%) t-20			0.23***	0.23***	
			[0.072]	[0.068]	
NRXGDP (%) t-30				0.14***	
				[0.046]	
MFGSERV (%) t+10		0.15			
		[0.096]			
MFGSERV (%) t	0.43***	0.26***	0.33**	0.37**	0.37**
	[0.141]	[0.090]	[0.142]	[0.159]	[0.168]
MFGSERV (%) t-10			0.26**	0.16**	0.17**
			[0.103]	[0.077]	[0.078]
MFGSERV (%) t-20				0.31**	0.32**
				[0.127]	[0.125]
DEINDU (%) 1980-t+10		0.27			
		[0.238]			
DEINDU (%) 1980-t	0.42	0.15	0.37	0.11	0.10
	[0.266]	[0.152]	[0.252]	[0.271]	[0.272]
DEINDU (%) 1980-t-10			0.01	-0.09	-0.08
			[0.295]	[0.170]	[0.162]
DEINDU (%) 1980-t-20				0.35	0.35
				[0.443]	[0.440]
FMXGDP (%) t-10					0.05
					[0.090]
FMXGDP (%) t-20					0.23***
					[0.069]
FMXGDP (%) t-30					0.14***
					[0.047]
AGXGDP (%) t-10					-0.04
					[0.160]
AGXGDP (%) t-20					0.23
					[0.195]
AGXGDP (%) t-30					0.15
					[0.161]
Sum for NXGDP			0.35***	0.40***	
			[0.12]	[0.15]	
Sum for MFGSERV			0.60***	0.85***	0.85***
			[0.20]	[0.29]	[0.29]
Sum for DEINDU			0.37	0.37	0.37
			[0.32]	[0.46]	[0.46]
Sum for FMXGDP					0.42***
					[0.15]
Sum for AGXGDP					0.33
					[0.34]
Cntry FE, Yr FE, Ctrls; Obs	Y; 694	Y; 578	Y; 578	Y; 462	Y; 462

Notes: Robust SEs are clustered at the country level. * p<0.10, ** p<0.05, *** p<0.01.

Table D.5: Resources, (De-)Industrialization & Urban Employment, IPUMS, c. 2000

Dep.Var. =	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Empl. Sh. of:	MFG	FIRE	SUM	UNT1	UNT2	UNT3	GOVT	GOVT2	NRX	CONST
MFGSERV	0.18**	0.10**	0.28**	-0.21*	-0.29*	-0.23	-0.02	-0.01	0.05	-0.02
	[0.09]	[0.05]	[0.11]	[0.12]	[0.14]	[0.15]	[0.03]	[0.06]	[0.10]	[0.04]
NRXGDP	-0.02	0.03	0.01	0.09	0.16	0.22	-0.13**	-0.09	0.11	-0.17**
	[0.11]	[0.07]	[0.15]	[0.15]	[0.20]	[0.26]	[0.06]	[0.13]	[0.16]	[0.07]
DEINDU	-0.73*	0.09	-0.64*	0.38	0.88*	1.15*	-0.23	-0.20	0.20	-0.40*
	[0.37]	[0.11]	[0.36]	[0.36]	[0.50]	[0.63]	[0.15]	[0.29]	[0.29]	[0.21]
NRXGDP	-0.20**	-0.07*	-0.27**	0.29*	0.45***	0.44**	-0.11**	-0.08	0.06	-0.15**
- MFGSERV	[0.10]	[0.04]	[0.11]	[0.15]	[0.15]	[0.20]	[0.05]	[0.10]	[0.14]	[0.06]
DEINDU	-0.91**	-0.01	-0.92**	0.58	1.17**	1.38**	-0.22	-0.18	0.15	-0.37*
- MFGSERV	[0.35]	[0.10]	[0.35]	[0.38]	[0.48]	[0.61]	[0.14]	[0.28]	[0.28]	[0.21]
Mean; Ctrls	20.7; Y	5.0; Y	25.7; Y	20.7; Y	25.3; Y	25.4; Y	6.5; Y	13.9; Y	13.0; Y	6.8; Y

Notes: Observations = 61 countries. This table shows the correlation between the employment share of each sector in urban areas c. 2000 and measures of natural resource exports, industrialization/FIRE-ization, and deindustrialization, also defined with respect to 2000. (3) SUM = MFG + FIRE. Robust SE.

Table D.6: Resources, (De-)Industrialization & Urban Informality, IPUMS, c. 2000

Dep.Var. =	Empl. Sh. in Urban Empl.			Empl. Sh. in Urban MFG			Empl. Sh. in Urban UNT2		
Type of Employment:	Wage Work	Self Empl.	Unpaid Empl.	Wage Work	Self Empl.	Unpaid Empl.	Wage Work	Self Empl.	Unpaid Empl.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MFGSERV	0.54*	-0.62**	0.08	1.00***	-0.91***	-0.09	0.63*	-0.84***	0.21
	[0.28]	[0.24]	[0.07]	[0.30]	[0.25]	[0.07]	[0.31]	[0.26]	[0.14]
NRXGDP	0.06	-0.22	0.16	0.56	-0.52	-0.05	-0.14	0.00	0.14
	[0.37]	[0.28]	[0.12]	[0.37]	[0.32]	[0.09]	[0.43]	[0.40]	[0.13]
DEINDU	-0.33	0.19	0.15	-0.47	0.31	0.16	0.52	-0.88	0.36*
	[0.69]	[0.57]	[0.17]	[1.08]	[0.90]	[0.21]	[0.88]	[0.80]	[0.21]
NRXGDP	-0.48^	0.40^	0.08	-0.44	0.39	0.05	-0.77**	0.84**	-0.07
- MFGSERV	[0.31]	[0.24]	[0.09]	[0.35]	[0.29]	[0.08]	[0.33]	[0.32]	[0.11]
DEINDU	-0.88	0.80	0.07	-1.47	1.22	0.25	-0.10	-0.05	0.15
- MFGSERV	[0.72]	[0.62]	[0.15]	[1.07]	[0.90]	[0.20]	[0.83]	[0.79]	[0.15]
Mean	58.0	34.8	7.2	61.2	33.9	5.0	35.8	58.4	5.8
Obs.; Ctrls	55; Y	55; Y	55; Y	54; Y	54; Y	54; Y	54; Y	54; Y	54; Y

Notes: This table shows the correlation between the employment share of each type of employment in urban areas or specific sectors in urban areas c. 2000 and measures of natural resource exports, industrialization/FIRE-ization, and deindustrialization, also defined with respect to 2000. UNT2 = non-tradables (domestic wholesale and retail trade). Robust SE. ∧ p<0.15, * p<0.10, ** p<0.05, *** p<0.01.

Table D.7: Resources, Industrialization & Sectoral Employment / Informality, Panel

Dep.Var. =	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Empl. Sh. of ... (t)	MFG	FIRE	SUM	UNT1	UNT2	UNT3	GOVT	GOVT2	WAGE	SELF
MFGSERV_t	0.34**	0.06	0.40	-0.29	-0.54**	-0.51***	-0.10	-0.15**	0.14	-0.27
	[0.154]	[0.111]	[0.243]	[0.239]	[0.233]	[0.099]	[0.083]	[0.063]	[0.337]	[0.271]
NRXGDP_{t-10}	0.30*	-0.04	0.26	0.21	0.49***	0.38***	0.18**	0.04	-0.31	0.30
	[0.166]	[0.071]	[0.217]	[0.153]	[0.152]	[0.104]	[0.076]	[0.167]	[0.257]	[0.228]
DEINDU_{1980-t}	-0.42	-0.03	-0.45	-0.23	-0.47***	-0.12	0.10	-0.17	0.30	-0.51***
	[0.368]	[0.204]	[0.563]	[0.161]	[0.153]	[0.191]	[0.126]	[0.127]	[0.199]	[0.17]
NRXGDP	-0.04	-0.10	-0.14	0.51	1.03***	0.90***	0.28*	0.19	-0.45	0.57
- MFGSERV	[0.19]	[0.13]	[0.29]	[0.35]	[0.30]	[0.15]	[0.14]	[0.18]	[0.49]	[0.42]
DEINDU	-0.76***	-0.10	-0.85**	0.06	0.07	0.40*	0.20	-0.03	0.16	-0.24
- MFGSERV	[0.27]	[0.14]	[0.41]	[0.20]	[0.15]	[0.21]	[0.15]	[0.13]	[0.28]	[0.23]
Observations	124	124	124	124	124	124	120	93	99	99
Country, Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table shows the correlation between the employment share of each sector/type of employment in urban areas in t and measures of natural resource exports (t-10), industrialization/FIRE-ization (t), and deindustrialization (1980-t). Robust SE clustered at the country level. * p<0.10, ** p<0.05, *** p<0.01.

Table D.8: Resources, Industrialization & Employment, Cross-Section, I2D2 Database

Dep.Var. =	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empl. Sh. (c. 2005):	MFG	FIRE	MFGFIRE	UNT1	UNT2	WAGE	SELF	UNPAID
Panel A: Vars. in 2000								
$MFGSERV_{2000}$	0.12***	-0.04	0.08*	0.09	0.14	0.44**	-0.48***	-0.15
	[0.035]	[0.039]	[0.043]	[0.127]	[0.144]	[0.180]	[0.136]	[0.118]
$NRXGDP_{1960-2000}$	-0.06	0.03	-0.03	0.18	0.03	0.41	-0.30	-0.15
	[0.056]	[0.045]	[0.076]	[0.127]	[0.209]	[0.294]	[0.221]	[0.121]
$DEINDU_{1980-2000}$	-0.26	0.14	-0.12	0.12	1.42**	-0.77	1.08*	0.54
	[0.167]	[0.105]	[0.204]	[0.364]	[0.597]	[0.715]	[0.557]	[0.326]
NRXGDP	-0.18***	0.07	-0.11	0.08	-0.11	-0.03	0.18	-0.00
- MFGSERV	[0.04]	[0.05]	[0.07]	[0.17]	[0.20]	[0.27]	[0.22]	[0.15]
DEINDU	-0.38**	0.18	-0.20	0.03	1.28**	-1.21	1.56***	0.69*
- MFGSERV	[0.16]	[0.12]	[0.21]	[0.40]	[0.60]	[0.74]	[0.57]	[0.36]
Panel B: Vars. in 2010								
$MFGSERV_{2010}$	0.10	-0.03	0.07	0.09	0.26	0.69***	-0.62***	-0.23
	[0.061]	[0.043]	[0.061]	[0.145]	[0.199]	[0.217]	[0.157]	[0.142]
$NRXGDP_{1960-2010}$	-0.13**	0.04	-0.10	0.14	0.16	0.42*	-0.28	-0.13
	[0.065]	[0.045]	[0.070]	[0.143]	[0.223]	[0.244]	[0.195]	[0.134]
$DEINDU_{1980-2010}$	-0.09	0.14	0.05	0.10	1.11**	-0.02	0.47	0.23
	[0.134]	[0.085]	[0.159]	[0.309]	[0.503]	[0.652]	[0.564]	[0.242]
NRXGDP	-0.23***	0.07	-0.16***	0.05	-0.09	-0.27	0.34*	0.09
- MFGSERV	[0.05]	[0.07]	[0.06]	[0.20]	[0.20]	[0.22]	[0.18]	[0.18]
DEINDU	-0.19	0.17	-0.02	0.02	0.86	-0.71	1.09*	0.45
- MFGSERV	[0.15]	[0.10]	[0.17]	[0.36]	[0.55]	[0.69]	[0.57]	[0.30]
Observations	93	90	90	94	91	94	93	93
Controls	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table shows the correlation between the employment share of each sector/type of employment in urban areas c. 2005 and measures of natural resource exports, industrialization/FIRE-ization, and deindustrialization, defined with respect to 2000 or 2010. Robust SE. * p<0.10, ** p<0.05, *** p<0.01.

Table D.9: Natural Resources, (De-)Industrialization & Urban Primacy, Country-Level

Dependent Variable:	Urban Primacy (%) in 2020 (Long-Diff.)		Urban Primacy (%) in t (Panel) 3 Lags Incl.		4 Lags Incl.	
	(1)	(2)	(3)	(4)	(5)	(6)
MFGSERV ((3)-(6): sum of lags)	-0.19	-0.2	-0.10	-0.05	-0.09	-0.05
	[0.13]	[0.14]	[0.10]	[0.13]	[0.10]	[0.13]
NRXGDP ((3)-(6): sum of lags)	-0.11		0.02	0.05		
	[0.15]		[0.07]	[0.09]		
DEINDU ((3)-(6): sum of lags)	-0.08	-0.11	-0.09	-0.05	-0.1	-0.05
	[0.17]	[0.17]	[0.18]	[0.19]	[0.18]	[0.18]
FMXGDP ((3)-(6): sum of lags)		-0.09			0.06	0.08
		[0.16]			[0.08]	[0.11]
AGXGDP ((3)-(6): sum of lags)		-0.46			-0.11	-0.11
		[0.36]			[0.18]	[0.20]
NRXGDP - MFGSERV	0.08		0.12		0.10	
	[0.18]		[0.09]		[0.14]	
DEINDU - MFGSERV	0.11	0.09	0.01	-0.01	0.00	0.00
	[0.20]	[0.18]	[0.24]	[0.23]	[0.28]	[0.27]
FMXGDP - MFGSERV		0.11		0.15		0.13
		[0.20]		[0.10]		[0.16]
AGXGDP - MFGSERV		-0.27		-0.01		-0.06
		[0.36]		[0.19]		[0.21]
Country, Year FE	N	N	Y	Y	Y	Y
Observations	115	115	462	346	462	346

Notes: Robust SE (clust. at the country level in (3)-(6)) in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table D.10: Resources, Industrialization & Growth of FUAs, 1975-2015, Cross-Section

Dependent Variable	Log FUA Pop. 2015 - Log FUA Pop. 1975							
Capital + Largest City:	Top 1	Top 2	Top 5	Top 0	Top 1	Top 2	Top 5	Top 0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MFGSERV*TOP	-0.02	-0.01	0.00	-0.01	-0.02	-0.01	0.00	-0.01
	[0.025]	[0.024]	[0.025]	[0.025]	[0.026]	[0.025]	[0.026]	[0.026]
NRXGDP*TOP	-0.01	-0.01	-0.01	-0.00				
	[0.029]	[0.023]	[0.018]	[0.039]				
DEINDU*TOP	0.04	0.03	0.01	0.05	0.04	0.03	0.01	0.05
	[0.047]	[0.046]	[0.044]	[0.051]	[0.047]	[0.046]	[0.044]	[0.051]
FMXGDP*TOP					-0.01	-0.01	-0.01	-0.00
					[0.031]	[0.024]	[0.019]	[0.042]
AGXGDP*TOP					-0.06	-0.04	-0.05	-0.05
					[0.057]	[0.052]	[0.046]	[0.061]
TOP*(NRXGDP - MFGSERV)	0.00	0.00	-0.01	0.00				
	[0.05]	[0.04]	[0.04]	[0.06]				
TOP*(DEINDU - MFGSERV)	0.06	0.04	0.01	0.06	0.06	0.04	0.01	0.06
	[0.07]	[0.06]	[0.06]	[0.07]	[0.07]	[0.07]	[0.06]	[0.07]
TOP*(FMXGDP - MFGSERV)					0.01	0.00	-0.01	0.01
					[0.05]	[0.04]	[0.04]	[0.06]
TOP*(AGXGDP - MFGSERV)					-0.04	-0.03	-0.05	-0.04
					[0.05]	[0.05]	[0.04]	[0.05]
Observations	7,422	7,422	7,422	7,422	7,422	7,422	7,422	7,422

Notes: Robust SE in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table D.11: Resources, Industrialization & Growth of FUAs, 1975-2015, Panel

Dependent Variable:	Log FUA Pop. in Year t							
Extra Lags Included	1 Extra Lag				2 Extra Lags			
Capital + Largest City:	Top 1	Top 2	Top 5	Top 0	Top 1	Top 2	Top 5	Top 0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum of Lags for MFGSERV	0.01	0.00	0.00	0.00	0.02**	0.01*	0.01*	0.01
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Sum of Lags for NRXGDP	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03
	[0.02]	[0.01]	[0.01]	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]
Sum of Lags for DEINDU	-0.02	-0.01	-0.01	-0.02	-0.01	-0.01	-0.00	-0.02
	[0.02]	[0.02]	[0.02]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Observations	29,681	29,681	29,681	29,681	22,259	22,259	22,259	22,259
City FE	Y	Y	Y	Y	Y	Y	Y	Y
Country-Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Robust SE clust. at the city level in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table D.12: Natural Resources & Tall Building Construction, 1960-2020

Type of Buildings:	All	Resid.	Non-Res.	Office	Hotel	Retail	Gvt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Core Controls	**Long-Difference:** Dep. Var.: Log Urban Height Density c. 2020						
$MFGSERV_{2020}$	0.08***	0.09**	0.10***	0.11***	0.07**	0.07*	0.02
	[0.024]	[0.040]	[0.029]	[0.029]	[0.034]	[0.043]	[0.029]
$NRXGDP_{1960-2020}$	0.05	0.10*	0.06**	0.06*	0.02	0.05	0.04
	[0.031]	[0.057]	[0.030]	[0.031]	[0.051]	[0.052]	[0.038]
$DEINDU_{1980-2020}$	-0.01	-0.04	-0.00	-0.05	0.04	-0.06	-0.03
	[0.028]	[0.050]	[0.035]	[0.036]	[0.039]	[0.054]	[0.047]
NRXGDP - MFGSERV	-0.03	0.01	-0.04	-0.05	-0.04	-0.02	0.01
	[0.03]	[0.06]	[0.03]	[0.03]	[0.05]	[0.06]	[0.04]
DEINDU - MFGSERV	-0.08***	-0.13**	-0.10**	-0.16***	-0.03	-0.13**	-0.06
	[0.03]	[0.06]	[0.04]	[0.04]	[0.05]	[0.06]	[0.05]
Obs; Controls	115; Y	115; Y	115; Y	115; Y	115; Y	115; Y	115; Y
Panel B: + Urban Dvt Ctrls	**Long-Difference:** Dep. Var.: Log Urban Height Density c. 2020						
$MFGSERV_{2020}$	-0.01	-0.02	0.01	0.02	-0.05	0.01	-0.02
	[0.023]	[0.043]	[0.022]	[0.024]	[0.029]	[0.040]	[0.035]
$NRXGDP_{1960-2020}$	0.02	0.03	0.05**	0.07**	-0.02	0.07	0.01
	[0.027]	[0.050]	[0.023]	[0.026]	[0.046]	[0.056]	[0.051]
$DEINDU_{1980-2020}$	-0.02	-0.04	-0.03	-0.06**	0.03	-0.09	-0.03
	[0.026]	[0.042]	[0.024]	[0.025]	[0.031]	[0.056]	[0.048]
NRXGDP - MFGSERV	0.03	0.05	0.05**	0.04*	0.02	0.06	0.03
	[0.02]	[0.05]	[0.02]	[0.02]	[0.04]	[0.07]	[0.06]
DEINDU - MFGSERV	-0.01	-0.01	-0.04	-0.09***	0.07*	-0.10	-0.00
	[0.04]	[0.06]	[0.03]	[0.03]	[0.04]	[0.06]	[0.06]
Panel C: + Urban Dvt Ctrls	**10-Yr Panel (w/ 4 Lags):** Dep. Var.: Log Urban Height Density in t						
Sum for MFGSERV Lags	0.05	0.08	-0.01	0.01	-0.03	-0.11	0.05
	[0.06]	[0.09]	[0.06]	[0.06]	[0.08]	[0.12]	[0.12]
Sum for NRXGDP Lags	0.10**	0.09	0.04	0.04	0.01	0.10	0.07
	[0.04]	[0.06]	[0.04]	[0.05]	[0.05]	[0.07]	[0.05]
Sum for DEINDU Lags	-0.08	0.09	-0.06	-0.05	-0.03	0.40*	-0.79***
	[0.07]	[0.14]	[0.07]	[0.07]	[0.15]	[0.23]	[0.30]
Obs; Cntry & Yr FE, Ctrls	346; Y	346; Y	346; Y	346; Y	346; Y	346; Y	346; Y

Notes: Robust SE in parentheses (clust. at the country level in Panel C). Summary statistics for LUHT in Panels A-B: All: Mean = 4.6; SE = 1.7; Min = -2.0; Max = 9.6. Resid: Mean = 3.3; SE = 2.7; Min = -3.7; Max = 9.3. Non-Res.: Mean = 3.9; SE = 1.8; Min = -2.4; Max = 8.6. * p<0.10, ** p<0.05, *** p<0.01.

Table D.13: Natural Resources & Vanitous Tall Buildings, 1960-2020

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: + Urban Dvt Ctrls	**Long-Difference:** Dep. Var.: Log Non-Residential Height Density c. 2020					
Buildings $\geq$ ... Meters:	All	125	140	160	200	240
MFGSERV_{2020}	0.01	-0.00	-0.03	0.06	0.03	0.01
	[0.022]	[0.039]	[0.037]	[0.045]	[0.051]	[0.049]
$\text{NRXGDP}_{1960-2020}$	0.05**	0.04	0.08**	0.09*	0.13**	0.14**
	[0.023]	[0.035]	[0.036]	[0.043]	[0.063]	[0.062]
$\text{DEINDU}_{1980-2020}$	-0.03	-0.06	-0.07*	-0.04	0.02	0.01
	[0.024]	[0.044]	[0.038]	[0.047]	[0.065]	[0.061]
NRXGDP - MFGSERV	0.05**	0.05	0.11***	0.03	0.11	0.12*
	[0.02]	[0.03]	[0.03]	[0.06]	[0.07]	[0.07]
DEINDU - MFGSERV	-0.04	-0.05	-0.04	-0.10	-0.01	-0.00
	[0.03]	[0.06]	[0.05]	[0.06]	[0.08]	[0.08]
Obs; Controls	115; Y	115; Y	115; Y	115; Y	115; Y	115; Y
Panel B: + Urban Dvt Ctrls	**10-Yr Panel (w/ 4 Lags):** Dep. Var.: Log Non-Residential Height Density t					
Buildings $\geq$ ... Meters:	All	125	140	160	200	240
Sum for MFGSERV Lags	-0.01	0.01	-0.03	0.01	-0.05	-0.15
	[0.06]	[0.09]	[0.09]	[0.09]	[0.11]	[0.11]
Sum for NRXGDP Lags	0.04	-0.01	0.00	0.13*	0.13*	0.10
	[0.04]	[0.07]	[0.07]	[0.08]	[0.08]	[0.08]
Sum for DEINDU Lags	-0.06	0.10	0.13	0.58**	0.46*	0.39
	[0.07]	[0.13]	[0.12]	[0.26]	[0.27]	[0.25]
Obs; Cntry & Yr FE, Ctrls	346; Y	346; Y	346; Y	346; Y	346; Y	346; Y

Notes: Robust SE in parentheses (clust. at the country level in Panel B).

Table D.14: Natural Resources & Construction, Long-Diff., 1970-2020

Dependent Variable:	**Log Sum Cement (Tons; 70-20)**				**Log Sum Constr.**		**Slum Share**	
Long-Difference	**Production**		**Consumption**		**GDP (70-20; PPP)**		**(%) c. 2010**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MFGSERV 2020/2010	0.05***	0.01	0.05***	0.01	0.01	-0.01*	-0.55*	0.18
	[0.018]	[0.014]	[0.019]	[0.014]	[0.02]	[0.01]	[0.32]	[0.31]
NRXGDP 1970-2020/2010	0.02	0.02	0.01	0.01	0.00	-0.01	-0.65*	0.14
	[0.021]	[0.017]	[0.020]	[0.016]	[0.02]	[0.01]	[0.36]	[0.37]
DEINDU 1980-2020/2010	-0.01	0.01	-0.01	0.01	-0.01	-0.01	-0.16	0.06
	[0.034]	[0.021]	[0.034]	[0.019]	[0.02]	[0.01]	[0.74]	[0.57]
NRXGDP - MFGSERV	-0.03	0.01	-0.03	0.01	-0.01	-0.02	-0.10	-0.04
	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]	[0.03]	[0.36]	[0.33]
DEINDU - MFGSERV	-0.06*	-0.00	-0.06	0.01	0.01	0.00	0.39	-0.12
	[0.04]	[0.02]	[0.04]	[0.02]	[0.01]	[0.02]	[0.70]	[0.61]
NRXGDP - DEINDU	0.03	0.00	0.03	0.00	0.01	0.01	-0.49	0.09
	[0.04]	[0.02]	[0.04]	[0.02]	[0.03]	[0.03]	[0.62]	[0.46]
Obs.; Core Controls	80; Y	80; Y	80; Y	80; Y	115; Y	115; Y	91; Y	91; Y
Ctrls Urban Econ Dvt.	N	Y	N	Y	N	Y	N	Y

Notes: Robust SE in parentheses: * p<0.10, ** p<0.05, *** p<0.01.

Table D.15: Resources, (De-)Industrialization, & Human Capital, c. 2000

	(1)	(2)	(3)	(4)	(5)
Panel A: Dep. Var.: (urban; c. 2000-2020)	Avg Number Years Educ.	Harmonized Test Score	Yrs Educ. x Test Score	Returns to Educ.	Yrs Educ. x Returns
MFGSERV	0.04*	0.93	0.03	0.15***	2.06***
	[0.02]	[0.62]	[0.02]	[0.04]	[0.49]
NRXGDP	0.07**	-0.30	0.04*	0.11**	2.01***
	[0.03]	[0.93]	[0.03]	[0.05]	[0.55]
DEINDU	0.16**	1.82	0.14	-0.03	0.05
	[0.07]	[3.14]	[0.12]	[0.13]	[0.93]
NRXGDP - MFGSERV	0.03	-1.23**	0.01	-0.05	-0.05
	[0.03]	[0.54]	[0.03]	[0.03]	[0.55]
DEINDU - MFGSERV	0.11	0.89	0.11	-0.18	-2.00*
	[0.08]	[3.00]	[0.12]	[0.13]	[1.01]
Observations	53	101	51	84	48
Panel B: Dep. Var.: (urban; c. 2000-2020)	Ret. Educ. Reg 01 FE	Ret. Educ. Reg 02 FE	Ret. Educ. PSU FE	Ret x Yrs Edu Reg 01 FE	Ret x Yrs Edu Reg 02 FE
MFGSERV	0.25***	0.18***	0.14***	2.00***	2.05***
	[0.07]	[0.05]	[0.03]	[0.50]	[0.48]
NRXGDP	0.12	0.13**	0.17**	0.65	2.07***
	[0.09]	[0.06]	[0.08]	[0.66]	[0.62]
DEINDU	0.16	0.09	-0.05	0.11	0.91
	[0.14]	[0.15]	[0.37]	[1.40]	[0.86]
NRXGDP - MFGSERV	-0.14*	-0.04	0.03	-1.35	0.02
	[0.07]	[0.02]	[0.07]	[0.99]	[0.61]
DEINDU - MFGSERV	-0.09	-0.08	-0.18	-1.89	-1.14
	[0.13]	[0.14]	[0.37]	[1.15]	[0.89]
Observations	46	66	51	28	40
Panel C: Dep. Var.: (urban; c. 2000-2020)	Ret x Yrs Edu PSU FE	Returns to Experience	Ret. Exp. Reg 01 FE	Ret. Exp. Reg 02 FE	Ret. Exp. PSU FE
MFGSERV	1.35***	0.01	0.02	0.01	0.01
	[0.30]	[0.01]	[0.02]	[0.01]	[0.01]
NRXGDP	1.67**	-0.02	0.02	-0.02	0.01
	[0.75]	[0.01]	[0.01]	[0.01]	[0.02]
DEINDU	3.57	-0.02	-0.01	-0.03	-0.21***
	[2.08]	[0.03]	[0.03]	[0.03]	[0.07]
NRXGDP - MFGSERV	0.32	-0.03***	0.00	-0.03***	-0.00
	[0.69]	[0.01]	[0.03]	[0.01]	[0.01]
DEINDU - MFGSERV	2.22	-0.03	-0.02	-0.04	-0.22***
	[2.22]	[0.03]	[0.03]	[0.03]	[0.07]
Observations	29	84	46	66	51

Notes: Cross-sectional regressions c. 2000 (2020 for the test scores). See text for details. Robust SE.

Table D.16: Resources, (De-)Industrialization, & Urban Regional Inequality, c. 2000

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	Gini of Regional Urban Pop.		Gini of Regional Urban Lights		Gini of the
Source:	Pop. Data from 2000	Pop. Data from 2015	Lights Data from 2000	Lights Data from 2010	Production City Index
NRXGDP (%) 2000	-0.16	-0.18	0.13	0.11	0.01
	[0.23]	[0.22]	[0.19]	[0.19]	[0.12]
MFGSERV (%) 2000	0.26**	0.29**	0.05	0.13	-0.13
	[0.11]	[0.11]	[0.09]	[0.09]	[0.10]
DEINDU (%) 2000	-0.23	-0.09	0.28	0.18	0.04
	[0.56]	[0.54]	[0.54]	[0.56]	[0.23]
Observations	115	115	115	115	59
Baseline Controls	Y	Y	Y	Y	Y
R-squared	0.611	0.620	0.545	0.617	0.659
NRXGDP-MFGSERV	-0.43**	-0.47**	0.09	-0.02	0.15
	[0.21]	[0.21]	[0.17]	[0.17]	[0.13]
DEINDU-MFGSERV	-0.50	-0.38	0.23	0.05	0.17
	[0.57]	[0.56]	[0.54]	[0.56]	[0.25]

Notes: Columns (1)-(2) The Gini of Regional Urban Population is the Gini Index of the total population of all GHS urban agglomerations across all regions (first-level administrative units) in each country. More precisely, the GIS file of all first-level administrative units in the world come from the GADM database (www.gadm.org), version 2.8, November 2015. For region, we then obtain the total population of all GHS urban agglomerations in 2000 and 2015. GHS urban agglomerations are urban agglomerations of at leat 50,000 inhabitants in 2015 in the Global Human Settlements (GHS) database. Column (3)-(4) The Gini of Regional Urban Lights is the Gini Index of the total sum of night lights of all GHS urban agglomerations across all regions (first-level administrative units) in each country. The night lights data come from the radiance-calibrated (hence, not top-coded) DMSP-OLS satellite series (resolution: $\sim$1 km at the equator). Using the boundaries of all urban agglomerations in the GHS database, we obtain the total sum of night lights of each city in 2000 and 2010. We then obtain the total sum of night lights of each region in 2000 and 2010, and finally compute a Gini index based on each variable. Column (5) We use the Gini Index of the production city-ness index of all GHS urban agglomerations in the sample. Details on how this Gini index is calculated are provided in the text. Finally, while this Gini index was calculated for 74 countries, it is only available for 59 developing economies among the 116 countries in our main sample.