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Socioeconomic Pathways and Regional Distribution of the World's 101 Largest Cities

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ABSTRACT

Regional trends in population, urbanization, resource availability and scarcity, as well as economic growth and decline are often best observed in the largest cities (urban areas). Typically, large cities are early adopters to regional opportunities for growth and development. This paper examines the effect of socioeconomic pathways on the regional population distribution of the world's 101 largest cities in the 21st century. City populations are provided for 2010, 2025, 2050, 2075, and 2100. Socioeconomic pathways, with various levels of sustainability and global cooperation are assessed based on their influence on the world's largest cities. The results of this paper provide valuable insights into the effect of sustainable development on the regional distribution of large urban areas throughout the 21st century.

KEYWORDS

population projection; urban areas; 21st century

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Abstract
Regional trends in population, urbanization, resource availability and scarcity, as well as economic growth and decline are often best observed in the largest cities (urban areas). Typically, large cities are early adopters to regional opportunities for growth and development. This paper examines the effect of socioeconomic pathways on the regional population distribution of the world's 101 largest cities in the 21st century. City populations are provided for 2010, 2025, 2050, 2075, and 2100. Socioeconomic pathways, with various levels of sustainability and global cooperation are assessed based on their influence on the world's largest cities. The results of this paper provide valuable insights into the effect of sustainable development on the regional distribution of large urban areas throughout the 21st century.

Nomenclature

UGR	Urban Growth Rate
LUA	Large Urban Area
GR	Growth Rate
CP	City Population
WUP	World Urbanization Prospects
YR	Year
P	Population
R^2	Coefficient of Determination
LAC	Latin America and the Caribbean
SSA	Sub-Saharan Africa
MENA	Middle East and North Africa
EAP	East Asia Pacific
ECA	Europe and Central Asia
SAR	South Asia Region

Introduction

Large urban areas are hubs of economic development and innovation, with larger cities underpinning regional economies and local and global sustainability initiatives. Currently, 757 million people reside in the 101 largest cities, with a population of 36 million for the largest city (Tokyo), and 3.5 million for the 101st largest city (Addis Ababa); these cities are home to 11% of the world's population. By the end of the century, the world population is likely to grow, with estimates ranging from 6.9 billion to 13.1 billion; the percentage of people residing in the 101 larger cities is estimated to be 15% to 23%. In all scenarios the projected populations in the world's largest cities are growing.

Urbanization can be a powerful antidote to environmental degradation as population density and well-managed provision of urban services that are possible in cities, enable substantial gains in resource consumption efficiency. Urbanization also leads to higher rates of education and health care provision [1, 2]. Urbanization, particularly through

large cities, is a key driver of economic development. Larger cities have a disproportionate impact on regional and global economies as well as geopolitical power dynamics.

With regard to defining and implementing sustainable development, cities have received relatively minor attention compared to countries. Working with cities may offer a more straightforward approach to sustainable development as requirements and achievements will be easier to define and monitor. Also, with almost 20% of the world's population and roughly double that in terms of economy and innovation in cities, sustainable development globally is not possible without sustainability being firmly anchored in most of the world's larger cities.

This paper considers how socioeconomic development may affect the world's 101 largest cities, and gives predictions of their population growth to the end of the century. The analysis is based on NCAR's (National Center for Atmospheric Research) three basic shared socioeconomic pathways (SSP1, SSP2, and SSP3) [3], and the United Nations World Urbanization Prospects [4]. Synergies between the growth and development of the 101 largest cities and their effect on global sustainability are highlighted.

Defining city boundaries

Various methods to define city boundaries exist. Without standard definitions large urban areas are subject to substantial interpretation. Large urban areas (LUAs, i.e. metropolitans) can be made up of as many as 50 local governments. The optimum unit of analysis for public policy and resource consumption is the contiguous metropolitan (e.g. the 'commuter-shed').

According to the UN [4], the primary methods to define a city boundary are administrative and population size/density, followed by urban and economic characteristics. Typically, these methods are used in combination with each other and a unique, and variable, border emerges for all larger urban areas. A practical, precise and consistent city boundary is important for city planning and management. Boundaries of the cities reviewed in this paper originate from the World Bank [5], however, these borders are expected to be regularly refined, ideally by respective governments (local, regional and possibly national). A map of each urban area outlining 'best fit' borders is needed.

Toronto provides a useful example of a LUA with various boundaries. The area currently has five common boundary schemes (Figure 1) including: (i) the City of Toronto (population of 2.62 million) [6]; (ii) the Census Metropolitan Area (5.71 million) [6]; (iii) the Greater Toronto Area (6.13 million) [7]; (iv) the Greater Toronto and Hamilton Area (6.65 million) [6, 7] and; (v) the Golden Horseshoe (9.09 million) [8]. In this analysis, the Census Metropolitan Area is selected because of readily available data by Statistics Canada, despite having a boundary that divides Durham Region and excludes the city of Oshawa.

Sources of data and procedures to predict the 101 largest cities

The World Urbanization Prospects (WUP) [4] by the United Nations provides a detailed analysis into the global population growth and urbanization rate to 2050. The predictions are developed from current data of the urban - rural ratio and urbanization rate, as well as birthrate and mortality rate for countries.

An analysis of future growth scenarios of nations by the National Center for Atmospheric Research (NCAR) includes the effects on population growth and urbanization rates. Population projections for each of the Shared Socioeconomic Pathways (discussed below) extend and modify the WUP predictions by refining the definition of urban - rural ratio and extrapolating the predictions to 2100.

As presented in Table 1, the main assumption for population growth in the 3 SSP scenarios depends on fertility, mortality, migration, and education rates. In the SSP scenarios, the countries are categorized based on their current fertility rate, either high-fertility (more than 2.9 children per woman) or low-fertility (less than or equal to 2.9 children per woman), for low and medium income nations. The third category consists of OECD and high-income nations. High Income / OECD Countries follow the World Bank definition [9]. The education rates are based on projections in IIASA / VID, where a high rate represents a scenario where school systems are globally expanded at the fastest possible rate, which is based on recent examples such as Singapore and South Korea. A medium rate represents a scenario where countries follow a similar path to other countries at a similar level of educational development and a low rate maintains proportions of education at current levels. These assumptions describe an urbanization rate of fast, central, and slow for SSP1, SSP2 and SSP3, respectively [10, 11].

Table 1 - Main Assumptions for the SSP population predictions (Source: Supplementary note for the SSP data set)

	SSP1			SSP2			SSP3		
	Hi Fert	Low Fert	HI-OECD	Hi Fert	Low Fert	HI-OECD	Hi Fert	Low Fert	HI-OECD
Demographics									
Fertility	Low	Low	Med	Med	Med	Med	High	High	Low
Mortality	Low	Low	Low	Med	Med	Med	High	High	High
Migration	Med	Med	Med	Med	Med	Med	Low	Low	Low
Education	High	High	High	Med	Med	Med	Low	Low	Low

In this report, the research by UN's WUP and NCAR's SSP are extended and refined to investigate the world's 101 largest cities in the 21st century. Population changes of the world's large urban areas (LUAs) are predicted by considering data of current city size, country population growth and country specific urbanization rates. The current city population are obtained from The World Bank's "Building Sustainability in an Urbanizing World" report [5]. The future city population is determined based on the country specific urban growth rate (UGR), and the current city population (CP_0)

$$CP_{\Delta YR} = CP_0\,(1 + UGR)^{\Delta YR}$$

where ΔYR represents the time (in years) to the prediction.

There are four ways of determining the urban growth rates (UGR) of the 101 largest cities; three are based on the SSP1, SSP2 and SSP3 scenarios, respectively; the fourth involves extrapolation of the WUP predictions beyond 2050. Under this fourth predictive method, a linear extrapolation of the UGR determines the largest 150 cities for each 25 year period. The top 150 cities, as predicted by the linear extrapolation of the WUP UGR predictions are then further refined by considering four different extrapolation techniques (Figure 2), including (i) exponential, (ii) polynomial (2nd order), (iii) constant, and (iv) linear. As illustrated by the bold line in Figure 2, the WUP predict the urban population growth for each country to 2050. Four extrapolation techniques are overlaid onto the WUP projection and the "best fit" is selected for 2050 to 2100. The extrapolation technique selected for Canada is exponential, China is constant, United Sates of America is exponential, and India is linear. The extrapolation technique for each country and city are presented in a supplementary paper appended here [12].

21st Century large city growth

Humanity is on an inexorable urbanization path that largely originated in 19th century Europe, America and parts of Asia and will likely culminate in Africa by the end of this century. Urbanization is a powerful driver of sustainability: as

affluence increases, basic services can be provided more efficiently in an urban setting, especially as density increases, although vulnerabilities can also increase as city size and density increase. Many of the more intractable challenges, such as climate change and biodiversity loss, have their roots in purchasing habits of the affluent who tend to almost all live in urban settings.

The relative size of cities may have an impact on sustainability as city-size affects economic development and resource consumption [13, 14]. Figure 3(a) shows that SS1 (sustainability) is predicated on the fastest and greatest growth of large urban areas relative to the other less-sustainable scenarios: assuming resilience increases commensurately with city size.

The size and shape of 21st century cities will determine much of the overall achievement of sustainable development. Various growth and sustainability scenarios (SSP1, SSP2 and SSP3) highlight the influence that urbanization and the world's larger urban areas have on total global population, resource consumption and quality of life.

Projecting city growths typified by Lagos growing form 10.6 million in 2010 to 88.3 million in 2100 obviously call for a fulsome measure of skepticism; many variables could change. However, in the absence of more accurate projections, these estimates are important. Long-lived infrastructure and resource development plans are developed with time horizons extending to the end of this century. These estimates should be regularly refined with new census data and as urban borders change. Ideally future work would also expand projection beyond the 101 largest only.

The average aggregate population of the world's 101 largest cities is projected to increase from 757 million in 2010 to 2.3 billion in 2100: a three-fold increase in average city size. The 'average' large urban area would increase from 7.5 million in 2010 to about 23 million in 2100. Managing these 'large mega-cities', more than 35 in excess of 15 million (the top ten all in excess of 30 million), will place inordinate demands on urban managers and future populations.

Cities are complex with significance to many disciplines. Economists, planners, political scientists and businesses (existing and potential) are all interested in projected growth and relative rankings of cities. As the pace of city-building increases, engineers have an acute and growing need for an urban 'rules of thumb'. All of the 101 largest urban areas are served by local engineering faculties. The engineering profession would be well served in developing a peer-reviewed self-collected and regularly updated (ideally annually) urban data base that at least includes population projections, resource flows, and quality of life indicators. Where practicable this data collection should incorporate local and national census data, international standards and similar efforts by agencies such as the Global City Indicators Facility, World Bank, and WBCSD.

Conclusions

In this paper, population predictions were developed for the world's largest cities with three different socioeconomic pathways. In each scenario, the urbanization growth rate between 2010 and 2025 had significant implications for the urbanization percentage in 2075 and 2100, with larger city growth in the first quarter century leading to more sustainable conditions after 2075. Depending on the path of development, world population can range from 7.5 to 8.3 billion in 2025, 8.2 to 9.9 billion in 2050, 7.9 to 11.4 billion in 2075, and 6.9 to 13.1 billion in 2100, with more sustainable progress favouring lower population predictions. In the 21st century, many high-income cities will decline in rank, relative to cities from low- and middle-income countries, especially if a more sustainable development trajectory is not followed. Development of cities that promotes resource efficiency, as well as cooperation between proximal and global urban areas, is essential for sustainable development. This paper illustrates that the urbanization of Africa will have a significant impact on future sustainability. Global cooperation to ensure Sub-Sahara Africa and other developing regions

optimally progress with adequate infrastructure, education and social policy to restrain population growth and resource depletion will have far reaching benefits.

Acknowledgements

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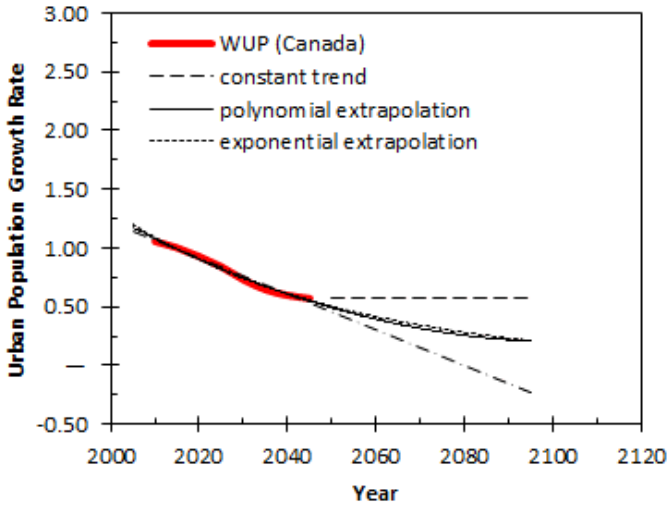
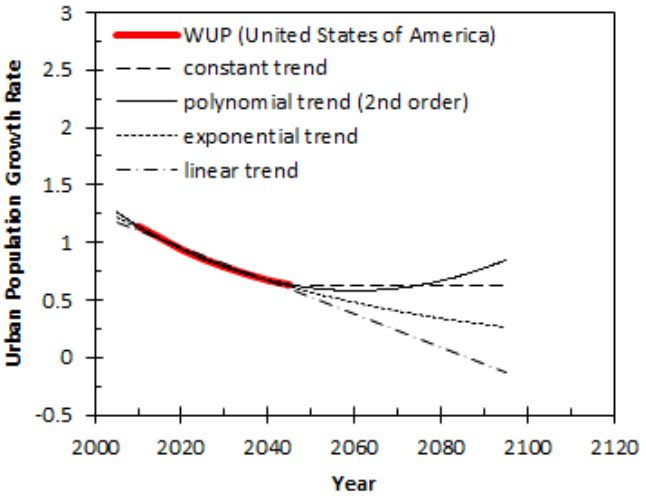
Figure 1 – Five different boundary schemes for defining the large urban area of Toronto, with greenbelt and protected areas



(a)



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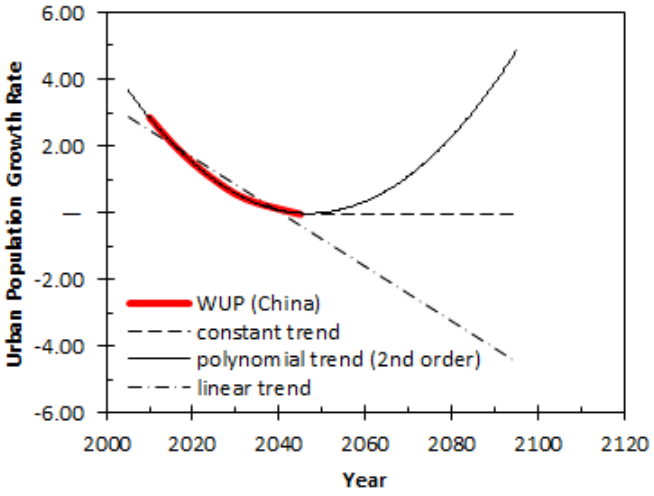
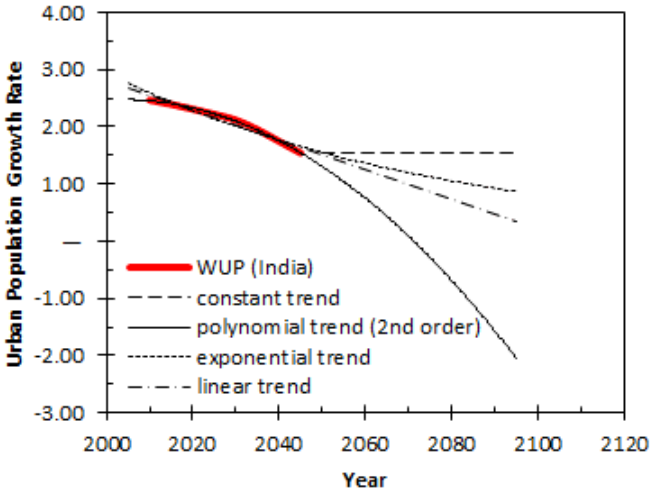
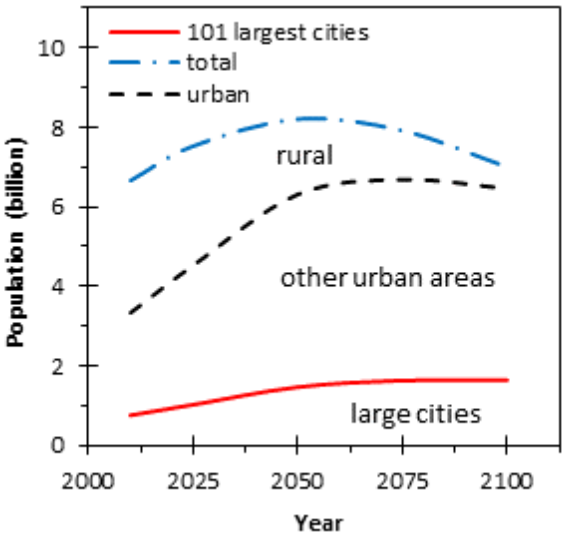


(b)

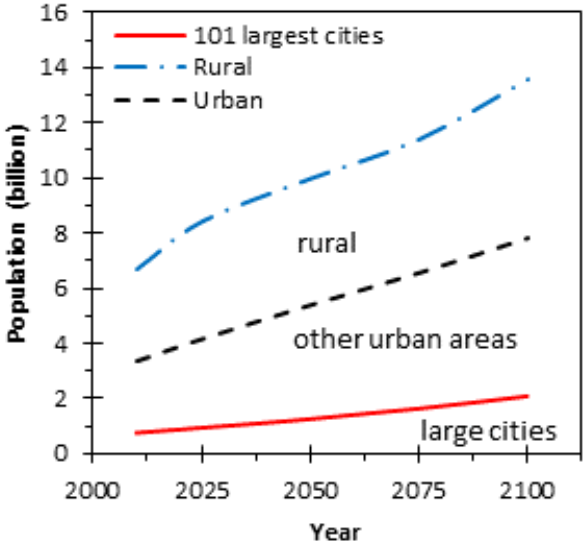


(d)

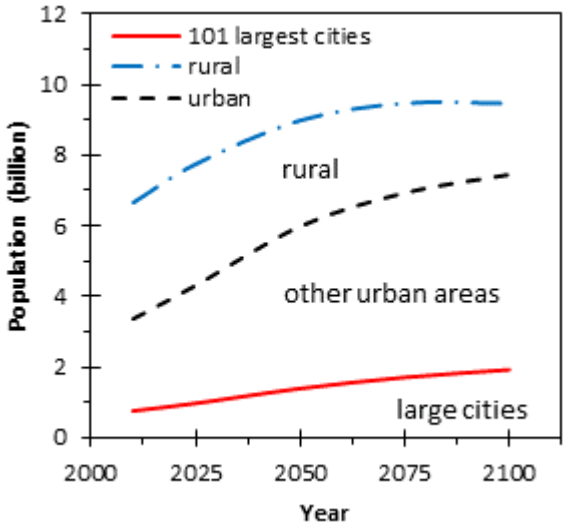
Figure 2 - Examples of extrapolating WUP to 2100 for (a) Canada, (b) China, (c) United States of America, and (d) India



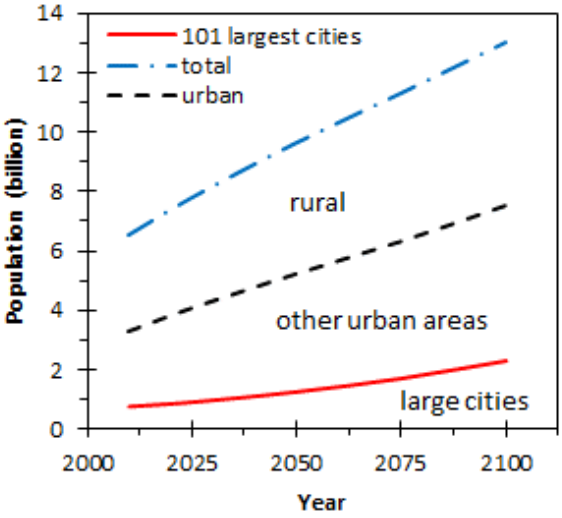
(a)



(c)



(b)



(d)

Figure 3 - World population distribution in the 21st century for (a) SSP1, (b) SSP2, (c) SSP3, and (d) WUP extrapolations

Appendix

Table 2 - 101 largest cities with WUP extrapolations

	2010		2025		2050		2075		2100	
	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)
1	Tokyo	36.094	Tokyo	36.400	Mumbai	42.404	Kinshasa	58.424	Lagos	88.345
2	Mexico	20.117	Mumbai	26.385	Delhi	36.157	Mumbai	57.862	Kinshasa	83.494
3	Mumbai	20.072	Delhi	22.498	Dhaka	35.193	Lagos	57.195	Dar Es Salaam	73.678
4	Beijing	19.610	Dhaka	22.015	Kinshasa	35.000	Delhi	49.338	Mumbai	67.240
5	Sao Paulo	19.582	Sao Paulo	21.428	Kolkata	33.042	Dhaka	46.219	Delhi	57.334
6	New York	19.441	Mexico	21.009	Lagos	32.630	Kolkata	45.088	Khartoum	56.594
7	Delhi	17.015	New York	20.628	Tokyo	32.622	Karachi	43.374	Niamey	56.149
8	Shanghai	15.789	Kolkata	20.560	Karachi	31.696	Dar Es Salaam	37.485	Dhaka	54.250
9	Kolkata	15.577	Shanghai	19.412	New York	24.769	Cairo	32.999	Kolkata	52.395
10	Dhaka	14.796	Karachi	19.095	Mexico	24.329	Manila	32.749	Kabul	50.270
11	Buenos Aires	13.089	Kinshasa	16.762	Cairo	24.035	Kabul	32.672	Karachi	49.056
12	Karachi	13.052	Lagos	15.796	Manila	23.545	Khartoum	30.681	Nairobi	46.661
13	Los Angeles	12.773	Cairo	15.561	Sao Paulo	22.825	Tokyo	28.916	Lilongwe	41.379
14	Cairo	12.503	Manila	14.808	Shanghai	21.317	Nairobi	28.415	Blantyre City	40.911
15	Rio De Janeiro	12.171	Beijing	14.545	Lahore	17.449	New York	27.924	Cairo	40.543
16	Manila	11.662	Buenos Aires	13.768	Kabul	17.091	Baghdad	24.388	Kampala	40.136
17	Moscow	11.514	Los Angeles	13.672	Los Angeles	16.416	Mexico	24.178	Manila	39.959
18	Osaka-Kobe	11.337	Rio De Janeiro	13.413	Chennai	16.278	Lahore	23.878	Lusaka	37.741
19	Istanbul	10.823	Jakarta	12.363	Khartoum	15.995	Addis Ababa	23.709	Mogadishu	36.372
20	Lagos	10.572	Istanbul	12.102	Dar Es Salaam	15.973	Chennai	22.213	Addis Ababa	35.820
21	Seoul	10.039	Guangzhou	11.835	Beijing	15.972	Bangalore	21.314	Baghdad	34.103
22	Paris	9.958	Osaka-Kobe	11.368	Jakarta	15.924	Sao Paulo	21.280	New York	30.193
23	Jakarta	9.703	Moscow	10.526	Bangalore	15.620	Shanghai	21.055	N'djamena	28.815
24	Guangzhou	9.447	Lahore	10.512	Buenos Aires	15.546	Niamey	20.371	Kano	28.277
25	Chicago (IL)	9.211	Shenzhen	10.196	Baghdad	15.088	Kampala	20.227	Sana'a	27.213
26	Kinshasa	9.052	Chennai	10.129	Hyderabad	14.612	Hyderabad	19.939	Lahore	27.006
27	London	8.607	Paris	10.036	Luanda	14.301	Luanda	19.646	Chennai	25.813
28	Lima	8.473	Chicago	9.932	Rio De Janeiro	14.287	Los Angeles	18.508	Tokyo	25.631
29	Bogota	8.320	Tehran	9.814	Nairobi	14.246	Kano	17.687	Bangalore	24.768
30	Tehran	8.221	Seoul	9.738	Istanbul	14.176	Jakarta	17.547	Ibadan	23.680
31	Shenzhen	8.114	Bangalore	9.719	Addis Ababa	13.212	Ahmedabad	16.963	Luanda	23.551
32	Chennai	7.559	Lima	9.600	Guangzhou	12.996	Sana'a	16.687	Hyderabad	23.170
33	Wuhan	7.542	Bogota	9.600	Ahmedabad	12.431	Rio de Janeiro	16.557	Bamako	22.951
34	Tianjin	7.468	Wuhan	9.339	Chittagong	12.212	Buenos Aires	16.402	Mexico	22.219

35	Hong Kong	7.419	Tianjin	9.243	Chicago	11.926	Chittagong	16.038	Dakar	21.178
36	Bangalore	7.229	Hyderabad	9.092	Ho Chi Minh	11.860	Mogadishu	15.942	Maputo	21.070
37	Lahore	7.092	London	8.618	Lima	11.571	Beijing	15.776	Shanghai	20.796
38	Bangkok	6.918	Bangkok	8.332	Bogota	11.555	Abidjan	15.518	Ouagadougou	20.631
39	Hyderabad	6.761	Hong Kong	8.305	Shenzhen	11.196	Lilongwe	15.231	Antananarivo	20.529
40	Chongqing	6.690	Chongqing	8.275	Paris	11.124	Blantyre City	15.058	Los Angeles	20.012
41	Santiago (BR)	6.100	Luanda	8.236	Bangkok	11.080	Pune	14.906	Rio de Janeiro	19.845
42	Belo Horizonte	5.941	Ho Chi Minh	8.149	Tehran	10.999	Ibadan	14.811	Ahmedabad	19.712
43	Baghdad	5.891	Baghdad	8.060	Pune	10.924	Istanbul	14.677	Abidjan	19.702
44	Santiago (CH)	5.879	Khartoum	7.937	Abidjan	10.709	Dakar	14.561	Sao Paulo	19.121
45	Madrid	5.764	Ahmedabad	7.735	Kano	10.444	Lusaka	14.523	Chittagong	18.824
46	Miami	5.755	Chittagong	7.639	Wuhan	10.255	N'djamena	14.484	Abuja	18.781
47	Toronto	5.741	Kabul	7.175	Moscow	10.235	Ho Chi Minh	14.222	Kigali	18.300
48	Ahmedabad	5.726	Santiago (BR)	7.033	Osaka-Kobe	10.188	Bamako	13.536	Jakarta	18.216
49	Ho Chi Minh	5.723	Pune	6.797	Tianjin	10.150	Chicago	13.445	Pune	17.322
50	Philadelphia	5.630	Hanoi	6.754	Sana'a	10.053	Guangzhou	12.837	Conakry	17.231
51	Khartoum	5.185	Belo Horizonte	6.748	Hanoi	9.830	Bangkok	12.549	Buenos Aires	16.798
52	Singapore	5.184	Santiago (CH)	6.310	London	9.750	Surat	12.507	Beijing	15.582
53	Barcelona	5.057	Riyadh	6.275	Seoul	9.469	Lima	12.444	Ho Chi Minh	15.526
54	Chittagong	5.012	Miami	6.272	Hong Kong	9.467	Antananarivo	12.401	Istanbul	14.791
55	Pune	5.010	Dongguan	6.157	Kampala	9.432	Alexandria	11.986	Alexandria	14.726
56	Dallas-Fort Worth	4.955	Shenyang	6.156	Surat	9.165	Bogot	11.886	Lubumbashi	14.659
57	Shenyang	4.952	Addis Ababa	6.156	Chongqing	9.087	Hanoi	11.787	Chicago	14.538
58	Riyadh	4.856	Philadelphia	6.133	Ibadan	8.746	Abuja	11.747	Surat	14.534
59	Dongguan	4.850	Abidjan	6.031	Alexandria	8.730	Ouagadougou	11.704	Mbuji-Mayi	14.201
60	St. Petersburg	4.849	Toronto	5.946	Dakar	8.522	Paris	11.638	Mombasa	14.012
61	Luanda	4.775	Madrid	5.935	Yangon	8.437	Shenzhen	11.059	Phnom Penh	13.883
62	Hanoi	4.723	Nairobi	5.871	Riyadh	8.092	Maputo	10.917	Kaduna	13.199
63	Atlanta	4.695	Yangon	5.869	Bamako	7.632	Conakry	10.627	Hanoi	12.868
64	Houston	4.609	Surat	5.703	Miami	7.531	Hong Kong	10.415	Lima	12.814
65	Boston	4.597	Dar Es Salaam	5.688	Santiago (BR)	7.492	Tehran	10.356	Guangzhou	12.679
66	Sydney	4.576	Alexandria	5.652	Kanpur	7.394	Yangon	10.263	Bangkok	12.138
67	Washington	4.464	Dallas-Fort Worth	5.419	Philadelphia	7.364	Wuhan	10.129	Paris	11.862
68	Aleppo	4.450	Tlaquepaque	5.368	Antananarivo	7.258	Kanpur	10.090	Kanpur	11.725
69	Tlaquepaque	4.435	Tonala	5.368	Belo Horizonte	7.188	London	10.089	Al-Hudaydah	11.514
70	Tonala	4.435	Zapopan	5.368	Faisalabad	7.109	Tianjin	10.025	Hong Kong	11.458
71	Zapopan	4.435	Chengdu	5.320	Toronto	7.039	Kigali	9.790	Yangon	11.416
72	Guadalajara	4.435	Xi'an, Shaanxi	5.233	Abuja	6.937	Faisalabad	9.729	Monrovia	11.205
73	Alexandria	4.421	Barcelona	5.183	Jaipur	6.907	Lubumbashi	9.571	Bogota	11.204
74	Yangon	4.348	Atlanta	5.151	Ouagadougou	6.897	Moskva	9.511	Benin City	11.135

75	Chengdu	4.266	Guiyang	5.114	Niamey	6.788	Jaipur	9.426	Giza	11.005
76	Detroit	4.203	Singapore	5.104	Santiago (CH)	6.772	Mbuji-Mayi	9.271	Faisalabad	11.003
77	Xi'an, Shaanxi	4.178	Kano	5.056	Dongguan	6.761	Osaka-Kobe	9.031	Accra	10.987
78	Abidjan	4.175	Houston	5.049	Shenyang	6.760	Riyadh	8.998	Jaipur	10.953
79	Surat	4.174	Boston	5.032	Mogadishu	6.567	Chongqing	8.975	Shenzhen	10.923
80	Porto Alegre	4.096	Guadalajara	4.973	Giza	6.524	Giza	8.957	Ta'izz	10.824
81	Guadalupe	4.090	Guadalupe	4.951	Madrid	6.519	Phnom Penh	8.851	Lome	10.207
82	Monterrey	4.090	Washington DC	4.889	Dallas-Fort Worth	6.507	Lucknow	8.649	Lucknow	10.051
83	Melbourne	4.077	Sydney	4.826	Lucknow	6.338	Mombasa	8.533	Wuhan	10.005
84	Guiyang	3.980	Nanjing, Jiangsu	4.771	Tlaquepaque	6.217	Miami	8.490	Tianjin	9.902
85	Ankara	3.953	Haerbin	4.696	Tonala	6.217	Philadelphia	8.302	Douala	9.682
86	Brasilia	3.938	Porto Alegre	4.633	Zapopan	6.217	Kaduna	8.256	London	9.560
87	Montréal	3.859	Detroit	4.606	Atlanta	6.185	Accra	7.979	Riyadh	9.401
88	Recife	3.831	Kanpur	4.601	Lubumbashi	6.145	Nagpur	7.858	Port Harcourt	9.396
89	Nanjing, Jiangsu	3.813	Ankara	4.589	Conakry	6.141	Toronto	7.812	Miami	9.180
90	Kabul	3.768	Brasilia	4.578	Houston	6.063	Seoul	7.671	Nagpur	9.131
91	Haerbin	3.753	Algiers	4.499	Boston	6.042	Aleppo	7.365	Philadelphia	8.977
92	Salvador	3.695	St. Petersburg	4.476	Mbuji-Mayi	5.953	Dallas -Fort Worth	7.336	Mosul	8.873
93	Yokohama	3.689	Monterrey	4.413	Accra	5.938	Lome	7.254	Chongqing	8.865
94	Phoenix	3.687	Sana'a	4.382	Aleppo	5.903	Monrovia	7.080	Moscow	8.425
95	Johannesburg	3.618	Recife	4.347	Washington DC	5.870	Douala	7.065	Aleppo	8.370
96	Fortaleza	3.599	Changchun	4.338	Chengdu	5.842	Al-Hudaydah	7.060	Toronto	8.332
97	Algiers	3.574	Jaipur	4.298	Sydney	5.821	Patna	7.033	Patna	8.173
98	San Francisco-Oakland	3.544	Faisalabad	4.283	Guadalajara	5.759	Santiago (CH)	6.985	Tehran	8.171
99	Medellín	3.524	Melbourne	4.238	Nagpur	5.758	Atlanta	6.973	Osaka-Kobe	8.005
100	Berlin	3.461	Ibadan	4.234	Xi'an, Shaanxi	5.746	Rawalpindi	6.967	Dallas-Fort Worth	7.932
101	Addis Ababa	3.453	Dakar	4.225	Guadalupe	5.733	Benin City	6.964	Rawalpindi	7.879
SUM		**756.957**		**906.458**		**1,256.218**		**1,705.812**		**2,299.668**

Table 3 - 101 largest cities with SSP1

	2010		2025		2050		2075		2100	
	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)
1	Tokyo	36.094	Tokyo	39.880	Mumbai	54.297	Mumbai	57.135	Lagos	61.032
2	Mexico	20.117	Mumbai	33.269	Delhi	46.027	Lagos	51.622	Mumbai	52.277
3	Mumbai	20.072	Delhi	28.202	Dhaka	43.945	Delhi	48.434	Kinshasa	48.832
4	Beijing	19.610	Beijing	26.530	Kolkata	42.137	Kinshasa	46.107	Karachi	44.434
5	Sao Paulo	19.582	Dhaka	25.953	Karachi	39.328	Dhaka	45.498	Delhi	44.315
6	New York	19.441	Kolkata	25.819	Tokyo	39.195	Karachi	45.252	Dar es Salaam	43.163
7	Delhi	17.015	Mexico	24.495	Kinshasa	34.414	Kolkata	44.340	Dhaka	40.719
8	Shanghai	15.789	New York	22.201	Lagos	34.299	Dar es Salaam	33.493	Kolkata	40.570
9	Kolkata	15.577	Karachi	22.196	Beijing	29.903	Tokyo	32.393	Nairobi	33.921
10	Dhaka	14.796	Sao Paulo	21.700	Mexico	29.052	New York	31.549	Kampala	33.051
11	Buenos Aires	13.089	Shanghai	21.361	Cairo	28.865	Cairo	30.527	New York	32.733
12	Karachi	13.052	Cairo	18.962	New York	27.787	Nairobi	28.685	Luanda	29.857
13	Los Angeles	12.773	Manila	16.977	Manila	25.820	Manila	27.684	Cairo	28.561
14	Cairo	12.503	Lagos	16.951	Shanghai	24.076	Mexico	26.419	Tokyo	27.470
15	Rio De Janeiro	12.171	Kinshasa	16.598	Sao Paulo	23.294	Luanda	26.053	Manila	25.939
16	Manila	11.662	Los Angeles	14.586	Lahore	21.370	Kampala	25.315	Kabul	24.164
17	Moscow	11.514	Buenos Aires	14.480	Chennai	20.448	Lahore	24.588	Lahore	24.144
18	Osaka-Kobe	11.337	Jakarta	13.878	Bangalore	19.555	Kabul	23.398	Addis ababa	23.055
19	Istanbul	10.823	Rio De Janeiro	13.487	Jakarta	19.198	Beijing	22.911	Niamey	22.951
20	Lagos	10.572	Istanbul	13.192	Dar es Salaam	19.013	Addis ababa	22.439	Khartoum	22.782
21	Seoul	10.039	Guangzhou	12.781	Hyderabad	18.289	Khartoum	21.733	Mexico	22.510
22	Paris	9.958	Chennai	12.529	Los Angeles	18.256	Chennai	21.517	Lusaka	22.268
23	Jakarta	9.703	Osaka-Kobe	12.526	Nairobi	18.161	Los Angeles	20.728	Los Angeles	21.506
24	Guangzhou	9.447	Moscow	12.356	Kabul	17.867	Bangalore	20.578	Chennai	19.687
25	Chicago	9.211	Lahore	12.061	Luanda	16.986	Sao Paulo	20.147	Kano	19.588
26	Kinshasa	9.052	Bangalore	11.982	Khartoum	16.919	Hyderabad	19.245	Bangalore	18.828
27	London	8.607	Hyderabad	11.206	Addis ababa	16.872	Jakarta	18.806	Hyderabad	17.609
28	Lima	8.473	Shenzhen	10.977	Buenos Aires	16.411	Shanghai	18.447	Beijing	17.274
29	Bogota	8.320	Paris	10.908	Istanbul	15.866	Kano	16.568	Sana'a	17.269
30	Tehran	8.221	Seoul	10.721	Ahmedabad	15.489	Niamey	16.556	Jakarta	17.153
31	Shenzhen	8.114	Chicago	10.519	Ho Chi Minh	15.077	Ahmedabad	16.299	Sao Paulo	16.923
32	Chennai	7.559	Lima	10.456	Chittagong	14.886	Baghdad	16.134	Ibadan	16.366
33	Wuhan	7.542	Tehran	10.420	Rio De Janeiro	14.478	Buenos Aires	15.764	Baghdad	15.704
34	Tianjin	7.468	London	10.243	Guangzhou	14.406	Sana'a	15.760	Chicago	15.509
35	Hong Kong	7.419	Bogota	10.229	Bangkok	14.338	Lusaka	15.661	Lilongwe	15.035

36	Bangalore	7.229	Bangkok	10.223	Baghdad	14.112	Chittagong	15.412	Antananarivo	14.947
37	Lahore	7.092	Wuhan	10.203	Pune	13.552	Ho Chi Minh	15.325	Ahmedabad	14.913
38	Bangkok	6.918	Tianjin	10.103	Chicago	13.165	Chicago	14.948	Blantyre City	14.865
39	Hyderabad	6.761	Hong Kong	10.037	Kampala	12.922	Bangkok	14.489	Ouagadougou	14.818
40	Chongqing	6.690	Ho Chi Minh	9.493	Lima	12.907	Istanbul	14.343	Conakry	14.790
41	Santiago (BR)	6.100	Ahmedabad	9.491	London	12.742	Pune	14.261	Phnom Penh	14.597
42	Belo Horizonte	5.941	Chongqing	9.051	Paris	12.667	Ibadan	13.843	Buenos Aires	14.310
43	Baghdad	5.891	Khartoum	8.942	Hanoi	12.442	Paris	13.611	Ho Chi Minh	13.916
44	Santiago (CH)	5.879	Chittagong	8.791	Bogota	12.441	London	13.540	Shanghai	13.909
45	Madrid	5.764	Baghdad	8.643	Shenzhen	12.373	Abidjan	13.243	Bangkok	13.813
46	Miami	5.755	Pune	8.304	Osaka-Kobe	12.311	Antananarivo	12.928	Chittagong	13.793
47	Toronto	5.741	Kabul	7.883	Tehran	12.273	Ouagadougou	12.811	Paris	13.751
48	Ahmedabad	5.726	Hanoi	7.835	Wuhan	11.501	Hanoi	12.647	London	13.423
49	Ho Chi Minh	5.723	Luanda	7.786	Moscow	11.411	Aleppo	12.577	Abidjan	13.352
50	Philadelphia	5.630	Addis ababa	7.404	Tianjin	11.388	Rio De Janeiro	12.522	Pune	13.048
51	Khartoum	5.185	Nairobi	7.231	Hong Kong	11.313	Lima	12.340	Bamako	12.866
52	Singapore	5.184	Dar es Salaam	7.104	Surat	11.291	Bogota	12.009	Dakar	12.509
53	Barcelona	5.057	Surat	6.918	Sana'a	11.160	Surat	11.881	Aleppo	12.295
54	Chittagong	5.012	Yangon	6.821	Kano	11.008	Dakar	11.864	Istanbul	12.273
55	Pune	5.010	Santiago (BR)	6.760	Abidjan	10.961	Bamako	11.212	Abuja	11.511
56	Dallas-Fort Worth	4.955	Alexandria	6.705	Aleppo	10.916	Guangzhou	11.037	Hanoi	11.485
57	Shenyang	4.952	Shenyang	6.699	Seoul	10.567	Alexandria	10.794	Kigali	11.213
58	Riyadh	4.856	Toronto	6.688	Alexandria	10.207	Lilongwe	10.643	Lima	10.994
59	Dongguan	4.850	Madrid	6.688	Chongqing	10.201	Conakry	10.627	Bogota	10.973
60	St. Petersburg	4.849	Aleppo	6.613	Yangon	10.129	Blantyre City	10.522	Surat	10.871
61	Luanda	4.775	Riyadh	6.598	Riyadh	9.782	Riyadh	10.477	Rio De Janeiro	10.518
62	Hanoi	4.723	Belo Horizonte	6.584	Dakar	9.198	Yangon	10.321	Alexandria	10.099
63	Atlanta	4.695	Miami	6.572	Ibadan	9.198	Tehran	10.252	Riyadh	9.945
64	Houston	4.609	Dongguan	6.561	Kanpur	9.113	Osaka-Kobe	10.174	Mombasa	9.935
65	Boston	4.597	Santiago (CH)	6.545	Antananarivo	8.627	Faisalabad	9.822	Miami	9.690
66	Sydney	4.576	Philadelphia	6.429	Ouagadougou	8.607	Abuja	9.737	Yangon	9.678
67	Washington	4.464	Abidjan	6.392	Faisalabad	8.536	Kanpur	9.590	Faisalabad	9.645
68	Aleppo	4.450	Barcelona	5.868	Jaipur	8.483	Shenzhen	9.480	Philadelphia	9.479
69	Tlaquepaque	4.435	Chengdu	5.771	Toronto	8.409	Kigali	9.369	Toronto	9.287
70	Tonala	4.435	Dallas-Fort Worth	5.658	Miami	8.226	Miami	9.339	Tel Aviv-Yafo	9.061
71	Zapopan	4.435	Xi'an, Shaanxi	5.652	Niamey	8.128	Toronto	9.275	Kaduna	9.006
72	Guadalajara	4.435	Kanpur	5.584	Philadelphia	8.047	Philadelphia	9.136	Kanpur	8.775
73	Alexandria	4.421	Singapore	5.569	Lucknow	7.783	Moscow	9.127	Osaka-Kobe	8.628
74	Yangon	4.348	Kano	5.440	Lusaka	7.722	Jaipur	8.927	N'Djamena	8.449
75	Chengdu	4.266	Tlaquepaque	5.400	Bamako	7.633	Phnom Penh	8.851	Dallas-Fort Worth	8.343

76	Detroit	4.203	Tonala	5.400	Madrid	7.589	Wuhan	8.811	Lubumbashi	8.329
77	Xi'an, Shaanxi	4.178	Zapopan	5.400	Shenyang	7.551	Tianjin	8.725	Guangzhou	8.322
78	Abidjan	4.175	Guadalajara	5.400	Dongguan	7.396	Hong Kong	8.668	Tehran	8.241
79	Surat	4.174	Guiyang	5.384	Santiago (BR)	7.257	Seoul	8.425	Jaipur	8.168
80	Porto Alegre	4.096	Sydney	5.362	Giza	7.208	Mombasa	8.402	Mbuji-Mayi	8.032
81	Guadalupe	4.090	Atlanta	5.361	Santiago (CH)	7.110	Lucknow	8.189	Atlanta	7.905
82	Monterrey	4.090	Houston	5.263	Dallas-Fort Worth	7.082	Dallas-Fort Worth	8.041	Accra	7.849
83	Melbourne	4.077	Boston	5.250	Belo Horizonte	7.067	Lubumbashi	7.864	Houston	7.760
84	Guiyang	3.980	St. Petersburg	5.203	Nagpur	7.063	Chongqing	7.816	Boston	7.740
85	Ankara	3.953	Jaipur	5.198	Sydney	6.765	Tel Aviv-Yafo	7.733	Moscow	7.671
86	Brasilia	3.938	Nanjing, Jiangsu	5.159	Atlanta	6.711	N'Djamena	7.679	Benin City	7.516
87	Montréal	3.859	Washington	5.098	Barcelona	6.658	Accra	7.639	Washington	7.516
88	Recife	3.831	Haerbin	5.077	Houston	6.588	Giza	7.623	Maputo	7.503
89	Nanjing, Jiangsu	3.813	Guadalupe	4.980	Boston	6.570	Atlanta	7.619	Lucknow	7.493
90	Kabul	3.768	Monterrey	4.980	Damascus	6.562	Kaduna	7.617	Damascus	7.391
91	Haerbin	3.753	Sana'a	4.831	Jiddah	6.525	Mbuji-Mayi	7.584	Shenzhen	7.148
92	Salvador	3.695	Dakar	4.821	Chengdu	6.505	Damascus	7.560	Giza	7.132
93	Yokohama	3.689	Ankara	4.819	Abuja	6.469	Houston	7.479	Detroit	7.077
94	Phoenix	3.687	Faisalabad	4.818	Tlaquepaque	6.405	Boston	7.460	Sydney	7.051
95	Johannesburg	3.618	Detroit	4.800	Tonala	6.405	Nagpur	7.432	Al-Hudaydah	7.003
96	Fortaleza	3.599	Melbourne	4.777	Zapopan	6.405	Washington	7.244	Rawalpindi	6.860
97	Algiers	3.574	Lucknow	4.769	Guadalajara	6.405	Sydney	7.213	Nagpur	6.800
98	San Francisco-Oakland	3.544	Giza	4.735	Washington	6.380	Maputo	7.080	Seoul	6.741
99	Medellín	3.524	Algiers	4.712	Xi'an, Shaanxi	6.371	Jiddah	6.988	Wuhan	6.644
100	Berlin	3.461	Changchun	4.600	Patna	6.289	Rawalpindi	6.986	Ta'izz	6.642
101	Addis Ababa	3.453	Ibadan	4.545	Algiers	6.251	Detroit	6.820	Jiddah	6.633
SUM		**757.958**		**1,024.415**		**1,465.365**		**1,631.791**		**1,640.144**

Table 4 - 101 largest cities with SSP2

	2010		2025		2050		2075		2100	
	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)
1	Tokyo	36.094	Tokyo	37.916	Mumbai	47.405	Lagos	61.543	Lagos	79.815
2	Mexico	20.117	Mumbai	29.725	Delhi	40.185	Mumbai	55.356	Dar es Salaam	62.269
3	Mumbai	20.072	Delhi	25.198	Dhaka	37.463	Kinshasa	50.816	Kinshasa	60.337
4	Beijing	19.610	Beijing	24.670	Karachi	36.977	Delhi	46.926	Mumbai	57.657
5	Sao Paulo	19.582	Mexico	23.978	Kolkata	36.789	Karachi	46.502	Karachi	49.921
6	New York	19.441	Kolkata	23.069	Lagos	36.317	Kolkata	42.960	Delhi	48.876
7	Delhi	17.015	Dhaka	22.929	Tokyo	35.070	Dhaka	42.128	Kolkata	44.745
8	Shanghai	15.789	Sao Paulo	22.191	Kinshasa	33.323	Dar es Salaam	41.715	Luanda	42.336
9	Kolkata	15.577	New York	22.095	Mexico	29.772	Luanda	33.605	Dhaka	42.263
10	Dhaka	14.796	Karachi	20.702	Cairo	27.900	Cairo	32.292	Nairobi	38.399
11	Buenos Aires	13.089	Shanghai	19.863	Beijing	27.270	Mexico	29.920	Cairo	33.385
12	Karachi	13.052	Cairo	17.989	New York	26.965	New York	29.787	Niiamey	33.316
13	Los Angeles	12.773	Lagos	16.829	Manila	25.331	Manila	29.486	Kampala	33.212
14	Cairo	12.503	Manila	16.422	Sao Paulo	25.313	Tokyo	29.052	Lusaka	32.513
15	Rio De Janeiro	12.171	Kinshasa	15.466	Shanghai	21.956	Nairobi	28.749	New York	30.805
16	Manila	11.662	Buenos Aires	14.864	Lahore	20.092	Lahore	25.268	Manila	30.284
17	Moscow	11.514	Los Angeles	14.516	Dar es Salaam	19.080	Khartoum	24.093	Mexico	28.681
18	Osaka-Kobe	11.337	Rio De Janeiro	13.792	Luanda	18.952	Kabul	23.993	Khartoum	28.005
19	Istanbul	10.823	Jakarta	13.093	Buenos Aires	18.118	Sao Paulo	23.980	Kabul	27.976
20	Lagos	10.572	Istanbul	12.867	Jakarta	18.027	Kampala	23.081	Lahore	27.126
21	Seoul	10.039	Moscow	12.036	Chennai	17.852	Beijing	22.351	Tokyo	25.794
22	Paris	9.958	Osaka-Kobe	11.909	Los Angeles	17.716	Chennai	20.847	Kano	25.616
23	Jakarta	9.703	Guangzhou	11.885	Bangalore	17.073	Niiamey	20.104	Ougadougou	24.770
24	Guangzhou	9.447	Lahore	11.249	Khartoum	16.487	Bangalore	19.937	Addis Ababa	23.365
25	Chicago	9.211	Chennai	11.194	Kabul	16.218	Lusaka	19.877	Sao Paulo	22.164
26	Kinshasa	9.052	Paris	10.858	Hyderabad	15.968	Kano	19.752	Chennai	21.713
27	London	8.607	Bangalore	10.706	Istanbul	15.884	Los Angeles	19.571	Sana'a	21.681
28	Lima	8.473	Seoul	10.670	Nairobi	15.784	Addis Ababa	19.449	Ibadan	21.403
29	Bogota	8.320	Chicago	10.468	Rio De Janeiro	15.733	Baghdad	19.441	Antananarivo	20.958
30	Tehran	8.221	Lima	10.324	Baghdad	15.306	Buenos Aires	19.379	Bangalore	20.765
31	Shenzhen	8.114	Shenzhen	10.208	Lima	13.628	Jakarta	18.862	Baghdad	20.657
32	Chennai	7.559	Bogota	10.119	Ahmedabad	13.523	Hyderabad	18.646	Los Angeles	20.239
33	Wuhan	7.542	Tehran	10.048	Bogota	13.150	Shanghai	17.996	Buenos Aires	19.612

34	Tianjin	7.468	Hyderabad	10.013	Guangzhou	13.137	Sana'a	17.858	Hyderabad	19.421
35	Hong Kong	7.419	London	9.815	Addis Ababa	13.073	Ougadougou	17.547	Lilongwe	19.253
36	Bangalore	7.229	Wuhan	9.488	Ho Chi Minh	12.905	Ibadan	16.504	Blantyre City	19.035
37	Lahore	7.092	Tianjin	9.395	Chicago	12.776	Abidjan	16.451	Bamako	19.016
38	Bangkok	6.918	Hong Kong	9.333	Chittagong	12.690	Ahmedabad	15.792	Beijing	18.771
39	Hyderabad	6.761	Bangkok	9.203	Bangkok	12.480	Antananarivo	15.716	Jakarta	18.609
40	Chongqing	6.690	Baghdad	8.709	Paris	12.295	Istanbul	15.625	Abidjan	18.536
41	Santiago (BR)	6.100	Ho Chi Minh	8.481	Tehran	12.203	Dakar	15.388	Dakar	18.490
42	Belo Horizonte	5.941	Ahmedabad	8.480	Abidjan	11.879	Rio De Janeiro	14.905	Ahmedabad	16.448
43	Baghdad	5.891	Chongqing	8.416	Pune	11.832	Lima	14.455	Shanghai	15.113
44	Santiago (CH)	5.879	Khartoum	8.346	Kano	11.656	Bogota	14.307	Abuja	15.054
45	Madrid	5.764	Luanda	7.943	London	11.498	Chittagong	14.270	Bangkok	14.822
46	Miami	5.755	Chittagong	7.767	Moscow	11.448	Bamako	14.257	Conakry	14.790
47	Toronto	5.741	Pune	7.420	Shenzhen	11.283	Ho Chi Minh	14.184	Istanbul	14.774
48	Ahmedabad	5.726	Hanoi	6.999	Osaka-Kobe	11.015	Chicago	14.113	Bogota	14.636
49	Ho Chi Minh	5.723	Kabul	6.974	Riyadh	10.988	Bangkok	13.852	Phnom Penh	14.597
50	Philadelphia	5.630	Santiago (BR)	6.913	Sana'a	10.983	Pune	13.817	Chicago	14.595
51	Khartoum	5.185	Riyadh	6.863	Aleppo	10.866	Aleppo	13.279	Ho Chi Minh	14.554
52	Singapore	5.184	Belo Horizonte	6.732	Kampala	10.846	Paris	13.054	Pune	14.391
53	Barcelona	5.057	Santiago (CH)	6.683	Hanoi	10.650	Riyadh	12.825	Chittagong	14.316
54	Chittagong	5.012	Toronto	6.658	Wuhan	10.488	London	11.944	Lima	14.158
55	Pune	5.010	Miami	6.541	Tianjin	10.385	Hanoi	11.705	Aleppo	13.900
56	Dallas-Fort Worth	4.955	Dar es Salaam	6.484	Hong Kong	10.317	Abuja	11.608	Rio De Janeiro	13.776
57	Shenyang	4.952	Aleppo	6.482	Seoul	10.092	Surat	11.511	Paris	13.432
58	Riyadh	4.856	Philadelphia	6.398	Dakar	9.922	Lilongwe	11.431	Riyadh	13.162
59	Dongguan	4.850	Madrid	6.384	Alexandria	9.865	Alexandria	11.418	Kigali	13.032
60	St. Petersburg	4.849	Alexandria	6.361	Surat	9.858	Blantyre City	11.301	London	12.053
61	Luanda	4.775	Abidjan	6.341	Ibadan	9.739	Tehran	10.994	Hanoi	12.011
62	Hanoi	4.723	Nairobi	6.261	Chongqing	9.303	Guangzhou	10.767	Surat	11.990
63	Atlanta	4.695	Shenyang	6.230	Yangon	8.965	Conakry	10.627	Alexandria	11.805
64	Houston	4.609	Yangon	6.185	Ougadougou	8.719	Moscow	10.281	Kaduna	11.777
65	Boston	4.597	Surat	6.181	Antananarivo	8.633	Faisalabad	10.094	Mombasa	11.247
66	Sydney	4.576	Addis Ababa	6.150	Toronto	8.135	Yangon	9.988	N'Djamena	11.122
67	Washington	4.464	Dongguan	6.102	Faisalabad	8.026	Kigali	9.301	Faisalabad	10.836
68	Aleppo	4.450	Dallas-Fort Worth	5.631	Miami	7.982	Kanpur	9.291	Maputo	10.486
69	Tlaquepaque	4.435	Singapore	5.623	Kanpur	7.957	Shenzhen	9.248	Yangon	10.404
70	Tonala	4.435	Barcelona	5.601	Lusaka	7.939	Osaka-Kobe	9.125	Lubumbashi	10.292
71	Zapopan	4.435	Kano	5.401	Santiago (BR)	7.885	Kaduna	9.081	Mbuji-Mayi	9.925

72	Guadalajara	4.435	Chengdu	5.367	Philadelphia	7.809	Phnom Penh	8.851	Moscow	9.870
73	Alexandria	4.421	Sydney	5.341	Bamako	7.791	Miami	8.818	Benin City	9.830
74	Yangon	4.348	Atlanta	5.336	Niiamey	7.681	Toronto	8.788	Tehran	9.818
75	Chengdu	4.266	Tlaquepaque	5.286	Belo Horizonte	7.680	Accra	8.778	Accra	9.813
76	Detroit	4.203	Tonala	5.286	Santiago (CH)	7.641	N'Djamena	8.769	Kanpur	9.678
77	Xi'an, Shaanxi	4.178	Zapopan	5.286	Jaipur	7.406	Lubumbashi	8.668	Bobo Dioulasso	9.303
78	Abidjan	4.175	Guadalajara	5.286	Jiddah	7.329	Maputo	8.666	Huambo	9.177
79	Surat	4.174	Xi'an, Shaanxi	5.256	Madrid	6.986	Jaipur	8.649	Miami	9.119
80	Porto Alegre	4.096	Houston	5.238	Giza	6.967	Philadelphia	8.626	Guangzhou	9.043
81	Guadalupe	4.090	Boston	5.224	Shenyang	6.886	Wuhan	8.596	Jaipur	9.008
82	Monterrey	4.090	Washington	5.073	Dallas-Fort Worth	6.873	Jiddah	8.554	Philadelphia	8.921
83	Melbourne	4.077	St. Petersburg	5.069	Abuja	6.850	Tianjin	8.512	Toronto	8.911
84	Guiyang	3.980	Guiyang	5.007	Lucknow	6.795	Hong Kong	8.456	Al-Hudaydah	8.793
85	Ankara	3.953	Kanpur	4.989	Dongguan	6.744	Mombasa	8.420	Jiddah	8.779
86	Brasilia	3.938	Guadalupe	4.875	Algiers	6.617	Mbuji-Mayi	8.359	Tel Aviv-Yafo	8.741
87	Montréal	3.859	Monterrey	4.875	Sydney	6.583	Giza	8.063	Damascus	8.355
88	Recife	3.831	Nanjing, Jiangsu	4.797	Tlaquepaque	6.563	Damascus	7.983	Ta'izz	8.340
89	Nanjing, Jiangsu	3.813	Detroit	4.777	Tonala	6.563	Lucknow	7.934	Giza	8.336
90	Kabul	3.768	Melbourne	4.759	Zapopan	6.563	Seoul	7.679	Port Harcourt	8.335
91	Haerbin	3.753	Haerbin	4.721	Guadalajara	6.563	Chongqing	7.625	Lucknow	8.264
92	Salvador	3.695	Ankara	4.700	Damascus	6.532	Dallas-Fort Worth	7.592	Osaka-Kobe	8.102
93	Yokohama	3.689	Dakar	4.687	Atlanta	6.512	Benin City	7.579	Kumasi	8.088
94	Phoenix	3.687	Algiers	4.670	Accra	6.420	Algiers	7.529	Douala	8.043
95	Johannesburg	3.618	Jaipur	4.644	Houston	6.393	Santiago (BR)	7.470	Algiers	8.030
96	Fortaleza	3.599	Porto Alegre	4.642	Boston	6.376	Tel Aviv-Yafo	7.424	Dallas-Fort Worth	7.851
97	Algiers	3.574	Jiddah	4.578	Washington	6.192	Huambo	7.284	Ogbomosho	7.784
98	San Francisco-Oakland	3.544	Ibadan	4.513	Nagpur	6.167	Santiago (CH)	7.277	Shenzhen	7.767
99	Medellín	3.524	Faisalabad	4.494	Conakry	6.141	Belo Horizonte	7.275	Rawalpindi	7.707
100	Berlin	3.461	Giza	4.492	Barcelona	6.129	Al-Hudaydah	7.242	Nagpur	7.500
101	Addis Ababa	3.453	Sana'a	4.483	Guadalupe	6.053	Douala	7.241	Brazzaville	7.443
SUM		**756.958**		**972.586**		**1391.149**		**1708.086**		**1924.036**

Table 5 - 101 largest cities with SSP3

	2010		2025		2050		2075		2100	
	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)	City	Population (millions)
1	Tokyo	36.094	Tokyo	34.102	Lagos	37.540	Lagos	66.837	Lagos	100.191
2	Mexico	20.117	Mumbai	26.755	Mumbai	37.322	Mumbai	45.675	Dar es Salaam	77.533
3	Mumbai	20.072	Mexico	25.603	Mexico	34.316	Luanda	45.518	Luanda	69.240
4	Beijing	19.610	Sao Paulo	23.627	Karachi	31.964	Karachi	43.130	Karachi	52.863
5	Sao Paulo	19.582	Beijing	22.904	Dhaka	31.815	Mexico	41.115	Mumbai	52.572
6	New York	19.441	Delhi	22.680	Delhi	31.638	Dar es Salaam	40.442	Kinshasa	50.826
7	Delhi	17.015	Dhaka	21.256	Kolkata	28.964	Dhaka	39.502	Mexico	46.533
8	Shanghai	15.789	New York	20.970	Sao Paulo	28.734	Kinshasa	38.926	Dhaka	45.470
9	Kolkata	15.577	Kolkata	20.763	Tokyo	27.046	Delhi	38.719	Delhi	44.565
10	Dhaka	14.796	Karachi	19.744	Kinshasa	26.255	Kolkata	35.447	Lusaka	40.862
11	Buenos Aires	13.089	Shanghai	18.441	Manila	25.357	Manila	32.419	Kolkata	40.799
12	Karachi	13.052	Lagos	18.309	Beijing	24.447	Sao Paulo	31.814	Nairobi	40.345
13	Los Angeles	12.773	Manila	16.826	Cairo	23.075	Cairo	28.803	Manila	38.080
14	Cairo	12.503	Cairo	16.620	Luanda	22.354	Nairobi	26.687	Sao Paulo	34.717
15	Rio De Janeiro	12.171	Buenos Aires	15.983	New York	20.956	Buenos Aires	25.936	Cairo	34.259
16	Manila	11.662	Kinshasa	14.721	Buenos Aires	20.860	Lahore	23.435	Ouagadougou	33.776
17	Moscow	11.514	Rio De Janeiro	14.685	Shanghai	19.684	Beijing	22.431	Kano	32.156
18	Osaka-Kobe	11.337	Los Angeles	13.778	Rio De Janeiro	17.859	Khartoum	21.814	Buenos Aires	31.491
19	Istanbul	10.823	Istanbul	13.059	Lahore	17.368	Kano	21.451	Khartoum	30.186
20	Lagos	10.572	Jakarta	12.070	Dar es Salaam	16.465	Baghdad	20.854	Lahore	28.724
21	Seoul	10.039	Moscow	11.322	Jakarta	15.576	Lusaka	20.065	Ibadan	26.867
22	Paris	9.958	Guangzhou	11.034	Istanbul	15.564	Kabul	20.038	Sana'a	25.757
23	Jakarta	9.703	Lima	10.996	Baghdad	15.440	Rio De Janeiro	19.774	Niamey	25.741
24	Guangzhou	9.447	Lahore	10.728	Lima	15.008	Ouagadougou	19.272	Kabul	25.191
25	Chicago	9.211	Osaka-Kobe	10.711	Nairobi	14.181	Abidjan	18.838	Antananarivo	25.069
26	Kinshasa	9.052	Paris	10.407	Chennai	14.055	Tokyo	18.787	Baghdad	24.962
27	London	8.607	Bogota	10.383	Bogota	14.026	Jakarta	18.407	Abidjan	24.789
28	Lima	8.473	Seoul	10.342	Khartoum	13.920	Bogota	18.343	Bogota	23.539
29	Bogota	8.320	Chennai	10.076	Los Angeles	13.768	New York	18.318	Dakar	21.786
30	Tehran	8.221	Tehran	10.064	Kabul	13.565	Shanghai	18.061	Kampala	21.669
31	Shenzhen	8.114	Chicago	9.936	Bangalore	13.442	Lima	17.989	Rio De Janeiro	21.578
32	Chennai	7.559	Bangalore	9.636	Hyderabad	12.571	Ibadan	17.923	Jakarta	21.372
33	Wuhan	7.542	Shenzhen	9.477	Abidjan	12.093	Sana'a	17.525	Beijing	20.642
34	Tianjin	7.468	Baghdad	9.269	Kano	12.048	Chennai	17.201	Bamako	20.408
35	Hong Kong	7.419	Luanda	9.141	Tehran	11.981	Bangalore	16.450	Lima	20.405

36	Bangalore	7.229	London	9.090	Guangzhou	11.777	Istanbul	16.307	Chennai	19.798
37	Lahore	7.092	Hyderabad	9.012	Riyadh	11.670	Kampala	15.827	Bangalore	18.934
38	Bangkok	6.918	Wuhan	8.809	Aleppo	10.855	Hyderabad	15.385	Lilongwe	18.905
39	Hyderabad	6.761	Tianjin	8.722	Chittagong	10.777	Antananarivo	15.241	Abuja	18.897
40	Chongqing	6.690	Hong Kong	8.665	Moscow	10.691	Dakar	15.117	Blantyre City	18.691
41	Santiago (BR)	6.100	Bangkok	7.994	Ahmedabad	10.647	Niamey	14.698	Hyderabad	17.708
42	Belo Horizonte	5.941	Khartoum	7.957	Addis Ababa	10.207	Riyadh	14.578	Riyadh	16.933
43	Baghdad	5.891	Chongqing	7.814	Paris	10.151	Aleppo	14.136	Istanbul	16.672
44	Santiago (CH)	5.879	Ahmedabad	7.632	Shenzhen	10.115	Addis Ababa	13.851	Shanghai	16.620
45	Madrid	5.764	Ho Chi Minh	7.482	Ibadan	10.067	Chittagong	13.381	Aleppo	16.562
46	Miami	5.755	Riyadh	7.453	Ho Chi Minh	10.040	Bamako	13.124	Addis Ababa	16.431
47	Toronto	5.741	Santiago (BR)	7.360	Chicago	9.929	Ahmedabad	13.030	Chittagong	15.403
48	Ahmedabad	5.726	Chittagong	7.200	Sana'a	9.782	Abuja	12.606	New York	15.020
49	Ho Chi Minh	5.723	Belo Horizonte	7.168	Wuhan	9.402	Los Angeles	12.035	Huambo	15.008
50	Philadelphia	5.630	Santiago (CH)	7.014	Bangkok	9.355	Ho Chi Minh	11.828	Ahmedabad	14.997
51	Khartoum	5.185	Kabul	6.834	Pune	9.316	Tehran	11.812	Conakry	14.790
52	Singapore	5.184	Aleppo	6.781	Tianjin	9.310	Pune	11.401	Kaduna	14.784
53	Barcelona	5.057	Pune	6.678	Hong Kong	9.249	Guangzhou	10.806	Phnom Penh	14.597
54	Chittagong	5.012	Abidjan	6.590	Kampala	9.159	Bangkok	10.791	Ho Chi Minh	13.642
55	Pune	5.010	Dar es Salaam	6.432	Seoul	9.101	Conakry	10.627	Pune	13.122
56	Dallas-Fort Worth	4.955	Nairobi	6.311	London	8.983	Moscow	10.474	Bangkok	12.875
57	Shenyang	4.952	Miami	6.208	Santiago (BR)	8.951	Alexandria	10.185	Bobo Dioulasso	12.685
58	Riyadh	4.856	Toronto	6.178	Dakar	8.950	Lilongwe	9.988	Accra	12.467
59	Dongguan	4.850	Hanoi	6.174	Belo Horizonte	8.718	Santiago (BR)	9.911	Benin City	12.339
60	St. Petersburg	4.849	Philadelphia	6.073	Ouagadougou	8.607	Blantyre City	9.875	Tokyo	12.276
61	Luanda	4.775	Addis Ababa	5.884	Osaka-Kobe	8.495	Huambo	9.866	Alexandria	12.114
62	Hanoi	4.723	Alexandria	5.877	Chongqing	8.340	Kaduna	9.862	Mombasa	11.817
63	Atlanta	4.695	Kano	5.876	Santiago (CH)	8.308	Hanoi	9.762	Maputo	11.562
64	Houston	4.609	Shenyang	5.784	Hanoi	8.286	Accra	9.728	Faisalabad	11.474
65	Boston	4.597	Madrid	5.679	Alexandria	8.159	Jiddah	9.724	Tehran	11.423
66	Sydney	4.576	Dongguan	5.665	Jiddah	7.784	Belo Horizonte	9.652	Jiddah	11.294
67	Washington	4.464	Tlaquepaque	5.644	Surat	7.761	Surat	9.498	Hanoi	11.258
68	Aleppo	4.450	Tonala	5.644	Antananarivo	7.567	Faisalabad	9.362	Moscow	11.101
69	Tlaquepaque	4.435	Zapopan	5.644	Tlaquepaque	7.565	Shenzhen	9.281	Surat	10.932
70	Tonala	4.435	Guadalajara	5.644	Tonala	7.565	Tlaquepaque	9.064	Santiago (BR)	10.815
71	Zapopan	4.435	Surat	5.564	Zapopan	7.565	Tonala	9.064	Port-Au-Prince	10.574
72	Guadalajara	4.435	Yangon	5.503	Guadalajara	7.565	Zapopan	9.064	Belo Horizonte	10.533
73	Alexandria	4.421	Singapore	5.493	Lusaka	7.508	Guadalajara	9.064	Port Harcourt	10.463
74	Yangon	4.348	Dallas-Fort Worth	5.345	Yangon	7.120	Santiago (CH)	9.020	Al-Hudaydah	10.445
75	Chengdu	4.266	Guadalupe	5.205	Abuja	7.080	Paris	8.891	Algiers	10.377

76	Detroit	4.203	Monterrey	5.205	Guadalupe	6.977	Phnom Penh	8.851	Kumasi	10.276
77	Xi'an, Shaanxi	4.178	Atlanta	5.064	Monterrey	6.977	Maputo	8.703	Tlaquepaque	10.259
78	Abidjan	4.175	Sydney	5.001	Bamako	6.942	Chicago	8.679	Tonala	10.259
79	Surat	4.174	Barcelona	4.983	Faisalabad	6.938	Wuhan	8.627	Zapopan	10.259
80	Porto Alegre	4.096	Chengdu	4.982	Algiers	6.773	Tianjin	8.542	Guadalajara	10.259
81	Guadalupe	4.090	Houston	4.972	Damascus	6.525	Damascus	8.497	Douala	9.991
82	Monterrey	4.090	Jiddah	4.971	Accra	6.510	Yangon	8.493	Medellín	9.970
83	Melbourne	4.077	Boston	4.959	Niamey	6.386	Hong Kong	8.486	Damascus	9.956
84	Guiyang	3.980	Porto Alegre	4.942	Kanpur	6.264	Algiers	8.442	Guangzhou	9.944
85	Ankara	3.953	Ibadan	4.910	Miami	6.203	Guadalupe	8.359	Kigali	9.926
86	Brasilia	3.938	Algiers	4.882	Shenyang	6.173	Monterrey	8.359	Ta'izz	9.907
87	Montréal	3.859	Xi'an, Shaanxi	4.880	Conakry	6.141	Port-Au-Prince	8.347	Los Angeles	9.869
88	Recife	3.831	Washington	4.815	Philadelphia	6.069	Benin City	8.231	Yangon	9.865
89	Nanjing, Jiangsu	3.813	Ankara	4.770	Dongguan	6.046	Douala	8.037	Ogbomosho	9.771
90	Kabul	3.768	St. Petersburg	4.768	Porto Alegre	6.010	Kumasi	8.018	Santiago (CH)	9.673
91	Haerbin	3.753	Brasilia	4.751	Port-Au-Prince	5.995	London	7.908	Brazzaville	9.580
92	Salvador	3.695	DAKAR	4.672	Medellín	5.941	Mombasa	7.817	Cuidad De Gautemala	9.544
93	Yokohama	3.689	Guiyang	4.648	Caracas	5.862	Medellín	7.769	Guadalupe	9.461
94	Phoenix	3.687	Recife	4.622	Toronto	5.850	Kanpur	7.666	Monterrey	9.461
95	Johannesburg	3.618	Detroit	4.534	Jaipur	5.831	Chongqing	7.653	N'Djamena	9.294
96	Fortaleza	3.599	Kanpur	4.491	Asuncion	5.811	Asuncion	7.633	Maiduguri	9.183
97	Algiers	3.574	Sana'a	4.465	Brasilia	5.778	Amman	7.469	Asuncion	9.142
98	San Francisco-Oakland	3.544	Salvador	4.458	Giza	5.762	Bobo Dioulasso	7.238	Zaria	9.126
99	Medellín	3.524	Melbourne	4.456	Ankara	5.685	Giza	7.192	Amman	9.033
100	Berlin	3.461	Nanjing, Jiangsu	4.453	Recife	5.621	Jaipur	7.136	Kanpur	8.824
101	Addis Ababa	3.453	Medellín	4.398	Douala	5.606	Al-Hudaydah	7.107	Lubumbashi	8.669
SUM		**756.958**		**938.550**		**1254.410**		**1635.123**		**2082.806**

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Population Predictions of the 101 Largest Cities in the 21st Century - Supplementary Details

Introduction

This paper presents supplementary data for population predictions of the 101 largest cities (in 2010) in the 21st century. Four different extrapolating techniques are applied for each country: exponential, linear, constant and second order polynomial.

The selection of extrapolation technique is based on World Urban Prospects [1] trends and likely growth scenarios based on level of urbanization and historical trends. Whenever appropriate, exponential extrapolation is selected as it offers a suitable method of representing the consistent and gradual reduction of urbanization rate as city growth matures and the urban to rural ratio decreases. However, exponential extrapolation cannot be used to extrapolate negative urbanization rates (i.e. decreasing urban populations).

The selection of best fit extrapolation is intended to be an initial iteration in a series of refinements to predict country specific urbanization rate. Also, examining the growth rate trends with different extrapolating techniques provides an appreciation of the sensitivity of the prediction, where a larger discrepancy between extrapolation predictions corresponds to lesser confidence in the predicted value.

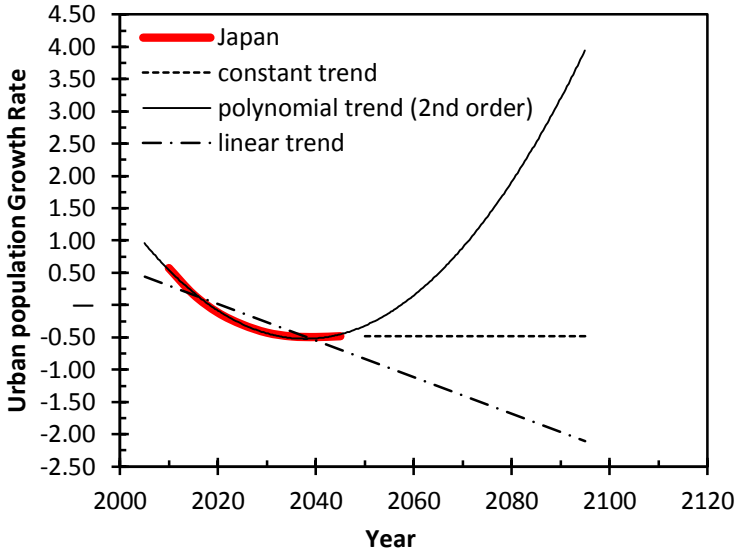
The population growth of the national average of large urban areas is obtained from The World Bank's "Building Sustainability in an Urbanizing World" report [2] by the World Bank's Urban Research Division. In the last section of this report, the divergence of the 21st century's predicted divergence from current population of the 101 largest cities is presented.

Equations

$$Normalized\ Population = \frac{(predicted\ population)}{(population\ in\ 2010)}$$

$$Divergence = \frac{(normalized\ city\ population) - (normalized\ urban\ population\ of\ country)}{(normalized\ city\ population)}$$

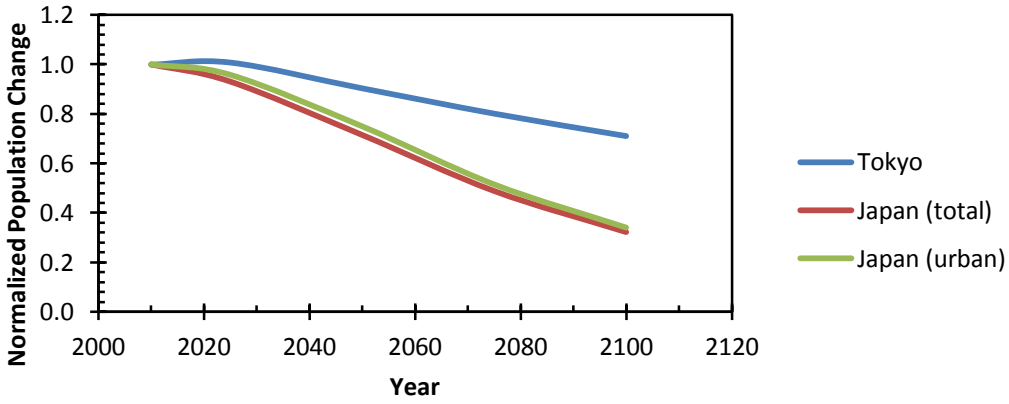
1. Japan, Tokyo



Predicted urban growth for large urban areas in Japan

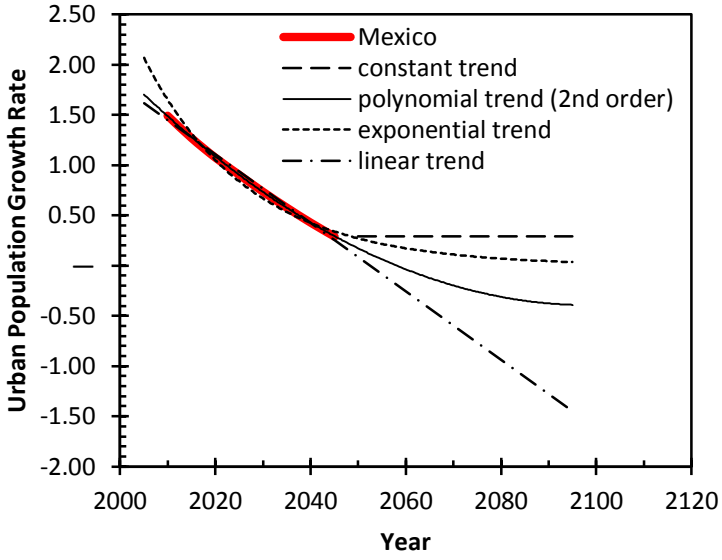
- Best fit of extrapolation method for urban population growth rate: constant

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	36,400,000	32,621,993		
Exponential			N/A	N/A
Polynomial			34,432,833	65,136,936
Linear			24,634,978	15,541,760
Constant			28,915,725	25,630,537



Tokyo's population change compared to the national average of large urban areas

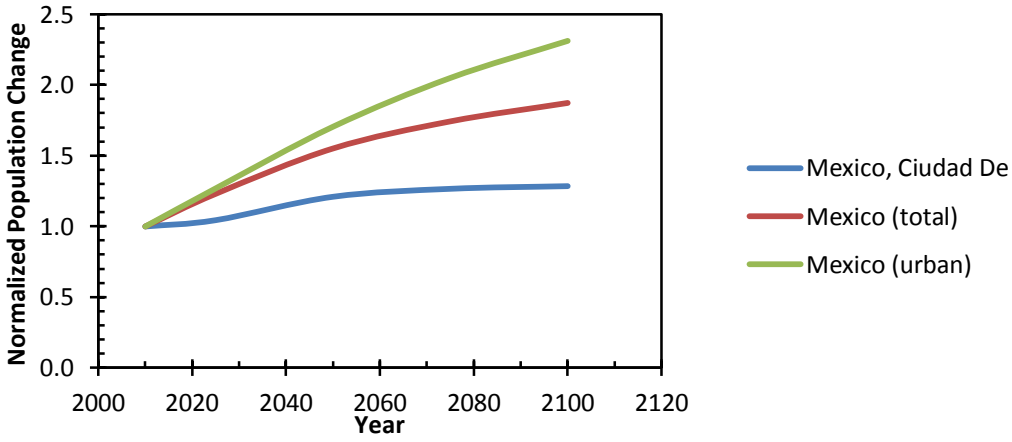
2. Mexico, Mexico City



Predicted urban growth for large urban areas in Mexico

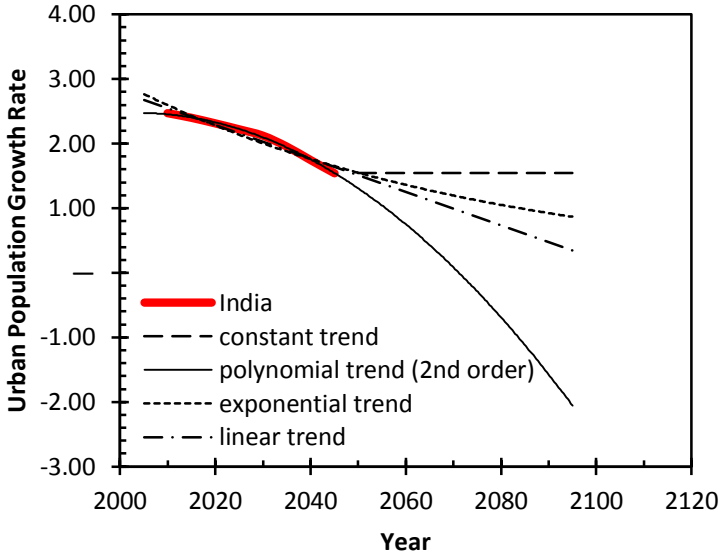
- Best fit of extrapolation method for urban population growth rate: polynomial

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	21,009,000	24,328,738		
Exponential			25,458,052	25,834,740
Polynomial			24,178,182	22,219,013
Linear			22,802,872	17,248,680
Constant			26,159,671	28,128,396



Mexico City's population change compared to the national average of large urban areas

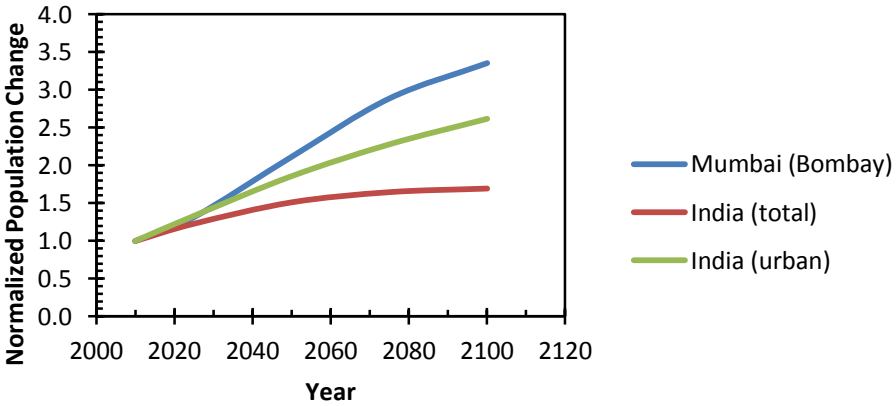
3. India, Mumbai



Predicted urban growth for large urban areas in India

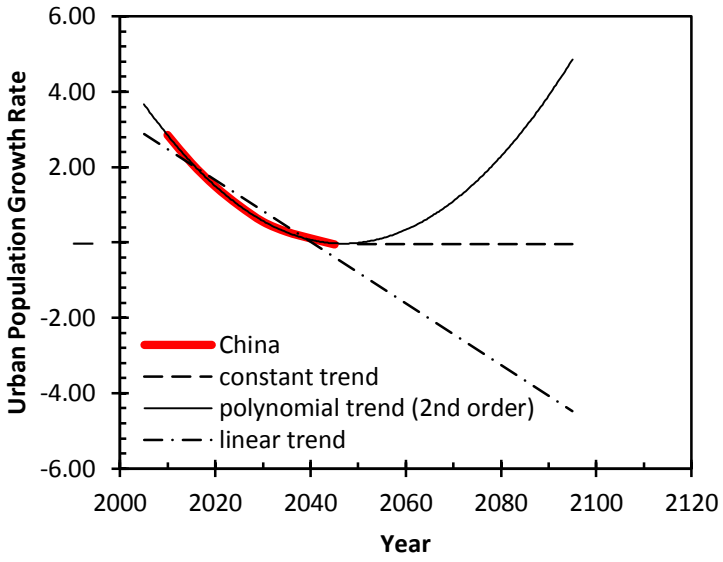
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	21,009,000	24,328,738		
Exponential			25,458,052	25,834,740
Polynomial			24,178,182	22,219,013
Linear			22,802,872	17,248,680
Constant			26,159,671	28,128,396



Mumbai's population change compared to the national average of large urban areas

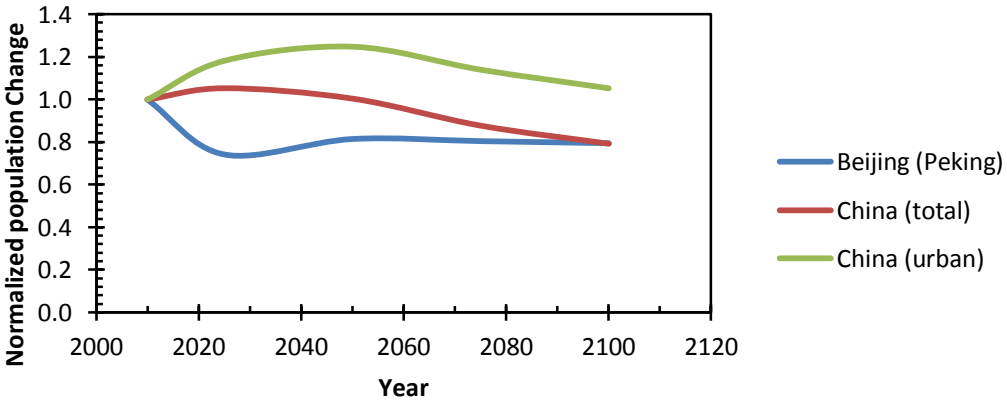
4. China, Beijing



Predicted urban growth for large urban areas in China

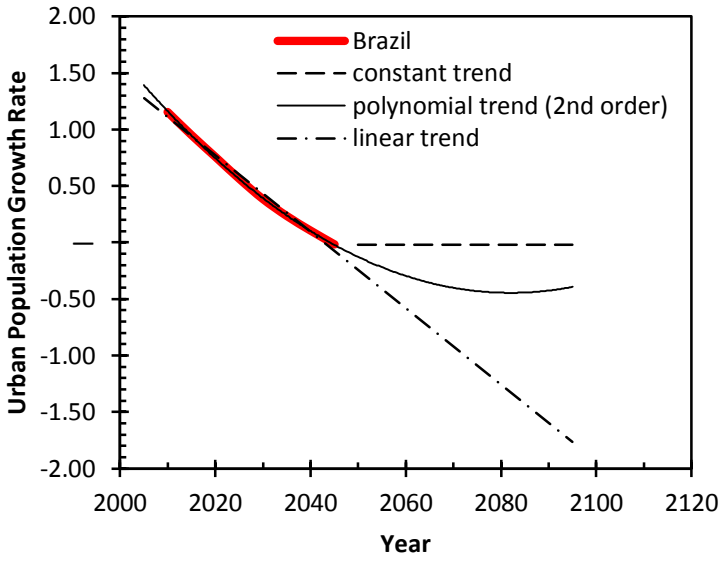
- Best fit of extrapolation method for urban population growth rate: constant

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	14,545,000	15,972,190		
Exponential			N/A	N/A
Polynomial			17,822,831	38,586,662
Linear			10,618,060	4,173,781
Constant			15,582,289	15,776,035



Beijing's population change compared to the national average of large urban areas

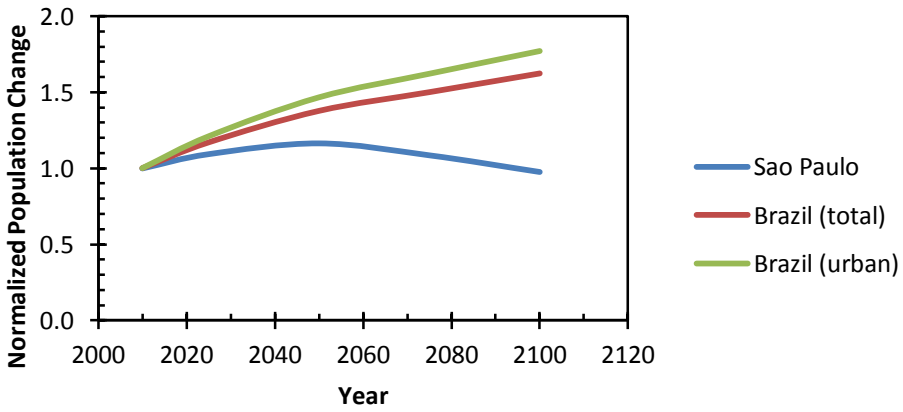
5. Brazil, Sao Paulo



Predicted urban growth for large urban areas in Brazil

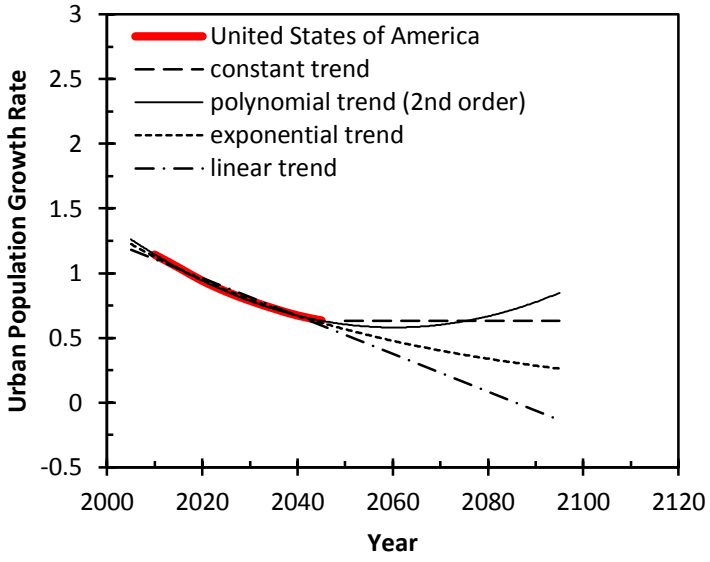
- Best fit of extrapolation method for urban population growth rate: polynomial

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	21,428,000	22,824,800		
Exponential			N/A	N/A
Polynomial			21,280,325	19,121,182
Linear			19,724,624	13,771,800
Constant			22,723,314	22,622,280



Sao Paulo's population change compared to the national average of large urban areas

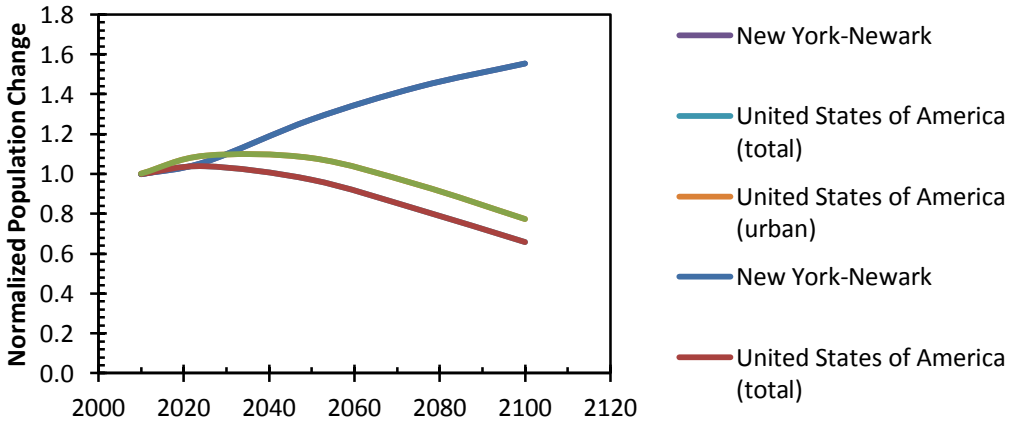
6. United States of America, New York



Predicted urban growth for large urban areas in the United States of America

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	20,628,000	24,768,743		
Exponential			27,923,734	30,193,444
Polynomial			28,704,133	34,403,057
Linear			27,193,907	27,252,430
Constant			28,999,759	33,953,520

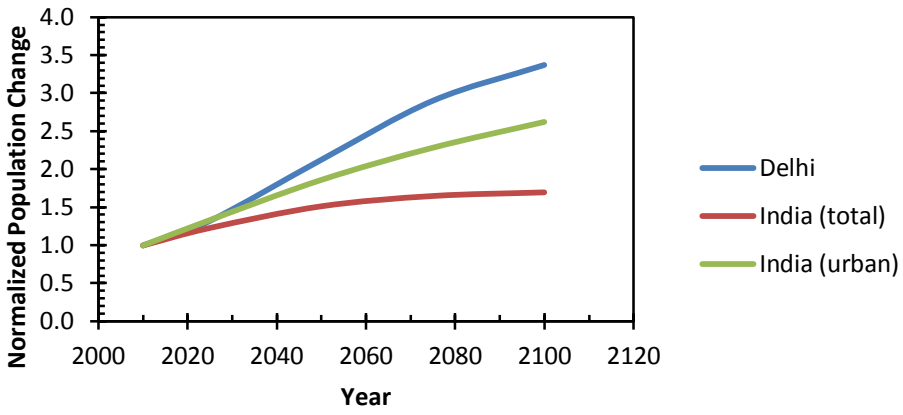


New York's population change compared to the national average of large urban areas

7. India, Delhi

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	22,498,000	36,156,789		
Exponential			50,768,962	64,947,135
Polynomial			43,282,074	32,444,558
Linear			49,338,148	57,334,134
Constant			53,019,088	77,745,390

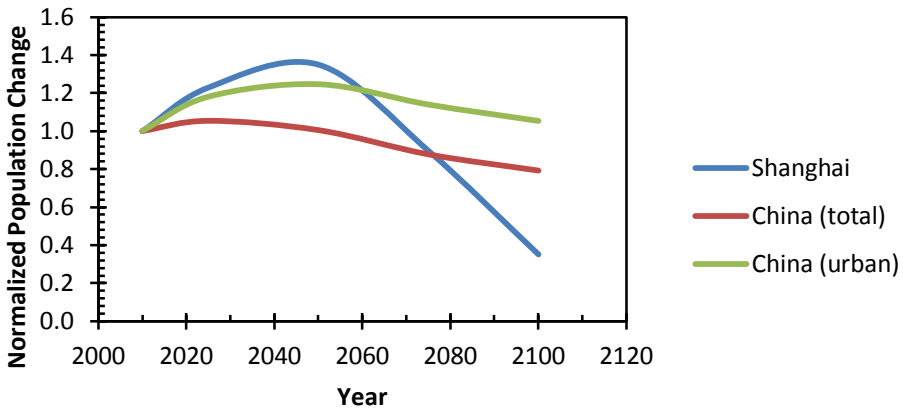


Delhi's population change compared to the national average of large urban areas

8. China, Shanghai

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	19,412,000	21,316,752		
Exponential			N/A	N/A
Polynomial			23,786,648	51,498,404
Linear			14,171,041	5,570,397
Constant			21,054,961	20,796,384

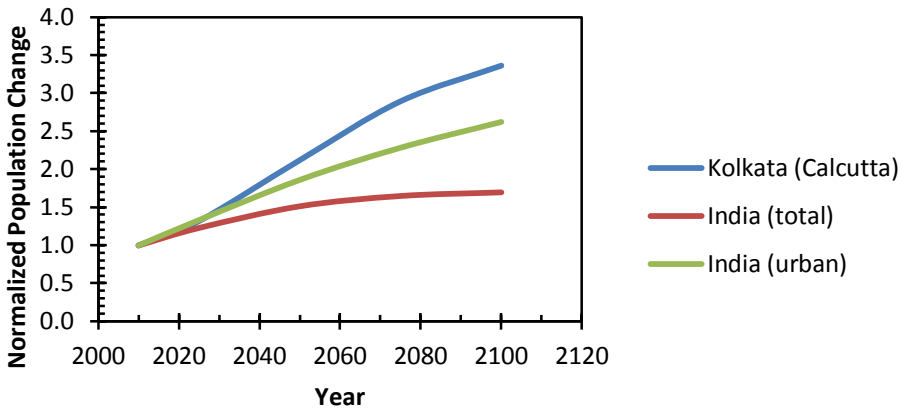


Shanghai's population change compared to the national average of large urban areas

9. India, Kolkata

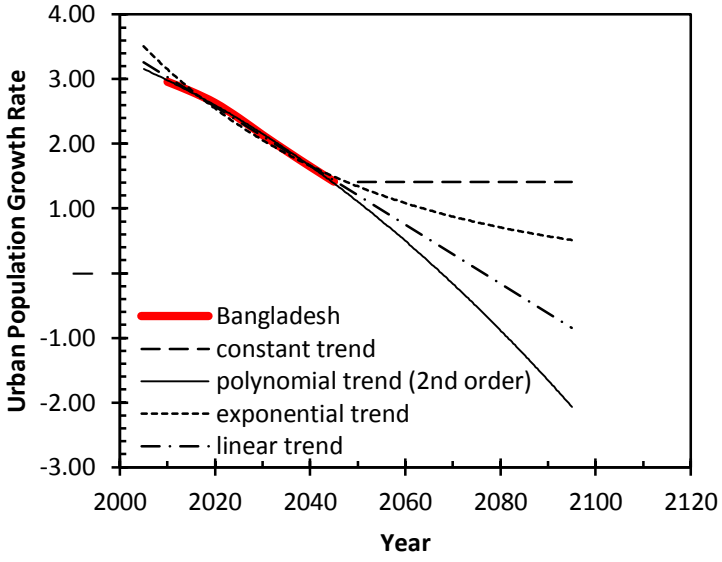
Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	20,560,000	33,042,208		
Exponential			46,395,674	59,352,525
Polynomial			39,553,714	29,649,752
Linear			45,088,111	52,395,315
Constant			45,088,111	52,395,315



Kolkata's population change compared to the national average of large urban areas

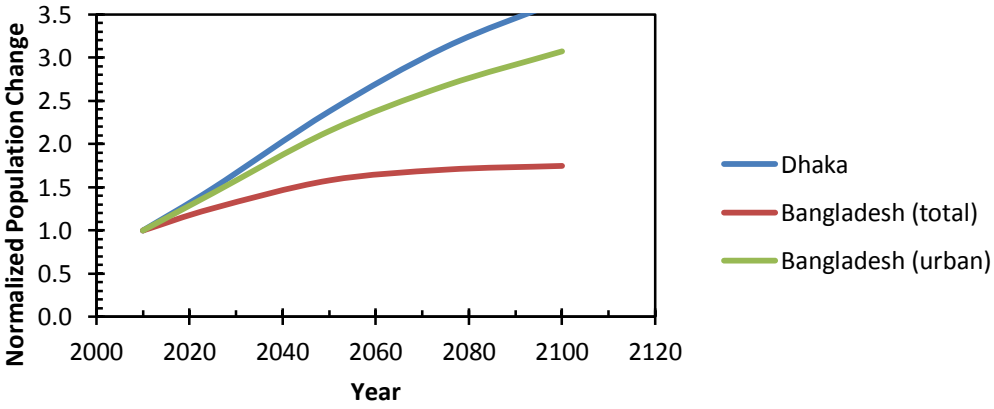
10. Bangladesh, Dhaka



Predicted urban growth for large urban areas in Bangladesh

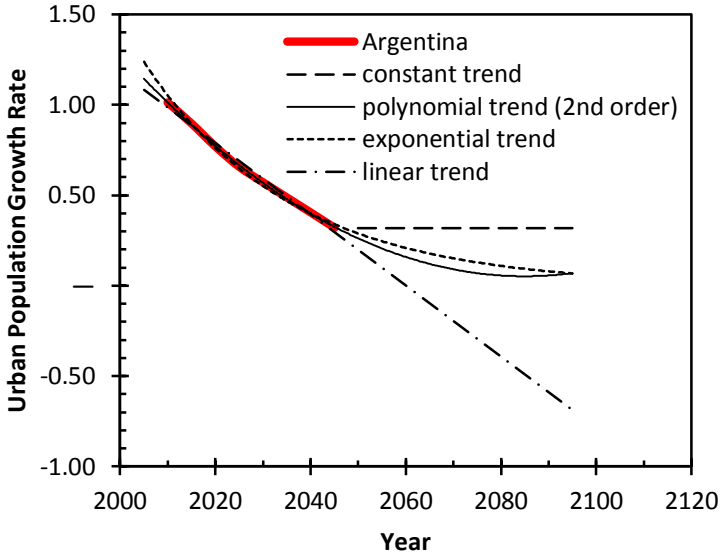
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	22,015,000	35,193,184		
Exponential			46,218,971	54,249,845
Polynomial			39,693,649	28,769,089
Linear			42,451,097	38,538,590
Constant			49,962,176	70,929,046



Dhaka's population change compared to the national average of large urban areas

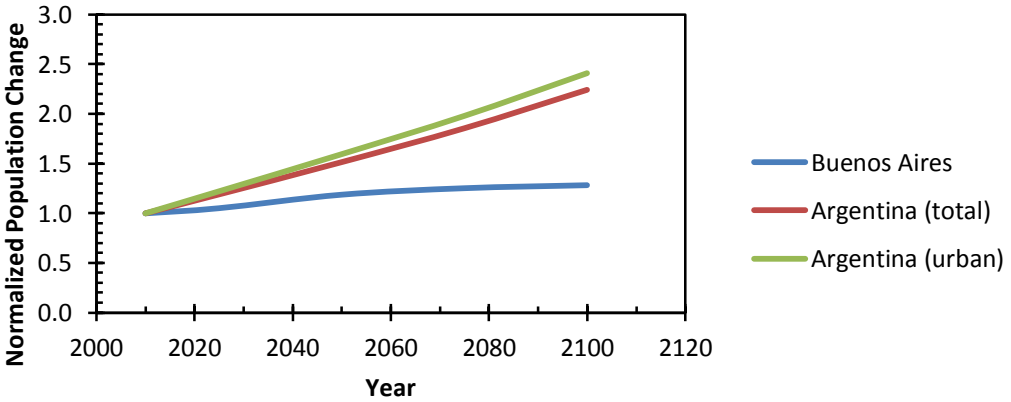
11. Argentina, Buenos Aires



Predicted urban growth for large urban areas in Argentina

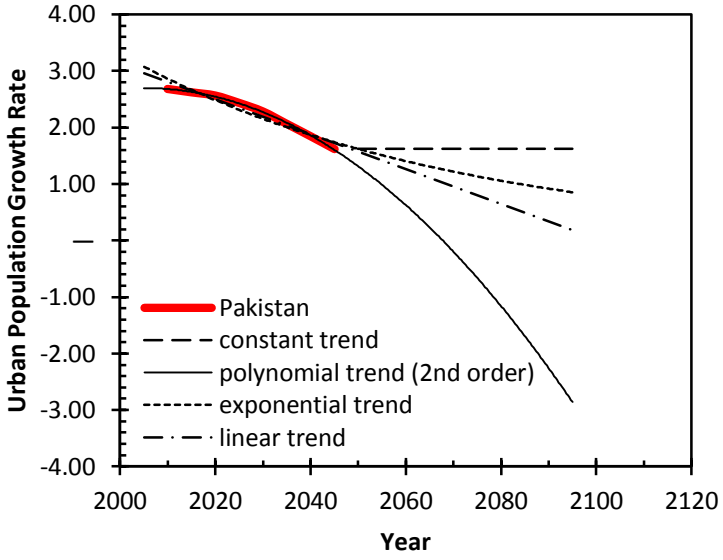
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	13,768,000	15,546,223		
Exponential			16,401,677	16,798,009
Polynomial			16,209,424	16,456,519
Linear			15,549,382	13,752,126
Constant			16,834,046	18,228,550



Population change compared to national average of large urban areas

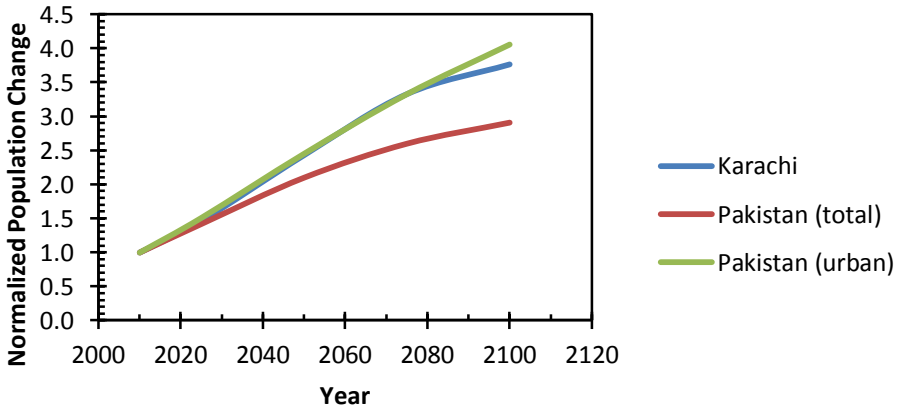
12. Pakistan, Karachi



Predicted urban growth for large urban areas in Pakistan

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	19,095,000	31,696,042		
Exponential			44,998,120	57,546,616
Polynomial			36,718,770	23,739,525
Linear			43,373,574	49,055,566
Constant			47,369,129	70,792,259

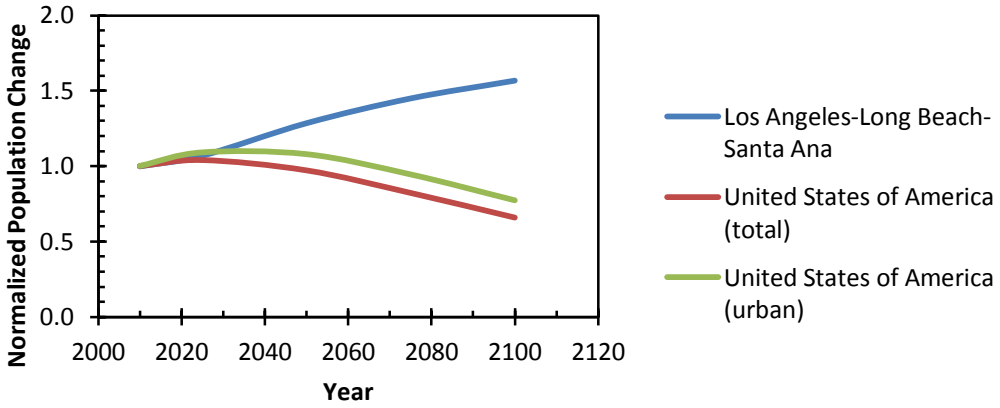


Population change compared to national average of large urban areas

13. United States of America, Los Angeles-Long Beach-Santa Ana (CA)

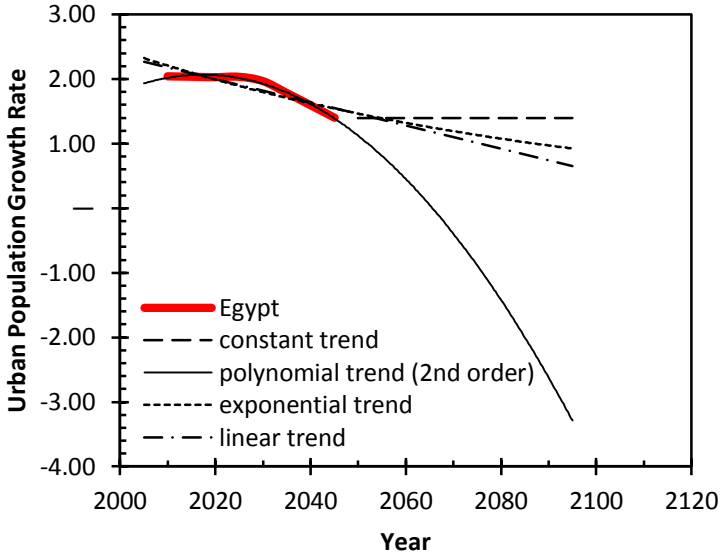
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	13,672,000	16,416,436		
Exponential			18,507,528	20,011,865
Polynomial			19,024,768	22,801,949
Linear			18,023,807	18,062,596
Constant			19,220,705	22,504,001



Population change compared to national average of large urban areas

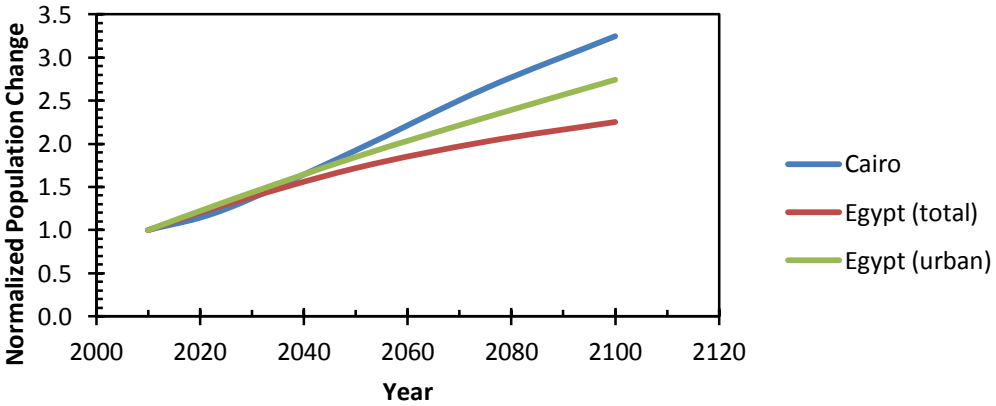
14. Egypt, Cairo



Predicted urban growth for large urban areas in Egypt

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	15,561,000	24,034,957		
Exponential			33,396,400	43,091,114
Polynomial			26,603,310	15,863,332
Linear			32,999,203	40,542,502
Constant			34,001,650	48,101,278

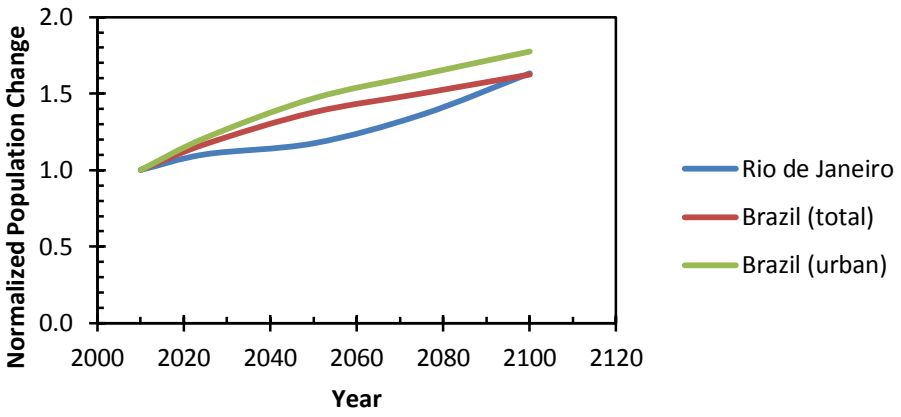


Population change compared to national average of large urban areas

15. Brazil, Rio de Janeiro

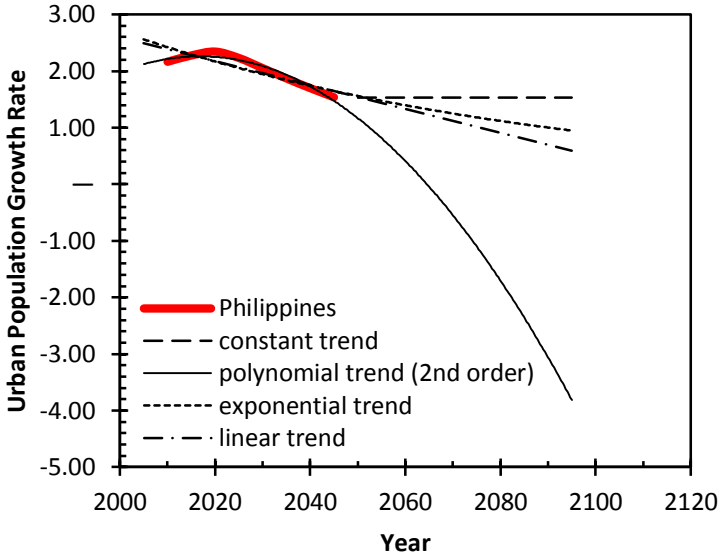
Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	13,413,000	14,287,336		
Exponential			n/a	n/a
Polynomial			16,557,385	19,844,691
Linear			12,346,760	8,620,551
Constant			14,223,811	14,160,567



Population change compared to national average of large urban areas

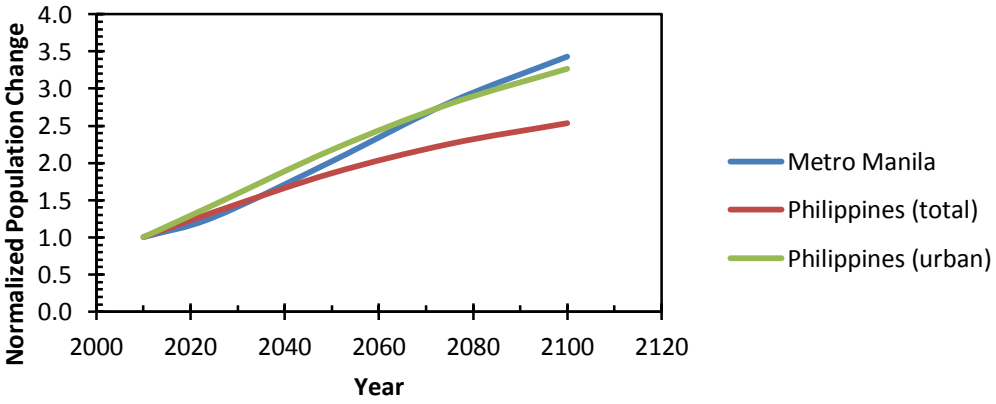
16. Philippines, Metro Manila



Predicted urban growth for large urban areas in the Philippines

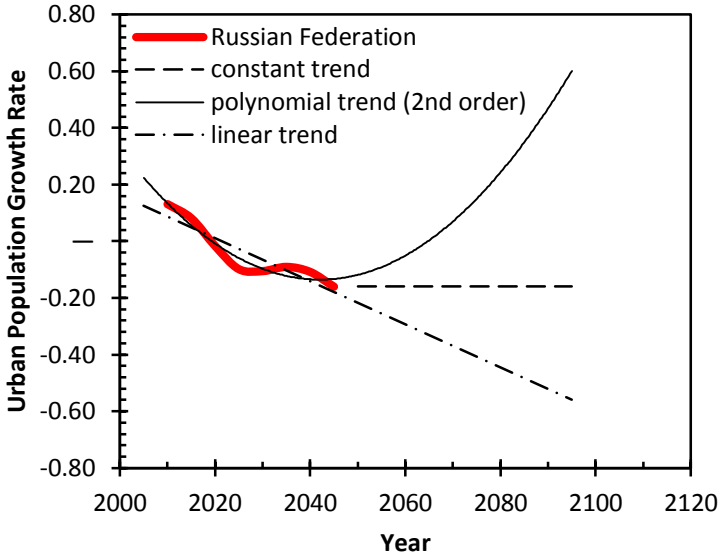
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	14,808,000	23,545,397		
Exponential			33,321,997	43,386,162
Polynomial			25,742,358	13,983,758
Linear			32,748,758	39,959,024
Constant			34,428,600	50,342,259



Population change compared to national average of large urban areas

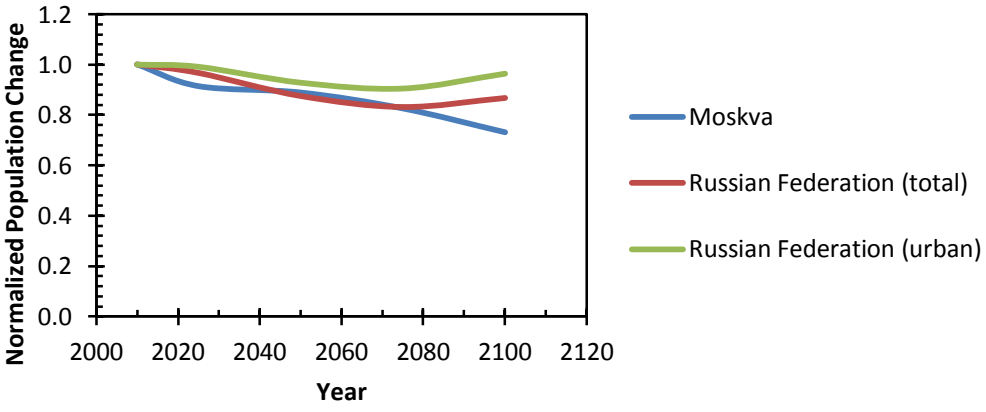
17. Russian Federation, Moskva



Predicted urban growth for large urban areas in the Russian Federation

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	10,526,000	10,235,265		
Exponential			N/A	N/A
Polynomial			10,139,947	11,099,460
Linear			9,510,691	8,424,885
Constant			9,834,662	9,449,739

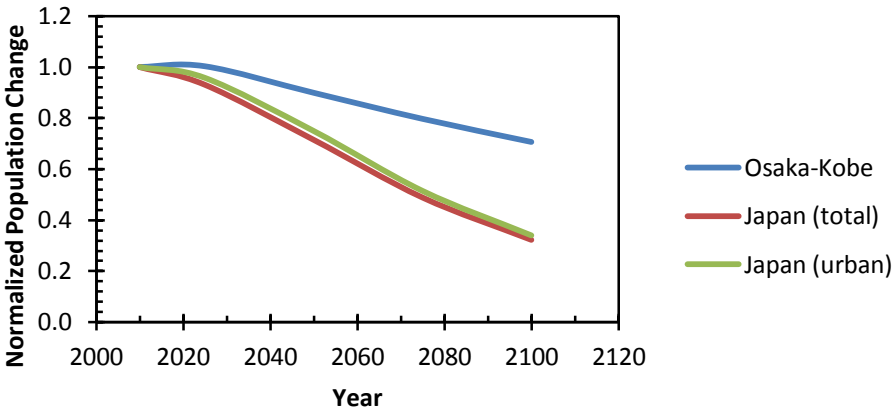


Population change compared to national average of large urban areas

18. Japan, Osaka-Kobe

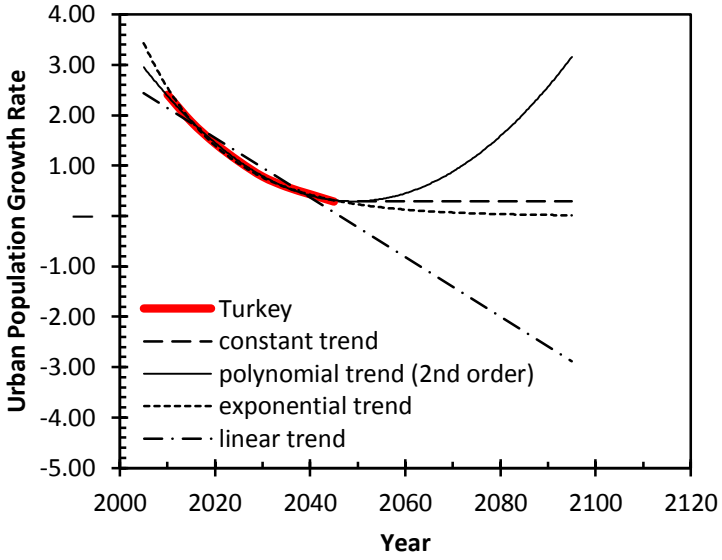
Predicted urban growth for large urban areas in Japan - refer to 1. Tokyo, Japan

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	11,368,000	10,188,099		
Exponential			N/A	N/A
Polynomial			10,753,639	20,342,766
Linear			7,693,693	4,853,811
Constant			9,030,603	8,004,614



Population change compared to national average of large urban areas

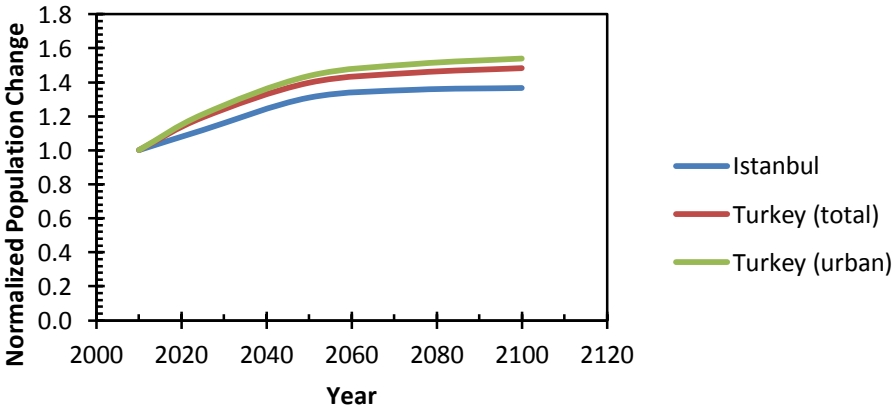
19. Turkey, Istanbul



Predicted urban growth for large urban areas in Turkey

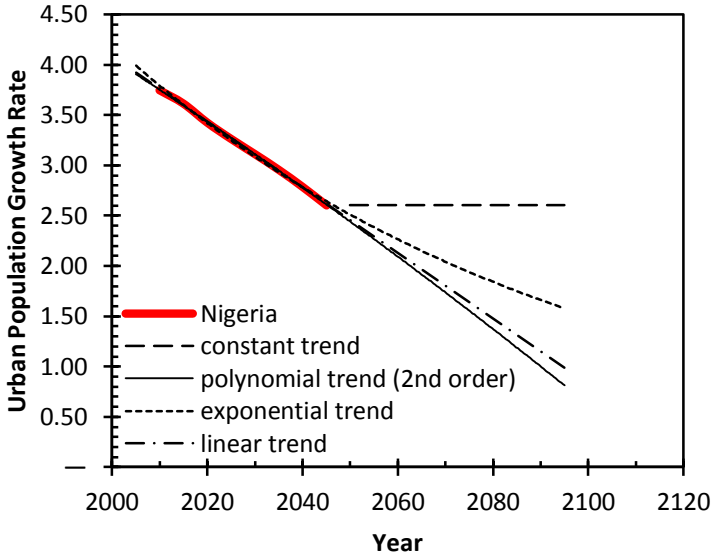
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	12,102,000	14,175,543		
Exponential			14,676,571	14,791,100
Polynomial			16,136,522	27,205,192
Linear			11,560,268	6,476,175
Constant			15,237,686	16,379,412



Population change compared to national average of large urban areas

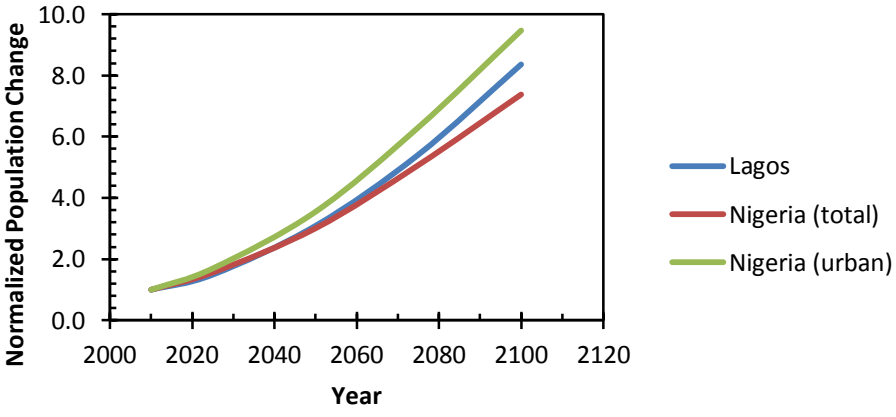
20. Nigeria, Lagos



Predicted urban growth for large urban areas in Nigeria

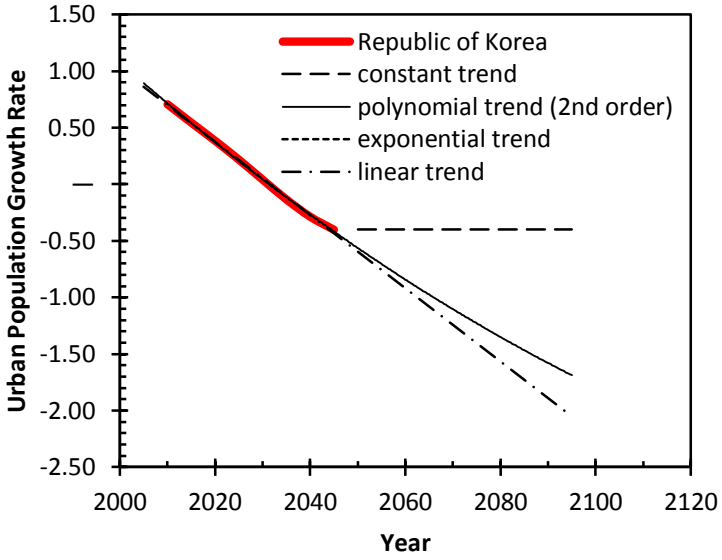
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	15,796,000	32,629,709		
Exponential			57,195,075	88,344,661
Polynomial			54,733,659	73,501,947
Linear			55,257,256	76,601,708
Constant			62,050,771	##########



Population change compared to national average of large urban areas

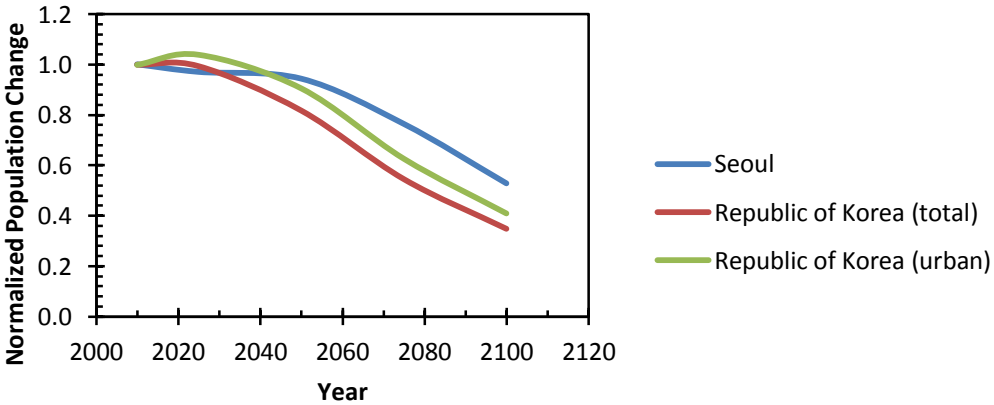
21. Republic of Korea, Seoul



Predicted urban growth for large urban areas in the Republic of Korea

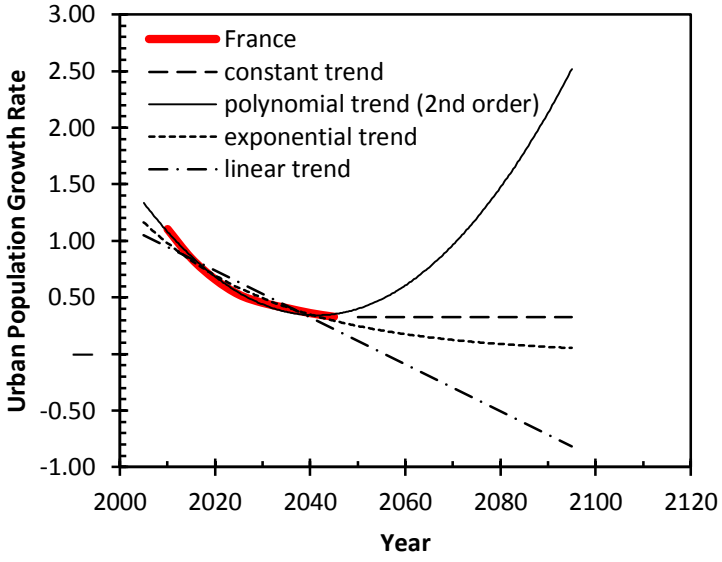
- Best fit of extrapolation method for urban population growth rate: polynomial

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,738,000	9,468,812		
Exponential			N/A	N/A
Polynomial			7,671,256	5,306,873
Linear			7,517,450	4,861,188
Constant			8,565,835	7,748,969



Population change compared to national average of large urban areas

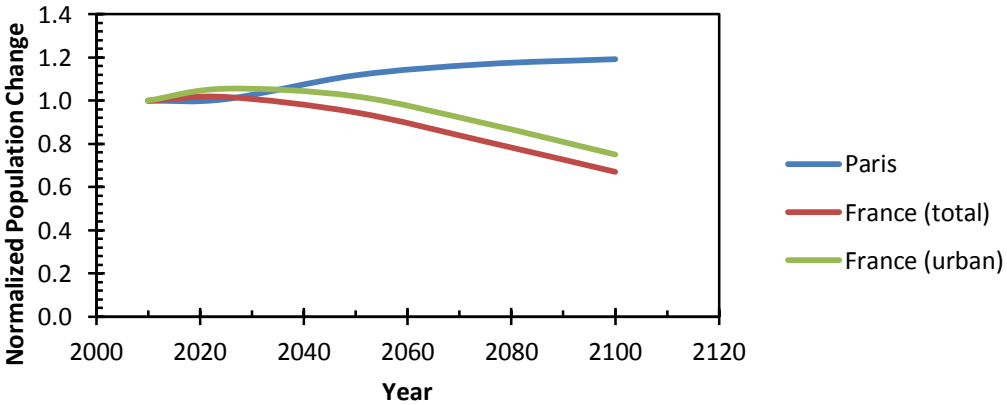
22. France, Paris



Predicted urban growth for large urban areas in France

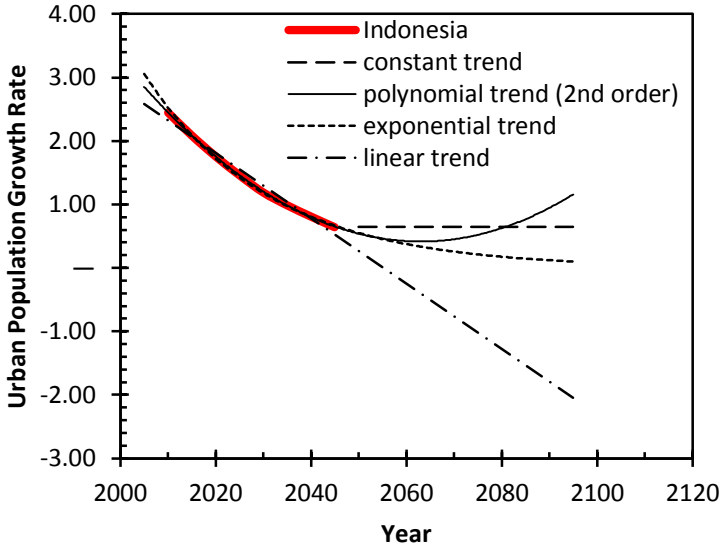
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	10,036,000	11,124,389		
Exponential			11,637,834	11,862,250
Polynomial			13,059,885	20,500,569
Linear			10,872,862	9,327,845
Constant			12,067,740	13,091,087



Population change compared to national average of large urban areas

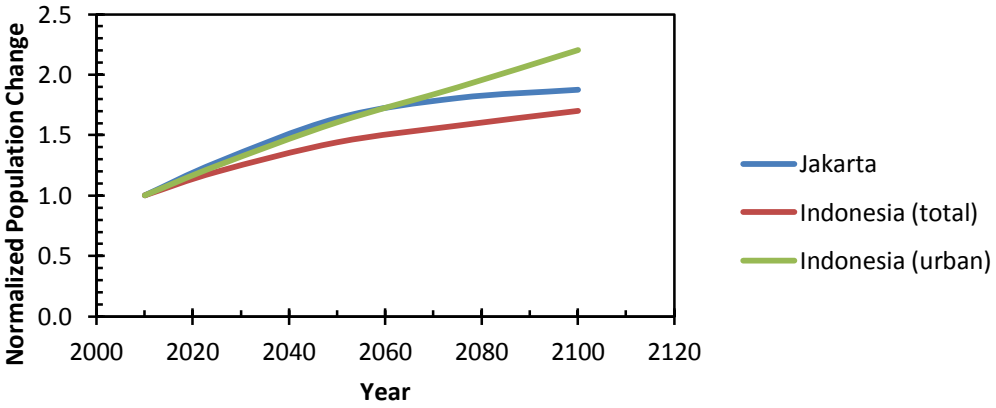
23. Indonesia, Jakarta



Predicted urban growth for large urban areas in Indonesia

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	12,363,000	15,923,577		
Exponential			17,546,723	18,216,212
Polynomial			17,851,464	21,805,487
Linear			14,962,020	10,166,556
Constant			18,686,314	21,928,386

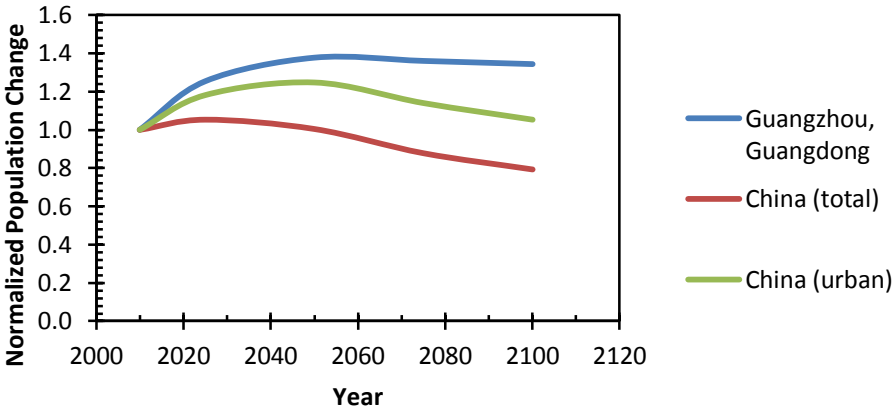


Population change compared to national average of large urban areas

24. China, Guangzhou, Guangdong

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	11,835,000	12,996,279		
Exponential			N/A	N/A
Polynomial			14,502,111	31,397,260
Linear			8,639,721	3,396,129
Constant			12,836,671	12,679,023

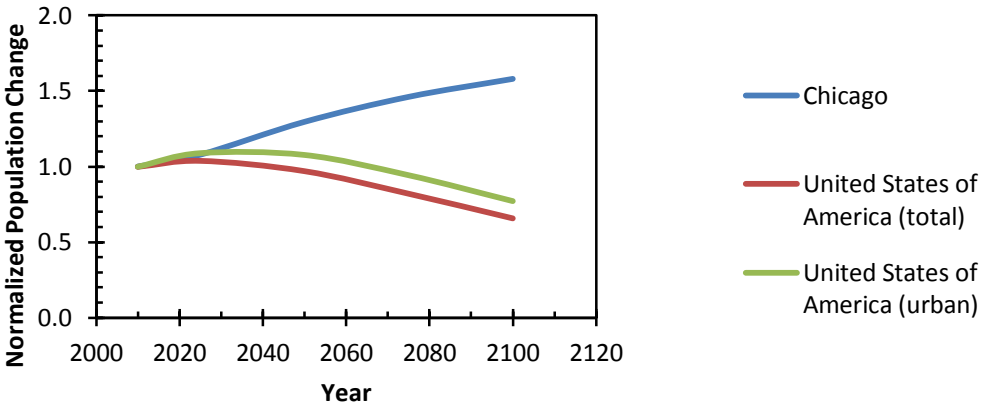


Population change compared to national average of large urban areas

25. United States of America, Chicago

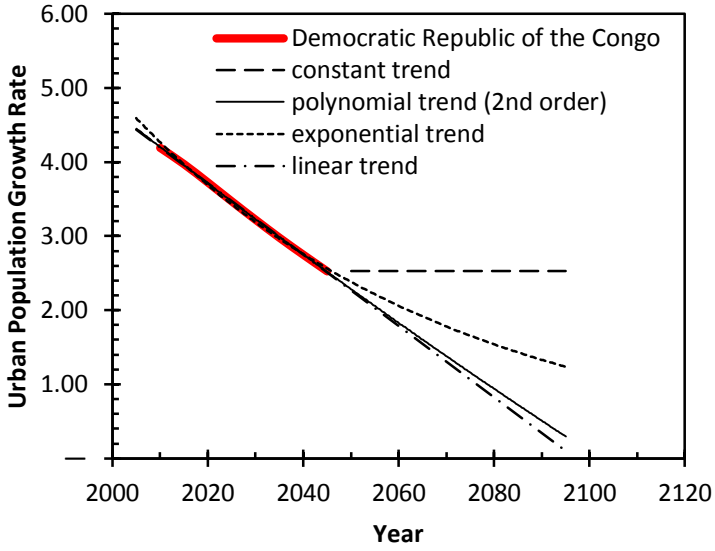
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,932,000	11,925,691		
Exponential			13,444,761	14,537,584
Polynomial			13,820,509	16,564,435
Linear			13,093,363	13,121,541
Constant			13,962,847	16,347,991



Population change compared to national average of large urban areas

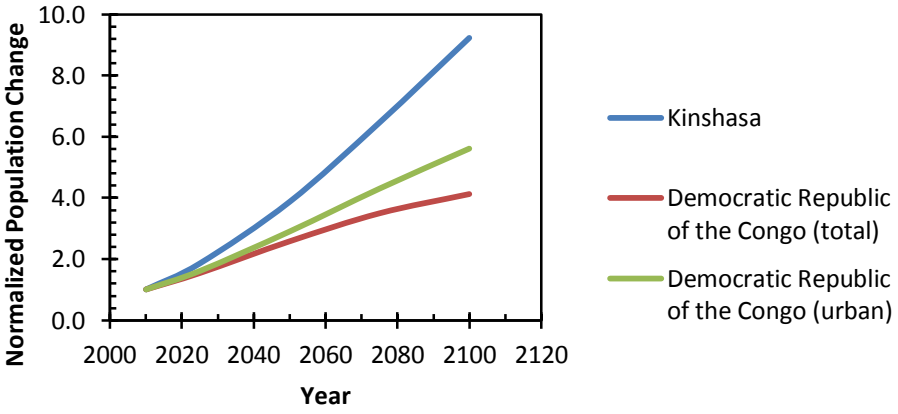
26. Democratic Republic of the Congo, Kinshasa



Predicted urban growth for large urban areas in the Democratic Republic of the Congo

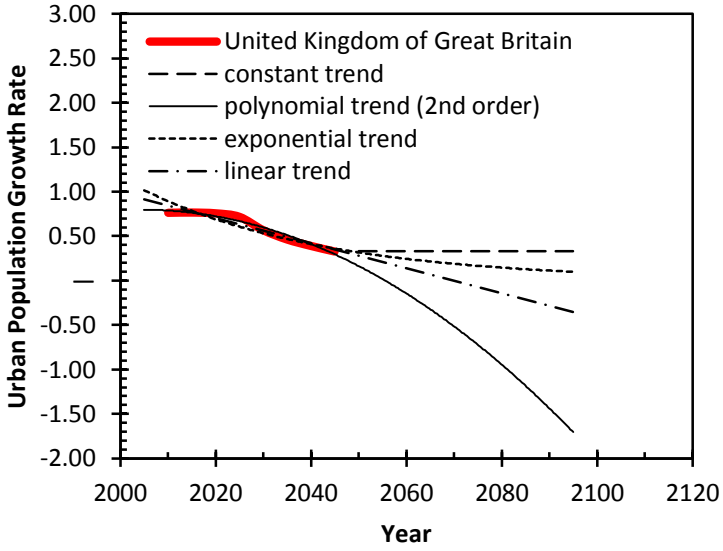
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	16,762,000	35,000,361		
Exponential			58,424,142	83,493,793
Polynomial			55,083,825	65,977,741
Linear			54,509,930	63,047,047
Constant			65,316,864	121,892,819



Population change compared to national average of large urban areas

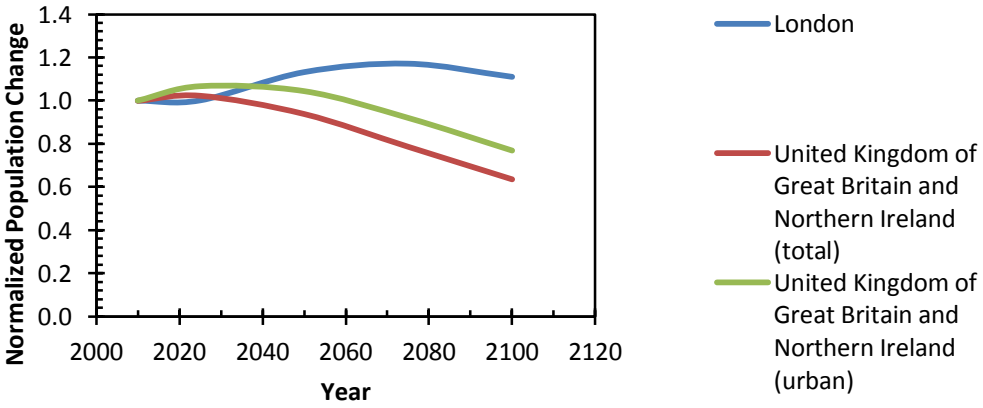
27. United Kingdom of Great Britain, London



Predicted urban growth for large urban areas in the United Kingdom of Great Britain and Northern Ireland

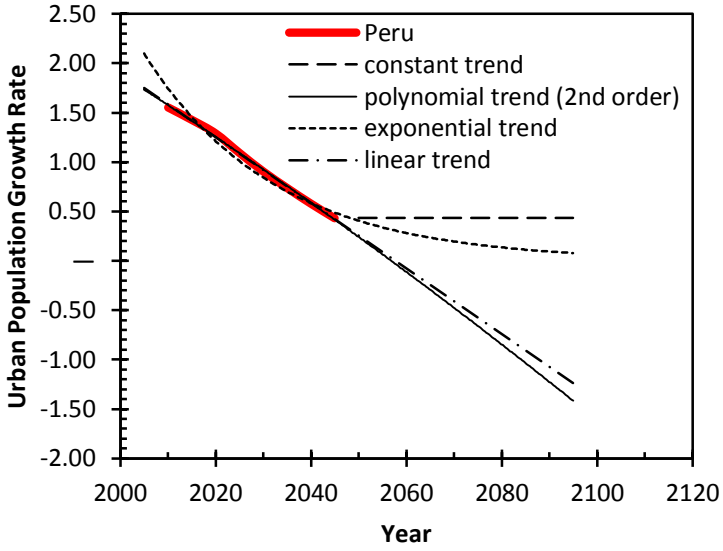
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,618,000	9,749,547		
Exponential			10,374,451	10,717,284
Polynomial			9,364,674	6,924,324
Linear			10,089,105	9,560,249
Constant			10,587,632	11,497,760



Population change compared to national average of large urban areas

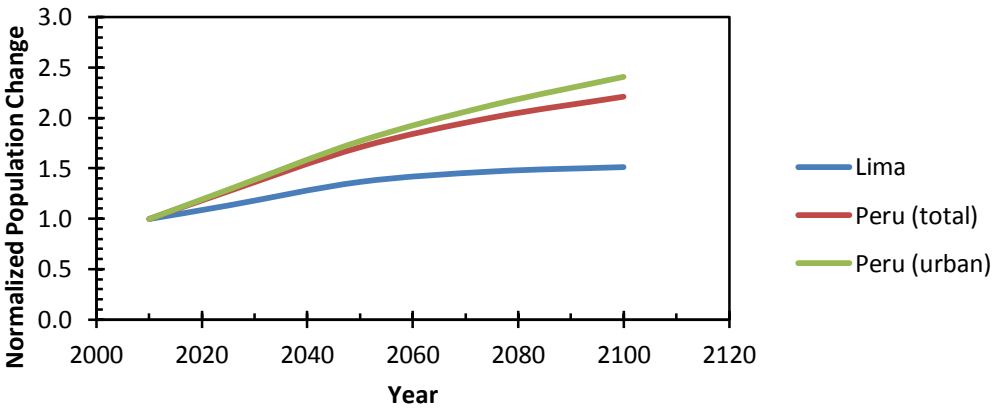
28. Peru, Lima



Predicted urban growth for large urban areas in Peru

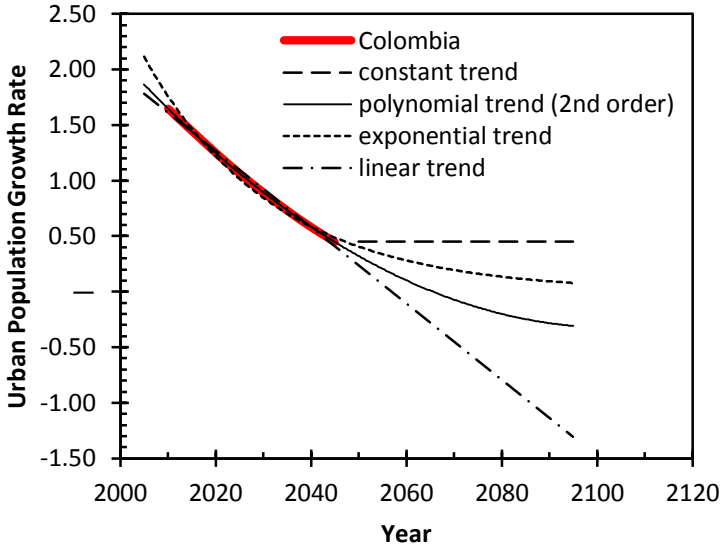
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,600,000	11,571,387		
Exponential			12,444,426	12,813,713
Polynomial			11,240,665	8,659,713
Linear			11,354,322	9,045,304
Constant			12,888,287	14,355,059



Population change compared to national average of large urban areas

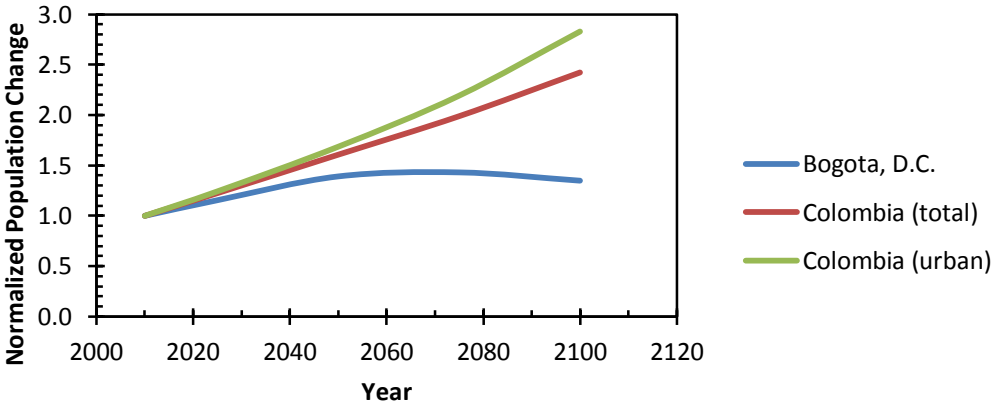
29. Colombia, Bogota, D.C.



Predicted urban growth for large urban areas in Colombia

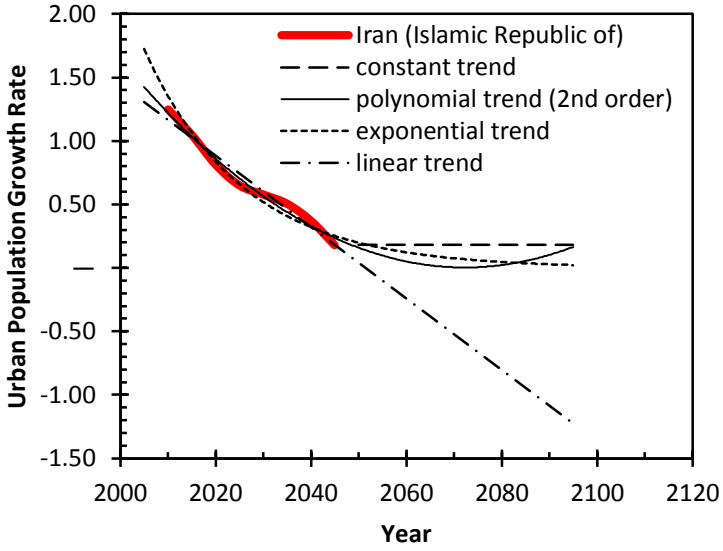
- Best fit of extrapolation method for urban population growth rate: polynomial

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,600,000	11,555,257		
Exponential			12,424,759	12,790,593
Polynomial			11,886,019	11,204,123
Linear			11,248,703	8,826,636
Constant			12,924,619	14,456,257



Population change compared to national average of large urban areas

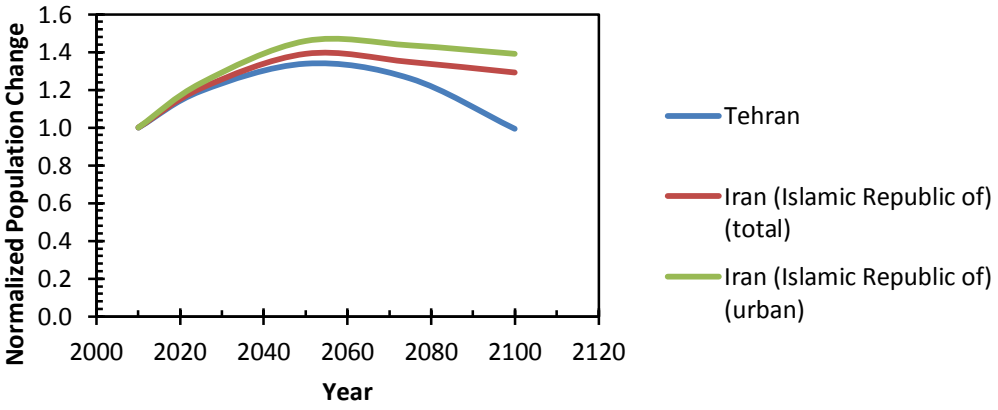
30. Iran (Islamic Republic of), Tehran



Predicted urban growth for large urban areas in Iran

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,814,000	10,998,668		
Exponential			11,360,038	11,470,932
Polynomial			11,181,934	11,379,747
Linear			10,356,183	8,171,322
Constant			11,506,916	12,038,651

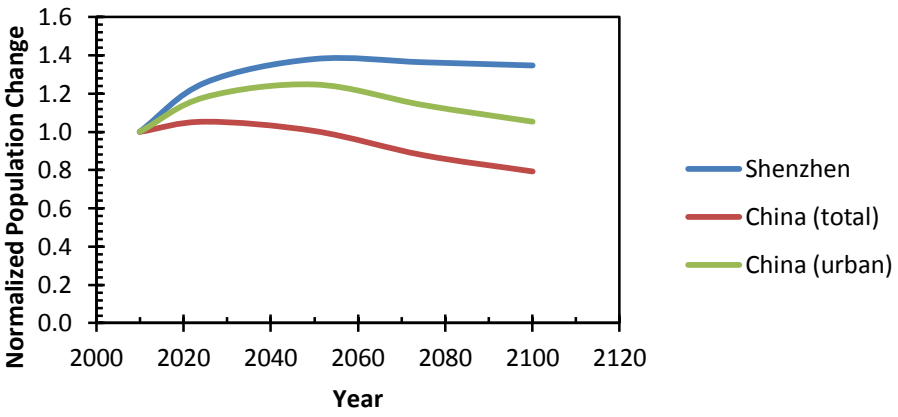


Population change compared to national average of large urban areas

31. China, Shenzhen

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	10,196,000	11,196,456		
Exponential			N/A	N/A
Polynomial			12,493,749	27,049,131
Linear			7,443,227	2,925,807
Constant			11,058,952	10,923,137

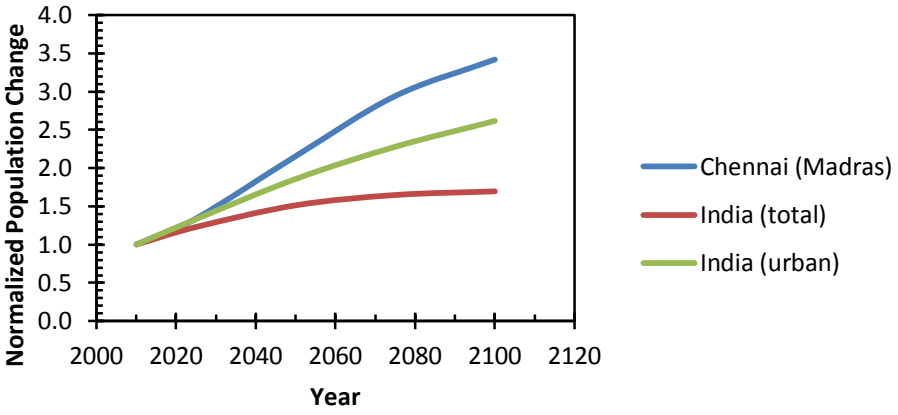


Population change compared to national average of large urban areas

32. India, Chennai (Madras)

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	10,129,000	16,278,430		
Exponential			22,857,090	29,240,356
Polynomial			19,486,360	14,607,118
Linear			22,212,912	25,812,847
Constant			23,870,137	35,002,358

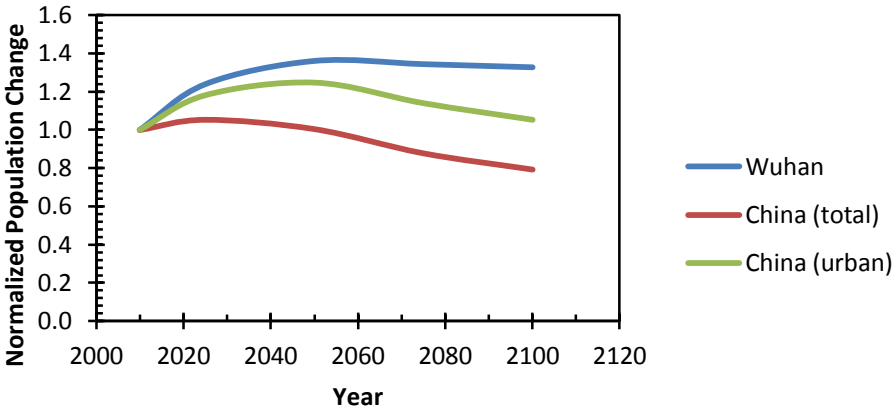


Population change compared to national average of large urban areas

33. China, Wuhan

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,339,000	10,255,365		
Exponential			N/A	N/A
Polynomial			11,443,618	24,775,582
Linear			6,817,605	2,679,886
Constant			10,129,419	10,005,019

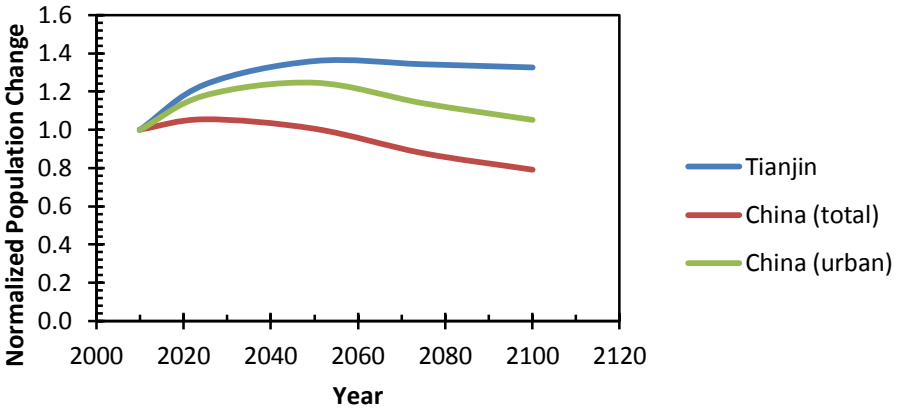


Population change compared to national average of large urban areas

34. China, Tianjin

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,243,000	10,149,945		
Exponential			N/A	N/A
Polynomial			11,325,983	24,520,902
Linear			6,747,524	2,652,338
Constant			10,025,294	9,902,173

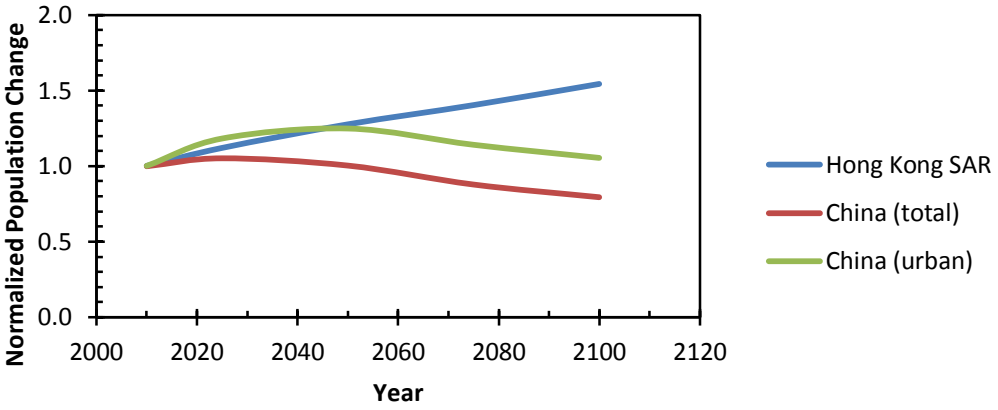


Population change compared to national average of large urban areas

35. China, Hong Kong SAR

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,305,000	9,466,652		
Exponential			N/A	N/A
Polynomial			10,563,519	22,870,158
Linear			9,462,134	8,272,114
Constant			10,414,728	11,457,754

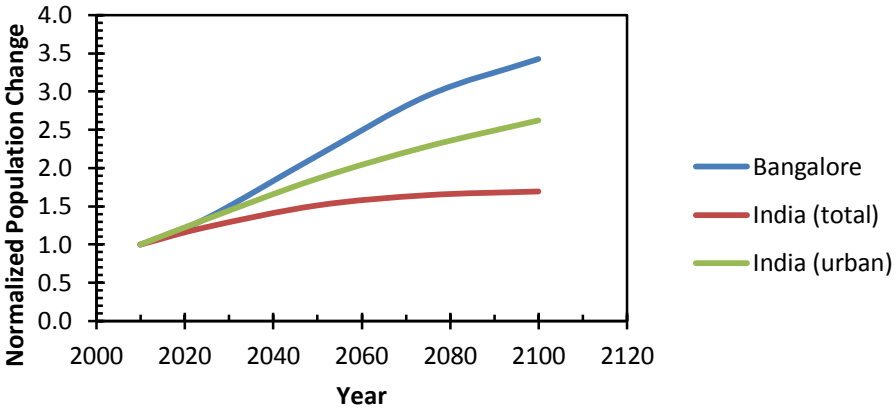


Population change compared to national average of large urban areas

36. India, Bangalore

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,719,000	15,619,514		
Exponential			21,931,885	28,056,770
Polynomial			18,697,595	14,015,853
Linear			21,313,782	24,767,999
Constant			22,903,925	33,585,538

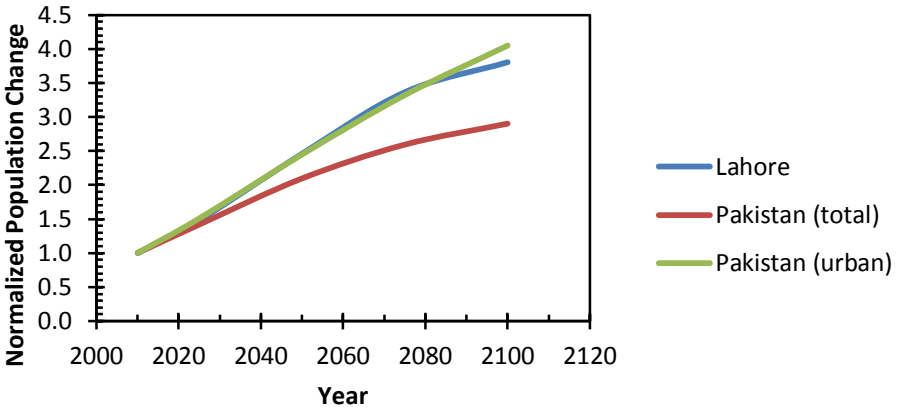


Population change compared to national average of large urban areas

37. Pakistan, Lahore

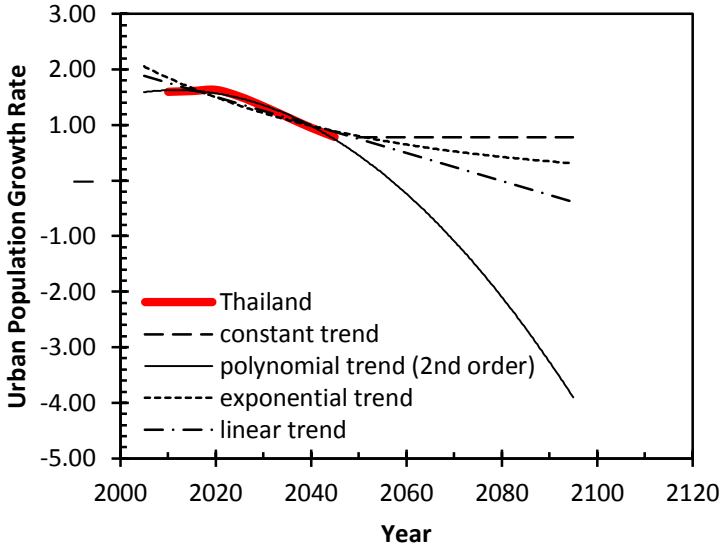
Predicted urban growth for large urban areas in Pakistan - refer to 12. Pakistan, Karachi

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	10,512,000	17,449,007		
Exponential			24,771,942	31,680,023
Polynomial			20,214,072	13,068,860
Linear			23,877,613	27,005,610
Constant			26,077,208	38,971,889



Population change compared to national average of large urban areas

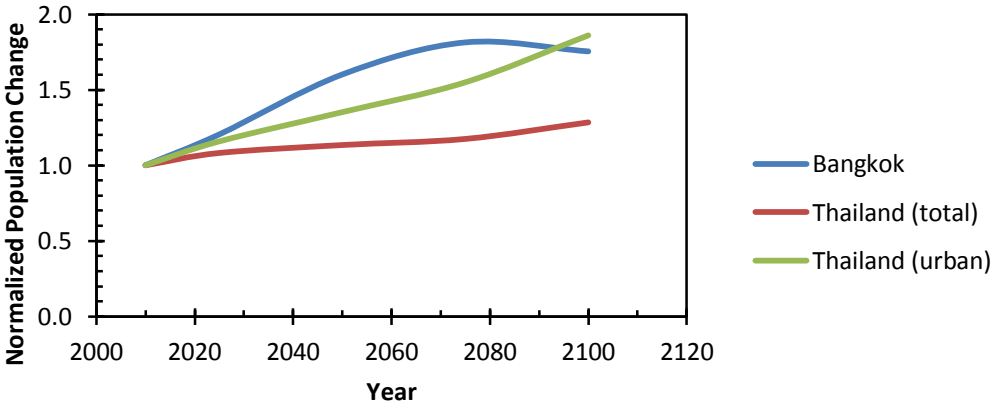
38. Thailand, Bangkok



Predicted urban growth for large urban areas in Thailand

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,332,000	11,079,598		
Exponential			13,047,967	14,377,186
Polynomial			10,335,611	5,210,439
Linear			12,549,462	12,138,056
Constant			13,471,345	16,379,397

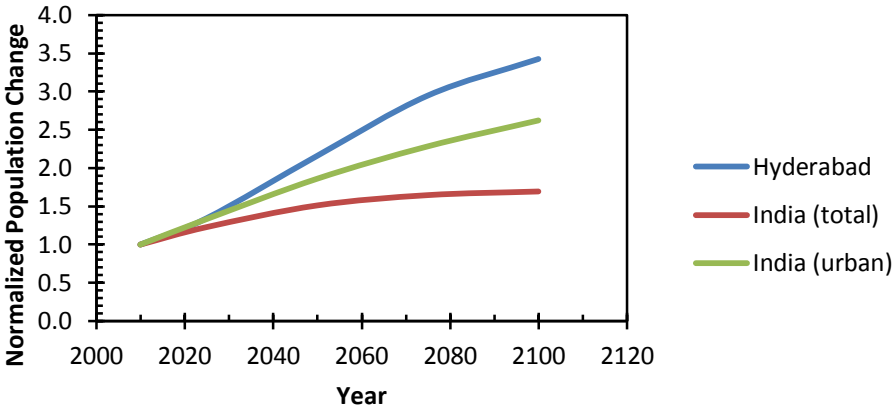


Population change compared to national average of large urban areas

39. India, Hyderabad

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	9,092,000	14,611,856		
Exponential			20,516,997	26,246,749
Polynomial			17,491,360	13,111,651
Linear			19,938,770	23,170,146
Constant			21,426,329	31,418,841

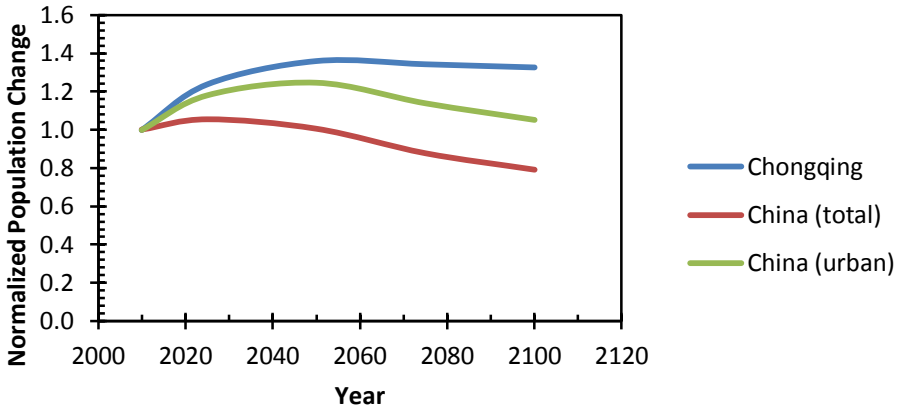


Population change compared to national average of large urban areas

40. China, Chongqing

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,275,000	9,086,963		
Exponential			N/A	N/A
Polynomial			10,139,837	21,952,879
Linear			6,040,870	2,374,564
Constant			8,975,366	8,865,139

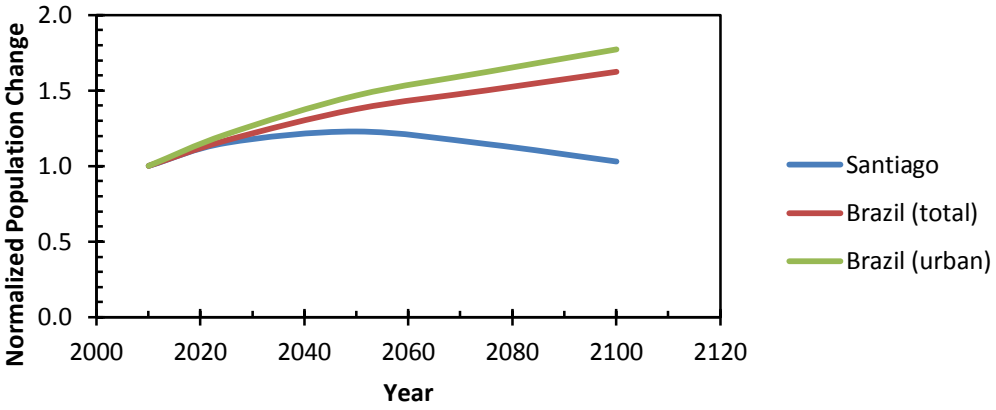


Population change compared to national average of large urban areas

41. Brazil, Santiago

Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	7,033,467	7,491,949		
Exponential			N/A	N/A
Polynomial			6,984,995	6,276,284
Linear			6,474,356	4,520,418
Constant			7,458,638	7,425,474

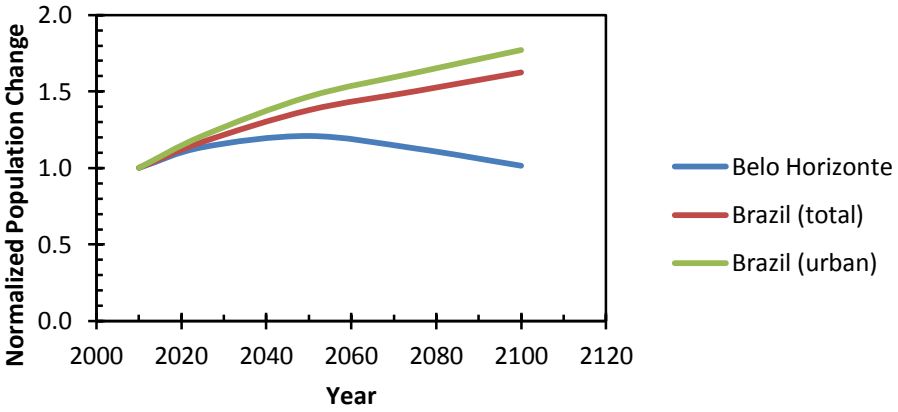


Population change compared to national average of large urban areas

42. Brazil, Belo Horizonte

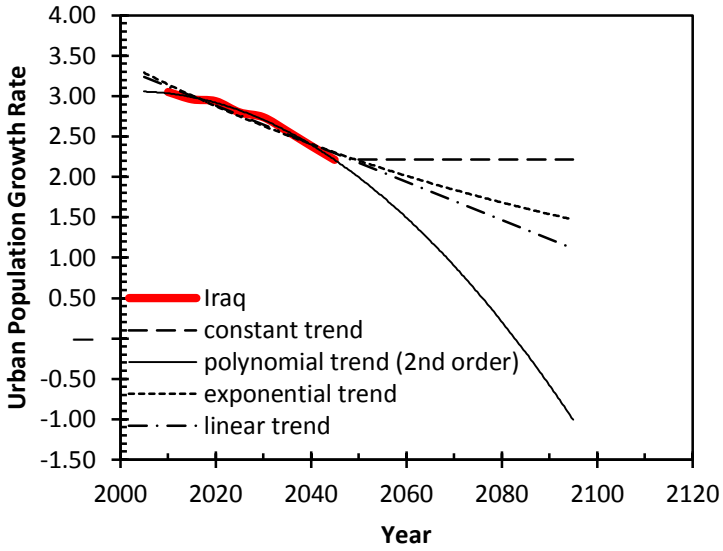
Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,748,000	7,187,873		
Exponential			N/A	N/A
Polynomial			6,701,495	6,021,548
Linear			6,211,581	4,336,947
Constant			7,155,914	7,124,097



Population change compared to national average of large urban areas

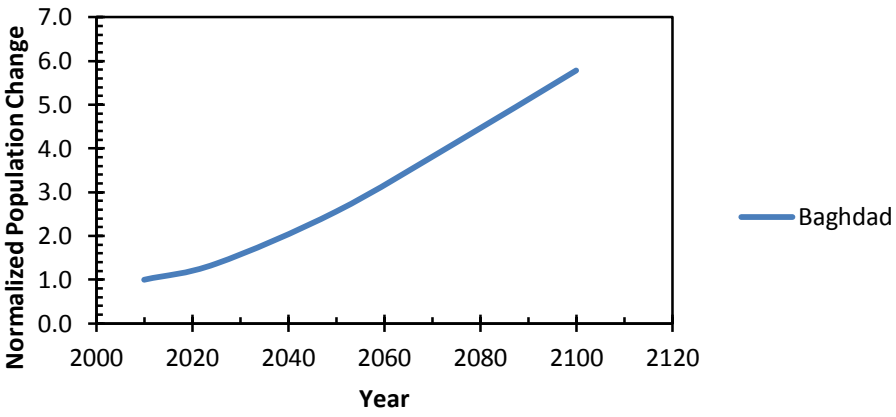
43. Iraq, Baghdad



Predicted urban growth for large urban areas in Iraq

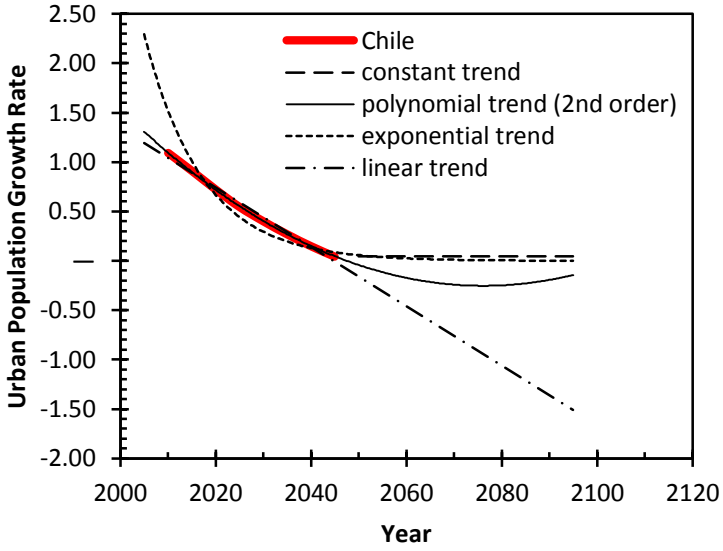
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,060,000	15,087,672		
Exponential			24,855,576	37,085,353
Polynomial			21,736,457	20,686,345
Linear			24,387,723	34,103,466
Constant			26,066,427	45,034,024



Population change compared to national average of large urban areas

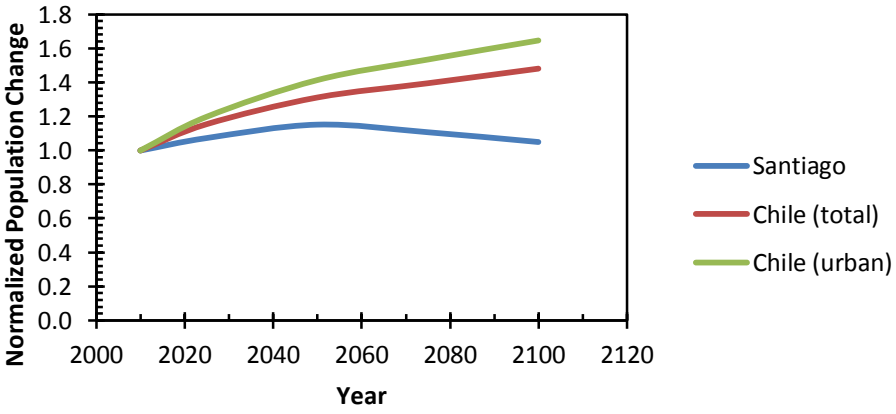
44. Chile, Santiago



Predicted urban growth for large urban areas in Chile

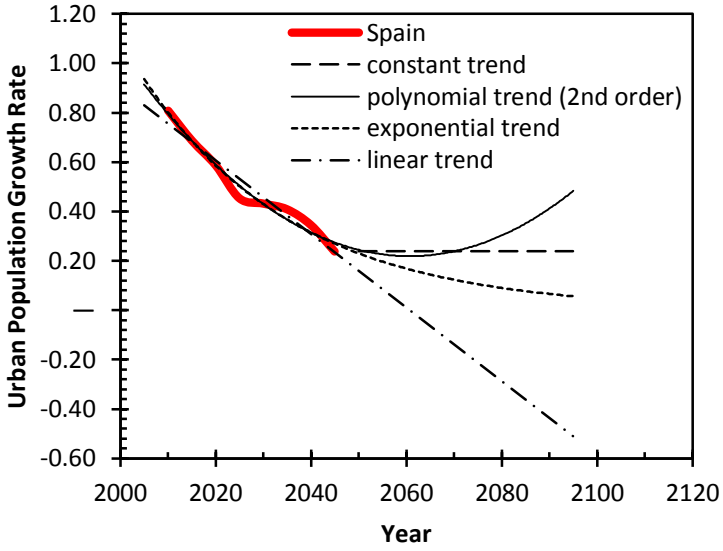
- Best fit of extrapolation method for urban population growth rate: polynomial

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,310,000	6,771,630		
Exponential			6,821,739	6,828,201
Polynomial			6,510,546	6,172,802
Linear			6,036,840	4,454,516
Constant			6,848,762	6,926,771



Population change compared to national average of large urban areas

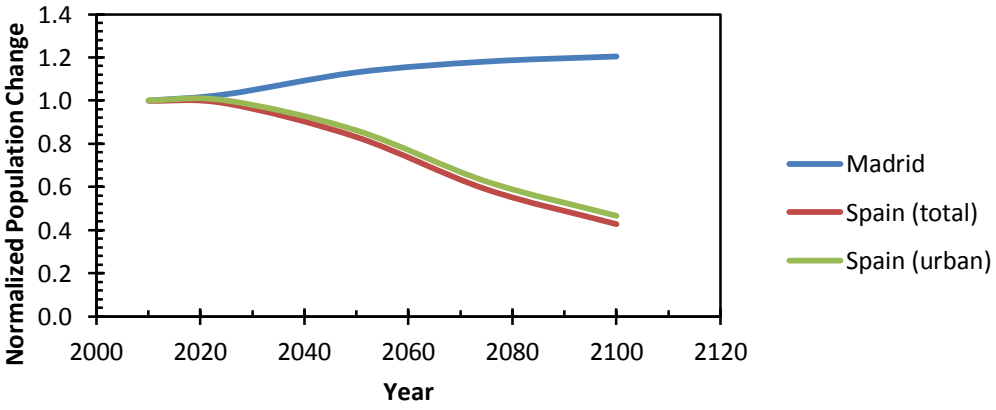
45. Spain, Madrid



Predicted urban growth for large urban areas in Spain

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,935,000	6,518,515		
Exponential			6,805,511	6,941,314
Polynomial			6,904,387	7,558,651
Linear			6,537,493	5,973,413
Constant			6,918,477	7,342,981

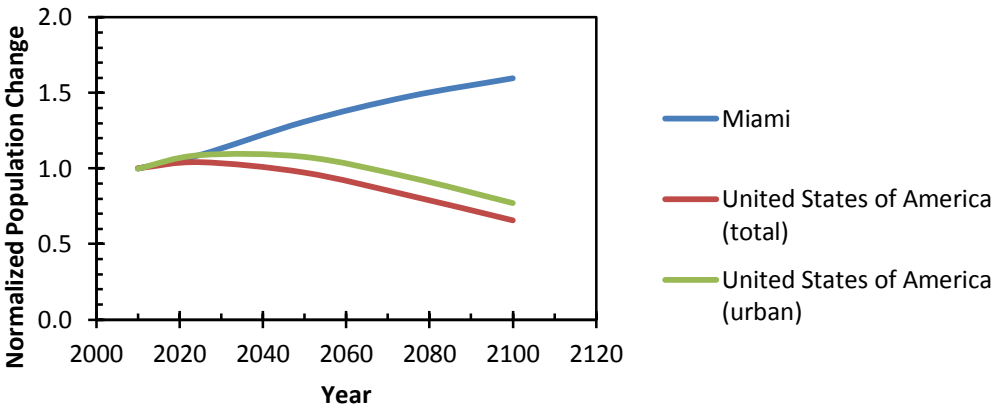


Population change compared to national average of large urban areas

46. United States of America, Miami

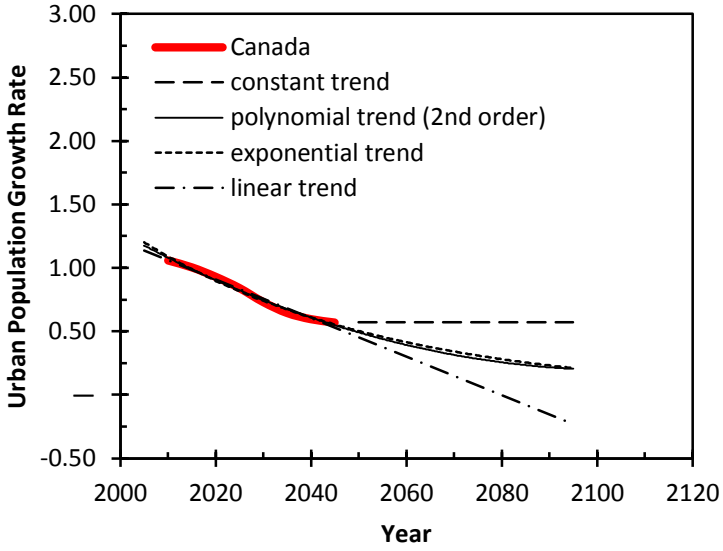
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,272,000	7,531,004		
Exponential			8,490,288	9,180,399
Polynomial			8,727,570	10,460,344
Linear			8,268,382	8,286,176
Constant			8,817,456	10,323,661



Population change compared to national average of large urban areas

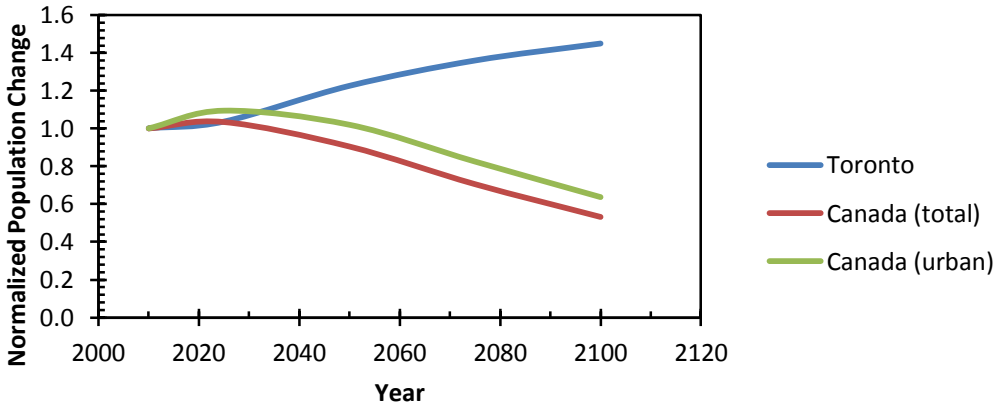
47. Canada, Toronto



Predicted urban growth for large urban areas in Canada

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,946,000	7,038,547		
Exponential			7,812,436	8,331,657
Polynomial			7,774,113	8,252,510
Linear			7,590,463	7,444,364
Constant			8,114,681	9,355,348

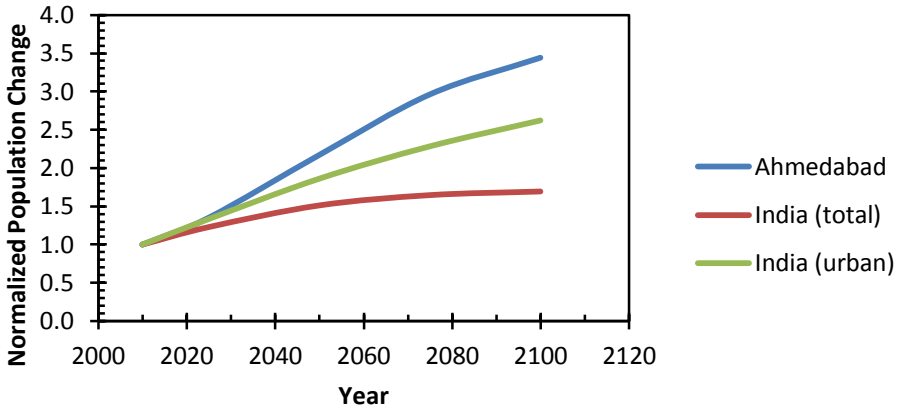


Population change compared to national average of large urban areas

48. India, Ahmedabad

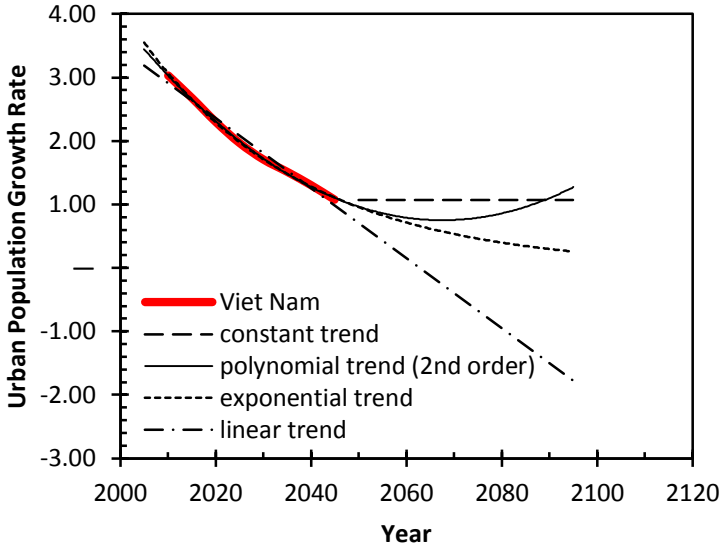
Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	7,735,000	12,431,006		
Exponential			17,454,793	22,329,367
Polynomial			14,880,738	11,154,710
Linear			16,962,867	19,711,953
Constant			18,228,404	26,729,513



Population change compared to national average of large urban areas

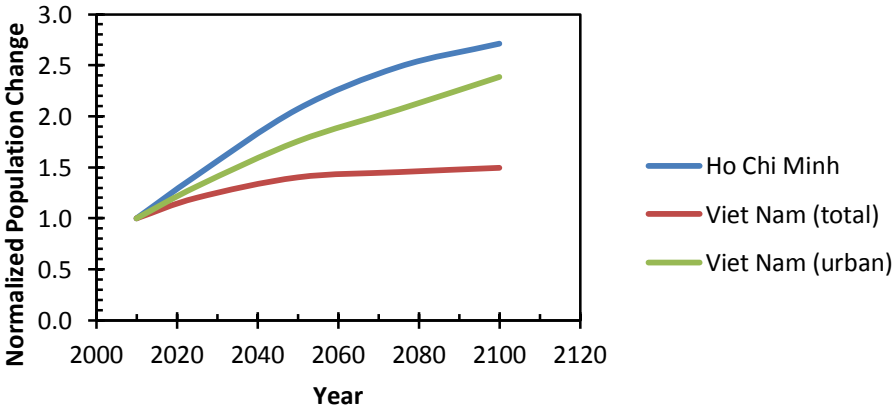
49. Viet Nam, Ho Chi Minh



Predicted urban growth for large urban areas in Viet Nam

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,149,000	11,860,301		
Exponential			14,221,916	15,526,317
Polynomial			14,564,980	18,660,081
Linear			12,322,259	9,052,902
Constant			15,489,117	20,228,217

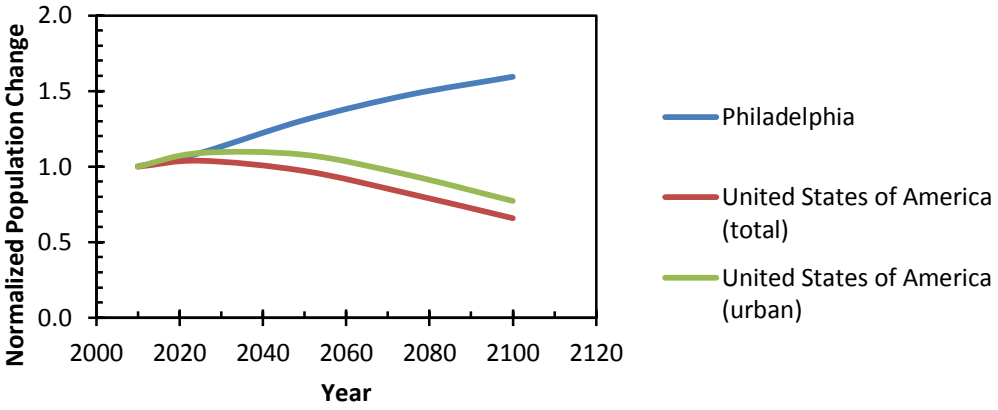


Population change compared to national average of large urban areas

50. United States of America, Philadelphia

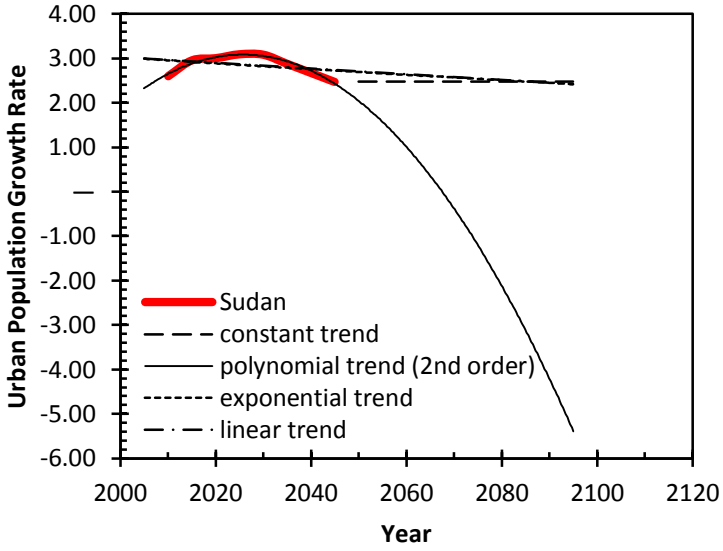
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,133,000	7,364,102		
Exponential			8,302,126	8,976,943
Polynomial			8,534,150	10,228,522
Linear			8,085,138	8,102,538
Constant			8,622,044	10,094,868



Population change compared to national average of large urban areas

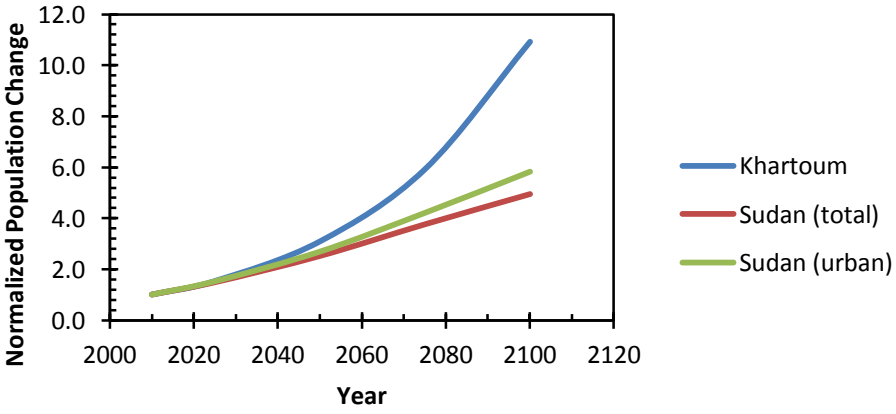
51. Sudan, Khartoum



Predicted urban growth for large urban areas in Sudan

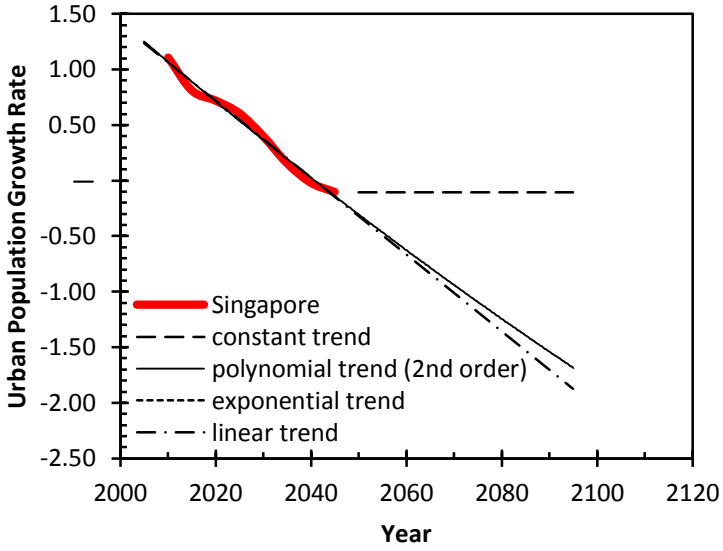
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	7,937,000	15,995,255		
Exponential			30,617,935	56,506,947
Polynomial			20,093,550	8,867,409
Linear			30,680,519	56,594,472
Constant			29,465,757	54,280,523



Population change compared to national average of large urban areas

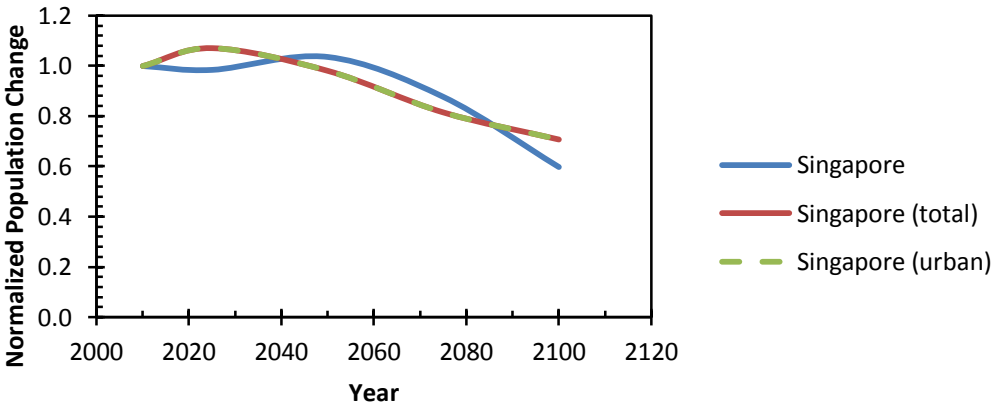
52. Singapore, Singapore



Predicted urban growth for large urban areas in Singapore

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,104,000	5,371,543		
Exponential			N/A	N/A
Polynomial			4,592,724	3,235,454
Linear			4,544,393	3,090,387
Constant			5,232,190	5,096,451

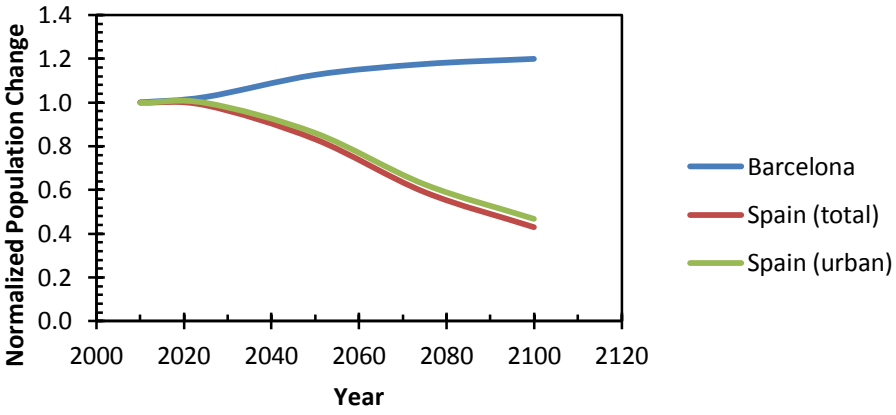


Population change compared to national average of large urban areas

53. Spain, Barcelona

Predicted urban growth for large urban areas in Spain - refer to 45. Spain, MADRID

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,183,000	5,692,580		
Exponential			5,943,212	6,061,808
Polynomial			6,029,560	6,600,925
Linear			5,709,153	5,216,546
Constant			6,041,865	6,412,581

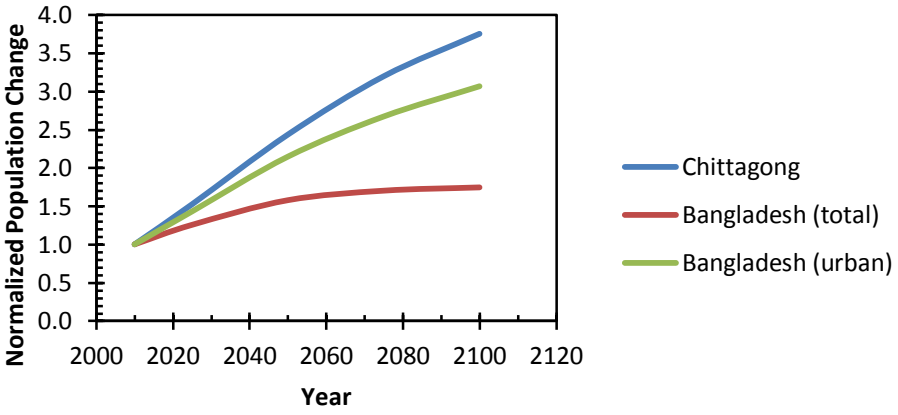


Population change compared to national average of large urban areas

54. Bangladesh, Chittagong

Predicted urban growth for large urban areas in Bangladesh - refer to 10. Dhaka, Bangladesh

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	7,639,000	12,211,707		
Exponential			16,037,552	18,824,191
Polynomial			13,773,327	9,982,606
Linear			14,730,136	13,372,532
Constant			17,336,410	24,611,719

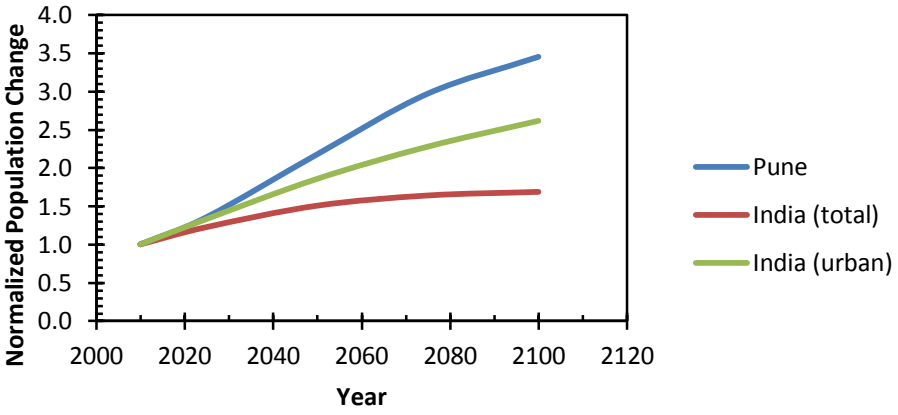


Population change compared to national average of large urban areas

55. India, Pune

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,797,000	10,923,535		
Exponential			15,338,103	19,621,552
Polynomial			13,076,196	9,802,012
Linear			14,905,831	17,321,544
Constant			16,017,901	23,488,106

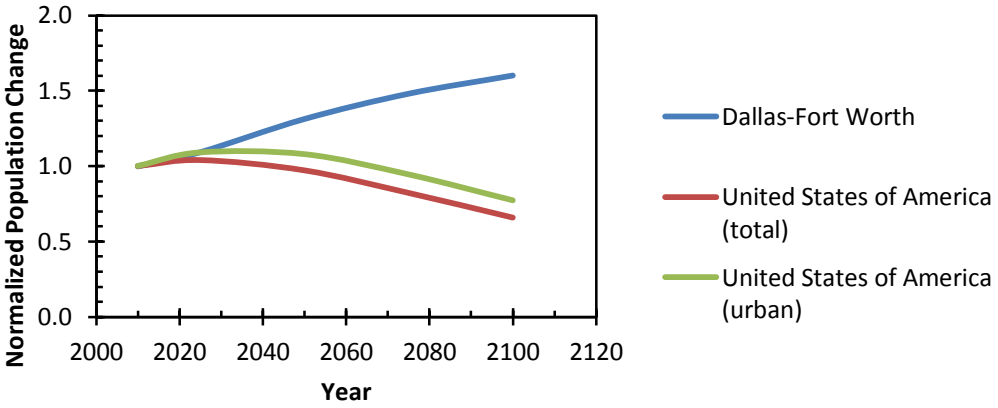


Population change compared to national average of large urban areas

56. United States of America, Dallas-Fort Worth

Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,419,000	6,506,778		
Exponential			7,335,598	7,931,853
Polynomial			7,540,610	9,037,724
Linear			7,143,872	7,159,246
Constant			7,618,271	8,919,630

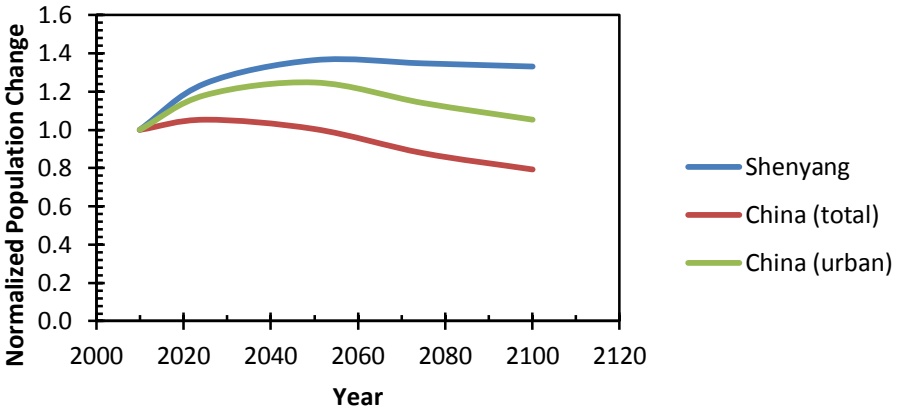


Population change compared to national average of large urban areas

57. China, Shenyang

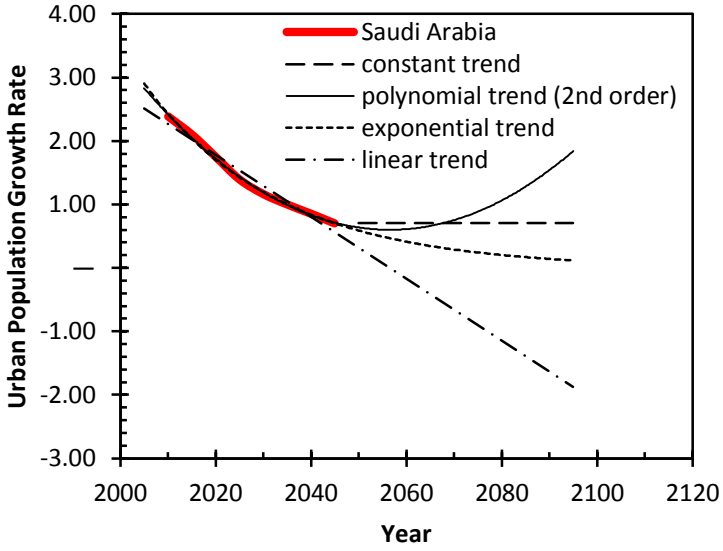
Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,156,000	6,760,042		
Exponential			N/A	N/A
Polynomial			7,543,303	16,331,351
Linear			4,493,969	1,766,504
Constant			6,677,021	6,595,021



Population change compared to national average of large urban areas

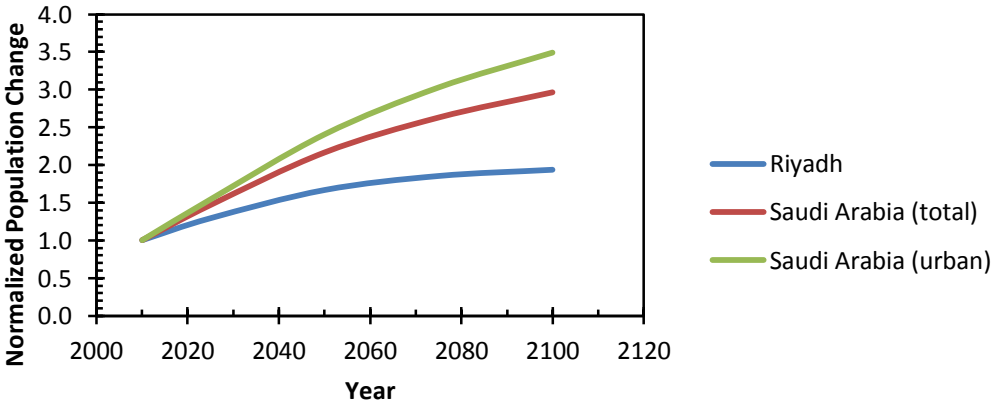
58. Saudi Arabia, Riyadh



Predicted urban growth for large urban areas in Saudi Arabia

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,275,000	8,091,763		
Exponential			8,997,992	9,400,718
Polynomial			9,520,343	13,219,386
Linear			7,762,812	5,479,598
Constant			9,638,489	11,480,869

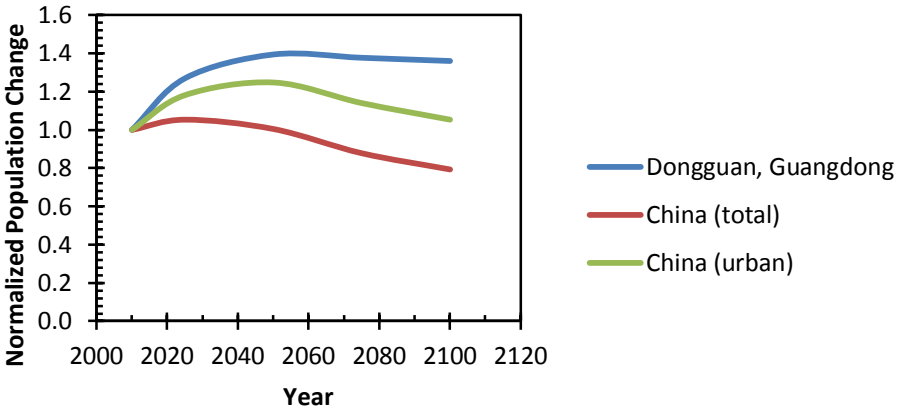


Population change compared to national average of large urban areas

59. China, Dongguan, Guangdong

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,157,000	6,761,140		
Exponential			N/A	N/A
Polynomial			7,544,529	16,334,003
Linear			4,494,699	1,766,790
Constant			6,678,106	6,596,092

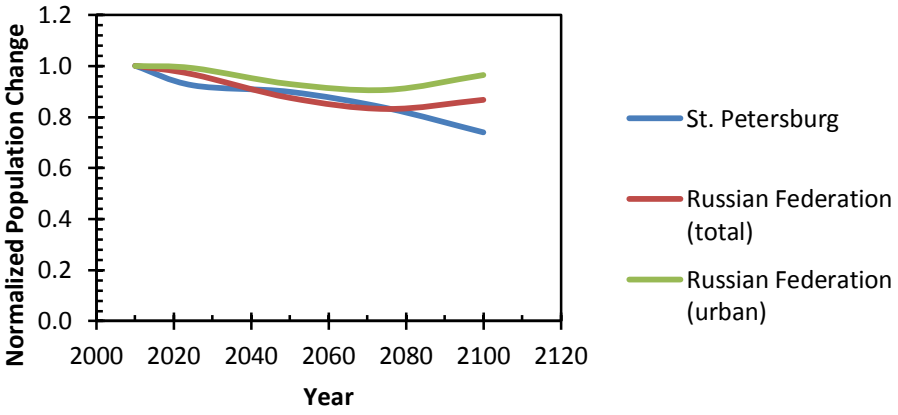


Population change compared to national average of large urban areas

60. Russian Federation, St. Petersburg

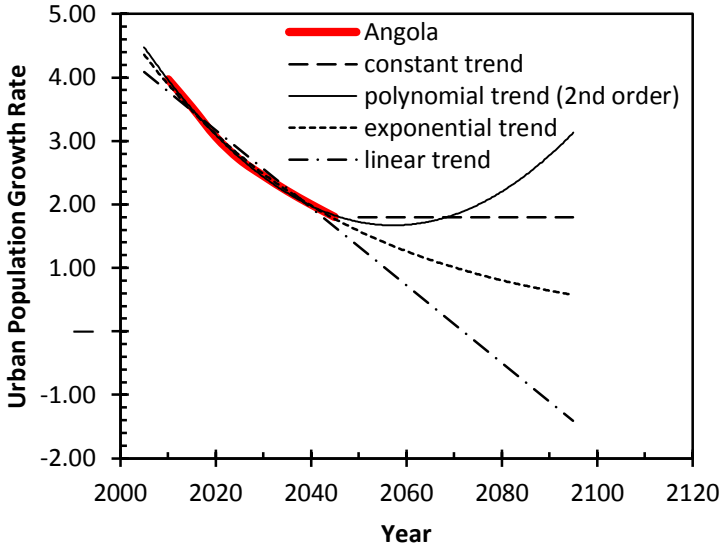
Predicted urban growth for large urban areas in the Russian Federation - refer to 17. Russian Federation, MOSKVA

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,476,000	4,352,370		
Exponential			N/A	N/A
Polynomial			4,311,838	4,719,854
Linear			4,044,257	3,582,537
Constant			4,182,020	4,018,338



Population change compared to national average of large urban areas

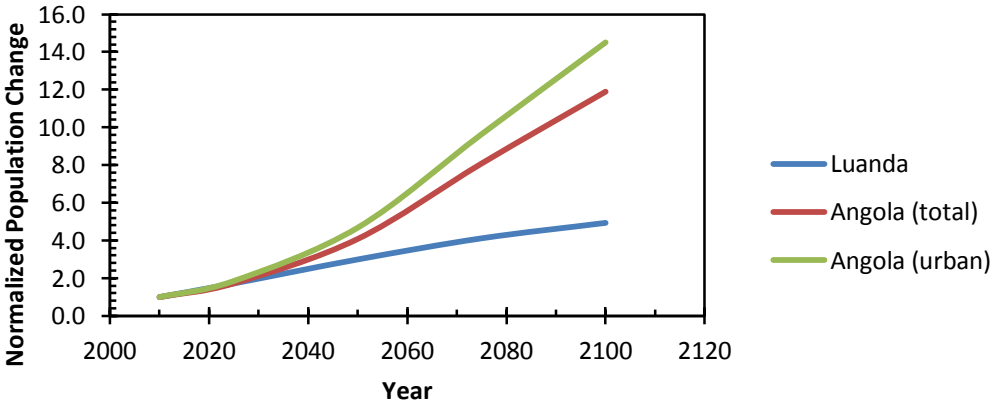
61. Angola, Luanda



Predicted urban growth for large urban areas in Angola

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	8,236,000	14,301,327		
Exponential			19,646,068	23,550,753
Polynomial			21,956,790	40,805,065
Linear			17,146,930	14,030,751
Constant			22,331,337	34,870,094

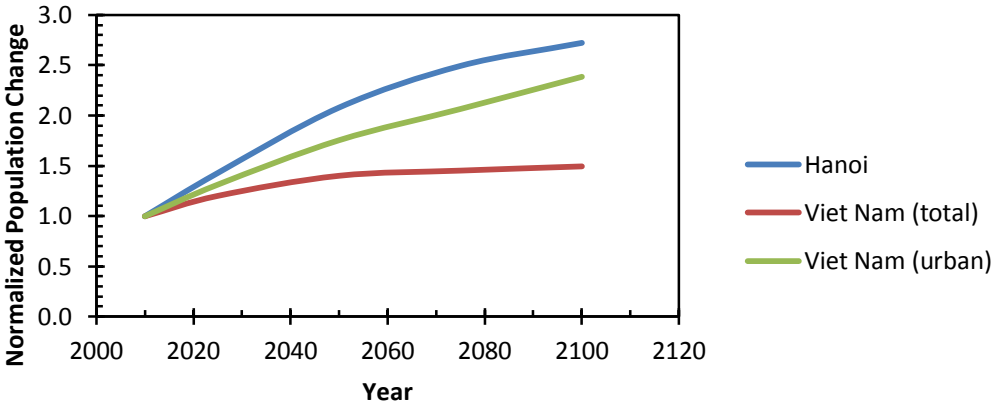


Population change compared to national average of large urban areas

62. Viet Nam, Hanoi

Predicted urban growth for large urban areas in Viet Nam - refer to 49. Viet Nam, Ho Chi Minh

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,754,000	9,829,976		
Exponential			11,787,314	12,868,419
Polynomial			12,071,650	15,465,724
Linear			10,212,853	7,503,166
Constant			12,837,587	16,765,417

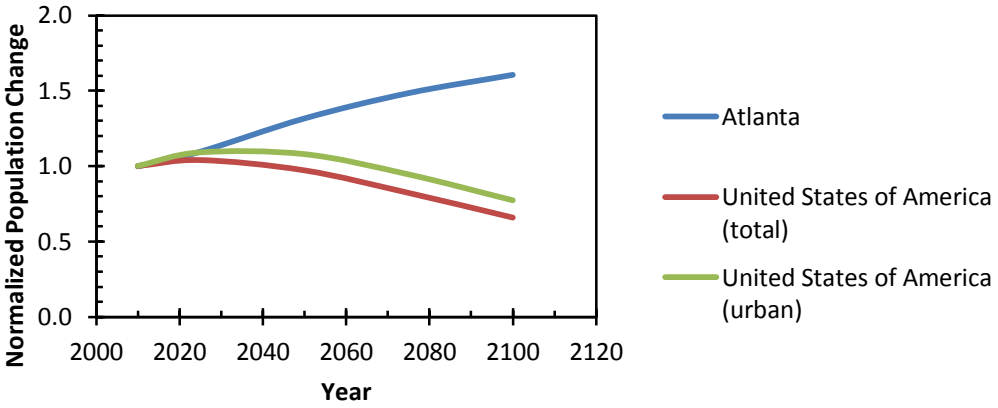


Population change compared to national average of large urban areas

63. United States of America, Atlanta

Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,151,000	6,184,981		
Exponential			6,972,811	7,539,579
Polynomial			7,167,684	8,590,758
Linear			6,790,567	6,805,181
Constant			7,241,505	8,478,504

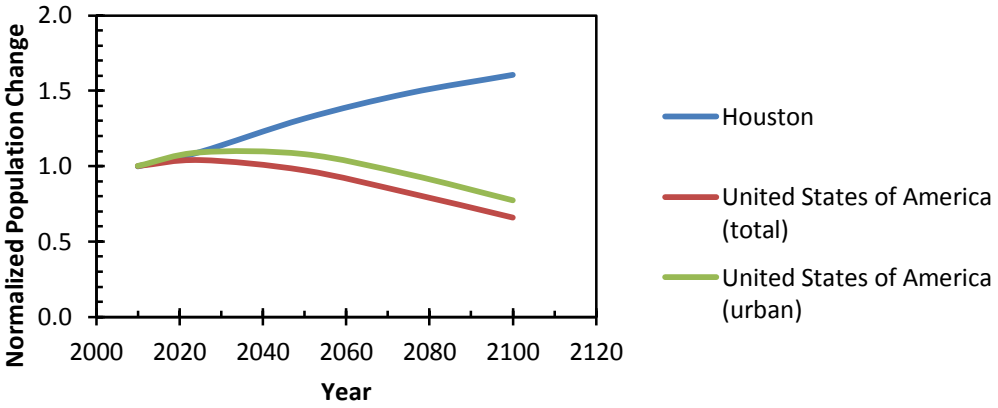


Population change compared to national average of large urban areas

64. United States of America, Houston

Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,049,000	6,062,506		
Exponential			6,834,736	7,390,280
Polynomial			7,025,750	8,420,644
Linear			6,656,100	6,670,425
Constant			7,098,108	8,310,613

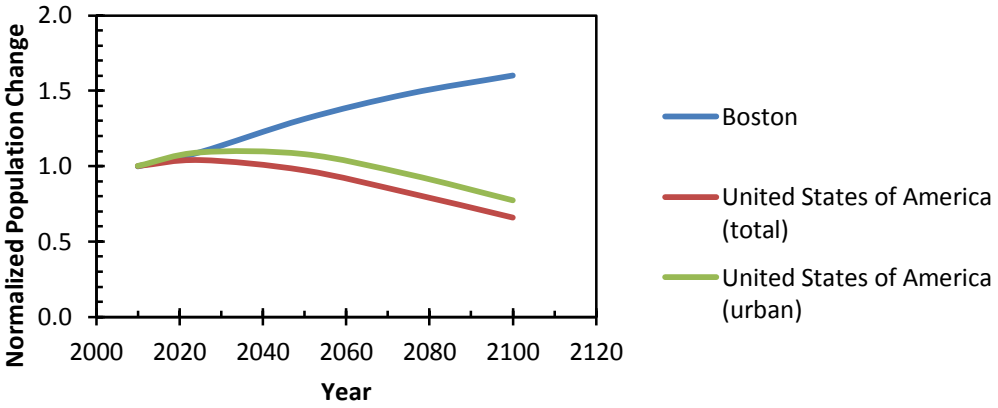


Population change compared to national average of large urban areas

65. United States of America, Boston

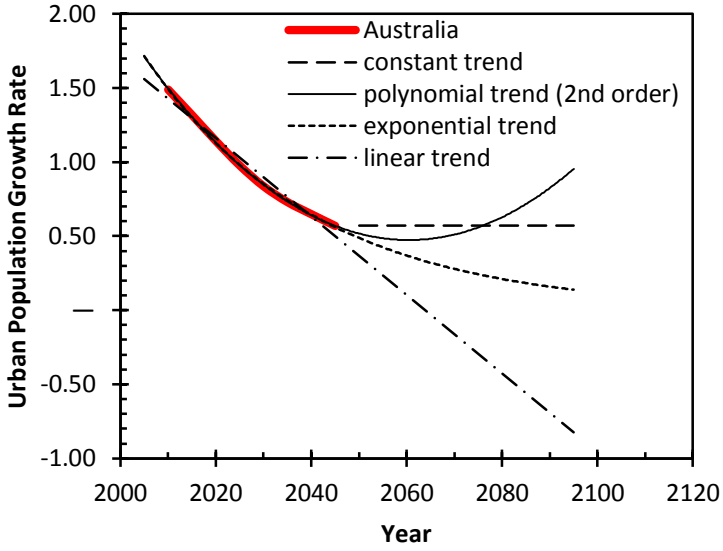
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,032,000	6,042,094		
Exponential			6,811,723	7,365,397
Polynomial			7,002,094	8,392,291
Linear			6,633,689	6,647,965
Constant			7,074,209	8,282,631



Population change compared to national average of large urban areas

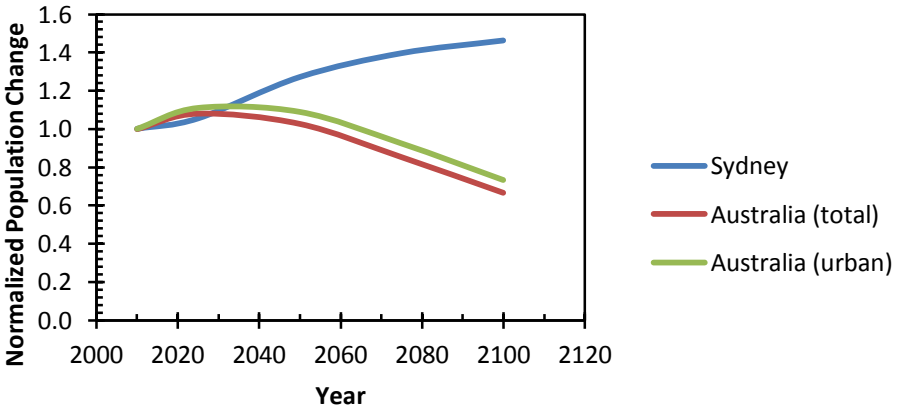
66. Australia, Sydney



Predicted urban growth for large urban areas in Australia

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,826,000	5,820,569		
Exponential			6,393,436	6,699,175
Polynomial			6,584,245	7,909,757
Linear			5,970,816	5,188,138
Constant			6,709,450	7,734,076

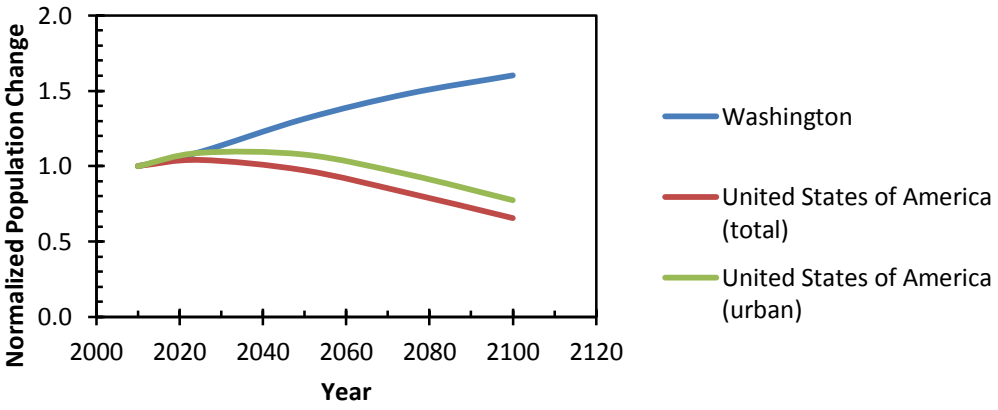


Population change compared to national average of large urban areas

67. United States of America, Washington

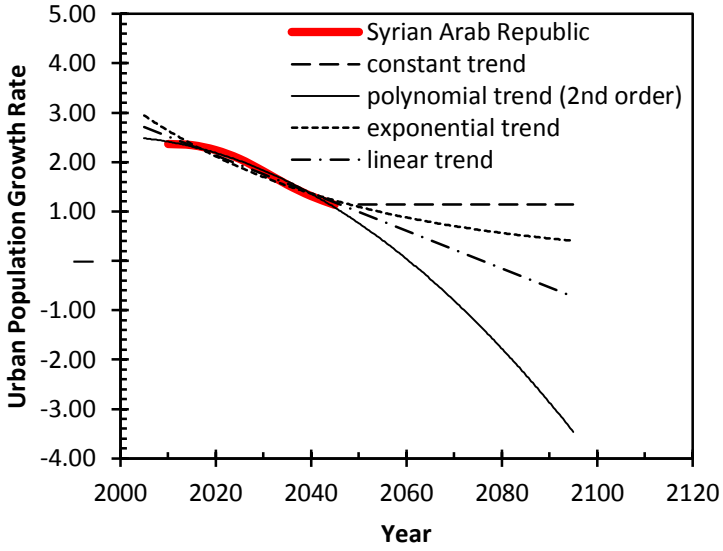
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,889,000	5,870,389		
Exponential			6,618,147	7,156,086
Polynomial			6,803,108	8,153,798
Linear			6,445,172	6,459,043
Constant			6,873,173	8,047,254



Population change compared to national average of large urban areas

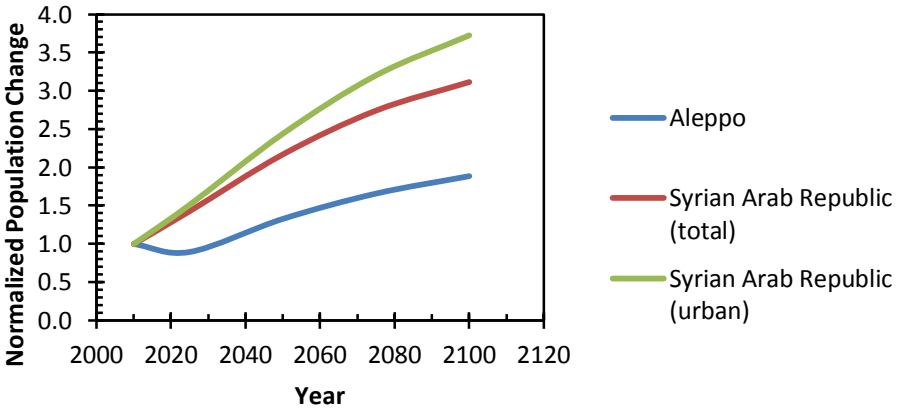
68. Syrian Arab Republic, Aleppo



Predicted urban growth for large urban areas in the Syrian Arab Republic

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	3,993,000	5,903,179		
Exponential			7,365,009	8,370,015
Polynomial			5,914,512	3,271,609
Linear			6,876,330	6,311,201
Constant			7,832,970	10,393,624

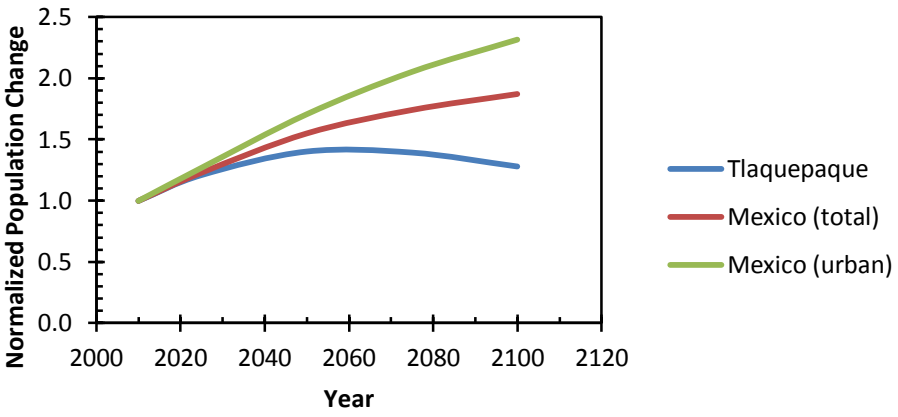


Population change compared to national average of large urban areas

69. Mexico, Tlaquepaque

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,368,384	6,216,670		
Exponential			6,505,240	6,601,495
Polynomial			6,178,198	5,677,576
Linear			5,826,768	4,407,518
Constant			6,684,524	7,187,588

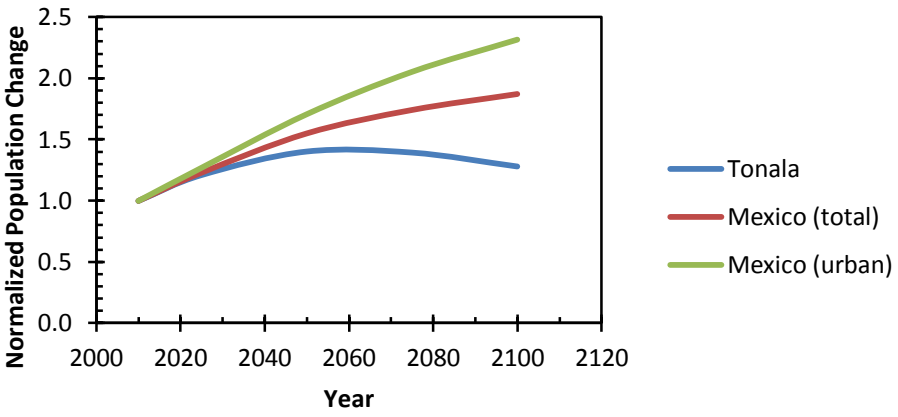


Population change compared to national average of large urban areas

70. Mexico, Tonala

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,368,384	6,216,670		
Exponential			6,505,240	6,601,495
Polynomial			6,178,198	5,677,576
Linear			5,826,768	4,407,518
Constant			6,684,524	7,187,588

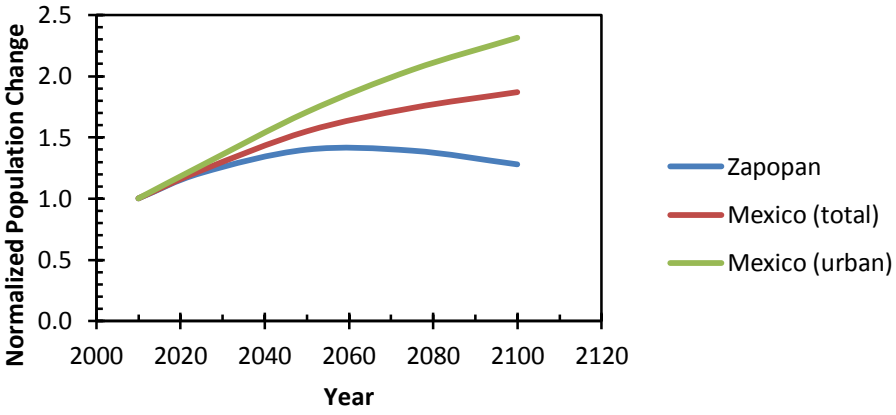


Population change compared to national average of large urban areas

71. Mexico, Zapopan

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,368,384	6,216,670		
Exponential			6,505,240	6,601,495
Polynomial			6,178,198	5,677,576
Linear			5,826,768	4,407,518
Constant			6,684,524	7,187,588

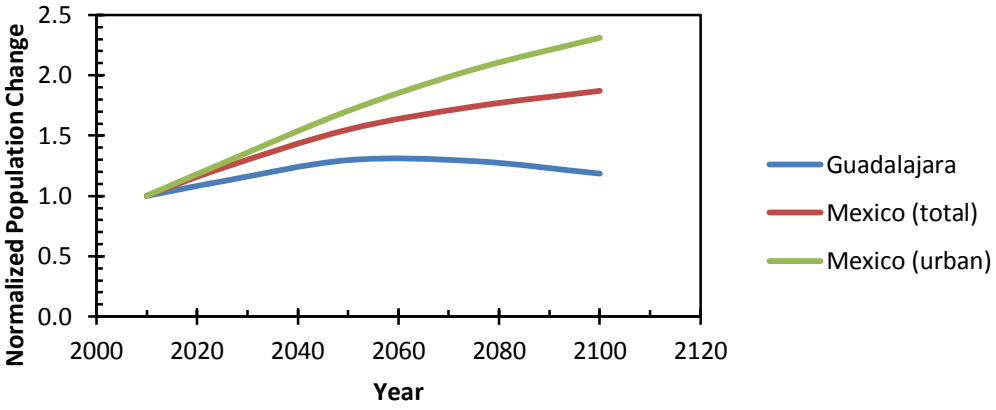


Population change compared to national average of large urban areas

72. Mexico, Guadalajara

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,973,000	5,758,809		
Exponential			6,026,126	6,115,292
Polynomial			5,723,171	5,259,420
Linear			5,397,624	4,082,902
Constant			6,192,205	6,658,218

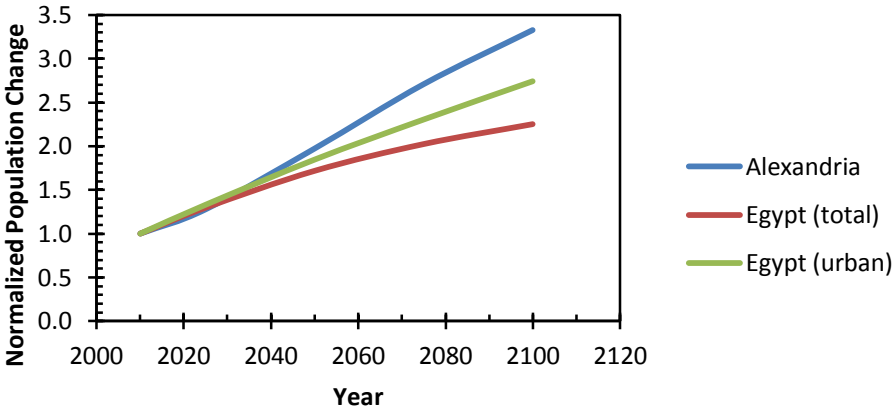


Population change compared to national average of large urban areas

73. Egypt, Alexandria

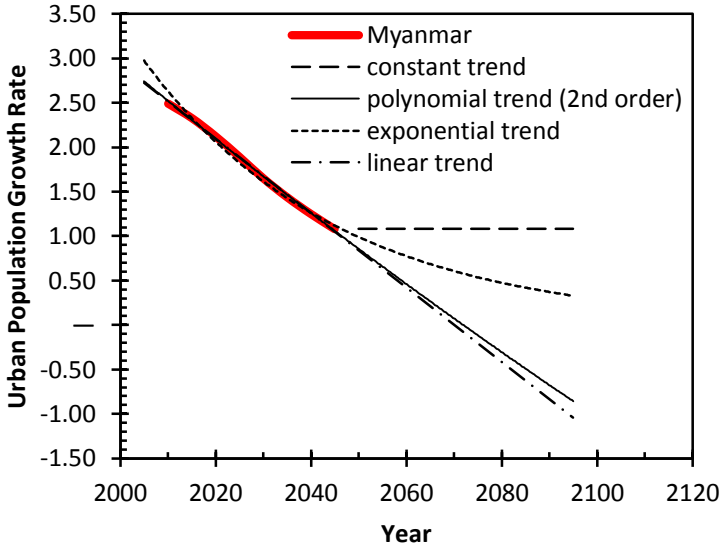
Predicted urban growth for large urban areas in Egypt - refer to 14. Egypt, CAIRO

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,652,000	8,729,875		
Exponential			12,130,098	15,651,370
Polynomial			9,662,741	5,761,812
Linear			11,985,830	14,725,675
Constant			12,349,934	17,471,141



Population change compared to national average of large urban areas

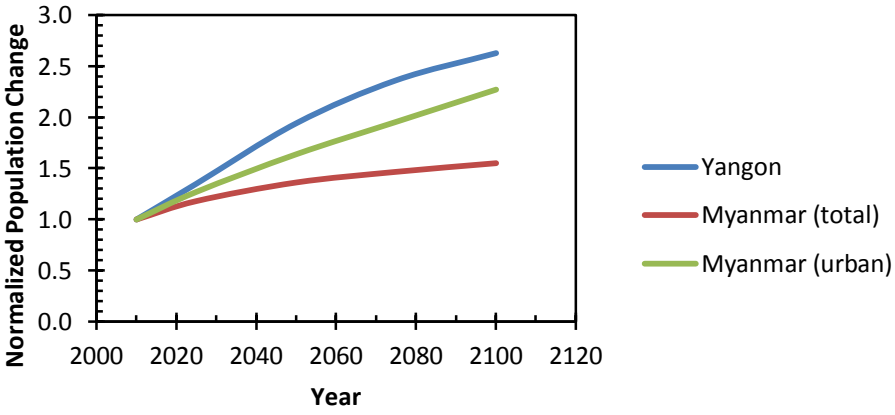
74. Myanmar, Yangon



Predicted urban growth for large urban areas in Myanmar

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,869,000	8,437,455		
Exponential			10,263,052	11,416,387
Polynomial			9,470,120	8,376,469
Linear			9,374,422	8,016,296
Constant			11,036,498	14,436,142

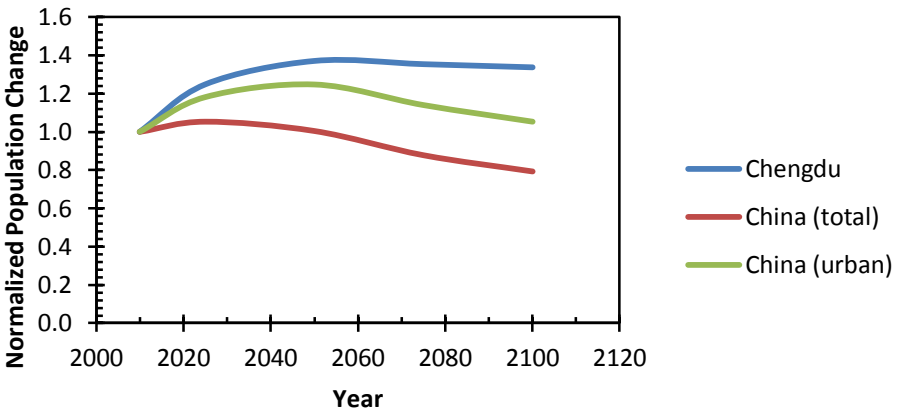


Population change compared to national average of large urban areas

75. China, Chengdu

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,320,000	5,842,011		
Exponential			N/A	N/A
Polynomial			6,518,904	14,113,513
Linear			3,883,677	1,526,608
Constant			5,770,265	5,699,400

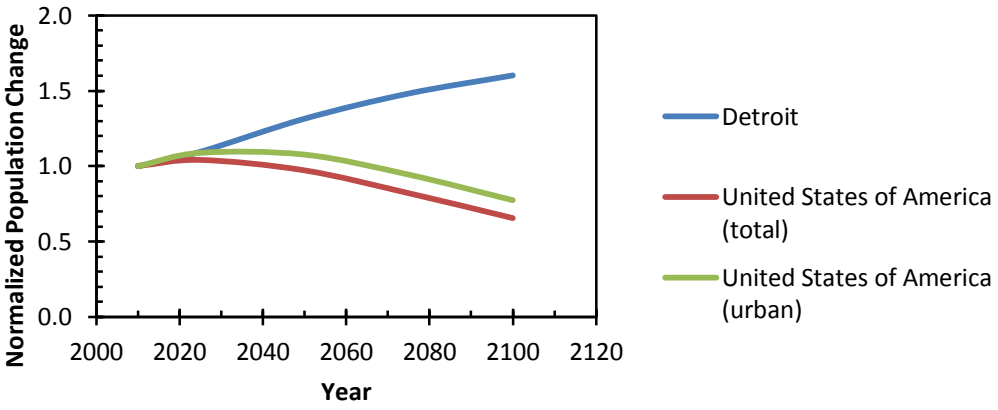


Population change compared to national average of large urban areas

76. United States of America, Detroit

Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,606,000	5,530,581		
Exponential			6,235,055	6,741,856
Polynomial			6,409,310	7,681,815
Linear			6,072,093	6,085,161
Constant			6,475,319	7,581,438

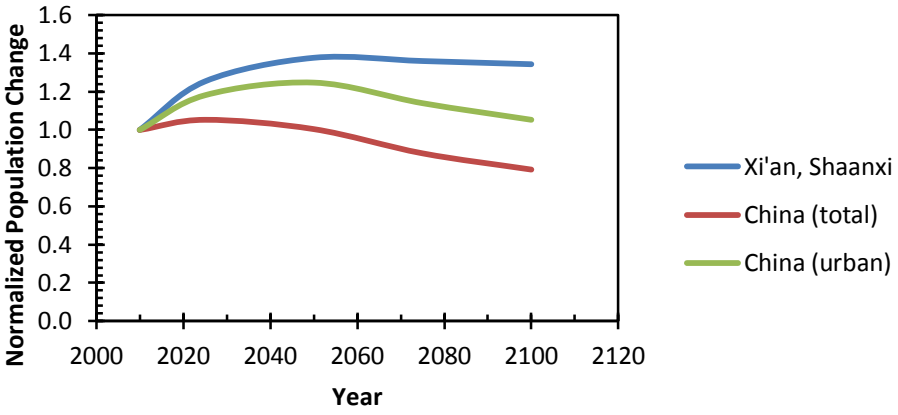


Population change compared to national average of large urban areas

77. China, Xi'an, Shaanxi

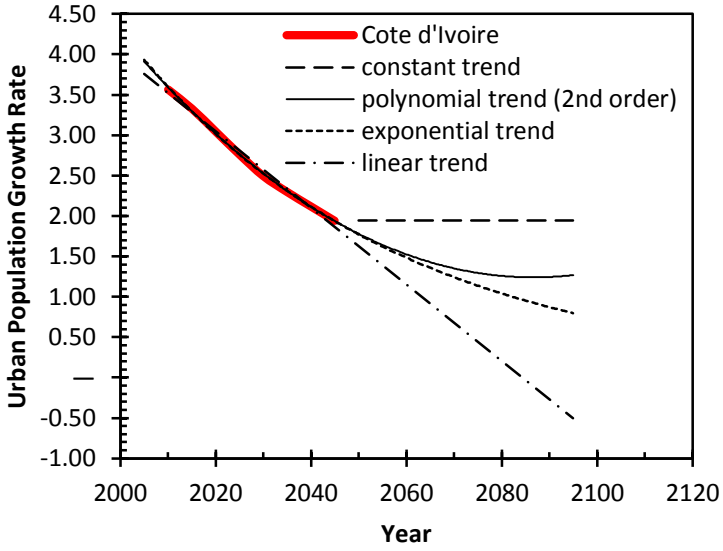
Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,233,000	5,746,475		
Exponential			N/A	N/A
Polynomial			6,412,298	13,882,709
Linear			3,820,166	1,501,643
Constant			5,675,902	5,606,196



Population change compared to national average of large urban areas

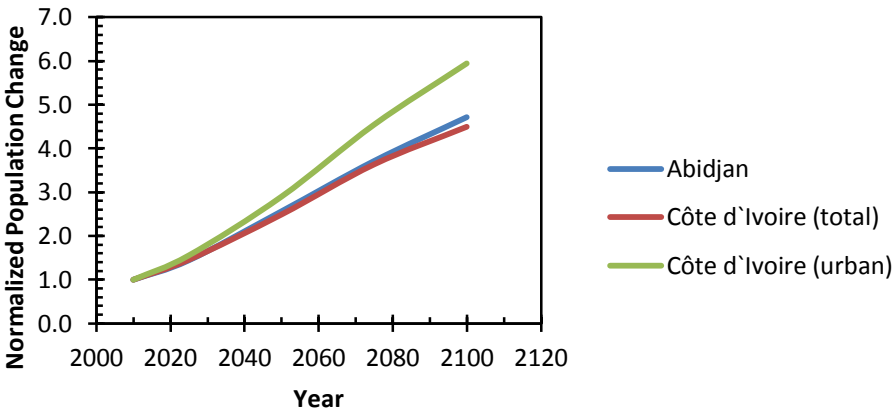
78. Cote d'Ivoire, Abidjan



Predicted urban growth for large urban areas in Cote d'Ivoire

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,031,000	10,708,876		
Exponential			15,517,751	19,701,522
Polynomial			15,710,225	21,490,656
Linear			14,266,824	14,158,635
Constant			17,322,696	28,021,223

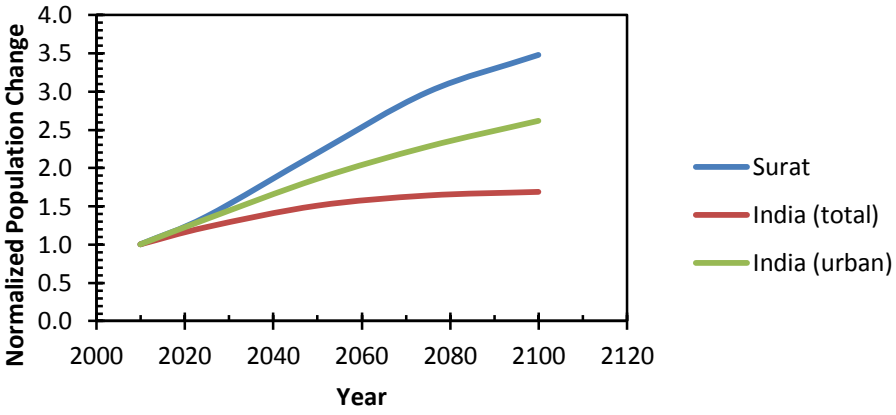


Population change compared to national average of large urban areas

79. India, Surat

Predicted urban growth for large urban areas in India - refer to 3. Mumbai, India

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,703,000	9,165,356		
Exponential			12,869,384	16,463,397
Polynomial			10,971,538	8,224,345
Linear			12,506,688	14,533,584
Constant			13,439,766	19,707,617

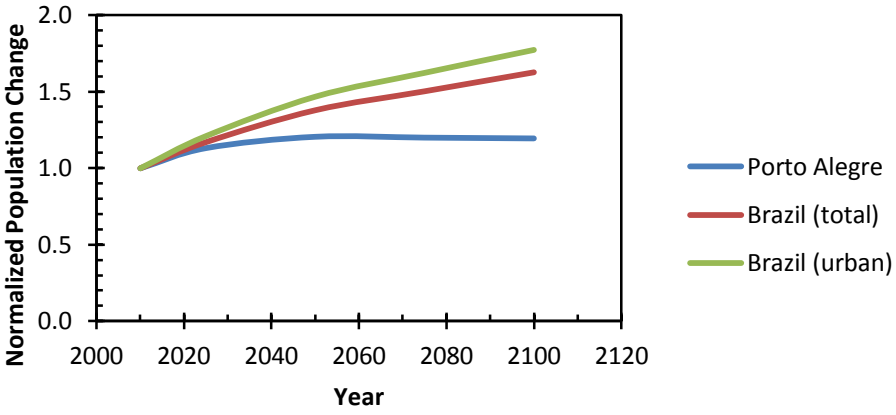


Population change compared to national average of large urban areas

80. Brazil, Porto Alegre

Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,633,000	4,935,006		
Exponential			N/A	N/A
Polynomial			4,601,071	4,134,237
Linear			4,264,709	2,977,634
Constant			4,913,063	4,891,218

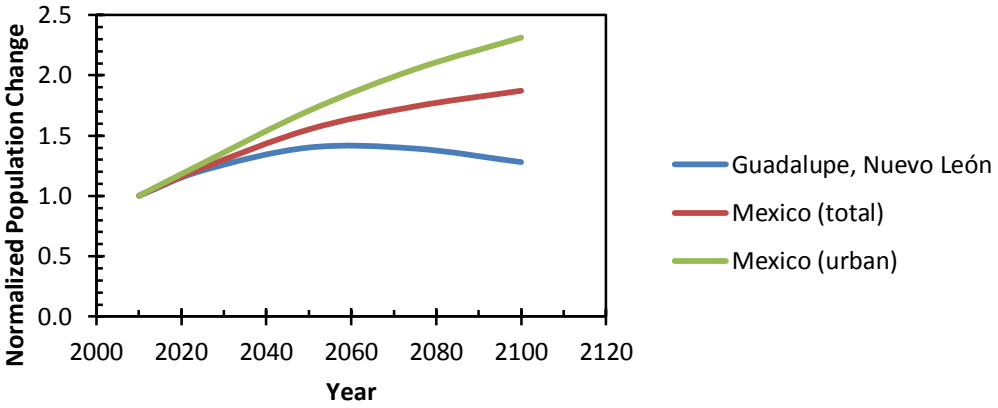


Population change compared to national average of large urban areas

81. Mexico, Guadalupe, Nuevo León

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,950,866	5,733,177		
Exponential			5,999,305	6,088,073
Polynomial			5,697,698	5,236,011
Linear			5,373,600	4,064,729
Constant			6,164,645	6,628,584

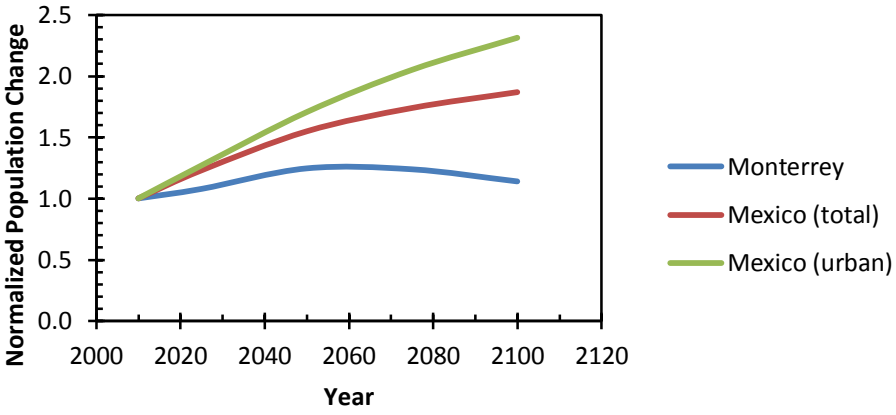


Population change compared to national average of large urban areas

82. Mexico, Monterrey

Predicted urban growth for large urban areas in Mexico - refer to 2. Mexico City, Mexico

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,413,000	5,110,320		
Exponential			5,347,536	5,426,660
Polynomial			5,078,696	4,667,167
Linear			4,789,808	3,623,134
Constant			5,494,913	5,908,449

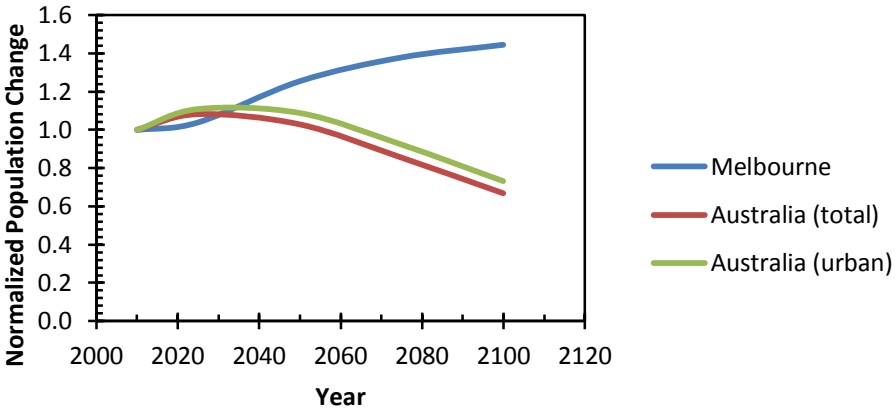


Population change compared to national average of large urban areas

83. Australia, Melbourne

Predicted urban growth for large urban areas in Australia - refer to 66. Australia, Sydney

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,238,000	5,111,390		
Exponential			5,614,459	5,882,947
Polynomial			5,782,020	6,946,032
Linear			5,243,331	4,556,016
Constant			5,891,970	6,791,756

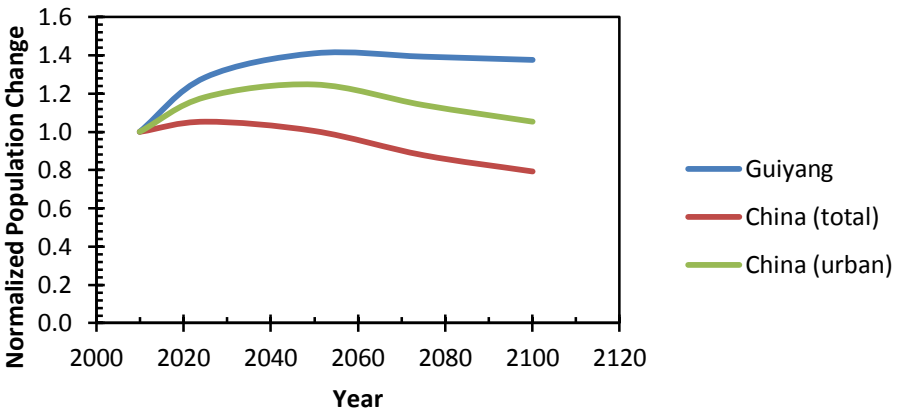


Population change compared to national average of large urban areas

84. China, Guiyang

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	5,114,000	5,615,798		
Exponential			N/A	N/A
Polynomial			6,266,480	13,567,012
Linear			3,733,294	1,467,495
Constant			5,546,830	5,478,709

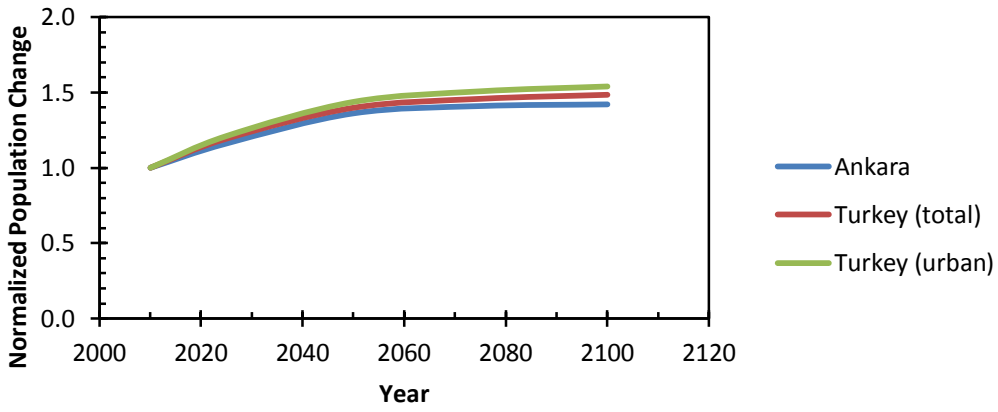


Population change compared to national average of large urban areas

85. Turkey, Ankara

Predicted urban growth for large urban areas in Turkey - refer to 19. Turkey, Istanbul

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,589,000	5,375,274		
Exponential			5,565,261	5,608,689
Polynomial			6,118,865	10,316,032
Linear			4,383,579	2,455,724
Constant			5,778,032	6,210,967

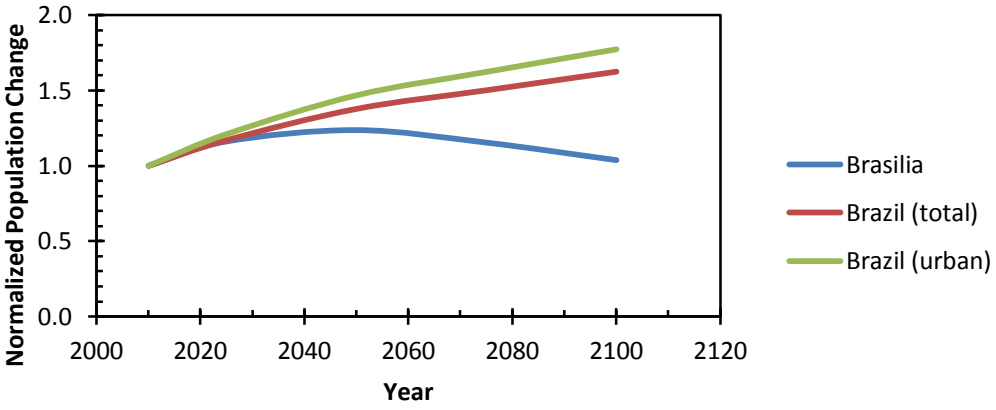


Population change compared to national average of large urban areas

86. Brazil, Brasilia

Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,578,000	4,876,420		
Exponential			N/A	N/A
Polynomial			4,546,450	4,085,158
Linear			4,214,081	2,942,286
Constant			4,854,738	4,833,153

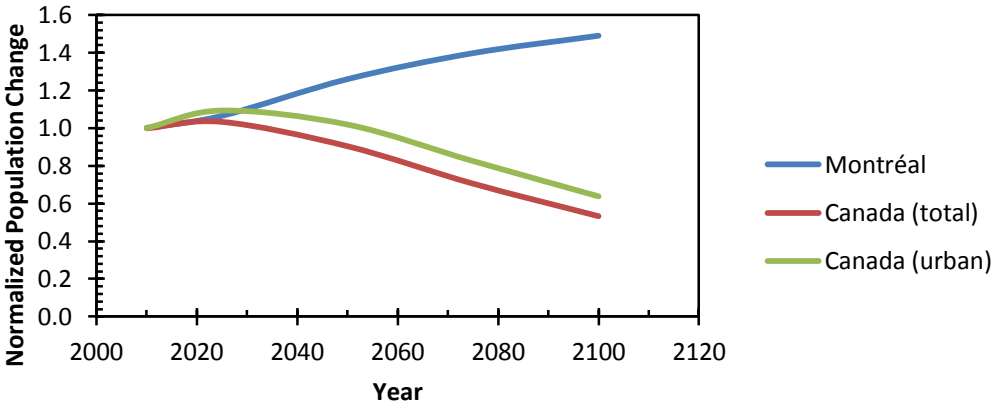


Population change compared to national average of large urban areas

87. Canada, Montréal

Predicted urban growth for large urban areas in Canada - refer to 47. Canada, Toronto (UA)

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,108,000	4,862,824		
Exponential			5,397,492	5,756,214
Polynomial			5,371,015	5,701,532
Linear			5,244,134	5,143,197
Constant			5,606,309	6,463,466

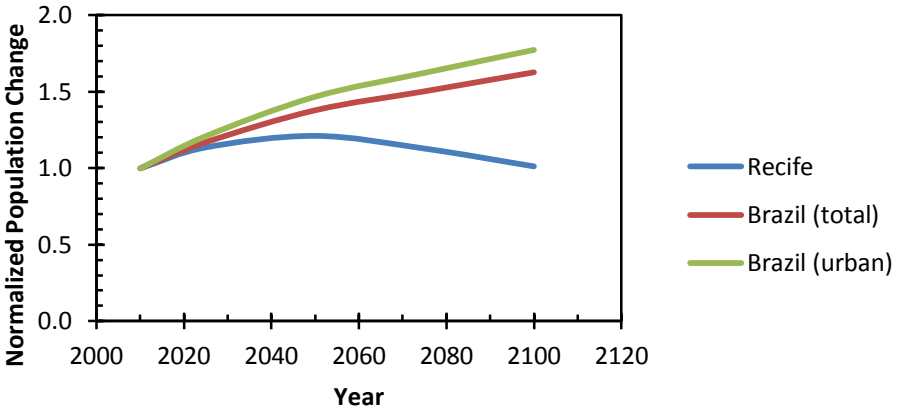


Population change compared to national average of large urban areas

88. Brazil, Recife

Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,347,000	4,630,362		
Exponential			N/A	N/A
Polynomial			4,317,042	3,879,026
Linear			4,001,444	2,793,822
Constant			4,609,774	4,589,278

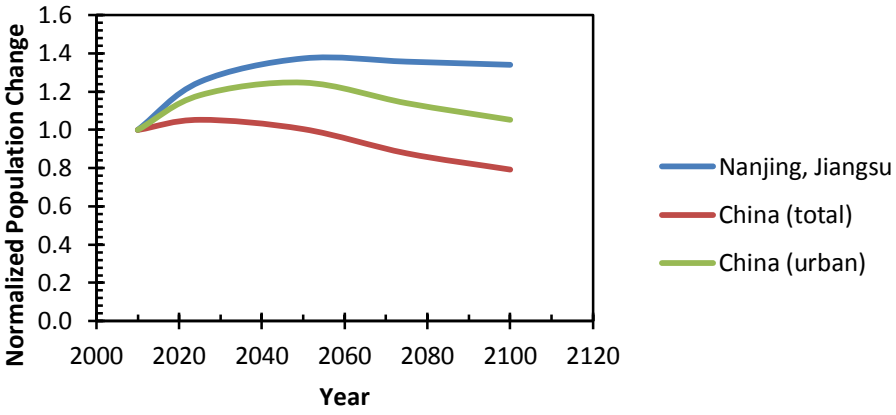


Population change compared to national average of large urban areas

89. China, Nanjing, Jiangsu

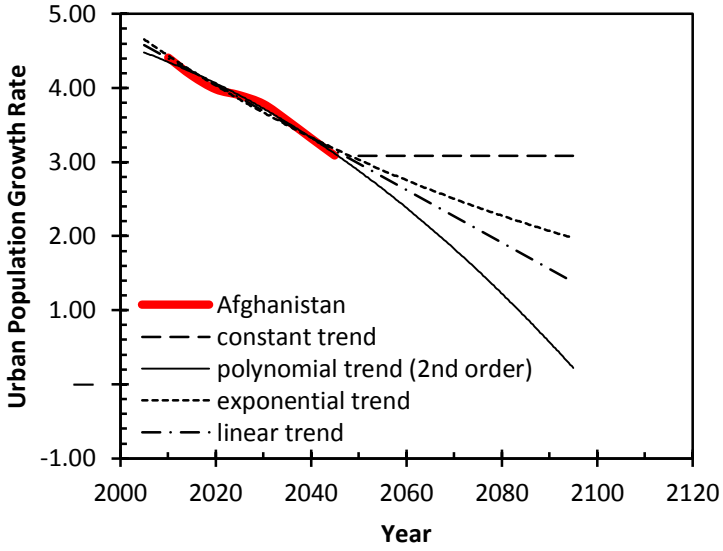
Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,771,000	5,239,142		
Exponential			N/A	N/A
Polynomial			5,846,183	12,657,062
Linear			3,482,899	1,369,069
Constant			5,174,800	5,111,248



Population change compared to national average of large urban areas

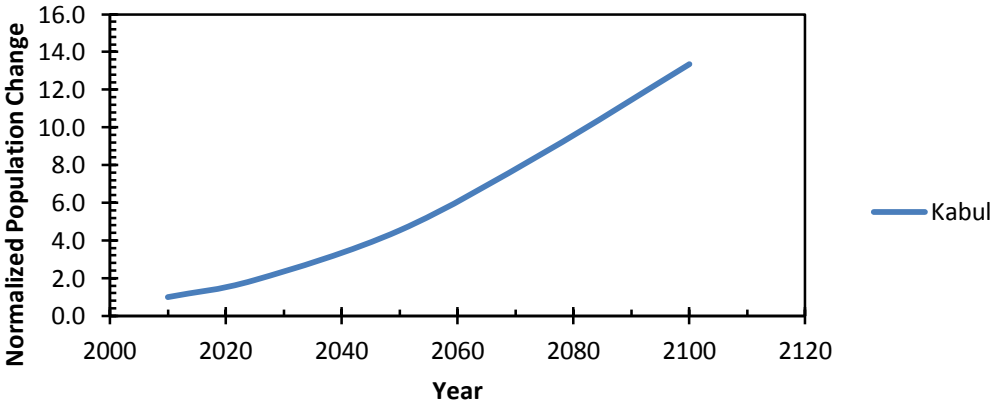
90. Afghanistan, Kabul



Predicted urban growth for large urban areas in Afghanistan

- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	7,175,000	17,091,030		
Exponential			33,772,140	57,849,329
Polynomial			30,689,203	38,298,378
Linear			32,671,623	50,269,659
Constant			36,544,998	78,142,561

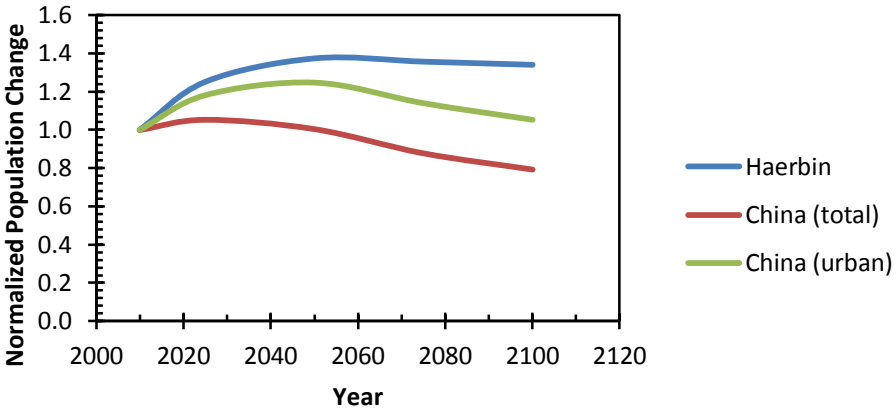


Normalized population change compared to national average of large urban areas

91. China, Haerbin

Predicted urban growth for large urban areas in China - refer to 4. Beijing, China

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,696,000	5,156,783		
Exponential			N/A	N/A
Polynomial			5,754,281	12,458,093
Linear			3,428,148	1,347,547
Constant			5,093,452	5,030,899

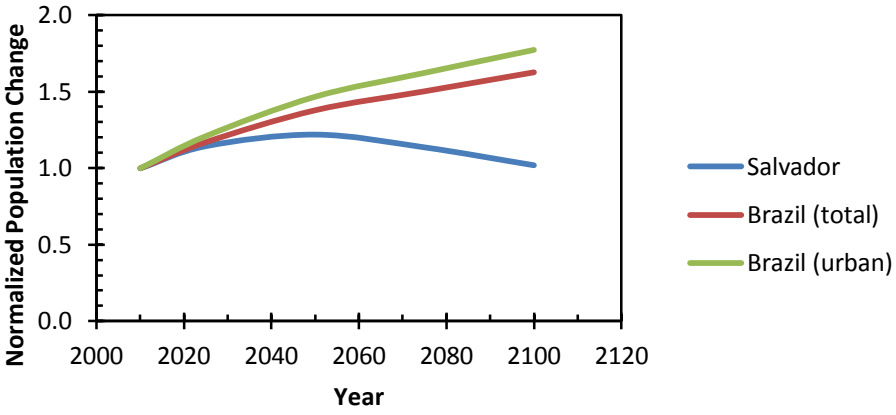


Population change compared to national average of large urban areas

92. Brazil, Salvador

Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,222,000	4,497,214		
Exponential			N/A	N/A
Polynomial			4,192,903	3,767,483
Linear			3,886,381	2,713,484
Constant			4,477,218	4,457,311

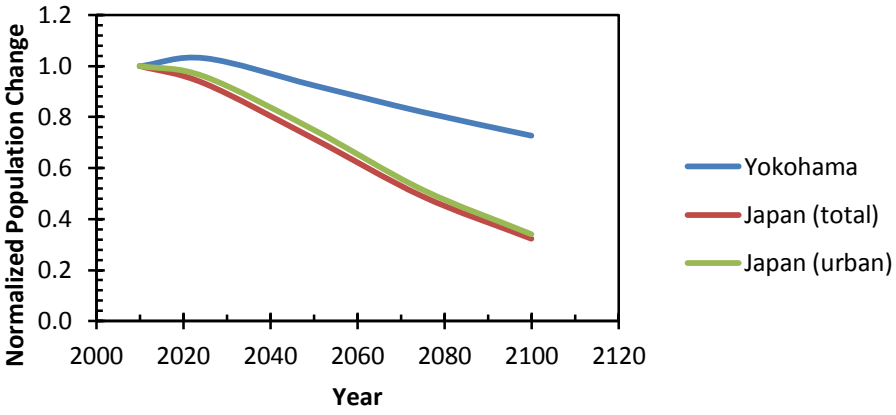


Population change compared to national average of large urban areas

93. Japan, Yokohama

Predicted urban growth for large urban areas in Japan - refer to 1. Tokyo, Japan

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	3,805,079	3,410,145		
Exponential			N/A	N/A
Polynomial			3,599,441	6,809,099
Linear			2,575,221	1,624,660
Constant			3,022,709	2,679,292

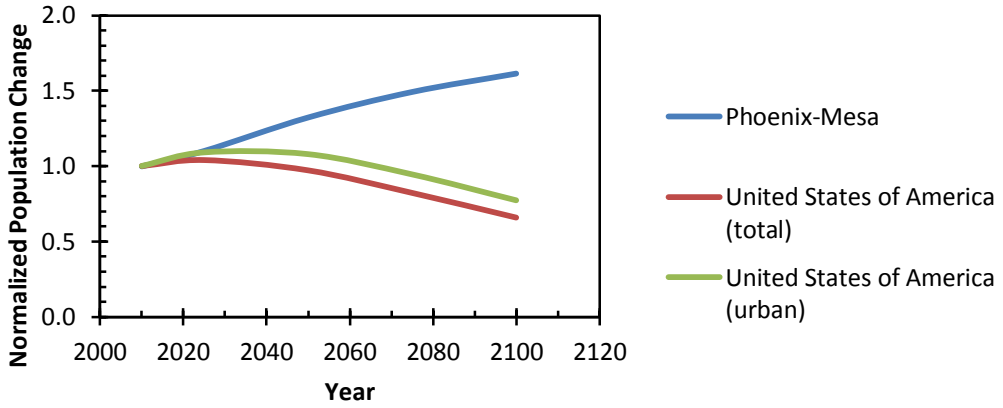


Population change compared to national average of large urban areas

94. United States of America, Phoenix-Mesa

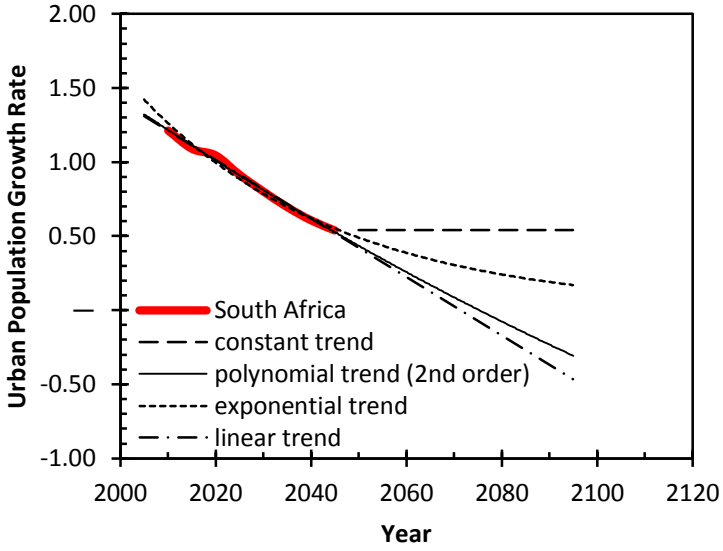
Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,062,000	4,877,382		
Exponential			5,498,653	5,945,597
Polynomial			5,652,326	6,774,540
Linear			5,354,937	5,366,462
Constant			5,710,540	6,686,019



Population change compared to national average of large urban areas

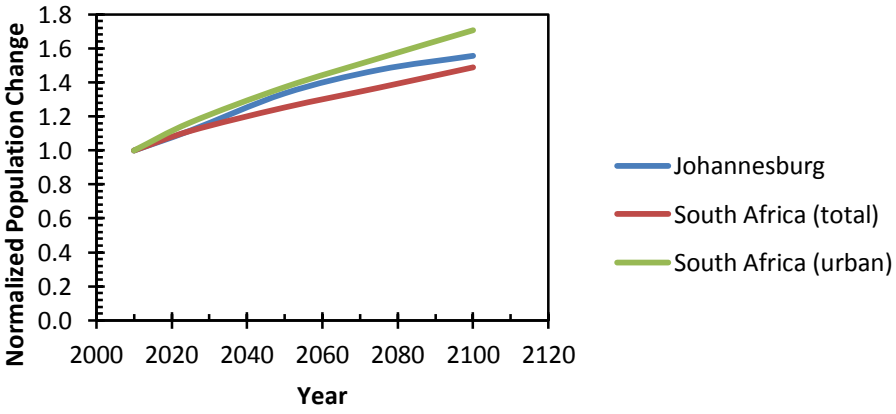
95. South Africa, Johannesburg



Predicted urban growth for large urban areas in South Africa

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,041,000	4,827,233		
Exponential			5,323,841	5,620,754
Polynomial			5,149,791	4,956,103
Linear			5,104,507	4,771,065
Constant			5,523,702	6,320,657

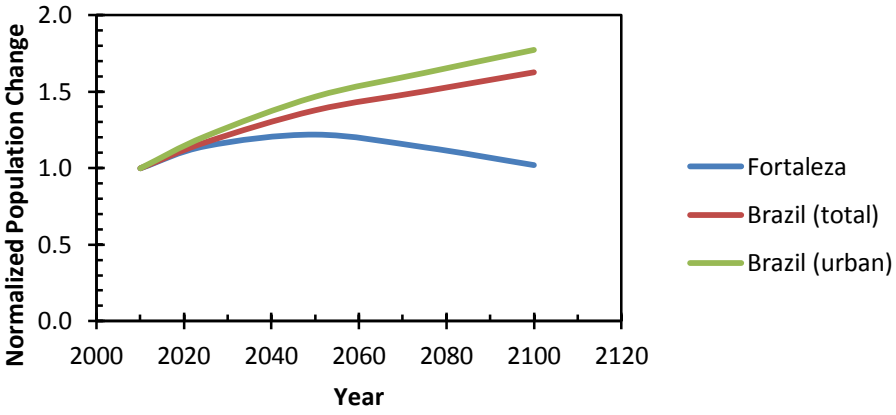


Population change compared to national average of large urban areas

96. Brazil, Fortaleza

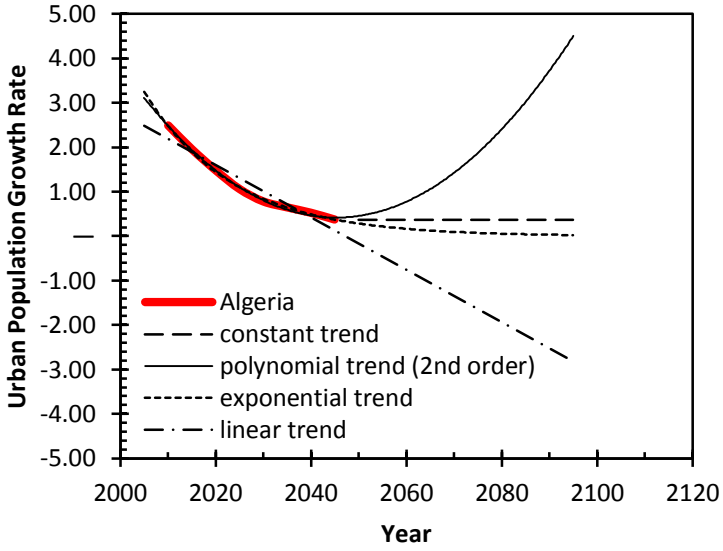
Predicted urban growth for large urban areas in Brazil - refer to 5. Sao Paulo, Brazil

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,117,000	4,385,370		
Exponential			N/A	N/A
Polynomial			4,088,627	3,673,787
Linear			3,789,727	2,646,001
Constant			4,365,871	4,346,459



Population change compared to national average of large urban areas

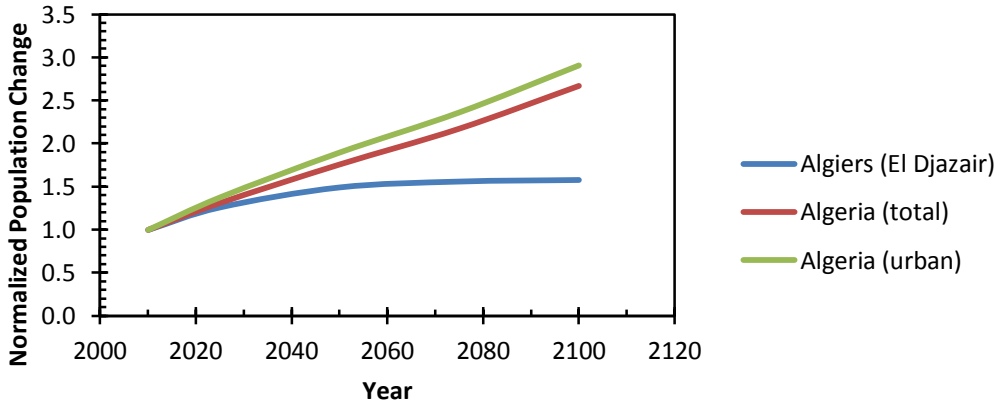
97. Algeria, Algiers (El Djazair)



Predicted urban growth for large urban areas in Algeria

- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,499,000	5,321,303		
Exponential			5,562,962	5,627,165
Polynomial			6,586,956	14,139,408
Linear			4,400,901	2,503,332
Constant			5,835,493	6,399,368

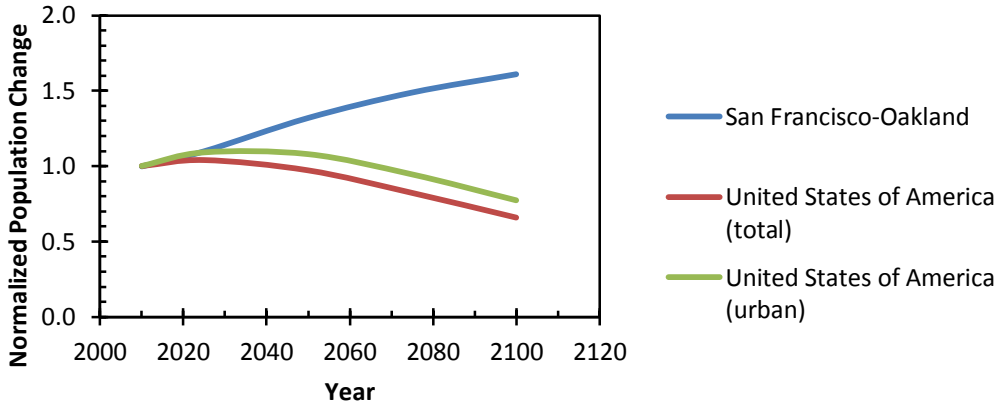


Population change compared to national average of large urban areas

98. United States of America, San Francisco-Oakland

Predicted urban growth for large urban areas in the United States of America - refer to 6. New York, United States of America

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	3,898,000	4,680,461		
Exponential			5,276,649	5,705,548
Polynomial			5,424,118	6,501,024
Linear			5,138,736	5,149,795
Constant			5,479,982	6,416,076

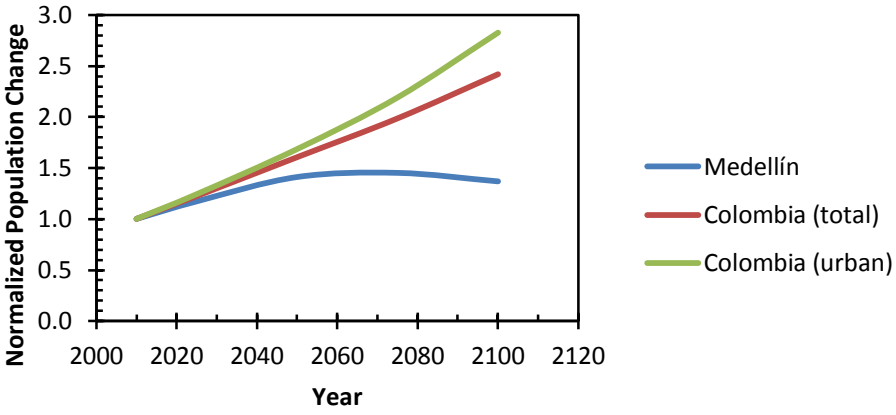


Population change compared to national average of large urban areas

99. Colombia, Medellín

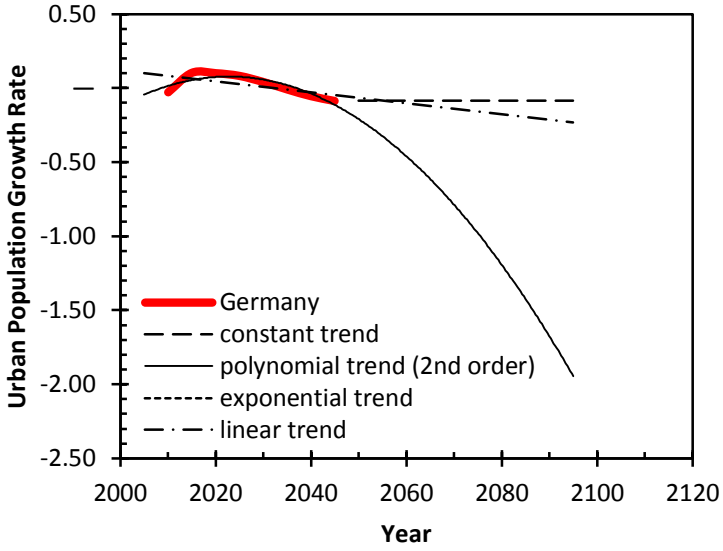
Predicted urban growth for large urban areas in Colombia - refer to 29. Colombia, BOGOTA, D.C.

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	4,129,000	4,969,964		
Exponential			5,343,941	5,501,287
Polynomial			5,112,226	4,818,940
Linear			4,838,114	3,796,373
Constant			5,558,932	6,217,696



Population change compared to national average of large urban areas

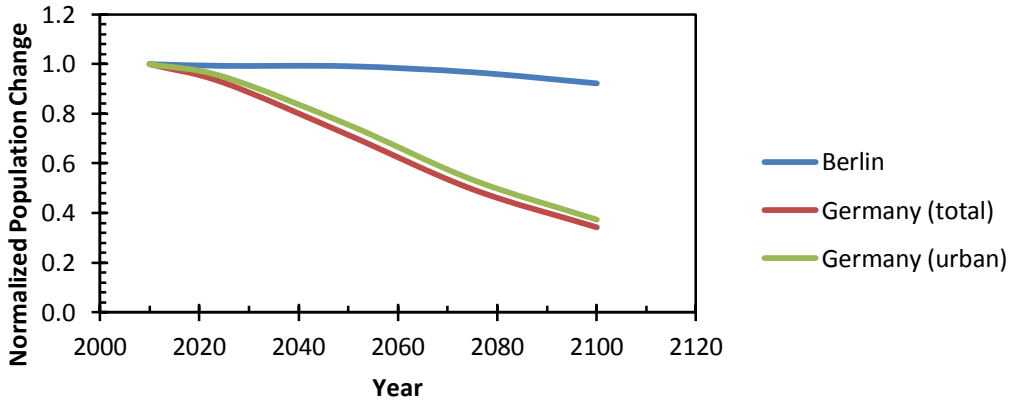
100. Germany, Berlin



Predicted urban growth for large urban areas in Germany

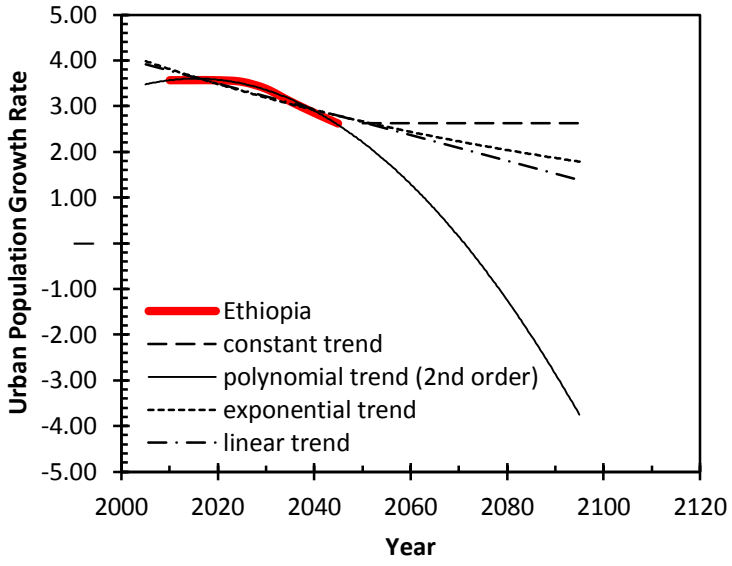
- Best fit of extrapolation method for urban population growth rate: linear

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	3,436,000	3,431,040		
Exponential			N/A	N/A
Polynomial			3,042,275	2,114,447
Linear			3,344,844	3,186,592
Constant			3,357,696	3,285,920



Population change compared to national average of large urban areas

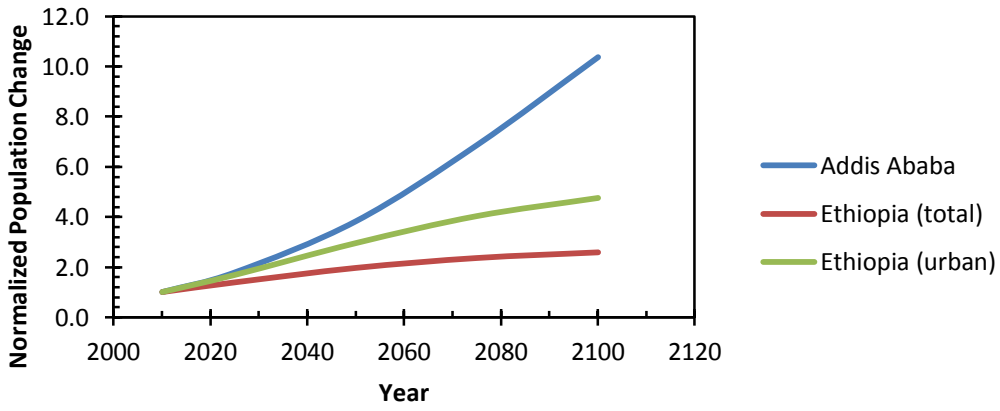
101. Ethiopia, Addis Ababa



Predicted urban growth for large urban areas in Ethiopia

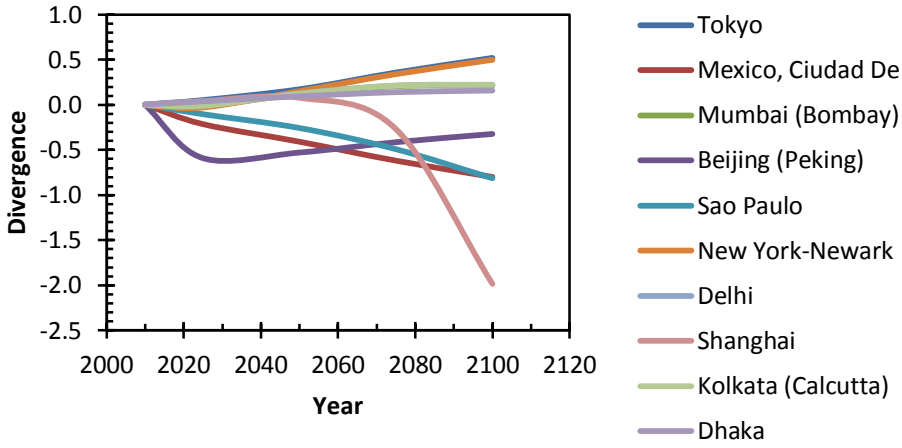
- Best fit of extrapolation method for urban population growth rate: exponential

Extrapolation Technique	UA (2025)	UA (2050)	UA (2075)	UA (2100)
WUP	6,156,000	13,212,273		
Exponential			24,157,143	39,191,518
Polynomial			17,939,413	10,580,046
Linear			23,708,789	35,820,348
Constant			25,223,706	48,154,874

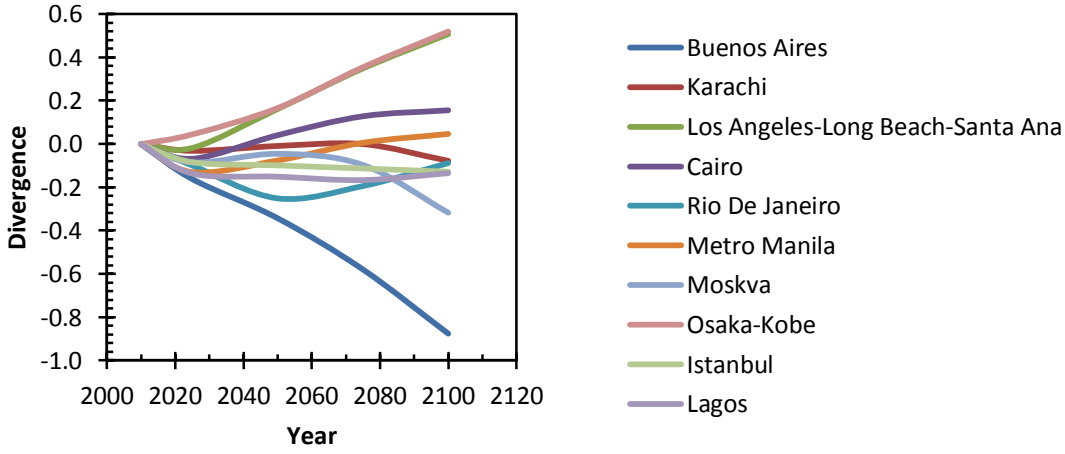


Population change compared to national average of large urban areas

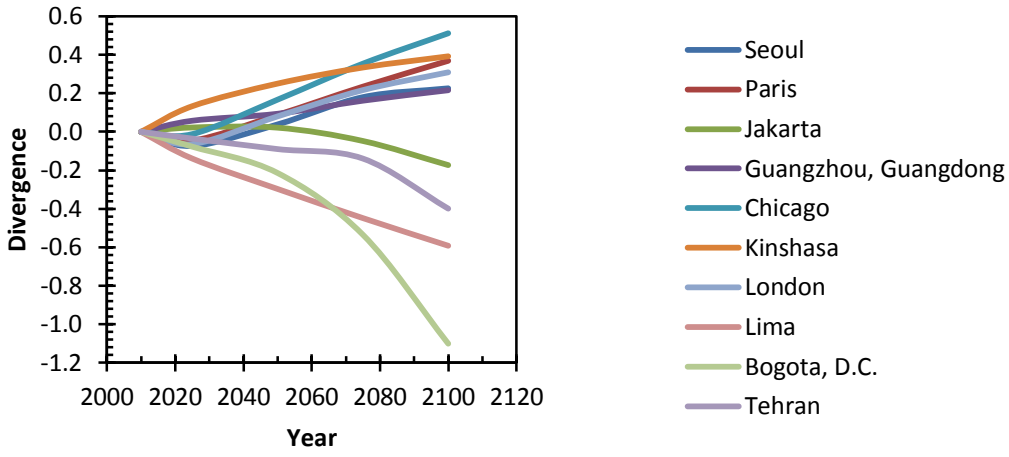
The 21st Century's Predicted Divergence from Current Population of the 101 Largest Cities



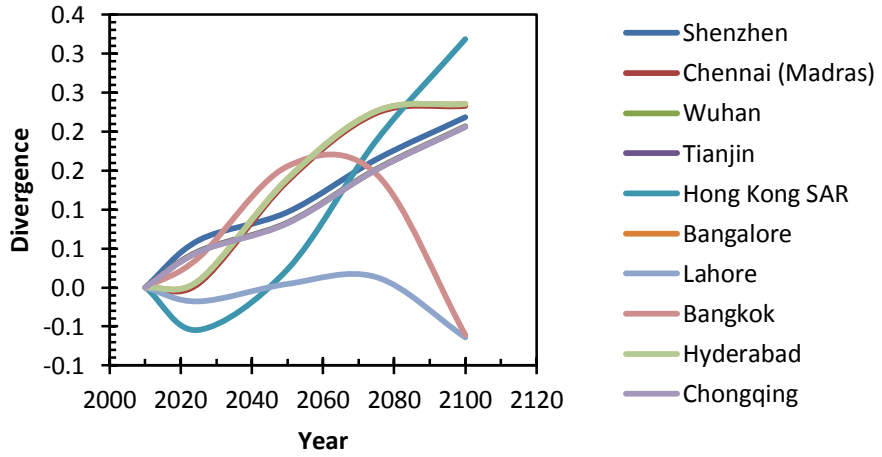
Population divergence of the ten largest cities



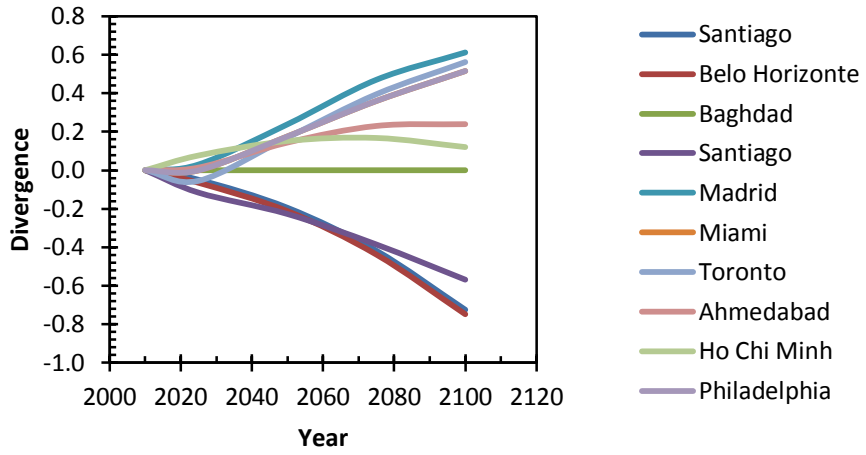
Population divergence of the eleventh to twentieth largest cities



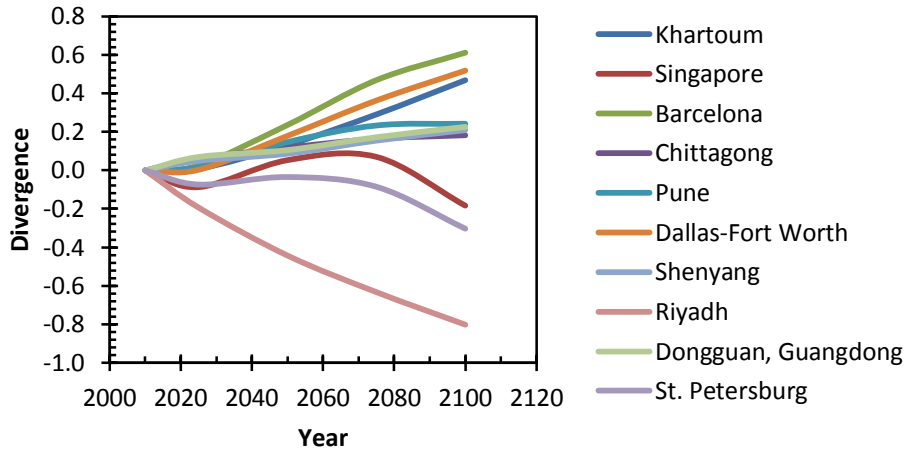
Population divergence of the twenty-first to thirtieth largest cities



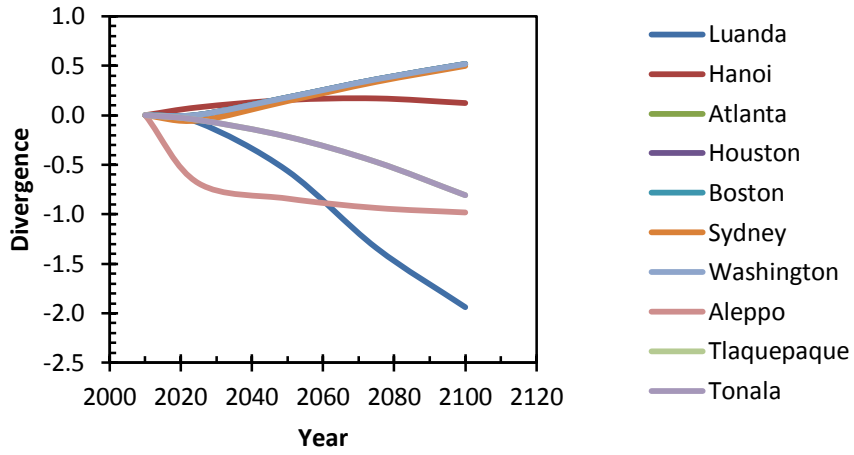
Population divergence of the thirty-first to fortieth largest cities



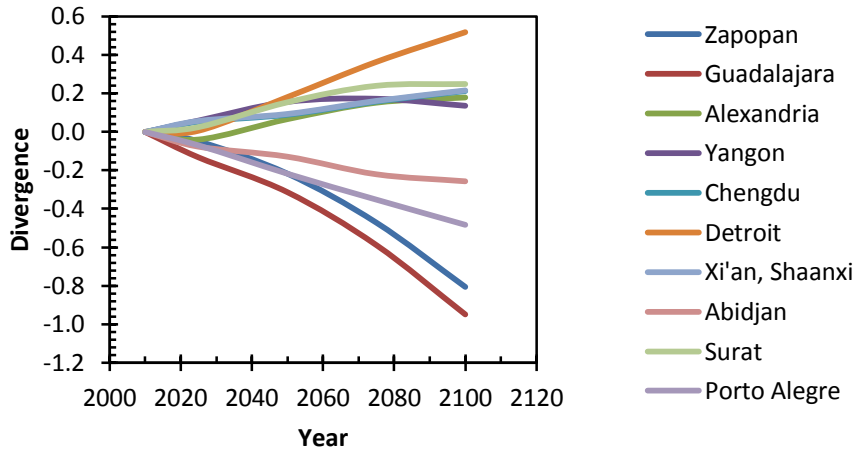
Population divergence of the forty-first to fiftieth largest cities



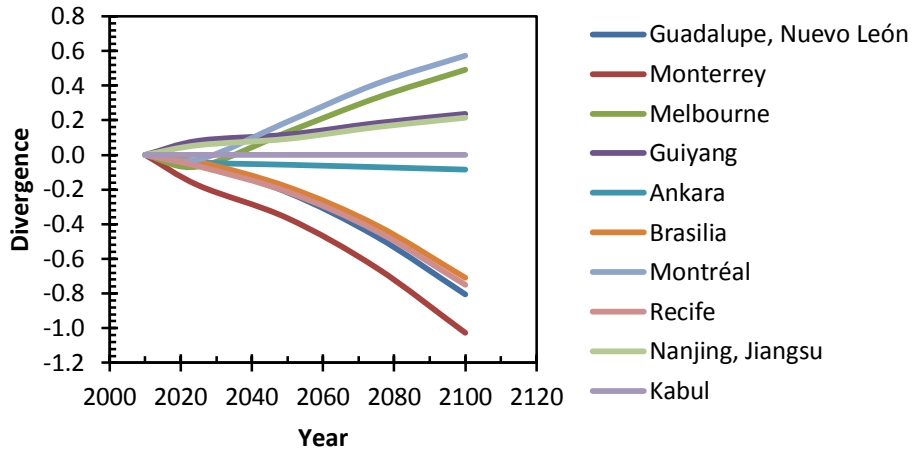
Population divergence of the fifty-first to sixtieth largest cities



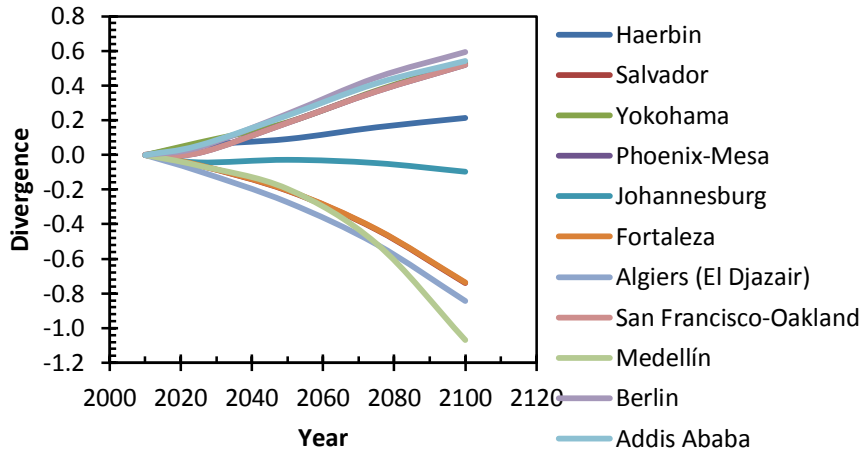
Population divergence of the sixty-first to seventieth largest cities



Population divergence of the seventy-first to eightieth largest cities



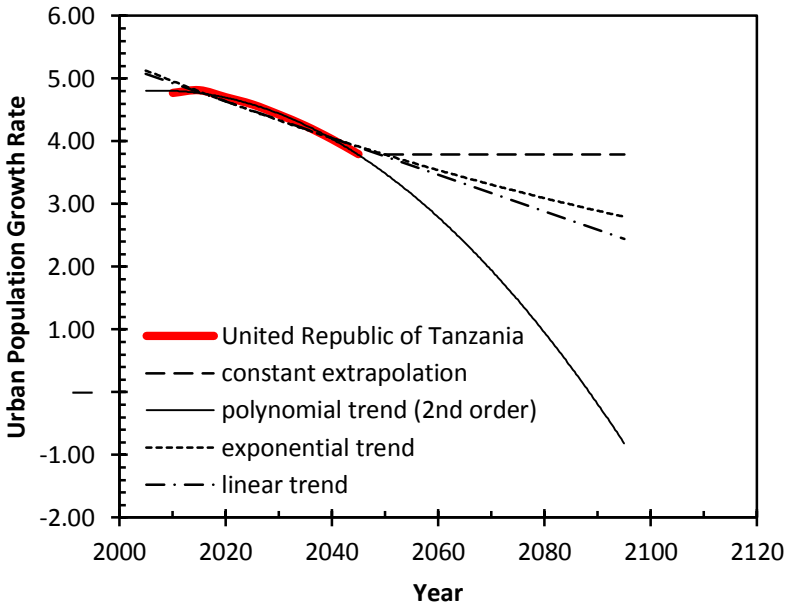
Population divergence of the eighty-first to ninetieth largest cities



Population divergence of the ninety-first one-hundred and one largest cities

Additional Countries – those without a city in 2010 but at least one in 2100.

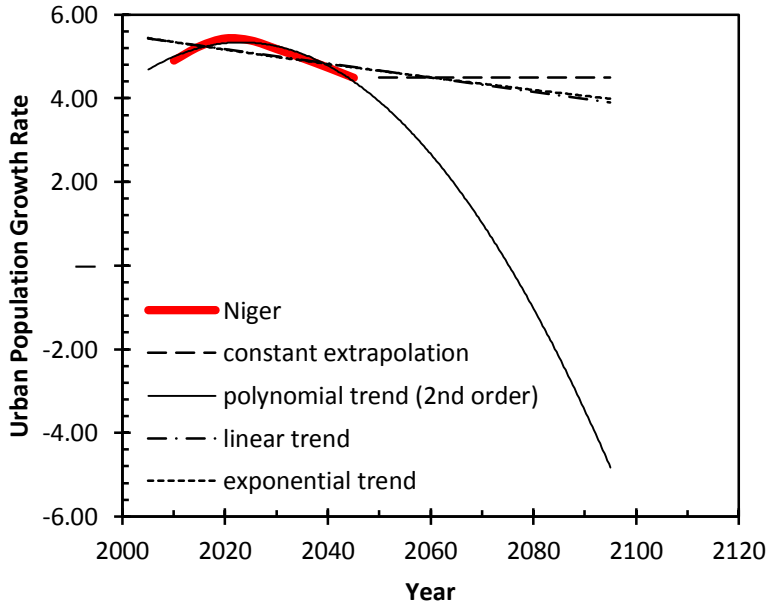
United Republic of Tanzania



Predicted urban growth for large urban areas in the United Republic of Tanzania

- Best fit of extrapolation method for urban population growth rate: linear

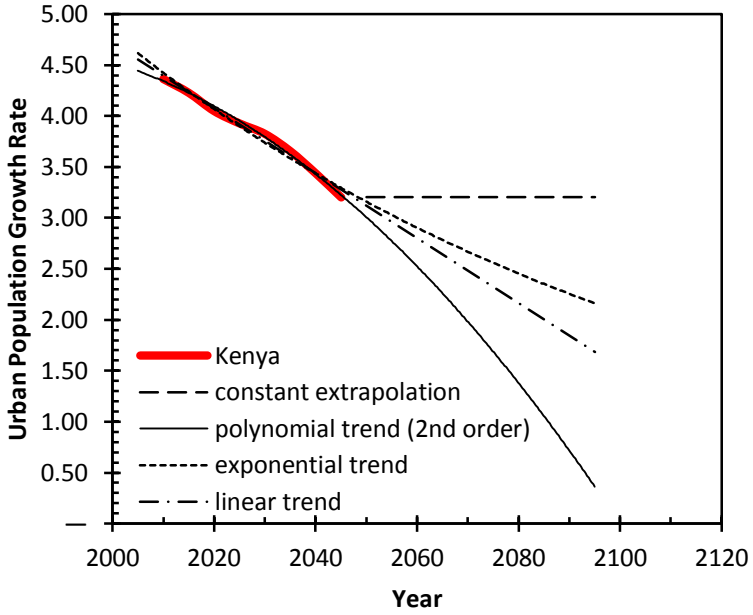
Niger



Predicted urban growth for large urban areas in Niger

- Best fit of extrapolation method for urban population growth rate: exponential

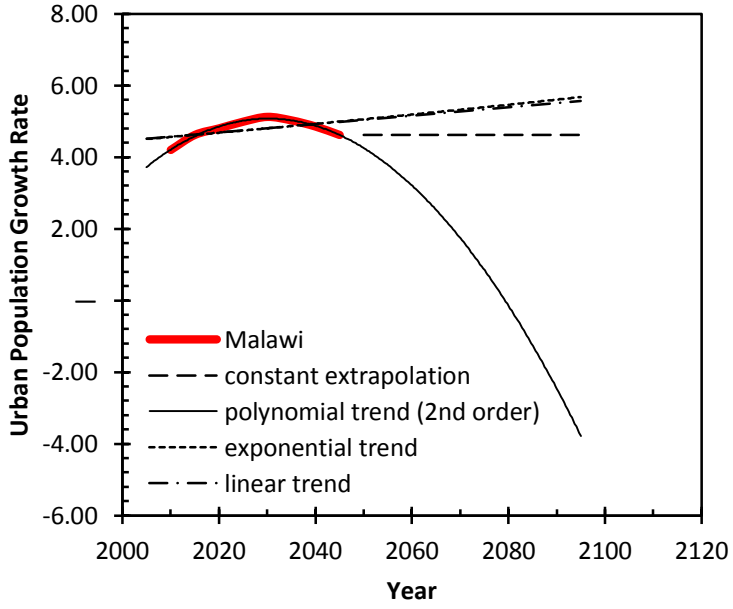
Kenya



Predicted urban growth for large urban areas in Kenya

- Best fit of extrapolation method for urban population growth rate: linear

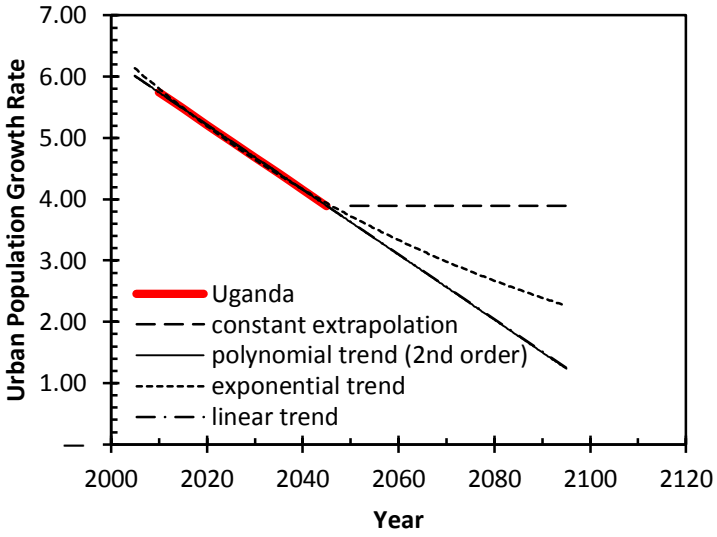
Malawi



Predicted urban growth for large urban areas in Malawi

- Best fit of extrapolation method for urban population growth rate: constant

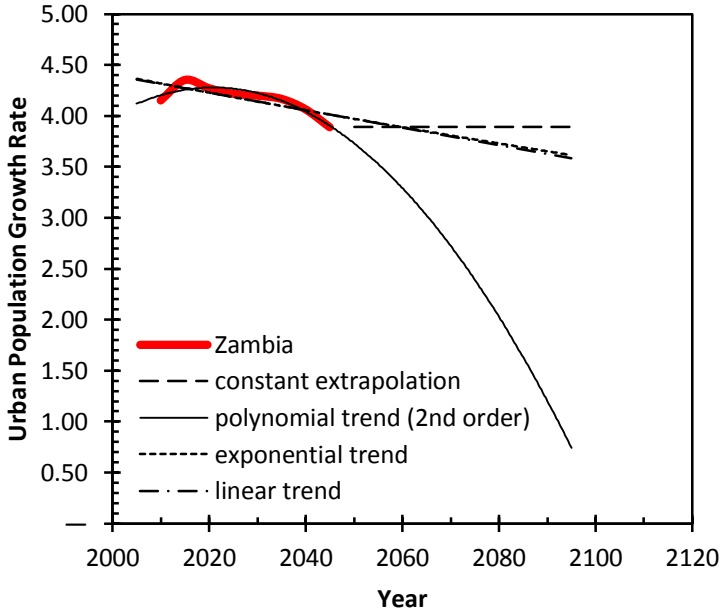
Uganda



Predicted urban growth for large urban areas in Uganda

- Best fit of extrapolation method for urban population growth rate: exponential

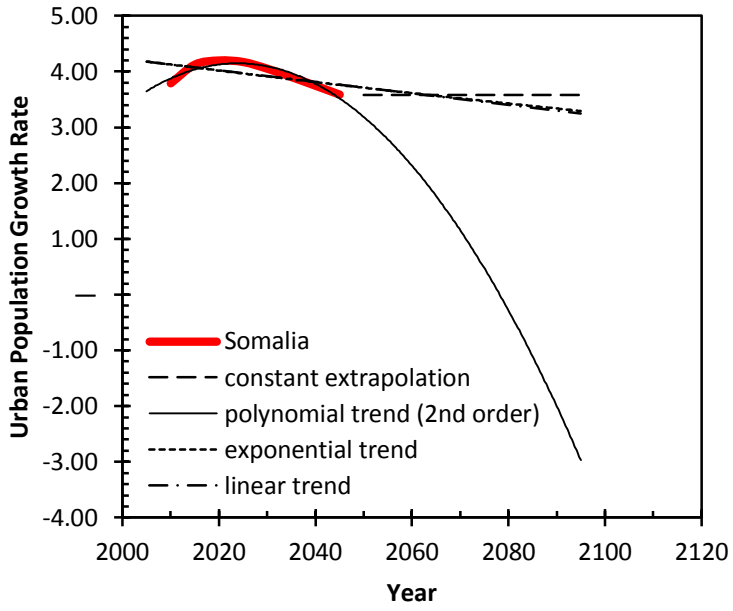
Zambia



Predicted urban growth for large urban areas in Zambia

- Best fit of extrapolation method for urban population growth rate: constant

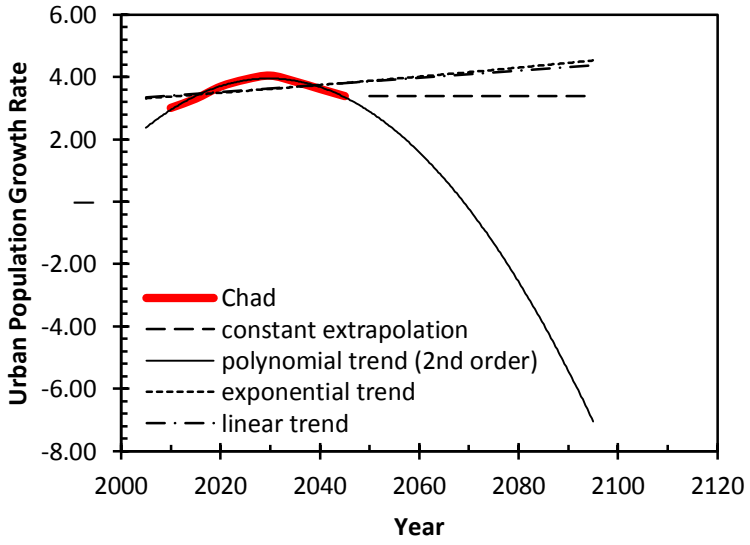
Somalia



Predicted urban growth for large urban areas in Somalia

- Best fit of extrapolation method for urban population growth rate: linear

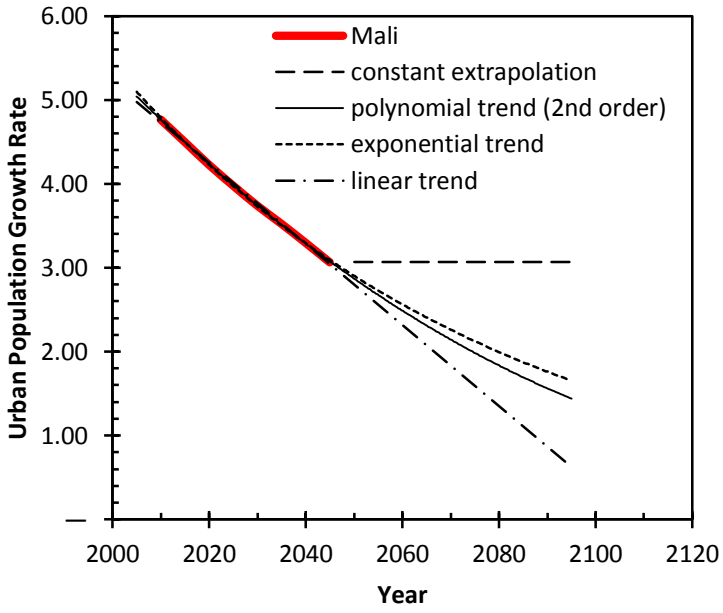
Chad



Predicted urban growth for large urban areas in Chad

- Best fit of extrapolation method for urban population growth rate: constant

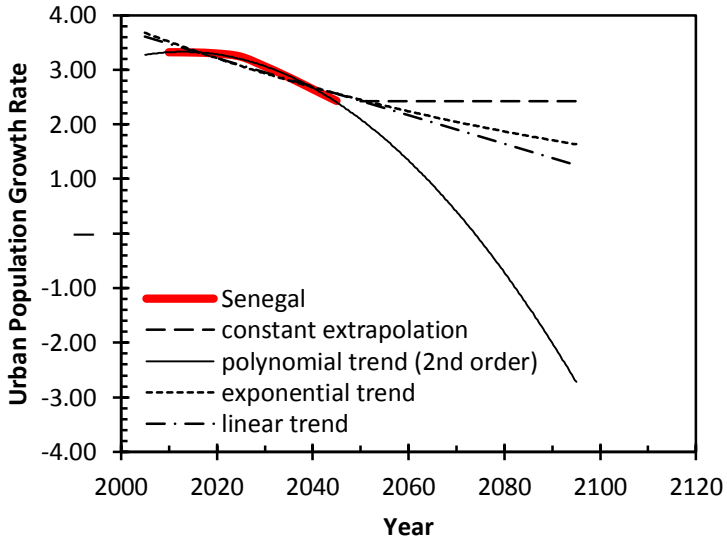
Mali



Predicted urban growth for large urban areas in Mali

- Best fit of extrapolation method for urban population growth rate: exponential

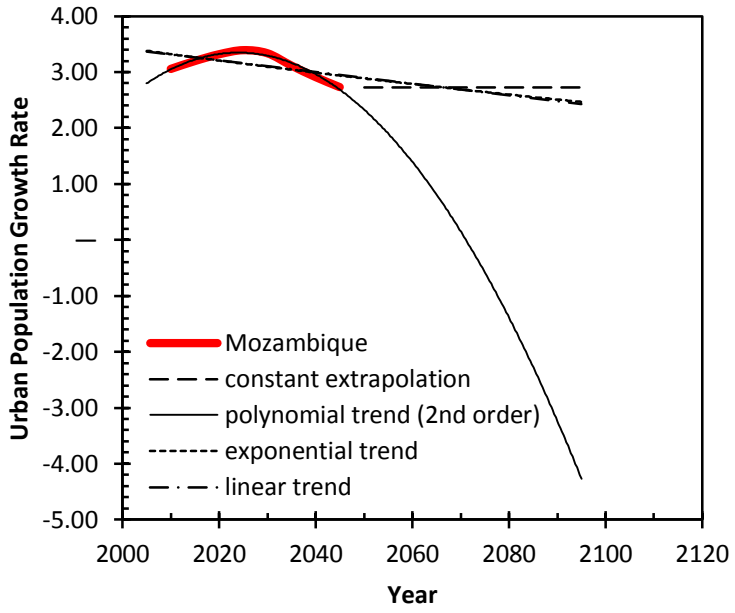
Senegal



Predicted urban growth for large urban areas in Senegal

- Best fit of extrapolation method for urban population growth rate: linear

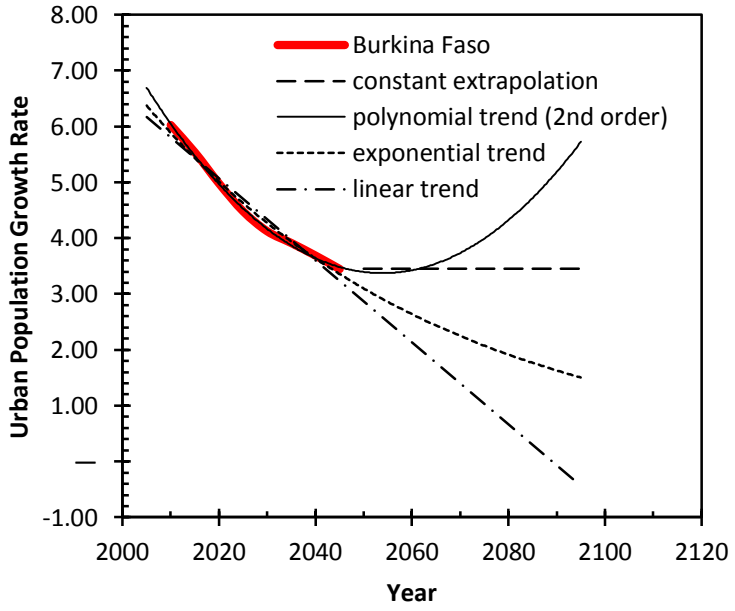
Mozambique



Predicted urban growth for large urban areas in Mozambique

- Best fit of extrapolation method for urban population growth rate: constant

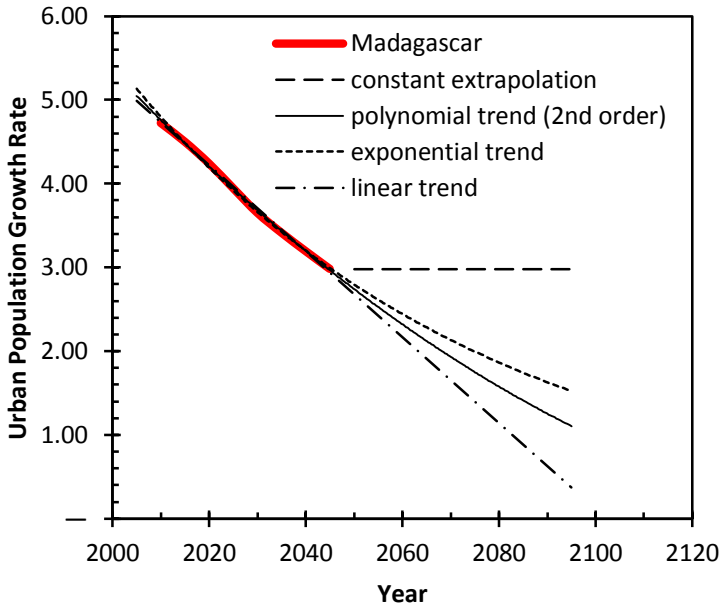
Burkina Faso



Predicted urban growth for large urban areas in Burkina Faso

- Best fit of extrapolation method for urban population growth rate: exponential

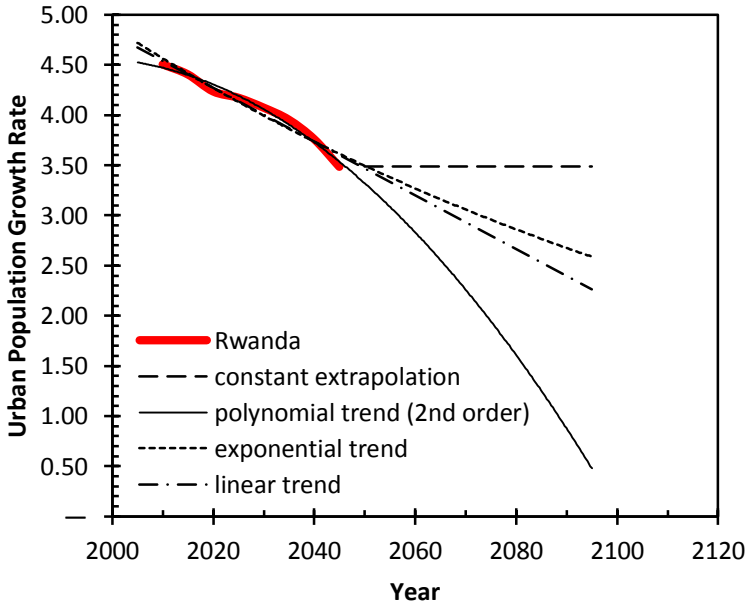
Madagascar



Predicted urban growth for large urban areas in Madagascar

- Best fit of extrapolation method for urban population growth rate: exponential

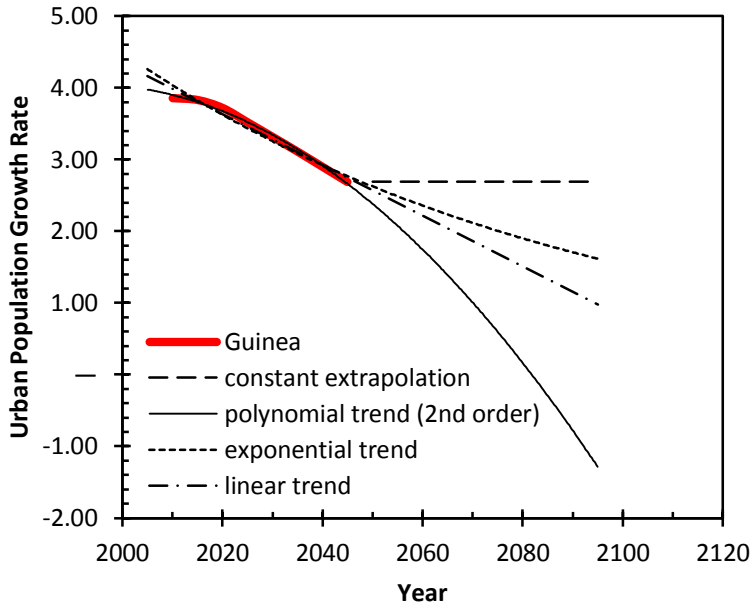
Rwanda



Predicted urban growth for large urban areas in Rwanda

- Best fit of extrapolation method for urban population growth rate: linear

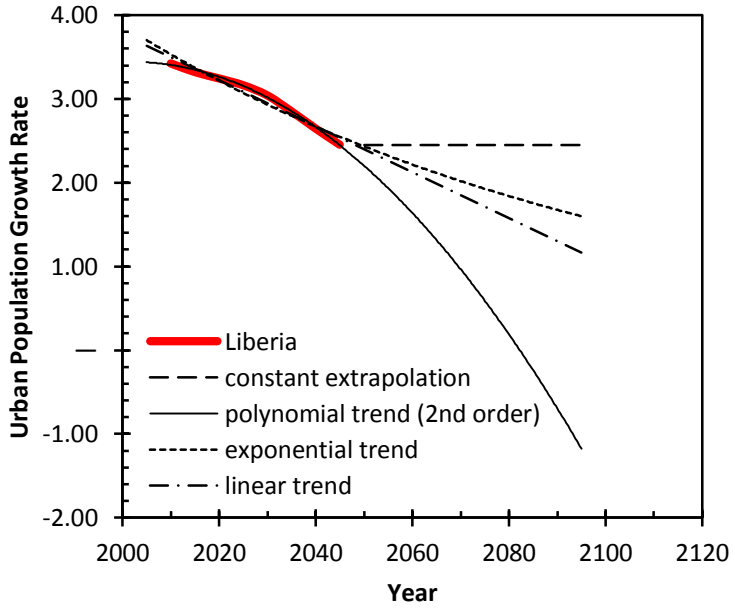
Guinea



Predicted urban growth for large urban areas in Guinea

- Best fit of extrapolation method for urban population growth rate: exponential

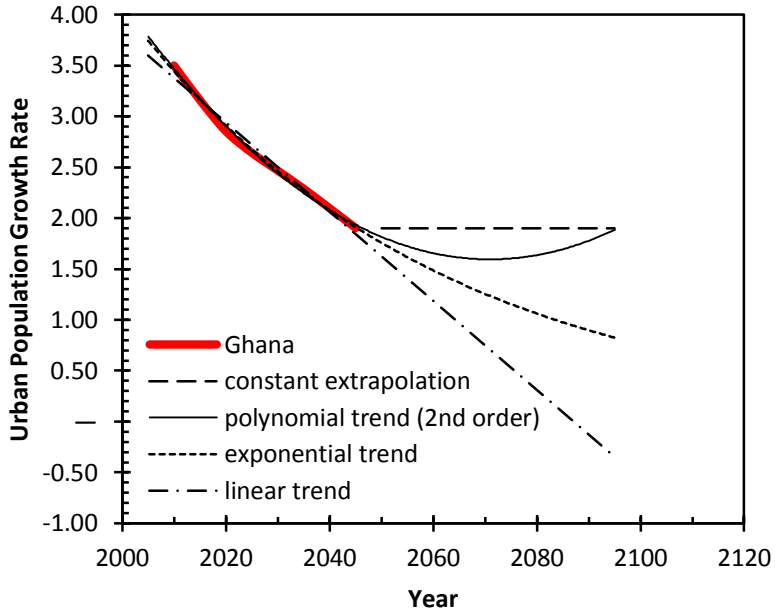
Liberia



Predicted urban growth for large urban areas in Liberia

- Best fit of extrapolation method for urban population growth rate: exponential

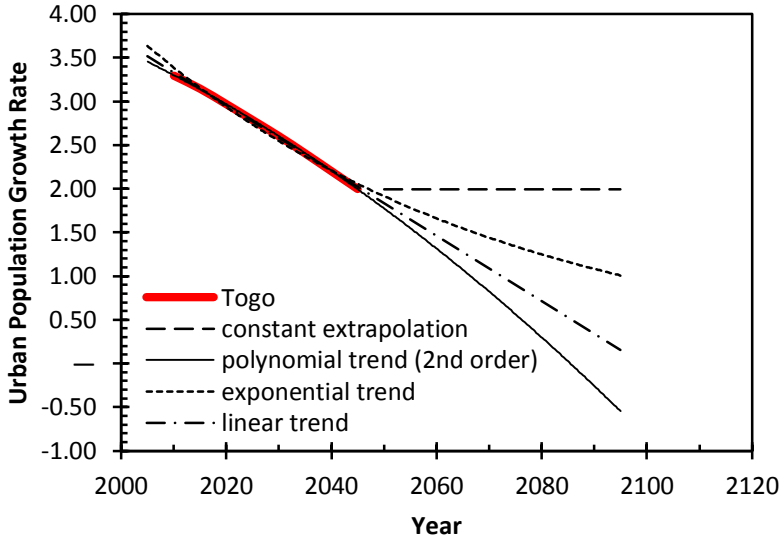
Ghana



Predicted urban growth for large urban areas in Ghana

- Best fit of extrapolation method for urban population growth rate: exponential

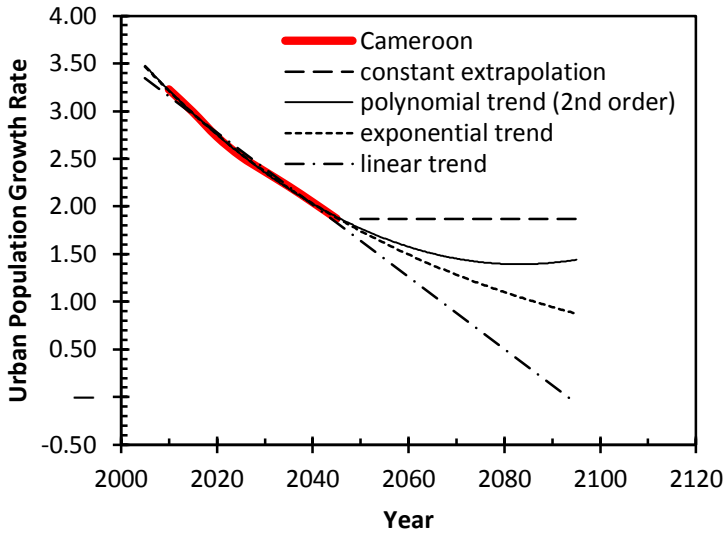
Togo



Predicted urban growth for large urban areas in Togo

- Best fit of extrapolation method for urban population growth rate: exponential

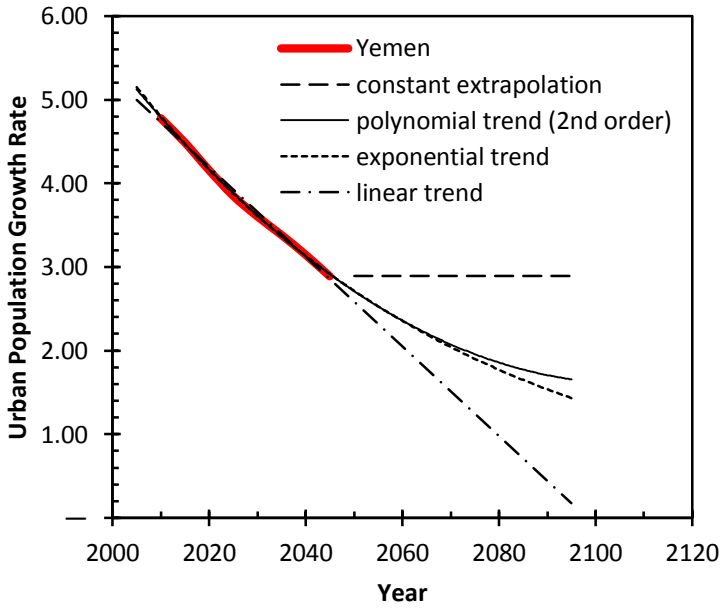
Cameroon



Predicted urban growth for large urban areas in Cameroon

- Best fit of extrapolation method for urban population growth rate: exponential

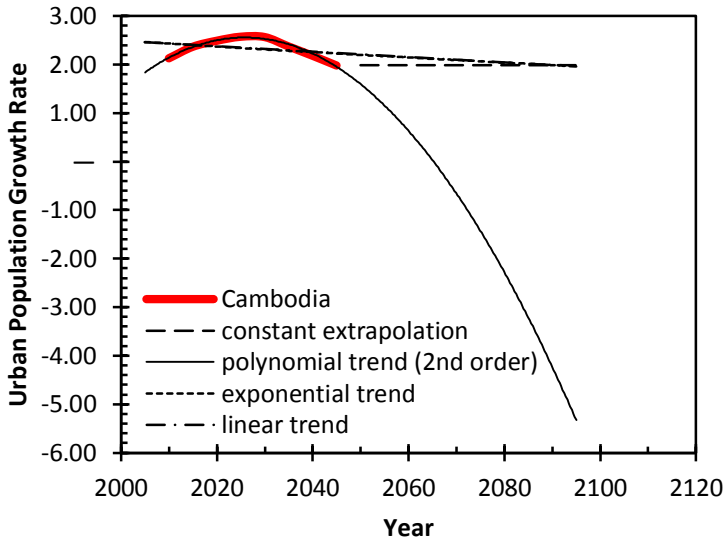
Yemen



Predicted urban growth for large urban areas in Yemen

- Best fit of extrapolation method for urban population growth rate: exponential

Cambodia



Predicted urban growth for large urban areas in Cambodia

- Best fit of extrapolation method for urban population growth rate: constant

Acknowledgements

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