The Economics of China

Future Challenges - Part 1

Fall 2020

Environmental Quality and the Sustainability of Growth

- "Almost always, countries undergoing industrialization deplete and damage their natural capital, and China has not been an exception".
- "The quality of China's air, water, and living resources has been severely degraded over the past century...[and] the most damaging environmental destruction has come during the acceleration of growth in the post-1978 reform era".
- In the past few decades, "China has transformed from an energy midget into an energy giant".
- "Meanwhile, traditional agricultural practices of recycling organic waste products into the soil have been displaced by a modern, chemical-intensive, and highly polluting agriculture".
- "Environmental degradation has imposed serious costs on the Chinese economy and has reduced the well-being of the Chinese population".

Environmental Quality and the Sustainability of Growth

- Bad News.
  - "It is evident that China has an **air pollution problem".**
  - "China suffers disproportionately from the local impact of air pollution, with its 19% of world population incurring 30% of the world health costs".
  - **"Soil pollution** is significant in China's agricultural regions".
  - "Nearby mines and the indiscriminate application of low-grade fertilizers and excessive pesticides have led to a buildup of toxic heavy metals in the soil".
  - **"Desertification** is an enormous problem".
  - Recall that to the west "of the Aihui–Tengchong line, much of the land is desert".
  - Well, "the desert has been moving east, primarily because of the impact of human activity".

Environmental Quality and the Sustainability of Growth

- Good News.
  - "For many years, **tree planting** has been emphasized as a government policy, as a civic responsibility, and, on several occasions, as a campaign of mass mobilization".
  - "Over the long term, this consistent emphasis has had a significant payoff, and **China's overall forest cover has grown substantially**".
  - "The first national inventory, in 1962, found that only 8.9% of China was forested".
  - "By 2015, total forest cover had increased to 27% of China".
  - In addition, "14.8% of China's land was protected in some fashion in parks or animal and nature reserves" by 2013.

Environmental Quality and the Sustainability of Growth

- Bad News.
  - China faces a **water pollution** problem.
  - "Since 1980, the quality of China's surface water and groundwater has deteriorated significantly".
  - Three main sources that have contributed to this deterioration are **industrial waste, municipal waste, and agriculture** (through animal waste, and the use of fertilizers and pesticides).
  - "As a result of these pollutants, water quality is poor, especially in the water-short northern regions".
  - "The share of pure water...has declined by more than half since 2003".
  - "Only 70% of China's river water is of good-enough quality that it can be used to begin the water-purification process that will make it fit for consumption".
  - "30% is unfit for human contact, and of this, almost 10% is toxic".

Environmental Quality and the Sustainability of Growth

- Good News.
  - "There has been major progress in cleaning up large-scale factories, and **today 90% of industrial wastewater from regulated (large-scale) industries receives some kind of treatment".**
  - "In the 1990s, almost no municipal sewage was properly treated".
  - "A major push has been undertaken to improve sewage treatment".
  - "By **2010** China had constructed **sufficient capacity to give all municipal waste at least primary treatment"**.

Environmental Quality and the Sustainability of Growth

- Bad News.
  - **"All fossil fuels [like coal, oil and gas]** are exhaustible, and all **contribute both to local air pollution and to global warming"**.
  - **"China is also the world's largest oil importer".**
  - Moreover, **"China's energy production and consumption are dominated by coal".**
  - "China is far and away the largest coal user in the world".
  - "Coal is particularly problematic because it is intrinsically much dirtier than oil and gas".
  - Therefore, it is no suprise that "**China contributed an estimated 27% of global carbon emissions in 2016** (BP 2017), making it by far the largest contributor to greenhouse gases and global warming".

Population

Table 21.1
Energy consumption, 2016.

	Total consumption	Percent of total energy consumption					
	Million TOE	Oil	Natural gas	Coal	Nuclear energy	Hydroelectric	Renewables
China	3,053	19.0	6.2	61.8	1.6	8.6	2.8
Brazil	298	46.6	11.1	5.5	1.2	29.2	6.4
India	724	29.4	6.2	56.9	1.2	4.0	2.3
Japan	445	41.4	22.5	26.9	0.9	4.1	4.2
EU	1,642	37.3	23.5	14.5	11.6	4.8	8.3
U.S.	2,273	38.0	31.5	15.8	8.4	2.6	3.7
World	13,276	33.3	24.1	28.1	4.5	6.9	3.2

Source: BP (2017), "Primary Energy: Consumption by Fuel." BP figures vary slightly from Chinese official data because conversion into comparable standardized units is done differently. Chinese coal-production figures were revised upward by 8% in 2014 after the discovery of previously uncounted output in the 2013 Economic Census. These revisions are incorporated into all data in this chapter.

Environmental Quality and the Sustainability of Growth

- Good News.
  - There has been **growth in the use renewable sources** of energy in China.
  - "Primary electricity generation—not derived from burning fossil fuels—already accounted for **10% of China's energy use in 2013**".
  - Further, "heavy investment in wind and solar power was also essential to **boost the share to 13.4% in 2016**".
  - In addition, "**China cut energy use per unit of GDP** by two-thirds between 1978 and the end of the twentieth century".
  - By 2015: "Total energy use per unit of output ...required one-quarter as much energy per unit of GDP as in 1978".
  - Moreover, "as part of the Paris accords in 2015, China agreed to reach zero carbon-emissions growth by 2030".
  - "If current trends continue, China will reach 'peak carbon' well before 2030".

Population

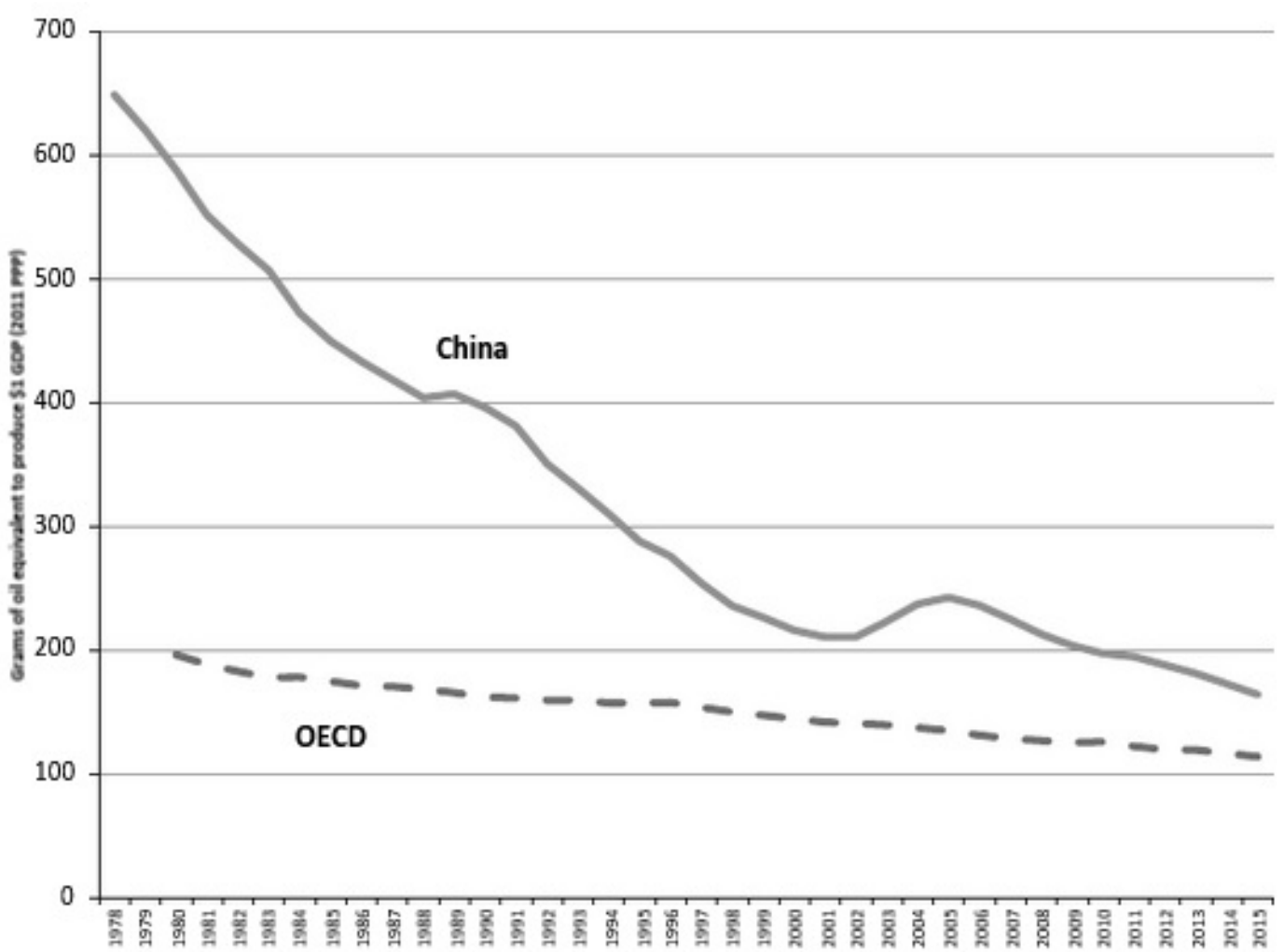
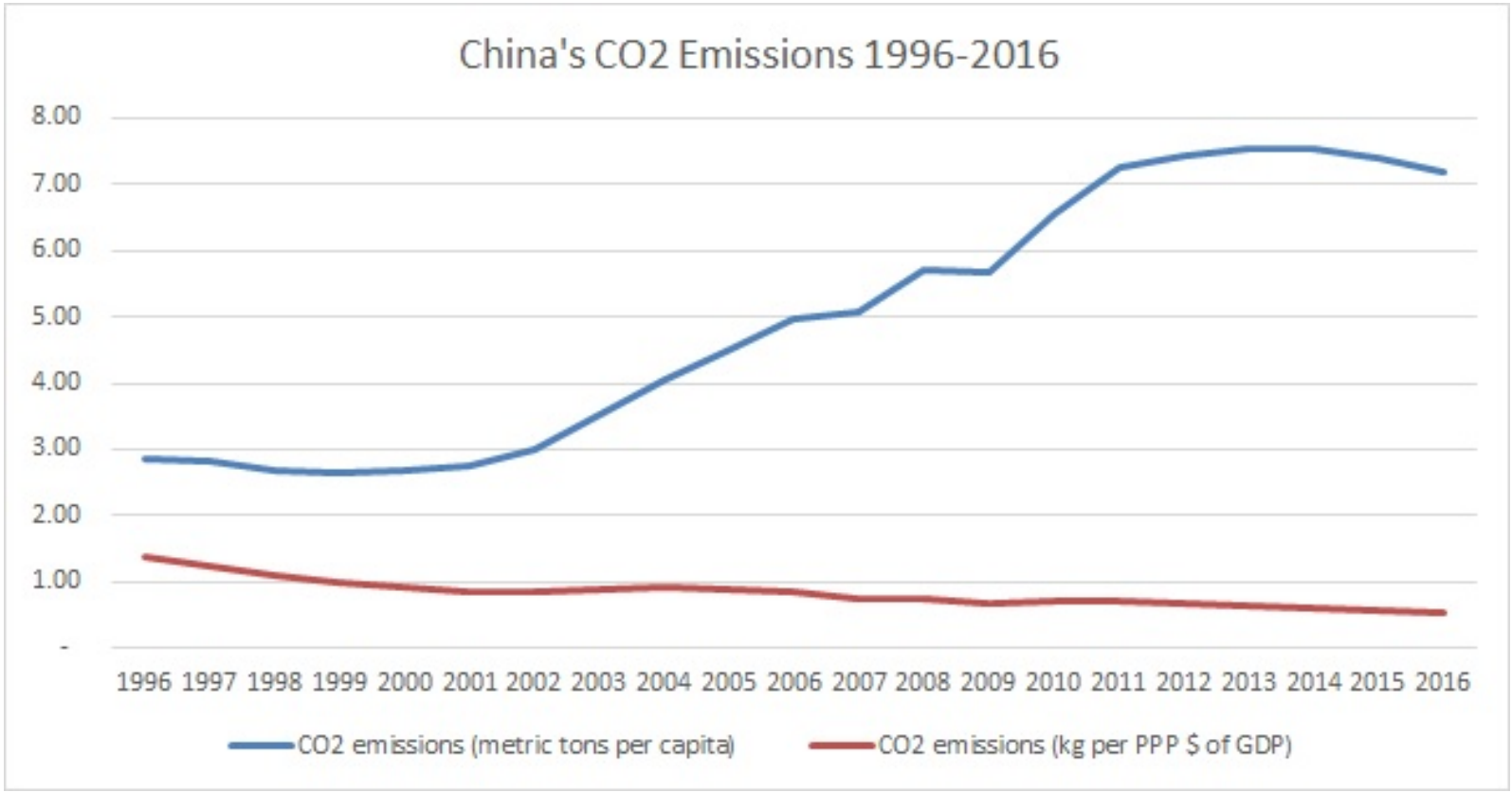


Figure 21.2
Energy use per unit of real GDP (oil equivalent per 2011 PPP-adjusted dollar).
Sources: Energy use is from BP (2016). GDP is annual 2011 PPP GDP from World Development Indicators, last update, August 10, 2016.

Population



Source: World Bank Development Indicators

Environmental Quality and the Sustainability of Growth

- Conclusion: Bad News.
  - "The interaction between **global warming and water availability is the area of greatest long-run uncertainty".
  - "According to some models, rainfall in the North and especially the Northeast will decline, and rain in the South will increase".
  - This "would exacerbate the existing water imbalances and the impact of severe coastal events".
  - "The glaciers of the Tibetan plateau are the ultimate source of China's rivers and...[the] speed at which these glaciers are shrinking appears to be accelerating".
  - In addition, "Higher temperatures will increase surface evaporation and reduce runoff".
  - These "powerful forces may come together in a way that threatens China's water availability".

Environmental Quality and the Sustainability of Growth

- Conclusion: Good News.
  - At least since 2005, Chinese policy-makers have shown signs of commitment to environmental improvement.
  - The end of the miracle growth phase may help this commitment in at least 4 ways:
    - 1.**Slower economic growth:** The simple fact of slower GDP growth means that **fewer emissions and pollutants** are being released.
    - 2.**Lower investment:** As growth slows, China will gradually invest a smaller share of its GDP in new fixed capital.... This reduces the demand for energy-intensive industrial goods such as steel and cement.
    - 3.**Shift to services:** As industrial output reaches peak levels, the growth impetus shifts to services....Most services are far less energy intensive and polluting than industry.
    - 4. As Chinese policy-makers search for **new drivers of growth,** they have increased resources directed to technology and industrial policies, including those focused on "strategic emerging industries" **(SEIs) of which many are related to renewable energy and "environmental engineering".**