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## China's Economy and Global Interactions in the Long Run

Thomas G. Rawski\*  
University of Pittsburgh

### OVERVIEW

Following three decades of reform success, China, with its double-digit GDP growth, prodigious exports, staggering appetite for resources, and massive hoard of foreign exchange, has become the world's newest, and largest *Wirtschaftswunder*. Today's vision of dynamic China represents a major shift from the recent past. It is also the latest in a long series of historical changes in the external view of China's position among the economies of Asia and the world.

Sixteenth-century visitors from Spain, Portugal, and Britain depicted China as prosperous and technologically sophisticated. Strong overseas demand for Chinese manufactures, notably silk, tea, and porcelain, enabled the Middle Kingdom to profit handsomely from its technological leadership. Beginning in the 1570s, Chinese merchants parlayed these manufactures into large-scale imports of silver, which transformed the domestic monetary and financial system.<sup>1</sup>

These advantages did not endure. Two centuries later, European writers, among them Adam Smith, viewed China as stationary rather than dynamic. China's relative position deteriorated rapidly after 1800, partly because of accelerated technological developments associated with the Industrial Revolution in Britain and Europe, and more specifically because foreign entrepreneurship and innovation erased the advantages formerly enjoyed by Chinese producers of silk (superior Japanese quality control), tea (successful branding and quality control by British planters in South Asia) and porcelain (British and European firms mastered technologies formerly unique to East Asia).<sup>2</sup>

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\*[tgrawski@pitt.edu](mailto:tgrawski@pitt.edu). This paper extends an initial effort written together with Evelyn S. Rawski (2008). The author has benefited from conversations with her, from conversations with Loren Brandt, Albert Keidel, Nicholas Lardy, and Debin Ma, and from Adam McKeown's bibliographic advice. Opinions expressed here are those of the author alone.

<sup>1</sup> On European impressions in the sixteenth century, see Mackerras 1989; on Chinese participation in the Southeast Asian trade networks, see Ng 2004. According to Frank 1998: 104, Chinese quicksilver, essential for refining silver, also entered the Spanish Americas via the Manila galleons and was a significant Chinese export. In addition, p. 112, China exported zinc and cupronickel which were used as alloys for coinage in other countries.

<sup>2</sup> For silk, see Ma, 2004; for tea, see Gardella 1994; for porcelain, which was successfully produced in Europe only in 1709, see Emerson, Chen, and Gates 2000.

Although interaction with the outside world cannot fully explain the evolution of China's economy from advanced to backward, and then from backward to the "workshop of the world," internal processes alone are equally incapable of accounting for the past five centuries of China's economic history.

## I. CHINA AND THE WORLD ECONOMY: NARRATIVE<sup>3</sup>

### The Sixteenth-Century Trade Expansion

China's rich tradition of international exchange dates back at least to the Roman empire, which imported Chinese silks. Prior to 1500, however, transport technology constrained long-distance commerce primarily to overland carriage. As a result, high transport costs stringently limited the volume of trade.<sup>4</sup>

Beginning around 1500, advances in maritime navigation spurred European participation in Asian commerce.<sup>5</sup> The Portuguese and the Dutch were the major European traders in Asia before 1650. The Portuguese first reached the Pearl River delta in south China in 1517. Expelled from the delta (1522), the Portuguese conducted an illicit trade on islands along the China coast, then (1550) were permitted to trade at Macao. The Dutch, who arrived in 1600-1601, established a trading post on Taiwan in 1624. The number of European ships sailing into Asian waters was small at first; waiting for the monsoon winds made for lengthy voyages. Portuguese vessels might take three years to sail from Goa to Macao to Nagasaki and back.

Before the 1540s, inter-Asian trade came under the rules of the Chinese tributary system. China's central government monopolized legal trade, restricting market access to foreign entities willing to subordinate themselves as vassals to the Chinese emperor. The Korean court had accepted vassal status in the fourteenth century, as had the Ryukyus. The Japanese shogun Ashikaga Yoshimitsu (the first and last shogun to accommodate himself to the Chinese system) resumed tributary status after a break of seven centuries and sent four embassies to China between 1401 and 1405. During the fifteenth century, China's weakened central government was unable to restrict foreign trade to its normal official channels (the so-called 'tributary' trade), and the disappearance of effective central authority in Japan permitted Japanese regional lords in western Honshu and Kyushu to participate in the lucrative China trade on their own accounts. The trade taking place outside official channels was sometimes conducted through fraudulent embassies bearing false credentials – enterprising Japanese and Ryukyuan magnates claimed to represent the

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<sup>3</sup> This section is condensed and modestly revised from E. Rawski and T. Rawski (2008). Brandt (2006) reviews China's involvement in foreign trade since 1450.

<sup>4</sup> Chinese data from the 1930s show minimum transport costs per ton-km of 0.02 yuan for railway, steamship, or sailboat vs. 0.05 for carts, 0.10 yuan for wheelbarrow or pack animal, and 0.20 yuan for human porter (T. Rawski 1989, p. 184).

<sup>5</sup> According to Curtin 1984: 136, the stimulus was not advances in ship design but "the discovery of the world wind system." See his chapter 7.

“King of Japan” or the “King of the Ryukyus,” and Ming officials often accepted such claims. Despite Ming prohibitions, privately conducted maritime trade cum piracy flourished.

The intra-Asian market activity in the sixteenth-century was primarily driven by the demand for Chinese silk and cotton textiles. The “Japanese pirates” were in actuality an international group which included Chinese merchants from the southeast coast who set up residence in Japanese ports and presided over extensive trade networks stretching from south China outward to East and Southeast Asia. Both Li (d. 1625) and Zheng Zhilong (1604-1661) were natives of Quanzhou, in south coastal Fujian. Li began his trading career in Manila, but moved to Japan (1607-08) after the Spanish massacred Chinese settlers in that city (1603). He became the “head” of the Chinese merchants in Hirado, an important international trade port in western Kyushu. Most of what we know about his activities comes from English, Dutch, and Japanese accounts.

In the next generation, Zheng Zhilong began his career working for Europeans in Macao, Manila and perhaps Taiwan. By the age of twenty, he was in Hirado. He preyed on Dutch and Chinese shipping before being pardoned by the Chinese government in 1628, and put in charge of suppressing pirates. With an official imprimatur, Zheng eliminated his competitors and consolidated his maritime empire which had branches in Nagasaki, the Philippines, and Taiwan. After 1628, he also controlled a large portion of coastal Fujian. He managed overseas trade in Xiamen and Taiwan, collecting taxes and commissions on goods traded from these ports and on ships at sea. The Zheng trading enterprise “in many respects resembled the contemporary East India Companies of Europe, with an international viewpoint, very large financial resources, major military power, and well-coordinated commercial strategies.”<sup>6</sup> This was the economic and institutional base from which his son, Zheng Chenggong, and other descendants were able to oppose the Qing conquest for several decades. At its peak, the Ming loyalist forces of the Zhengs were able to muster over one hundred thousand men and attack towns in the Yangzi delta.<sup>7</sup> When Zheng was forced to retreat to Taiwan in 1661, he drove the Dutch East India Company out of the trading post they had erected on the southwest coast. Chenggong’s son and successor, Zheng Jing brought Southeast Asia back into the Zheng maritime trade network and permitted the English East Indies Company to open an office in Taiwan (1670). Only in 1683, two years after Zheng Jing’s death and nearly four decades after they entered Beijing, were the Manchus able to capture the last of the Zheng leaders and close down their trading empire.

Early European traders functioned as niche players in well-established networks of migration and entrepot trade that linked China not just with neighboring Japan and Korea, but also with ports in Southeast Asia, where Chinese, Japanese, and Ryukyuan traders were present everywhere from Manila in the east to Malacca in the west. The Portuguese,

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<sup>6</sup> Ho 1994: 47.

<sup>7</sup> Carioti 1996, 2006.

for example, carried Chinese goods to Japan when the Ming prohibition on official trade prevailed.<sup>8</sup>

### **Silk, Porcelain and Tea: China's Export Products**

China's primary exports were based on technologies in which it either held a monopoly or a comparative advantage for a considerable period. The technology of producing silk textiles from silkworms seems to have been known by Chinese at least 5,000 years ago, and remained a Chinese monopoly until the third or fourth century A.D. The existence of silk pieces in Christian church treasuries, medieval Fustat in present-day Egypt, and other parts of the Middle East indicate that Chinese silk remained a much-desired product in Asia and Europe until at least the nineteenth century.<sup>9</sup> Embroidered and fringed silk shawls traveled via Manila to Spanish colonies in the Americas and eventually directly to Seville; lavishly embroidered bedcovers were "one of the most ubiquitous items made in China for export to the West," and painted silks were used in Europe for clothes and furnishings.<sup>10</sup> Silk was the major commodity shipped from China by the British East India Company until the middle of the eighteenth century; exports increased again after a disease ruined European sericulture in the middle of the nineteenth century, more than doubling between 1868 and 1900.

Silk remained China's leading export from 1900-1930, but during that period, Japan was supplanting China in world markets, providing a higher standard of quality demanded by American silk manufacturers for their power looms. China's failure to rapidly adapt to the new requirements of textile manufacture, and Japan's success in organizing reforms of its silk industry was responsible for its market loss.<sup>11</sup> Before the late nineteenth century, China had "few rivals in silk" in the world economy. By the early decades of the twentieth century, however, superior organization had enabled Japan to supplant China as the leading exporter: whereas the Japanese producers could enforce improvements in the uniformity of their silk, extreme atomization of production hindered similar reforms in China, making Japanese silk a much more desirable commodity in Europe.

Before the height of European imports of Chinese porcelain, which dominated the sixteenth to eighteenth centuries, Chinese porcelain exports circulated for the most part in the vast sector of Eurasia that extended from the eastern Mediterranean to the Pacific Ocean. From the ninth to the sixteenth century, international trade in Chinese porcelain and stoneware—first white vessels, then *qingbai* (bluish white), and finally blue and white ware-- was in the hands of Chinese, Southeast Asians, and Arabs, who distributed

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<sup>8</sup> On the replacement of the Silk Road by maritime trade, see Meilink-Roelofs 1962; on the Asian trade network in which European traders functioned, see Klein 1989. Gang Deng 1997 presents estimates of China's foreign staple trade from earliest times to ca. 1715.

<sup>9</sup> Wilson 2005: chapter 2; on the early Silk Road, see Curtin 1984: 93-4.

<sup>10</sup> Wilson 2005: 29-32.

<sup>11</sup> Li 1981, Introduction.

the ceramics to Korea, Japan, Southeast Asia and into the cities of the Middle East, where shards of Chinese pieces have been found at excavations of ninth-century Samarra in Iraq and Nishapur in Iran.<sup>12</sup> The raising of shipwrecks in the China Seas during the late twentieth century suggests the large scale of porcelain exports: for example, 60,000 pieces were recovered in 1983 from a Chinese ship which sank in the mid-1640s on its way from China to Batavia. In the Philippines alone, thirty-one shipwrecks bearing large cargoes of porcelain have been found. Japanese records for three years in the 1635-1645 period show an average of 371,000 pieces of ceramic exports a year; in 1645 the Dutch shipped 300,000 pieces of porcelain to the Arab market. Total annual exports of Chinese ceramics approximated one million pieces during the seventeenth and eighteenth century.<sup>13</sup>

First introduced to Europe in the fourteenth century, porcelain was “As valuable as gold” and “a great rarity, serving as gifts for potentates and kings.”<sup>14</sup> Francesco de’Medici was able to produce a soft-paste porcelain in the sixteenth century but since Italian kilns were only able to fire clays at 1100 degrees Celsius the finished product was very different from Chinese porcelain and, because of the difficulties of firing, few vessels were produced. Experiments continued, but it was not until the late seventeenth century that Count Ehrenfried Walther von Tschirnhaus (1651-1708) was able to devise a kiln that could match the high temperatures attained in Chinese kilns. A “renegade alchemist,” Johann Friedrich Böttger (1682-1719), was assigned by his patron, Augustus the Strong (1670-1733), Elector of Saxony and King of Poland, to assist Tschirnhaus with his work. The successful production of Chinese-type (hard-paste) porcelain in Europe came in 1709, after Tschirnhaus’ death; the first porcelain factory was established a year later, at Meissen. Of course, the onset of European manufacture did not immediately affect demand for the Chinese product.

The tea plant, *Camellia sinensis*, is a perennial which originated in the mountains of southwest China and northeast India.<sup>15</sup> Of the two major subspecies that are commercially important, the China variety is a multi-stemmed bush which reaches a height of nine feet in its natural state and may survive for a century. As cultivated in the hills of south China, the tea plant reaches a height of only a few feet, easing the task of picking its leaves and leaf buds for processing.

Tea seems to have become a Chinese beverage of choice during the eighth century, and trade in tea along Inner Asian routes began at about that time. By 1840, tea is estimated to have ranked fourth in value of all commodities marketed on an empire-wide scale; at that point approximately 23 percent of the total tea output was exported.<sup>16</sup> Tea was “one

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<sup>12</sup> Emerson, Chen and Gates 2000: 74-80.

<sup>13</sup> Deng 1997: 275-76.

<sup>14</sup> Emerson, Chen and Gates 2000: 24, 25.; 26-30 on the development of European porcelain.

<sup>15</sup> Gardella 1994: 9.

<sup>16</sup> Gardella 1997: 6-7; Wu Chengming’s estimate, reported above, is lower than Perkins 1969, who estimated that 30-40 percent of tea output was exported during the late Qing.

of the few staples of Sino-European commerce,” and China was the world’s principal source of supply until the 1880s.<sup>17</sup>

Even before the Boston Tea Party, which was a reaction against the British tax on tea, the beverage was a prestige item in European diets. Attempts to establish tea plantations outside China foundered for ignorance of the complex processing of the tea leaves. Despite attempts by Chinese officials to ban the export of tea seeds or plants, not to mention knowledge about the crucial process by which the tea leaves were converted into tea, the Englishman Robert Fortune, posing as a native, entered the tea growing region in south China in the 1840s and smuggled out tea plants. Even though tea was native to Assam, the first British tea plantations in India based themselves on Chinese tea plants. Assam became the center of tea production in India. Grown on plantations, the Assam tea processing was mechanized in the second half of the nineteenth century, and black tea became a “semi-standardized commodity” enjoying economies of scale. The industrial model of tea production was replicated on Ceylon, in the Dutch East Indies and in British colonies in east and south Africa. Meanwhile, the creation of tea blends in the new grocery chain stores of Thomas Lipton persuaded consumers to switch to Ceylon and Indian teas, to the detriment of Chinese tea exports. China’s tea trade fell sharply, beginning in the 1890s.<sup>18</sup>

### **China and the Global Economy, 1800-1937**

During the nineteenth century, China’s global standing continued its decline from “advanced” to “backward.” As the Industrial Revolution spread beyond Great Britain, productivity and living standards in a succession of nations advanced far beyond even the most prosperous regions of China. Expansionist policies rooted in Europe’s growing commercial ambition and military strength resulted in the “unequal treaty” system that, beginning with the 1842 settlement ending the first Opium War, forced China to allow free trade (and, following an 1895 agreement, foreign investment) in a growing roster of open ports. As noted earlier, technical and organizational innovations in Japan, Europe, and India stripped China’s leading sectors - silk, porcelain, and tea - of their formerly advantageous position. By the end of the 19<sup>th</sup> century, Japan had joined the ranks of would-be colonizers, reversing East Asia’s long-standing political and cultural order by defeating Chinese military forces and publishing cartoons showing “modern” Japanese endowing Chinese primitives with fire and other elements of civilization.

Aside from material directly related to international trade, systematic research on trends in China’s domestic economy is surprisingly limited for the 19<sup>th</sup> century, but considerably richer for the early decades of the 20<sup>th</sup> century. We can provide the following brief summary:

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<sup>17</sup> Gardella 1997: 6-7.

<sup>18</sup> Ibid., 124-36, Table 1, p. 7 and Table 2, p. 8.

Economic growth. At the national level, aggregate output expanded during the 19<sup>th</sup> century, despite the negative impact of massive warfare incited by Taiping rebellion (ca. 1854-1867). Perhaps the clearest evidence of widespread growth comes from Wu Chengming's somewhat impressionistic but extensively documented estimates (see Table 1) showing that the volume of domestic trade rose steadily between 1869 and 1908, with the deflated value of goods entering trade expanding at an average annual rate of 1.5 percent over this 40-year period. These data confirm the farm sector's involvement in growing domestic trade (and, by implication, specialization): Wu shows annual grain shipments rising from 233 million *dan* (a measure of weight equal to 133.33 pounds) before 1840 to 372.5 and 526.8 million *dan* in 1894 and 1919/20 respectively, along with impressive increases in shipments of soybeans and cotton (Wu 2002, p. 278).

[Table 1 about here]

Growth accelerated in the early decades of the 20<sup>th</sup> century. T. Rawski finds that China experienced "modern economic growth" prior to the 1937 outbreak of the Pacific War, with real output per person rising by 22-24 percent between 1914/18 and 1931/36, "a rate that approached comparable Japanese figures for the period 1897-1931 (1989, p. 332). Expansion was not uniform, but clustered in regions involved in both foreign trade and manufacturing, notably the lower Yangzi region centered on Shanghai (see Ma 2008) and the Northeast region, which benefited economically from Japanese investment (and eventual colonization; see for example Chao 1982).

International Trade and Investment. As the 19<sup>th</sup> century progressed, China's economy, particularly the regions economically linked to the coastal treaty ports (via physical proximity or water-borne transport), gradually linked up with the expanding regional and global flows of trade and investment, now dominated by the newly industrialized European powers. With its formerly dominant manufactured exports suffering diminishing market strength, China's exports came to resemble those of other low-income regions. Ongoing reduction of manufacturing and shipping costs originating in Europe rapidly enlarged trade volumes as well as the range of goods available to long-distance maritime commerce.

Available data, crudely summarized in Table 2, show that China's share of world trade remained stable at 1.3 percent throughout the last quarter of the nineteenth century. Terms of trade also remained stable: using price indexes for exports and imports compiled by researchers at Nankai University, L.L. Hsiao finds that the ratio  $P_i / P_e$  is 101.3 in 1870, 93.2 in 1880, 79.0 in 1890, and 103.7 in 1900. Chi-ming Hou's revision of the Nankai indexes also shows no major trends: Hou's figures for  $P_i / P_e$  average 75.2 for 1867-70 and 84.0 for 1900-03 (data from Hsiao 1974, pp. 273-275).

[Table 2 about here]

Moderate acceleration of domestic growth during the early 20<sup>th</sup> century contributed to China's growing share of global trade, which reached 2.4 percent during the 1920s (Table

2). Terms of trade became more volatile after 1900, with steep increases in the ratio of import to export prices occurring during World War I and again during the global depression of the 1930s.

The proliferation of steamships, railways, and telegraphs expanded the scope of domestic commerce, thus multiplying the impact of maritime links with Europe. For example, Loren Brandt shows that by the late 1880s, rice prices throughout the Yangzi River drainage area become firmly linked to international price trends, creating strong reciprocal ties between transnational rice markets and all inhabitants of the Yangzi area who grew, traded, or ate rice or conducted business with partners who did so (1985, 1989, which also shows similar results for wheat and cotton in North China). Since China's major rivers flow from west to east, completion in 1905 of the first north-south railway linking Peking to the major Yangzi port of Wuhan stimulated trade by cutting transit time between the two centers from 40 to 2 days.

China's slow transition to modern economic growth. China's historically dominant position in the regional and global economy has led many to puzzle over the conspicuous absence of a quick response, parallel to Japan's Meiji restoration, following the shock of the Opium War defeat and subsequent European and Japanese incursions. Research of the early post-World War II decades emphasized the deleterious consequences of corruption (e.g. Feuerwerker 1970) and of traditional Chinese social structures (e.g. Levy 1949) – explanations that no longer seem relevant. Subsequent work (e.g. by Lin 1992) focuses on the “Needham puzzle”: in view of China's long-standing scientific excellence (chronicled by the late Joseph Needham), why the slow transition to modern growth? Kenneth Pomeranz attributes China's slow response to resource constraints, particularly the lack of conveniently-situated coal deposits (2000).

We suggest that structural and institutional factors may have constrained China's economy prior to 1949. China's large size may have slowed the transition to modern growth. Japan's fabled Toyota Corporation originated when the corporate founder, a village mechanic, encountered European textile machinery at a treaty-port exhibition and was inspired to develop what became the Toyoda automatic loom (Kajinishi 1962). But the proportion of Chinese who lived within a day's walk of a treaty port in 1870, 1890, or 1910 was surely far smaller than in Japan; how many potential Chinese Toyodas never materialized simply because the friction of distance separated them removed from sources of inspiration? The particularistic nature of commercial property rights is one candidate for detailed study. The intensity of commercial competition may have inhibited innovation (E. Rawski 1990). Finally, until the advent of the People's Republic, no Chinese government (except possibly the 16<sup>th</sup>-11<sup>th</sup> century BC Shang dynasty) possessed sufficient revenue to mount a substantial development effort. Under Japan's Tokugawa shogunate, the “feudal dues” amounted to roughly one-quarter of national product. Access to this immense share of total output allowed the Meiji government to buy off potential opponents, administer the country, strengthen the military, and devote approximately 5 percent of GDP to development efforts. This level of developmental expenditure exceeded the entire revenue share of the Qing central state (1644-1912) and



approximated the revenue share of all levels of government during the subsequent Republican era (1912-1949).<sup>19</sup>

### **China and the Global Economy, 1949-2009**

China's economic history since the creation of the People's Republic in 1949 falls into two chapters: the era of economic planning, which lasted until the late 1970s, and the era of reform and transition toward a market system, which began in the late 1970s and continues as this is written.

China's Economy Under Socialist Planning. We may summarize key features of China's socialist interlude as follows:

1. Resource mobilization. Land reform and expropriation of the business classes, followed by collectivization of agriculture effectively concentrated tangible wealth (except for household belongings) in the hands of the state. Control over most productive assets and monopoly/monopsony power in most markets permitted public accumulation on an unprecedented scale: by the late 1950s, government revenue amounted to 30 percent of GDP, a large multiple of the revenue achievements of all prior Chinese regimes (Lardy 1978, p. 41). Massive growth of public revenues supported a huge expansion of investment, initially with technical support and policy advice from the Soviet Union.
2. Investment spending extended to the creation of human capital as well as physical assets. China's socialist era brought a steep rise in literacy and important advances in public health – the latter reflected in declining infant mortality, which fell from approximately 140 to about 35 per 1000 live births between 1950 and 1982, and a substantial increase in life expectancy, which rose from about 44 to about 67 years during the same period (data from Wang and Mason 2008, p. 138).
3. Despite the waste and inefficiency common to planned economies, exacerbated in China's case by massive damage inflicted by political campaigns – particularly the Great Leap Forward and consequent famine of 1958-60 and to a lesser extent the “Cultural Revolution” of the late 1960s, China's planned economy recorded substantial growth. Focusing on 1950-75, years roughly coterminous with China's plan era, David Morawetz finds that China's 4.2 percent average growth of per capita income exceeded results in all but 10 of 77 developing nations, surpassing outcomes in other populous developing states, including Brazil, Egypt, India, and Mexico, often by large margins (1978, pp. 19-21).

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<sup>19</sup> Yeh-chien Wang concludes that “in the last quarter-century of the Ch'ing, the land tax [which was the chief source of fiscal revenue] fell within the range between 2 and 4 percent of the land produce in most districts and provinces” (1973, p. 128). T. Rawski's compilation of data for 1931 shows combined central and local government revenues amounting to 4.7-7.2 percent of GDP (1989, p. 23).

4. China's plan-era experience was unusual in that important advances in "basic needs" for average citizens – including education, control of infectious disease, access to basic health care, and protection via rudimentary social safety nets, coincided with stagnant per capita consumption and, for most rural Chinese, insufficient food supplies (between 1958 and the start of reform in the late 1970s).
5. Like other planned systems, China limited its participation in world markets to essential imports and the exports needed to pay for such purchases. The withdrawal of Soviet assistance following the Sino-Soviet split of the late 1950s pushed the economy in the direction of autarchy, as China's share of world trade fell far below levels attained in the 19<sup>th</sup>-century treaty-port era (Table 2).

Three decades of socialism left China's economy with an unusual combination of accomplishments and setbacks. Despite this mixed outcome, several aspects of China's plan system contributed substantially to the long boom that began soon after the death of Mao Zedong in 1976, and often in completely unexpected ways. These include:

- The uniquely Chinese approach to expanding socialist industry by emphasizing construction of "complete sets" of manufacturing facilities in most provinces. As a result, deregulation, which tended to create monopolies in the former Soviet Union, sparked competition among Chinese manufacturers.
- the expectation that local governments should pursue economic growth on their own initiative, a feature introduced under the Great Leap Forward of the late 1950s, which unleashed enormously successful entrepreneurial efforts beginning two decades later.
- Although China's rural collectives managed cultivation of approximately 95 percent of arable land, villagers continued to experience the impact of market forces via private plots (which occupied roughly 5% of land and a considerably larger share of household income), and the purchase and sale of subsidiary farm products (piglets, fodder for pigs and poultry etc.), building materials (housing remained largely private; households sought to provide newlywed sons with houses or at least extensions onto family homes); and brides (marriage typically involved substantial payments from the groom's family to the bride's parents).
- In rural China, the collective system forced all adults to respond to external forces (more often political than economic). When reform began in the late 1970s, this heightened awareness of external circumstances accelerated the entrepreneurial response of Chinese villagers and magnified the resulting rural boom (T. Rawski 2006).
- Current field studies of Chinese industry find that the legacy of institutions surrounding socialist industry – technical universities, government-

sponsored scientific research facilities, etc. - continue to generate benefits in the form of smoothing the every operations (e.g. firms hire engineers and train workers through networks linked to plan-era professional associations and educational institutions) and stimulating innovation and upgrading (e.g. a machine tool plant uses contacts established during the plan era to initiate cooperation with a German design institute).

### China's Economy During the Reform Era, 1978-present

There is no need to rehearse the well-known accomplishments of China's completely unanticipated economic boom of the past three decades.<sup>20</sup> We focus on the impact of global ties in the origin and extension of China's remarkable economic upsurge.

Chinese reform arose from two concerns: the inability of the collective farm system to provide an adequate food supply and dissatisfaction with overall economic performance that, despite favorable comparison with other large developing nations, lagged far behind the achievements of China's East Asian neighbors.

The ancestry of China's long boom is linked to post-World War II developments in Japan and especially in Taiwan, both of which experienced extraordinary growth involving substantial contributions from both agriculture and trade. Taiwan's experience is of particular relevance: a Chinese administration, relying on unconventional advice from Chinese economists, flouted then-standard anti-trade policies by replacing confiscatory foreign exchange policies with a new regime that rewarded successful exporters of agricultural and industrial products, resulting in a notable episode of export-led growth.

China's reform began with what amounted to a reverse land reform in which households received operational control (but not ownership) of arable land. Reversion to household cultivation exposed the disincentives associated with collective farming, as agricultural output surged even as large numbers of workers began to leave the farm sector. This initial rise in farm production rapidly erased chronic food shortages, relaxed long-standing foreign exchange constraints, and encouraged renewed expansion of rural industry (which had boomed in the late 1950s, contracted in the 1960s, and revived during the 1970s) via increases in both supply (of workers and of agricultural materials) and demand (from rising rural incomes).

At the same time, small and hesitant measures intended to expand foreign trade and experiment with foreign direct investment, notably the establishment of four special export zones (imitating earlier measures in Taiwan and other Asian economies) in south China.

These new trade zones, and the considerable flexibility enjoyed by China's rural industries (which remained largely under local government ownership until the late 1990s) soon developed into an unexpected export bonanza, thanks in large part to a fortunate

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<sup>20</sup> Naughton (2007) provides a good overview. For more detailed analysis, see Brandt and Rawski (2008).

historical accident. Starting in the late 1950s, Taiwan and Hong Kong emerged as centers for small-scale manufacturing of labor-intensive exports. Successful expansion raised land and labor costs, leading owners to search for new venues. The opening of south China provided an ideal opportunity for these entrepreneurs. The combination of Overseas Chinese entrepreneurial skill and marketing expertise with Chinese labor opened the door to massive expansion of foreign trade, and also provided an ample menu of opportunity for China's nascent private business sector.

In contrast to the historical circumstances surrounding China's pre-modern economic prominence, the current economic upsurge of the People's Republic depends on extensive transfer of overseas technologies rather than, as in the past, on distinctively Chinese production methods. In general, the recent commercial success of Chinese producers does not arise from distinctive products or trade secrets. Rather, as is widely observed, China's export dynamism arises from changes in transport costs and information technology that, together with a domestic transition from economic planning to a new form of semi-capitalism, have allowed enterprises staffed by China's immense work force to gain global market share in a rapidly expanding array of product lines.<sup>21</sup>

The clustering of Overseas Chinese manufacturing ventures along China's southern coast provided the first of multiple channels through which production technology, market intelligence, management methods, institutional options, and many other forms of knowledge poured into China's long-isolated economy. As reform expanded, foreign direct investment from multinational corporations and overseas travel and study soon emerged as important vehicles for knowledge acquisition. In recent years, multinational firms' expansion of China-based R&D centers as well as China's own outbound FDI, especially funds destined for the purchase of manufacturing properties (rather than widely publicized efforts at resource acquisition), have further enlarged the inward flow of knowledge and information.<sup>22</sup>

Growing participation of foreign business has contributed to China's development in many ways. Rapid dismantling of barriers to commodity imports and to foreign direct investment, which preceded China's 2001 entry into the World Trade Organization (see Branstetter and Lardy, 2008), injected international standards of quality and design into a broad array of domestic sectors.

The efforts of foreign manufacturers to build local supply chains, encouraged by a combination of government policy and cost pressures, have encompassed a growing proportion of domestic firms, especially in China's coastal provinces. A single example can illustrate this point. Johnson Controls, a U.S.-based firm, established a greenfield plant to supply auto seats to the Hyundai car assembly firm located in Beijing. The plant

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<sup>21</sup> Work by Peter Schott of Yale shows, for example, that Chinese manufactures have penetrated the "import space" of the U.S. economy more rapidly than goods from other exporters such as South Korea and Mexico.

<sup>22</sup> UNCTAD data tabulates China's incoming FDI at US\$52-72 billion annually during 2002-2006 and US\$83.5 billion in 2007; China's outbound FDI rose from US\$0.9 billion in 2000 to US\$5.5, 12.3, 21.2, and 22.5 billion in 2004-2007 (all at current prices).

was completed in March 2004. When visited in July 2005, this plant employed 60 suppliers, 10 of which are wholly owned Korean firms specified by Hyundai. The remaining 50 are private domestic firms located within an hour or so of the Johnson Controls facility in the Beijing suburbs.

As China's policy elites gradually came to appreciate the benefits associated with international trade and investment, numerous legislative and regulatory changes have smoothed the path to attaining these gains. In the 1980s, for example, foreign firms persuaded Chinese administrators to allow the use of newspaper advertisements to recruit staff, and to permit workers to change jobs without their employers' permission. During the 1990s, China permitted the establishment of wholly owned foreign firms; this in turn led to enhanced pressure to relax restrictions on private domestic business. The predilection of foreign firms for leased equipment led to provisions facilitating the spread of leasing to the domestic economy. The special legal/regulatory regime established to govern activity in the special economic zones, reminiscent of the mixed Sino-foreign regimes that governed China's 19<sup>th</sup> and early-20<sup>th</sup> century treaty ports, gradually spilled into the domestic economy – as did the zones themselves – as initial success encouraged local and provincial governments across China to campaign for permission to establish new zones to encourage foreign trade, foreign investment, technology start-ups and other forms of enterprise that could benefit from the beneficial regulatory environment provided to the initial zones.

The cumulative impact of these developments is very large. Over a period of three decades, China has vaulted from near-autarchy to join the ranks of global leaders in trade and investment. China's share of world trade outstripped Japan's in 2004. WTO data for 2008 rank China as the world's second largest exporter (behind Germany) and the number 3 importer of merchandise (trailing only the United States and Germany). China's trade ratio (combined value of exports and imports as a percentage of GDP) rose from 5 percent in 1970 to 12, 30, and 40 percent in 1980, 1990, and 2000. In 2005, the trade ratio reached 63.9 percent, a total far in excess of comparable figures for other large nations (with populations above 100 million – see Brandt, Rawski and Zhu 2007). Foreign-linked firms regularly transact more than half of China's overall imports and exports. China ranks among world leaders as a destination for FDI and is rapidly emerging as a mid-sized capital exporter.

The economic benefits associated with expanded participation in global flows of commodities, technology, capital, and knowledge, while large, remain unevenly distributed across China's vast landscape. Figure 1, which illustrates the differential impact of international trade and investment on three geographic sub-regions, demonstrates that a disproportionate share of activity, and hence of benefits, accrues to coastal provinces that, based on data for 2007, account for roughly 40 percent of the nation's populace, 60 percent of GDP, and more than 90 percent of international trade and nearly 80 percent of incoming FDI. As a result, regional trade ratios for central and western provinces resemble China's national figures for the mid-1980s, while the per capita volume of trade and FDI along the coast is 3-14 times the figure for central China and 10-16 times comparable figures for the west.

[Figure 1 about here]

In reform-era China, regional growth is closely linked to easy access to global markets, and also to a relatively small share of state ownership in the local economy. This reality places interior regions at a double disadvantage as they are both distant from coastal port cities and typically burdened by large state sectors, which preoccupy policymakers' attention, divert capital into often ill-chosen projects, and retard the growth of non-farm productivity and employment as well as the transfer of labor from farming to non-agricultural occupations (Brandt, Hsieh, and Zhu 2008).

China's massive efforts to construct a national system of expressways, together with nationwide development of airports and telecommunications, have sharply reduced the economic distance separating key interior cities from the coast. Additional policy interventions aimed at reducing regional inequality, such as the "Develop the West" campaign initiated in 2000, reflect official determination to pursue regional economic balance.

## II. CHINA AND THE WORLD ECONOMY: ANALYSIS

The analytic component of this paper explores three topics: monetary implications of transnational silver flows during the late imperial period; the idea of "economic culture" as a long-term stimulus to China's economy; and the changing impact of external market forces on China's domestic economy.

### **How Did International Trade in Silver Affect the Evolution of China's Money Stock?**

Prior to the 20<sup>th</sup> century, Chinese monetary history offers a rich tapestry of essentially qualitative observations. Numbers abound, but as yet with little effort to assemble them into a framework that might facilitate application of the quantity theory of money. In a setting without rapid growth or structural change, systematic compilation of (inevitably crude) monetary data together with (far superior) information on price changes has the potential to create a sharper image of trends in aggregate and per capita output than current knowledge can support. The following discussion represents a preliminary foray in this direction.

The broad outlines of China's domestic monetary arrangements are well-known. During the Song period (979-1279), China's economy used a combination of government-issued paper notes and metal coinage (copper, some iron). The circulation of China's copper<sup>23</sup> coinage extended to overseas regions, including Japan, Korea, and Southeast Asia.

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<sup>23</sup> Historians commonly refer to Chinese cash coins, which were actually made of a bronze alloy, as "coppers" or "copper cash." We follow this tradition.

Despite regional variations and problems associated with counterfeiting, researchers generally project a favorable view of the Song currency system, which seems to have provided a stable backdrop to the expansion of markets and domestic commerce. The Jurchen invasion of north China shattered both political and monetary stability. The Jurchen, attacking from their base in Manchuria, captured the Song emperor in 1126, forcing the remnants of the Song court to abandon their capital, Kaifeng, and flee to Nanjing.

The ensuing rivalry between the Jin dynasty (i.e. the Jurchens) and the Nanjing-based Southern Song lasted until the thirteenth century, when both parties succumbed to Mongol armies, which established the short-lived Yuan or Mongol dynasty (1279-1368). Political instability took its toll on both economic activity and monetary arrangements. Von Glahn notes that: “The erosion of popular confidence in paper money. . . [was] fully apparent by the turn of the thirteenth century. . . as the Southern Song state [began] . . . printing enormous quantities of paper money in order to defray its mounting debt. . .” (1996, p. 45). More generally, the unified currency collapsed after Song – von Glahn comments that monetary arrangements “refracted into manifold regional currencies. . . [the] preferred medium of exchange also shifted periodically. . .” (ibid, 11).

The Ming dynasty, established in 1368, faced the task of reconstructing trade networks and currency arrangements that had suffered considerable damage from the conflict and uncertainty surrounding this succession of rulers. Early Ming monetary policy, chronicled by Richard von Glahn, featured mercantile evasion of official mandates favoring a succession of dubious monetary instruments. The private sector’s capacity to sidestep official regulations via recourse to a variety of unofficial monies, including silver, privately-minted copper coins and counterfeit copper cash in commercially advanced coastal regions and grain, furs and cloth in less developed interior districts (see 1996, p. 97ff), illustrates the resourcefulness of the mercantile community, but also suggests high transaction costs, which surely hampered the growth of production and trade.

Against this background, the emergence of strong Chinese demand for New World silver is not surprising. Large-scale silver imports increased the volume, stability, and uniformity of China’s domestic currency base. Together with the revival of the government mints, which supplied the copper cash used in retail (and some wholesale) trade, import-driven expansion of domestic stocks of monetary silver provided the foundation for extending the scale of production, the reach of commercialization, and the volume and complexity of domestic and international exchange.

Documentary evidence tracks the growing prevalence of silver-based transactions. In Huizhou (South Zhili, modern-day Hebei province in north China), land-sale documents dating from the period 1456-1644 show that “in every one of the 836. . . contracts. . . the sale prices was denominated and paid in silver,” with no mention of copper coin (von Glahn 1996, p. 79). Yang Guozhen has compiled 18<sup>th</sup> and 19<sup>th</sup>-century contracts from

Quanzhou (Fujian province): 83 of 93 documents (and 83 of 88 dated before 1790) specify payment in silver sycee (ingots cast by money shops) or silver coin.<sup>24</sup>

Shortly after the discovery of rich silver mines in Mexico and Peru, new world silver began reaching China in large quantities. Protracted divergence between the high price of silver (relative to gold and other trade goods) offered in China and the much lower value assigned to silver in Europe and Japan provided the economic logic that propelled the lengthy and expensive process of mining silver, laboriously transporting it down to sea level, and then shipping it across oceans and continents to the Middle Kingdom. From 1592 to the early 17<sup>th</sup> century, the price ratio of gold to silver fluctuated between 1:5.5 and 1:7 at Canton, as opposed to 1:12 or 1:14 in Spain. This divergence attracted silver to China from Europe, the Americas, and Asia, where 1590s bimetallic ratios were approximately 1:10 in Japan and 1:9 in India. Large-scale transfer of silver led to the convergence of bimetallic ratios worldwide by the 1640s.<sup>25</sup>

While the data on silver flows are complex and widely debated, there is sufficient agreement to compare the magnitude of the monetary changes initiated by China's importation of new world silver with monetary conditions in the early 20<sup>th</sup> century, and to use estimates of silver flows to construct crude approximations of partial monetary aggregates prior to 1900.

Our analysis begins with the stock of monetary silver in 1910, which we take as equivalent to 1393 million yuan (or silver dollars), the midpoint of two estimates of China's monetary silver stock for that year (T. Rawski 1989, Table C-1, p. 364). Applying conversion factors of 1.3 troy ounces per yuan (ibid, 365, n. 3) and 32,151 troy ounces per metric ton (see [www.metric-conversions.org](http://www.metric-conversions.org)), the 1910 stock of monetary silver becomes 56.28 thousand metric tons or 56.28 million kg. Taking China's 1910 population at 425 million yields a per capita stock of monetary silver amounting to 0.13 kilogram.

We begin with the following question: if we divide a conservative estimate of 16<sup>th</sup> and 17<sup>th</sup> century silver imports by China's 1700 population, how does the resulting *increment* to China's per capita stock monetary silver arising from new world imports compare with the *overall* 1910 figure?

Andre Gunder Frank conveniently summarizes a considerable body of research on silver flows. Silver reached China along three routes: i) shipments of new world silver via Europe; ii) trans-Pacific shipments of new world silver via Manila; and iii) imports of silver mined in Japan. A review of each in turn, aimed at constructing a conservative estimate of China's imports of monetary silver between 1500 and 1700, produces the following results (for details, see E. Rawski and T. Rawski 2008):

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<sup>24</sup> Data tabulated in von Glahn (2007, p. 55).

<sup>25</sup> Flynn and Giraldez (1994, pp. 75-76), citing work by Chuan Han-sheng and by Kozo Yamamura and Tetsuo Kamiki.



Imports via Europe:	17,000
Trans-Pacific shipments	6,000
Direct imports from Japan	9,600
Total imports, 1500-1700	32,600 metric tons

Our population total for 1700 comes from Dwight Perkins' sensible review of demographic data, which remains useful 40 years after its original publication. Perkins places China's population at 100-150 million in 1650 and 200-250 million in 1750, commenting that "these figures are meant to indicate a range on which there is perhaps an 80 percent chance of the true figure being included" (1969, Table A.7, p. 216). We assume that China's 1700 population fell between 150 and 200 million, and take the midpoint of this range, 175 million, as a crude point estimate.

To answer the question posed above, we conclude that between 1500 and 1700, imports of new world silver, conservatively estimated to avoid possible overstatement of their economic consequences, added something in the neighborhood of 32.6 million kilograms or, dividing by 175 million, a per capita amount equal to approximately 0.186 kg. of silver to China's monetary stock for each person living in 1700.

This evidently represents a massive economic shift. The *increase* during 1500-1700 of approximately 0.186 kg. of silver per member of China's 1700 population is considerably larger than the *entire per capita stock* of monetary silver in 1910, which we place at 0.13 kg.

What can we say about long-term changes in the stock of monetary silver? Table 3 addresses this question by starting with the 1910 silver stock and applying data and estimates for cross-border silver flows during earlier periods to derive figures for China's stock of monetary silver in 1887, 1855, 1807, 1720, and 1500. With the exception of the figure for 1887, which is derived using annual trade data compiled by China's respected Imperial Maritime Customs Service, these results represent crude approximations at best. To obtain initial results, I have taken figures compiled in secondary sources, particularly the work of Man-houng Lin, without investigating the original sources or considering possible alternative figures. I have ignored differences in the fineness of silver reported in various sources as well as inconsistencies in conversions among bullion, dollars, and taels. There are also gaps in the trade data for 1700-1720, 1800-1808, and 1850-1856 – years for which my calculations implicitly assume zero import/export of silver.

[Table 3 about here]

To underscore the unavoidably crude nature of the calculations embodied in Table 3, I include a separate calculation based on data for 1910 silver stocks compiled by Yen-ping Hao.<sup>26</sup>

What can we learn from the figures compiled in Table 3?

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<sup>26</sup> Regrettably, I finished my 1989 study without encountering Hao's 1986 book. The large discrepancy among sources bearing on the 1910 stock of monetary silver requires further investigation.

1. **Monetary trends during the Qing era.** The data point to a substantial rise in the nominal money stock during the Qing era. The stock of monetary silver roughly doubled between 1720 and 1910. Furthermore, the rapid development of both indigenous and, beginning in the second half of the 19<sup>th</sup> century, “modern-style” financial institutions means that the share of commodity money in Qing monetary aggregates was far higher in 1720 than the 1910 estimate of roughly half (for silver alone) or two-thirds (silver and copper combined) for 1910. If, for example, commodity money occupied 90 percent of the 1720 money stock, then nominal money would have risen by 190% (Rawski figures) or 142% (Hao figures) between 1710 and 1910.

Since China’s population grew by roughly 118% between 1720 and 1910 (Table 3), the assumption of 90 percent commodity money in 1720 suggests that, in per capita terms, China’s nominal money stock may have been roughly 33% (Rawski figures) or 11% (Hao figures) larger in 1910 than in 1720.

Given the emphasis in the historical literature about the substantial development of markets and commerce during Qing, this increase in nominal money per capita is surprisingly small, particularly since the price of rice – the only major commodity for which long-term information is readily available – was dramatically higher at the end of the Qing reign than during the early 18<sup>th</sup> century. According to data compiled by Wang Yeh-chien, the price of rice in the lower Yangzi area rose from 0.80 to 3.91 silver taels per *shi* (annual data) or from 0.95 to 4.24 taels per *shi* (31-year moving average) between 1720 and 1910 (2003, vol. 3, pp. 291-298). If, as seems probable, lower Yangzi rice prices capture the broad trend of domestic prices, the data in Table 3, crude as they may be, indicate that despite massive silver imports and the expansion of banks and related financial institutions, China’s real money stock lagged behind population during the course of the Qing period. This is a surprise (at least to this author).

2. **Early demonetization.** Another unexpected implication of the data in Table 3 is the considerable decline in the per capita stock of monetary silver between 1500 and 1720, the exact period for which historians have highlighted China’s global role as a destination for silver mined in the Americas and in Japan. Table 4 presents the information on silver flows underlying the calculations in Table 3. The results show that in terms of annual averages, silver flows were much larger in the 18<sup>th</sup> century than during the 15<sup>th</sup> and 16<sup>th</sup> centuries, and that further large increases occurred during the 19<sup>th</sup> century. Thus the early silver inflows before 1700, although imposingly large from the perspective of contemporary observers and trade volumes, were dwarfed by subsequent volumes that reflected ongoing improvements in navigation and shipbuilding that brought long-term reductions in transport costs and corresponding expansion of market flows.

[Table 4 about here]

3. **Silver crisis in the first half of the 19<sup>th</sup> century.** Man-houng Lin (2006) and others have written extensively about the “silver crisis” associated with China’s rising imports of opium during the early decades of the 19<sup>th</sup> century. Until now, the exact nature of the supposed “crisis” has remained unclear to the present author. Table 3 brings the matter into sharp focus: using figures based on either of our 1910 data points, we see that China’s per capita stock of monetary silver declined by roughly half between 1807 and 1855. With limited development of bank money and no evident means of rapidly expanding the stock of copper currency, this appears to set the stage for a strong deflationary trend – exactly what the descriptions of “silver crisis” anticipate.

This raises a question of theory or principle. What is the meaning of “inflation” or “deflation” in an economy operating under a bi-metallic currency system? Available wage data pose this issue in stark terms: Table 5 presents data on wages in rural Peking compiled by Debin Ma from a 1943 paper by Sidney Gamble. In terms of coppers (the currency in which unskilled workers earned their living and purchased food and other goods), wages **rose**. But with the number of coppers needed to command one tael of silver rising from approximately 1000 around 1808 to 2000 and higher during the 1850s, the silver equivalent of these copper-denominated wages clearly **declined**. So, did nominal wages rise or fall? And with Wang’s series of lower Yangzi rice prices dropping from around Tls 2.9 per *shi* in 1805-10 to about Tls 1.4 during 1853-56, did the silver supply crisis erode the consumption basket of workers in rural Peking?

[Table 5 about here]

The answers to these questions are far from obvious. Without clear answers, unambiguous responses to seemingly straightforward matters such as “was the trend of wages, prices, and living standards up, down, or steady during period X?” will be difficult to obtain for an economy like that of imperial China.

4. **Steep increase in monetization during the late 19<sup>th</sup> century.** Man-houng Lin emphasizes the limited validity of the widely discussed linkage between opium imports, trade deficits, and silver drain. While the three coincided in the early decades of the 19<sup>th</sup> century, the subsequent decades brought a radical turnaround in which large inflows of silver coincided with continued growth of opium imports (2006, p. 22).

The data in Table 3 underscore the impact of this shift: China’s per capita stock of monetary silver rose by 118 percent (Hao data) or 193 percent (Rawski data) between 1855 and 1910, with most of the increase concentrated in the three decades immediately following 1855. We may speculate that aggregate monetary growth was even faster, as this period witnessed a rapid (and, most likely, accelerating) decline in the share of silver (and of commodity money) in the overall money stock. In addition, we should expect that the growing prevalence of bank money, which continued to 1936, along with the spread of modern transport and communications in the form of steamships, railways, and especially the telegraph, led to a considerable increase in the velocity of circulation. We conclude that the years 1855-1936 brought rapid

growth in China's money stock, a factor that might be expected to quicken the pace of development.

I must emphasize the preliminary nature of these calculations and, therefore, of interpretations using them. The underlying data require careful review and sifting. For example, Mio Kishimoto's review finds that Man-houng Lin's estimates of silver flows, used here to derive results in Tables 3 and 4, "are of limited reliability" (2009). In addition, Yeh-chien Wang cites contemporary accounts to obtain a series of historical silver stocks that differs widely from the figures derived in those tables (1992, Table 2).

### **The Contribution of Cultural Factors to China's Economic Growth**

Economists have slowly begun to extricate themselves from the self-imposed straitjacket of assuming that individuals are born with independent lifelong preferences. As predicted by Thomas Kuhn, it has required more than obvious inconsistencies to wean the tribe of dismal scientists from traditional assumptions about preferences. Fortunately, a growing body of "scientific" evidence from mainstream authors makes it increasingly acceptable for economists to admit culture into the pantheon of factors expected to influence economic behavior.<sup>27</sup>

I regard what I term Chinese "economic culture" as both distinct and economically significant. In comparison with other pre-industrial societies, daily life in imperial China for commoners as well as elites was permeated with the trappings of commerce: not just markets with fluctuations of price and currency values, but documents (contracts, receipts), public and private organizations with formal and informal regulations, shareholding. What is unusual is not the existence of bank drafts, land contracts, and so on – after all, such commercial tools existed in many regions of the world – but the frequency with which ordinary farm households (including women as well as men) participated in arrangements that demonstrated awareness of devices that, in other societies, rarely spread beyond political and commercial elites.<sup>28</sup>

These circumstances placed a considerable premium on literacy and numeracy, both of which reached high levels in imperial China. Evelyn Rawski (1979) shows that strong household demand for education, coupled with low prices for teaching services and for books, produced levels of literacy in Qing China that outstripped much of preindustrial Europe. John L. Buck's rural surveys during the 1930s concluded that 45% of males over the age of seven and 2% of females had received some schooling (ibid, 6, 18). To this we must now add evidence of widespread numeracy compiled by Baten, Ma, Morgan, and Wang (2008) who find that "estimates based on age-heaping data reveal Chinese

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<sup>27</sup> For example, Roth et al (1991); Denzau and North (2000); Hanushek and Woessmann (2008) ; Luttmer and Singhal (2009)

<sup>28</sup> Descriptions of these practices include Skinner 1964-65, Gates 1996, Cohen 2005, and T. Rawski 2006.

level[s] of human capital were among the highest in the world during” the late 19<sup>th</sup> and early 20<sup>th</sup> centuries.

I have argued elsewhere that the unusual proliferation of markets and commercially-oriented business and kinship ties created a populace that was unusually responsive to market opportunities (T. Rawski 2007, 2008). Ng’s 1983 study of the development of trade in and around the port of Amoy (now known as Xiamen) in Fujian province nicely illustrates this argument (1983, p. 37, with emphasis added):

the rural society with its dynamic structure **provided a training ground for its people to develop organizational capability**. Both the lineage and the cross-lineage organizations functioned as the medium for socialization within the rural environment. **People learned... techniques of accommodation to government authorities**. They also became less exclusive when the need arose.

This process of socialization within the village. . . [can] explain the social behaviour of the Fukienese trading communities in the extra-village environment. Although the lineage organizations did not function in its full-fledged form outside the ancestral village, **their rural experiences help them establish wider social connections through the practice of extending the use of kin terms in a figurative way in the association with non-kin people.**”

Ng contrasts the power of lineage organizations with the limited reach of the state, quoting sources to the effect that “people. . . have dared to refuse to pay taxes to the government, but they dared not refuse to pay the contributions [for the lineage]; they were not afraid of government officials, but they were afraid of these tyrannical bullies. . .” (1983, p. 36).

Ng also shows that official restrictions could disrupt commercial activities for several decades without eroding the business skills of local people: “the Ch’ing government failed to weaken the commercial position of Amoy even when it forcefully evacuated the coastal population and told the merchants to move their business. . .” (1983, pp. 53-54). Centuries later, the same cultural resilience confounded Mao Zedong’s effort to “forcefully evacuate” rural communities from household farming into People’s Communes, a reform intended in part to eliminate the petty capitalist instincts of Chinese villagers.

Two points deserve attention here. Historical evidence surrounding China’s participation in international markets richly illustrates the cultural advantage that Chinese migrants, many of humble origins, brought to marketplaces throughout the Asia-Pacific region. In addition, we can show that participation in international exchange contributed to regional cleavages that remain very apparent in Chinese society.

Trade and commerce have long provided avenues for socioeconomic mobility. P.T. Ho mentions “the common impression that Chinese society traditionally looked down upon and discriminated against artisans and merchants,” but immediately warns that historical research “reveals a very different picture” in which “the power of money was increasingly felt” first indirectly and, beginning in mid-Ming (i.e. after 1450), more

directly, so that “after 1850 at the latest, [wealth] had overshadowed higher academic degrees as a determinant of higher social statuses” (1964, pp. 41, 42, 256). In addition, the competitive nature of Chinese markets<sup>29</sup> enabled men of energy and ambition to join the lower echelons of the commercial world as petty traders and brokers (who earned commissions by introducing merchants to clients and facilitating their transactions). Chinese guilds tended to be inclusive rather than exclusionary, so that would-be traders could typically join guilds by paying standard fees and agreeing to abide by common regulations (Rowe 1992). Accumulated profits could support increased business volume, expanded trading orbits, or entry into new lines of business. Ma Junya finds, for example, that owners of early 20<sup>th</sup>-century “native banks” (*qianzhuang*), which he sees as “the key institutions of the national financial network,” had distinctly plebian backgrounds, with many having “started out as dealers in agricultural products. . . . many Shanghai native bankers were originally sampan owners who had long been engaged in the trade in beans, rice, and homespun cloth. . . . A majority of Guangdong native bankers started as opium traders. . . . [in the Northeast] most of the local native bankers had been involved in the trade in beans and bean products” (2008, pp. 360. 362).

Abundant historical evidence demonstrates long-standing Chinese prominence in international commerce spanning broad areas of Asia before, and well after the arrival of European traders and the creation of European colonies. Referring to work by Anthony Reid and Leonard Blussé, among others, Adam McKeown indicates that “Some researchers have begun to call the period from 1750 to 1850 the ‘Chinese century’ in Southeast Asia, when Chinese shippers, labor, and politics shaped the region. . . . [during this period] colonial administrators and planters frequently . . . remarked on their dependence on Chinese merchants” (2009, p. 942).

This story begins long before 1750. In the early 17<sup>th</sup> century, Dutch efforts “in establishing their commercial sphere of influence in the Eastern Seas. . . found Chinese merchants standing in their way. Since Western trade was actually grafted onto the junk trade, it was natural to find the ubiquitous presence of Chinese commercial interests” (Viraphol 1977, p. 11).

In the 1630s, Dutch observers “noted the practice by the Siamese king of using Chinese in the Japan trade” (*ibid.*). Indeed, a succession of Siamese rulers entrusted the entire apparatus of foreign commerce, including the construction and operation of ocean-going vessels as well as the management of both import and export trade, to Fujianese merchant-entrepreneurs. Beginning in the 15<sup>th</sup> century, “the Chinese had begun to act on behalf of the Siamese Court” in commercial affairs. Royal trading, which dominated Siam’s international commerce, was “dependent on Chinese who staffed the apparatus at all levels: royal factors, warehousemen, accountants, captains, seamen, and customs officials” (*ibid.*, 40, 19). Such practices reflected the commercial expertise of Chinese merchants, who, in comparison with indigenous populations across much of Asia, were “more knowledgeable about sailing junks and about market conditions at the various ports of call (where merchants were more often than not Chinese compatriots)” and also

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<sup>29</sup> On competition, see Myers and Wang 2002 and T. Rawski 1989.

skilled “in bribery and other ‘wheeling-and-dealing’ techniques [that] enabled them to transact business with minimal cost and delay” (ibid., p. 8).

Contemporary and retrospective accounts emphasize the responsiveness of Chinese migrants and business interests to commercial opportunities throughout East and Southeast Asia:

Pomeranz notes perhaps 30,000 Chinese at Manila before the 1603 massacre and possibly 100,000 Chinese around Batavia in 1800 (2000, p. 205).

Chinese flocked to Singapore after the opening of that city’s port: “When Singapore was opened. . . Chinese junks immediately traded there. . . . Singapore rose rapidly as a trading center when the Chinese flocked there (in 1819, their number was 30, but in 1824, there were 3,317 Chinese out of a total population of 10, 683 on the island). The Chinese apparently spread the news of Singapore as a trade center so more Chinese came, and with them the junk trade” (Viraphol, 1977, pp. 205-206).

Fujian’s well-known specialization in human trafficking dates back to the 16<sup>th</sup> century: Ng reports that smuggling would-be migrants from the Chinese mainland to Taiwan “had become a profitable occupation in Amoy” before 1700 (1983, pp. 83-84).

Despite repeated massacres, Chinese influence in Southeast Asia remained strong. “At Batavia and Luzon, the services of Chinese as middlemen and procurers for the European colonials were indispensable. The Batavia government had attempted to get rid of Chinese influence, but ironically the Chinese economic position grew stronger. By the last half of the eighteenth century . . . the Chinese had become dominant began in the colony’s economic life” (Viraphol 1977, p. 170).

Chinese mercantile networks encompassed Korea, Japan, and Russia’s Pacific coast. After Commodore Perry forced Japan to permit international trade, Chinese merchants were quick to take advantage of new opportunities. In 1871, a foreign observer commented that if the Chinese staff of foreign trading firms “were suddenly removed, business [in Japan’s treaty ports] would come to an abrupt halt.” Two decades later, the foreign community became deeply concerned about “the damage to foreign businesses which would be done if war broke out between China and Japan . . . because of the possible internment of Chinese compradores” (quotations from Hoare 1977, pp. 26-27). Considerable portions of Japan’s late 19<sup>th</sup> century trade with Korea – especially cotton textile exports from Japan - were handled by “Chinese merchants in Nagasaki” (Furuta 2001, p. 73). Even after the rise of Japan’s regional political and military power, Japanese business networks in Korea “struggled with Chinese rivals” (Kimura 2001, p. 53).

Links between involvement in international exchange and commercial sophistication abound. In Fujian, for example:

Trade in the pre-sixteenth century period was mainly an activity of the urban population and monopolized by a small number of merchants. Around 1500, it was recorded in a local gazetteer that the more interior districts . . . were still ‘unfamiliar with commerce’ and their people ‘value only. . . agriculture’. . . . After the mid sixteenth century, trading activities in these districts are no longer the monopoly of the larger coastal cities. . . . More local people were engaged in trade, while tens of thousands of the rural South Fukienese sought their new livelihood in trade overseas. Around 1600, it was estimated that one half of the Fukienese population earned their living outside the home village (Ng 1983, p. 12).

Knowledge gained in trade and migration endowed participants with many advantages in China’s domestic economy. The opening of northern ports to foreign commerce following the Opium War settlements precipitated a northward migration of southern businessmen, whose personal experience and exposure to books describing European languages and currencies provided an advantage over their northern rivals.

During the century following the Opium War, such skills pushed Cantonese to prominence among the ranks of compradores and leaders of government-sponsored enterprise. The Kaiping Mines, for example, were initially led by Tang Ting-shu [Tong King-sing], whose cosmopolitan upbringing and efficient management earned the respect of foreign as well as Chinese observers. In addition to hiring foreign mining engineers, Kaiping recruited experienced Cantonese mine operatives.

how had the Cantonese already developed skills relating to modern mining which the natives of Chihli [the north China location of the mines] did not possess? A possible answer is suggested by a dispatch which S. Wells Williams sent to the Department of State about 10 years before Kaiping started to hire labor. In discussing the possibility of gold mining near Chefoo in Shantung, Williams said that ‘ the Cantonese miners who have returned from California and Australia are likely to gather here in numbers.’ He went on to speak of their skill and industry (Carlson 1957, p. 43).

Many accounts describe how individuals situated within networks of trade and migration accumulated organizational as well as technical skills.

Ma Zhuchao, for example, operating from a Hong Kong base, developed a business network built on personal ties with a far-flung network of emigrants, all of whom originated from a particular area in Guangdong’s Taishan region. Ma acted as an intermediary in both the family and business lives of his clients, combining remittances, services for new emigrants, banking, lending, and trade agency (Fok 2001). Tomoko Shiroyama’s (2009) study of the remittance networks linking the same Taishan region to overseas migrants prior to World War II shows the enduring imprint of these networks on economic life in China today. A 2009 *Economist* report patronizingly describes China as “a society that believes that even the simplest transaction must be accompanied by receipts with thickets of signatures and ‘chops’ (seals).” But these receipts and chops are nothing other than the modern incarnation of systems developed by generations of businesses seeking methods of assuring clients that their hard-earned funds would arrive



safely and without loss at the doorstep of recipients located in distant provinces or continents. Without techniques that strike the *Economist* correspondent as quaint or absurd, could millions of “township-village” enterprises have grown to employ over 100 million workers and generate annual exports worth tens of billions of dollars during the 1980s in the absence of well-developed commercial law?

The gap between commercially skilled populations along China’s coast, especially in the south, and less adroit inlanders, already noted as early as 1500, is clearly visible in China today – reflecting the persistence and heritability of cultural traits and organizational knowledge. In addition to the dominance of coastal provinces in foreign-trade and incoming foreign direct investment, which persists despite vigorous official efforts to increase the share of interior regions in cross-border flows of commodities and investment funds (see Figure 1, above), several examples can illustrate the depth and persistence of regional variation in commercial sophistication in China today.

- Cheng Li notes that “China’s entrepreneurs are disproportionately distributed along the southeast coastal area” (2009, p. 56). This reflects the relative openness of regional governments in the south to promoting and supporting private business. Supportive local government arises partly from the center’s willingness to ease long-standing restrictions by establishing special economic zones (SEZs) at the outset of reform.
- Discussions surrounding the reform also recognized the superior commercial/entrepreneurial skills in the coastal regions. According to the memoirs of former Premier Zhao Ziyang: “originally, there were going to be more SEZs along the coastal regions, including around Shanghai and in Zhejiang province. But [prominent economic specialist] Chen Yun said that those areas were not to establish SEZs. This region, as Chen Yun put it, was **famous for its concentration of opportunists who would, with their consummate skills, emerge from their cages if given the slightest chance**” (Pu et al 2009, p. 102, with emphasis added).
- Long after initial reforms spread beyond the special zones, Chinese observers recognize the continuing obstacles to development arising from obstructive governments in central and western China. In April 2008, Vice-Premier Wang Qishan, addressing a Central China Investment & Trade Exposition in Wuhan, “urged leaders in central China to further liberate their thinking and speed up reform.” Wang emphasized the importance of “transforming minds” and instructed the assembled leaders to “reduce intervention into micro-economic operations.” Commerce Minister Chen Deming’s promise to “help set up centers **to train business brains in East China for the central region**” highlighted the significance of regional differences in economic culture (Gong Zhengzheng 2008, with emphasis added).

- Visits to factories highlight regional differences in adjustment to the growing penetration of domestic and international market forces. Firms in Xi'an and Baoji (Shaanxi province) frequently commented on their own limited sales capability. An apparel firm reported that its market position had slipped due to competition from “southern” (meaning coastal) firms that enjoyed a six-month advantage in learning about fashion trends (2007 interviews).
- The manager of a large state-owned textile firm in Xi'an rejected suggestions that his firm could increase profitability by dyeing its products rather than selling plain cloth. His comment: *nanfang* [i.e. southern or coastal] firms do such things, but we don't – seemed to divide China's populace into two types: entrepreneurial risk-takers from the south, and more stolid personalities elsewhere (2007 interview).
- “Managers at a leading maker of auto parts were only able to produce products that were less ‘quality demanding’ in their inland facilities. . . . They also report that efforts to raise standards encounter broader cultural obstacles at interior plants, even though they regularly use workers from the same provinces to staff their superior coastal plants” (Brandt, Rawski and Sutton 2008, p. 624).

Alexander Gerschenkron emphasized “the significance of . . . native elements in the industrialization of backward countries” (1962, p. 26). For China, the legacy of traditional village culture represents a “native element” that has spurred commerce, entrepreneurship, and hence economic development throughout the five centuries reviewed here. There is no need to insist that the “will to economize” is stronger in China than elsewhere. Instead, the argument is that pre-modern Chinese village society, with its long and deep traditions of involvement with markets, financial instruments, contracts, shareholding, and complex organizations, produced social patterns and cultural legacies that equip its descendents with what, on average, amounts to an unusually rich and flexible portfolio of organizational skills with which to pursue economic advantage.

## **Changing Impact of External Forces on China's Domestic Economy**

Our review of long-term trends in China's global interaction reveals a gradual but uneven expansion and deepening of links between domestic and external economic mechanisms, culminating in a powerful surge toward integration beginning in the final decades of the twentieth century.

This gradual move in the direction of integration was not a one-way process; war and official policy repeatedly halted or even reversed the long-term strengthening of international links both under the Qing and in the 20<sup>th</sup> century. The Qing initially suppressed trade in order to deny resources to Ming loyalists under Zheng Chenggong, then sought to confine overseas commerce to Canton (Guangzhou) until the Treaty of

Nanjing (1842) initiated the system of treaty ports that expanded throughout the remainder of the 19<sup>th</sup> century.

During the 20<sup>th</sup> century, international exchange was limited by a succession of domestic and international events, including World War I, the (considerable, though often exaggerated) disruption of trade and transport arising from domestic struggles for political control during the “warlord era” of the 1910s and 1920s, the world depression of the 1930s, and the growing tension with Japan that exploded into open warfare following the Marco Polo Bridge incident in 1937, the hyperinflation that followed the Nanjing government’s retreat from its coastal base (and from its main revenue sources) and was quelled only after the Communist victory, the civil strife between China’s Nationalist (Guomindang) and Communist rivals that began in the late 1920s, simmered throughout the conflict with Japan, and exploded into open warfare following the Japanese surrender, and the quarter-century of near autarchy under the People’s Republic that held China’s global trade share far below levels observed in the century prior to 1937 (see Table 2).

Despite these setbacks, long-term trends moved in the direction of integration, with the most rapid movements concentrated in the late 19<sup>th</sup> and especially the late 20<sup>th</sup> centuries. Prior to 1800, the impact of foreign commerce on China’s national economy was greatest in the monetary sector, in which silver imports transformed the monetary system and underpinned the long-term expansion of money supply, commercialization of the rural economy, deepening of specialization and division of labor at the household and regional level, and intensification of local as well as interregional trade. Overseas influence was also evident in the gradual spread of cotton and of “new world” crops – especially maize, sweet potatoes, and peanuts, developments that vastly extended the demographic capacity of China’s land mass.

Prior to 1800, however, the direct and contemporaneous influence of international merchandise trade was largely restricted to regions adjacent to major trading ports, to districts that produced tea, silk, and ceramics - China’s main export products, and to the trade routes that linked producing regions with the port cities. These effects, although at times considerable, could not be described as having a major impact on the national economy. As William Rowe puts it: “no historian. . . would argue for the determinative importance of the West in China's history before 1800, however much recent scholarship has come to upwardly re-evaluate China's integration into a global community in the early modern era” (1998, p. 174); the same surely applies to China’s participation in intra-Asian commerce and diplomacy. Wu Chengming’s estimates of trade flows (Table 1) illustrate the dominant role of domestic commerce, even as late as 1869. From another perspective, we may note that historians of 18<sup>th</sup>-century Hunan, a province with easy water links to Pacific Ocean via the Yangzi River, analyze economic trends in great detail with virtually no reference to overseas influences (E. Rawski 1972, chap. 5; Perdue 1987).

The 19<sup>th</sup> century, however, brought a multiplication of international economic linkages, starting with the expansion of opium imports, which spawned nationwide marketing

networks that may represent an early episode of commercial branding.<sup>30</sup> The Opium War of 1839-1842 initiated a long series of treaty settlements that eventually opened dozens of Chinese cities to foreign residence, free international trade and, after 1895, foreign-owned factories: the number of treaty ports reached 50 by 1911; Abbey lists “49 cities . . . where the Chinese Maritime Customs maintained an office in 1920” and adds “ 33 additional towns that were declared by the Chinese government to be open for international trade. . . . [and] where foreigners were allowed to own or lease property and conduct business” (<http://www.geocities.com/treatyport01/treatyportlist.html>). These open ports, often selected for their role in domestic commerce, served as nodes that accelerated the circulation of imported goods, new technologies, novel organizational methods, and fresh ideas within Chinese networks of trade and information.

New modes of transport and communication – steamship, telegraph, and railway – as well as novel financial intermediaries in the form of foreign-run banks, reinforced this process by slashing the expense and especially the time to required to move both goods and knowledge across space. Rising trade flows and new linkages in transport, communications, and finance opened the door to unprecedented integration of China into the late-19<sup>th</sup> century global economy. Loren Brandt (1985, 1989) has shown that, starting in the 1880s, prices of major tradable products such as rice, wheat, and cotton within domestic commercial networks became linked through leading treaty ports to prevailing international prices in the Asia-Pacific Basin. Ma Junya (2008) uses early 20<sup>th</sup>-century reports to provide a qualitative extension of Brandt’s theme by showing how monetary conditions at the upper levels of the domestic marketing hierarchy (which responded to international financial fluctuations) governed the behavior of local money markets occupying lower nodes of China’s internal trade network.

The Great Depression of the 1930s offers an important opportunity to examine China’s links with the global economy. The conventional view is that China’s economy, although initially buoyed by the declining price of silver (which formed the basis for China’s monetary system while major trading nations linked their currencies to gold) and exports of inferior goods, suffered massively once leading nations cut their currencies loose from gold. Roosevelt’s silver purchase policy, which encouraged big commercial outflows of silver (enlarged by Japanese economic warfare), compounded the damage by reducing China’s money supply, and hence escalating the burden of deflation.

Brandt and Sargent (1989) questioned the supposed impact of the U.S. silver purchase policy. T. Rawski, insisting that the conventional accounts portraying “the early 1930s as years of desperate crisis for China’s economy contain large elements of exaggeration,” deployed data on production, railway activity, investment, wages, and prices to argue that “there was no large economic contraction in China during the depression years” and that “China avoided the steep decline suffered by America’s economy” because entrepreneurial Chinese bankers responded to the large silver drain by persuading the Chinese public to absorb “still larger amounts of bank money, allowing the money stock

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<sup>30</sup> Spence (1975, p. 152) refers to various types of opium: “Patna. . . Wu-t’u (Bengal).. . White Skin (Bombay). . . Red Skin (Madras).”

to rise and avoiding the lengthy deflation that affected the industrial nations” (1989, pp. 168-179).

Tomoko Shiroyama (2008) has completed a new study of the Great Depression built on more extensive and detailed research than any prior study. She proposes to reinstate the traditional view “that China – like many other countries – could not escape the dire consequences of the worldwide economic slump” (p. 1), that “fluctuations in the international price of silver critically undermined China’s silver-standard monetary system and destabilized its economy” (p. 2), and that, in the wake of the U.S. silver purchase policy, “the Chinese economy sank into a severe deflation” (p. 4). Unfortunately, Shiroyama makes no serious effort to refute the revisionists’ quantitative evidence, noting only that “their reinterpretation requires modification” (2008, pp. 269-70 – see note 28 to chapter 6). We are left with an unresolved conflict.

China’s era of socialist planning, which extended from the 1949 establishment of the People’s Republic until the mid- to late 1970s, saw limited involvement in global markets. This reflected Chinese mistrust of overseas trade and investment as well as U.S.-led efforts to restrict economic opportunities for the new Communist giant. As a result, China’s trade remained small in size (Table 2) and oriented mainly toward the Soviet Union and its allies, although trade with Japan, Canada, and the market economies of Western Europe began to increase during the 1960s and 1970s. The two oil shocks that roiled the global economy during the 1970s illustrate the extent of China’s isolation. Since the People’s Republic neither exported nor imported petroleum products, these events had no effect on the production, distribution, consumption, or domestic price of petroleum or any other energy product. Standard accounts of recent Chinese economic performance make no mention of “oil shocks” because China, unlike other large economies, remained unaffected by these events.

Beginning in the mid-1970s, reform efforts sparked a revival of international trade and investment, initially centered on Special Economic Zones that embodied many features of 19<sup>th</sup> century treaty ports. This initially modest revival mushroomed into an enormous and (at least initially) unexpected and unplanned trade and investment boom that catapulted China into the ranks of great trading nations, elevated Chinese demand to a key determinant of market conditions for a growing array of raw materials and transport modes, established China’s central and southern coast as a central participant in global networks of manufacturing (and increasingly, of R&D), entrenched China as a leading creditor nation, and moved the People’s Republic from marginal participation to a central player in global negotiations about trade, finance, macroeconomic stability, and environment.

China’s new position as the “workshop of the world,” with a correspondingly high trade ratio (Table 2), growing importance as a destination of foreign direct investment (and more recently, of multinational firms’ R&D operations), and massive participation in cross-national supply chains, betokens a huge increase in mutual interdependence between Chinese economic outcomes and the performance of the economies that supply

China with materials, equipment, and components, and with the economies of nations that absorb China's massive exports, particularly the United States.

Despite ample evidence of growing interdependence, the idea of “decoupling” – which holds that China (and other 3<sup>rd</sup> world nations, especially in Asia) can maintain growth momentum in the face of major business fluctuations affecting the big developed market economies – has gained surprising currency in recent years. The notion of decoupling is encouraged by rhetoric from Beijing suggesting that government “fine tuning” can insulate China's economic momentum from external shocks. Many Chinese economists seem to accept this position, at least in their public statements, which emphasize the necessity of maintaining annual GDP growth of at least 7-8% in order to promote employment growth and maintain social stability.

If decoupling seems to defy economic logic and experience, official statistics reflecting the impact of global downturns on China's economy, which are accepted without demur by legions of diplomats, economists, journalists, and international civil servants worldwide, seem even more improbable. Official data portray China's economy as enjoying the benefits of “export-led growth” when external markets expand, but suffering only brief and modest inconvenience when external demand growth slows or turns negative. It is as if China alone has access to a policy thermostat that allows Beijing to dial up desired growth regardless of the nature and severity of unexpected disturbances.

Unfortunately, there is no thermostat. In this author's view, the key ingredient in the apparent capacity of China's economy to shrug off negative shocks is adjustments that affect macroeconomic statistics rather than actual results. China seems to have adopted a strategy of deploying performance announcements as a tool of macroeconomic policy.

A recent monograph by Nobel laureate George Akerlof and Robert Shiller provides a plausible rationale for this approach: “We conceive of the link between changes in confidence and changes in income as being **especially large and critical when economies are going into a downturn**, but not so important at other times” (2009, p. 17, with emphasis added). I suggest that Chinese leaders share this perspective. They see an opportunity to cushion economic downturns by announcing inflated results that, thanks to their strong control over domestic media and their considerable influence<sup>31</sup> over international discussion, are accepted, repeated, and therefore validated by global as well as Chinese media, including major international organizations (World Bank, etc.) and commercial information outlets (Goldman Sachs, etc.).

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<sup>31</sup> On May 3, 2006, Ernst & Young issued a report estimating that “Conservatively, we estimate China's NPL liability from all sources including the banks, AMCs, investment companies, and credit co-operatives at more than U.S. \$900 billion, an amount that exceeds its massive foreign exchange reserves” (2006, p. 14). Seven days later, the firm withdrew the report amidst groveling apologies, presumably reflecting effective application of official Chinese influence; see <http://www.prnewswire.co.uk/cgi/news/release?id=170746> (accessed 21 September 2009).

What evidence supports this controversial view? I refer briefly to three recent episodes in which politics seems to have temporarily supplanted economic measurement in the determination of official announcements regarding macroeconomic performance.

**Short-term Impact of the Asian Crisis on China's Economy.** The Asian Crisis struck a considerable, albeit glancing, blow to China's near-term economic prospects, as formerly ebullient export markets in Southeast Asia suddenly evaporated. The present author ignited considerable debate by arguing that Chinese performance claims of 7.6% real GDP growth in 1997/98 and 7.9% in 1998/99 were far removed from actual results, which he guessed fell between -2% and +2% in those years. The debate was inconclusive, as well-informed, objective observers failed to reach a consensus regarding the plausibility of official claims for those years. Political manipulation of data at the local and provincial levels is widely recognized: in 1999, for example, an NBS official publicly denounced "cooked local figures" (see T. Rawski 2001, p. 351).

The author, who maintains the view that national-level official figures for those years failed to reflect actual outcomes, would point to three items:

- Chinese commentary at the time provides considerable evidence of data manipulation. In a May 2002 interview, NBS Director Zhu Zhixin began his discussion of "the current problems of China's statistics" by stating that "the statistics system cannot effectively resist intervention" (Xu Dashan 2002). Other retired and incumbent NBS officials offered similar comments.
- Retrospective Chinese data, which reflect revisions affecting measures of both output and energy, continue to show unprecedented outcomes during the crisis years. The elasticity of energy consumption with respect to GDP is negative in 1997 and 1998 and 0.16 in 1999. Annual data for 1990-2007 excluding those years average 0.71, with a minimum figure of 0.37 (for 1992). The elasticity of electricity consumption with respect to GDP is reported at 0.52 and 0.36 for 1997 and 1998. The average for all other years during 1990-2007 is 1.11, with a minimum figure of 0.75 (for 1995).<sup>32</sup> The clear implication: something is very odd about the data for 1997-99: either (as several Chinese commentators have suggested) the energy figures are too low or (as seems more probable) the output figures are overstated.
- In retrospect, the strongest evidence against the official figures comes from information about passenger traffic on China's airlines, a topic that attracted little attention during earlier debates. Figure 2 presents information about passenger traffic, reductions in ticket prices, and the price and income elasticity of demand during 1998. The data, although partial, seem to reflect overall trends. They can be used to provide a crude approximation of year-to-year changes in per capita income. The results

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<sup>32</sup> Energy elasticity data from Yearbook 2008, Table 6-8.

suggest a substantial **decline** in incomes during 1997/98. The conclusion is not that per capita incomes dropped by 8-20 percent during 1997/98, but rather that official claims of 6-7 percent growth of per capita income during 1997/98 are totally inconsistent with the data on passenger airline traffic, price changes, and elasticities.

[Figure 2 about here]

**Short-term Impact of the SARS Crisis on China's Economy.** SARS hit China in the first and second quarters of 2003. The impact on transport was particularly strong, as local authorities (and even informal citizen groups) organized blockades and applied quarantine measures to provide crude but effective barriers to the spread of disease vectors. Despite many qualitative reports of slowdowns, official data showed strong growth performance. I have not studied the national figures for the entire year in detail. The widely recognized disjuncture between national totals and provincial reports means that the national figures may be reliable even if lower-level reports are not. The following comment indicates that publication of implausible claims continued into the current decade, at least at the provincial level:

Among China's provinces, Beijing is uniquely dependent upon the service sector, which contributed 61.3 percent of the city's GDP in 2002, 10 percentage points higher than any other jurisdiction and 27 percentage points above the national average. The SARS outbreak prompted what Joan Kaufman describes as a "panic exodus" of students and migrant workers from the capital and essentially halted the normally huge influx of domestic and international travelers. As a result, Beijing's population dropped by perhaps 15–20 percent. Many public facilities and retail establishments closed their doors for several weeks. Despite these drains on economic activity, the municipality reported that total output during the first half of 2003 rose by 9.6 percent over the figure for 2002. Reported GDP for May was 4.8 percent above the figure for May 2002 and 14.4 percent above average monthly GDP for the first three months of 2003. Official reports place municipal GDP for the second quarter at 27.5 percent above results for the first quarter—more than double the comparable national figure, which shows a quarter-to-quarter increase of 12.4 percent. (T. Rawski 2006, p. 111).

**Short-term Impact of the 2008 Financial Crisis and Global Recession on China's Economy.** In 2008, as in 1998, the domestic economy had begun to lose momentum before the impact of a sudden international crisis landed on China's shores. In 1998, the domestic slowdown arose from what turned out to be excessively vigorous application of contractionary policy following a burst of inflation earlier in the decade. In 2008, the combined impact of a real estate slowdown and a stock market crash weakened domestic growth in advance of the international crisis.

The crisis brought a sharp falloff in export sales, foreign tourist arrivals, and other activity linked to overseas markets. The impact quickly brought strong downward pressure on many segments of domestic demand as well as disrupting export production. Employment dropped precipitously, with prominent Chinese analyst CAI Fang placing



the number of crisis-induced layoffs above 40 million<sup>33</sup> – i.e. more than 5 percent of the entire national work force.

Table 6 deploys officially reported figures summarizing year-on-year changes in monthly commodity output for the final month of each quarter beginning in 2009 Q1. The results provide a useful sketch of the timing of recession and recovery and the depth and speed of both the slowdown and the subsequent revival. They also illustrate the improbable nature of official data on the performance of industrial output, the largest component of China's aggregate output.

[Table 6 about here]

The data confirm that China's slowdown preceded the outbreak of panic and crisis in September 2008. The share of commodities reporting negative year-on-year growth doubled from 8.6 to 19.6 percent between March and June 2008, while the median increase in physical output for 70 items (compared with the same month of the previous year) slumped from 15.2% to 9.3% between March and June of 2008.

The crisis dealt a frightening blow to China's economy. Between June and September 2008, the share of commodities reporting negative year-on-year growth jumped from 18.6 to 42.8%, while the median rise in physical output (vs. the same month of the previous year) slid by a further 6 percentage points, to 3.3 percent. Qualitative accounts corroborate the suddenness of the autumn drop-off. Speaking at a December 2008 forum, State Council advisor Chen Quansheng said that around 670,000 small firms had closed as a result of the global financial crisis ([http://www.bjreview.com.cn/quotes/txt/2009-01/19/content\\_174995.htm](http://www.bjreview.com.cn/quotes/txt/2009-01/19/content_174995.htm), accessed 3 October 2009). Wu Fen, the chairman of JLP Nanjing Chemical Industrial Corporation, a maker of engineering plastics for the production of automotive interior and exterior decoration parts and fasteners on sleepers for high-speed railways, recounted in mid-2009 that “in the fourth quarter of last year, car sales stopped, and demand for our products practically dropped to zero.”<sup>34</sup>

The data in Table 6 also show that the economy reached its low point at the end of 2008 or early in 2009, and that the nadir soon gave way to a gradual process of recovery that continues as this is written in late September 2009. These observations confirm the beneficial impact of China's quickly formulated stimulus program and also confirm the claim that China was the first major economy to emerge from the crisis-induced slump. Here again, qualitative reports corroborate the statistical evidence. Wu Fen, the Nanjing executive quoted above, went on to say that “Now [evidently referring to late spring of 2009] auto demand has revived, and orders from the railway sector continue, and rising oil prices will float our product prices higher, leading to higher profits” (ibid.).

While confirming important features of the story conveyed by official announcements, the data in Table 6 point to a far larger slowdown than the official measures of GDP,

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<sup>33</sup> See [http://www.china.com.cn/zhibo/2009-09/08/content\\_18472595.htm](http://www.china.com.cn/zhibo/2009-09/08/content_18472595.htm), accessed 29 September 2009.

<sup>34</sup> See <http://www.chinairn.com/doc/50180/427914.html>, accessed 13 July 2009.

which show robust year-on-year growth of at least 6 percent throughout the crisis and its aftermath (See Table 7).<sup>35</sup> Trends in energy use provide the chief rationale for questioning the veracity of official output measures during the crisis period. Table 7 shows that the elasticity of electricity consumption with respect to GDP, which dropped below 0.74 only twice since 1990 (0.52 and 0.36 in 1997 and 1998) and stood above 1.0 throughout the years 2000-2007 (Yearbook 2008, p. 247) suddenly plunging into negative territory during the 2008-09 crisis and recession.

[Table 7 about here]

Table 6 highlights the apparent conflict between recent data on reported growth of industrial value-added and aggregate production of electricity. Again we see a steep and improbable decline in the elasticity of electricity use, now with respect to industrial value-added. Can we believe that this elasticity, which has shown considerable fluctuation but has remained almost continuously above 0.5 for the past quarter century, as shown in Figure 3 (except for the late 1990s, which this author sees as another period in which official GDP reports diverge from actual outcomes), dropped toward and even below zero in 2008 Q3 and Q4 and in Q1 of 2009? Is it realistic to imagine that growth of industrial value-added ran 7.7 percentage points ahead of power consumption in June 2008, rising to 8 points in September, 13.6 points in December, and then 9.6 points in March 2009?<sup>36</sup>

[Figure 3 about here]

As with the controversial data for the late 1990s, there are well-informed and objective observers who reject the present author's opinion that recent official GDP announcements during the crisis period diverge substantially from actual outcomes. Another common element is occasional comments from official sources that appear to ratify (or at least seem consistent with) the views of skeptical onlookers. Recent instances include the following:

Posted on the NBS web site 4-17-2009 (apparently in English only): "Mr. Ma Jiantang, Commissioner of NBS, made important comments on "How to Treat GDP Statistics in

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<sup>35</sup> Several Chinese agencies are preparing to issue measures showing seasonally adjusted changes in GDP from quarter to quarter. This represents a departure from past Chinese practice of emphasizing year-on-year performance. Huge gyrations of quarterly GDP, which normally surges in Q4 and then declines dramatically in the subsequent Q1 – a legacy of Soviet-style planning that has survived 3 decades of reform – will complicate the task of seasonal adjustment. T. Rawski (2002b) illustrates the magnitude of seasonal fluctuations, and shows that they arise from massive gyrations of investment spending.

<sup>36</sup> Data underlying Figure 3: for 1985-2007, elasticity is calculated from data on annual increase in industry's GDP contribution and in industry's consumption of electricity. The electricity data used for 2008-09 are national figure for production of electric power. Even though industry regularly uses 75- 80% of China's power output (75.3% in 2007 – see Yearbook 2008, p. 246), splicing these data sets together does not represent a clean calculation. I doubt that replacing power production with industrial power consumption in the 2008-09 data would undercut the comments in the text, but this is not certain and should be checked.

the Period of China's Economic Slowdown" . . . written by Mr. Tom Orlik, freelance journalist of WSJ Chinese Network, former Policy Adviser of British Ministry of Finance, living in Shanghai. The Comments indicated that. . . True and fair is not only the requirement fulfilled of our professional responsibility, **but also the requirements of consciously accepting the supervision from social and public.**<sup>37</sup> This recalls previously cited comments by senior NBS officials in 2002 to the effect that "there are some problems that cannot be solved by our bureau alone, especially when they are linked to politics" and that "the statistics system cannot effectively resist intervention" (cited in T. Rawski 2002a).

When visiting Shaanxi factories in May 2009, NBS Director Ma asked workers "If you compare this year with last year, or May with the past several months, what's happening to sales? What about output value and profits? Are they rising or falling?" If official reports showing that value-added in Shaanxi's above-norm industry grew by 7.7 percent in February (vs. February 2008), and 13.8%, 11.3%, 14.9%, and 15.7% in March, April, May, and June are believable, why ask about possible declines in sales, output, or profits amidst double-digit growth? The evident explanation appears in the same source that claimed double-digit industrial growth, which states that industrial power consumption in Shaanxi during the first half of 2009 increased by 0.7 percent over the first half of 2008 (Shaanxi 2009).

In August 2009, Premier Wen Jiabao "warned against being 'blindly optimistic' despite improvements in economic growth" (Liu 2009). With official data showing the economy marching toward double-digit GDP growth, why worry about "blind optimism"?

As in the late 1990s, descriptions of economic performance focus on encouraging information. An August 2009 *Financial Times* op-ed by Chinese Academy of Social Sciences economist Yu Yongding illustrates this approach:

China has rebounded from the global slump with vigour. In the second quarter, its official figures showed year-on-year gross domestic product growth of 7.9 per cent. **Those who doubt the quality of China's macroeconomic statistics can check its physical statistics: in June, electricity production increased 5.2 per cent, reversing the falls of the previous eight months.** It is almost certain that China's GDP will grow more than 8 per cent this year.

However a review of NBS monthly reports on commodity output shows that electricity production during the second quarter of 2009 was only 1.43% higher than in 2008 Q2; power output in the first half of 2009 was 1.7% less than in the first six months of 2008 – hardly a recipe for 8 percent GDP growth.

Current discussions also display differences from earlier debates about official GDP statistics. On this occasion, a number of critics have stepped forward to question the

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<sup>37</sup> [http://www.stats.gov.cn/english/newsandcomingevents/t20090417\\_402552728.htm](http://www.stats.gov.cn/english/newsandcomingevents/t20090417_402552728.htm) , accessed 9-24-2009, with emphasis added. I have not been able to locate the paper by Tom Orlik, which apparently appeared in Chinese on the Wall Street Journal's web site.

official measures, including observers within the Chinese economics community, one of whom described the official data for 2008 as “bewildering” [扑朔迷离], suggested that the official figures might reflect revisions to the underlying statistical categories, and indicated that, if calculated according to methods used in western nations, Chinese growth during Q4 of 2008 approached zero, and had possibly turned negative (Zhang 2009). Overseas skeptics include the International Energy Agency, which highlighted apparent inconsistencies between energy use and reported output gains in a May 2009 report, noting the “possibility . . . that real GDP data are not accurate, and therefore should not be taken at face value” (IEA May 2009, p. 14).

Another novel feature of recent controversy is that China’s NBS, rather than dismissing critics as uninformed (as in the late 1990s), has engaged with the issues raised by skeptics , publishing detailed analyses that seek to reconcile apparent contradictions between reported growth of GDP and (much slower) growth of energy consumption. The argument in these papers is straightforward and plausible: energy use per yuan of output varies dramatically both across and within different sectors of the economy. The crisis imposed large output declines on several energy-intensive sectors, notably steel and aluminum. Within these sectors, cutbacks were concentrated in firms with weak technology that consumed above-average amounts of energy. Therefore, it is entirely possible to have much larger declines in electricity consumption than in industrial value added (Energy Consumption 2009, Electricity Decline 2009). International firms pursue identical logic in defending the veracity of official figures (Wang and Hu 2009; Anderson 2009). However this approach implies that if energy-using sectors play a large role in the upturn, as seems to be the case (e.g. August 2009 output of crude steel and cement were 22 and 24% above comparable figures for August 2008), then we should expect consumption of energy and electricity to run ahead of industrial output and GDP growth (or decline) during the upturn as well as the downturn; recent official data show nothing of the sort (see Tables 6 and 7). Whatever the outcome of the current controversy, the willingness of NBS to engage in public debate about the quality and consistency of its data represents a major advance for the Chinese economics community.

To date, controversy has focused on national-level statistics. Examination of provincial data reveals further inconsistencies between output claims and energy realities. To avoid extending an already oversized paper, I focus on Table 8, which compiles data on reported growth of industrial value-added and production of electric power in the four leading industrial provinces, which jointly contributed 42.2 percent of national industrial production in 2007. Contradictions abound. Could Guangdong, China’s export leader, have experienced only a minuscule decline in industrial growth during the course of 2008? Could 3 of the 4 provinces have enjoyed double-digit growth in the second half of 2008 even as national production of thermal power fell to the level attained in late 2006? Could these four provinces have attained combined industrial growth of 9.4 percent during the year ending in May 2009 despite raising power output by no more than 1.3 percent?

[Table 8 about here]

I conclude that gradual entry into the world market has indeed increased the impact of external forces on China's domestic economy. The correspondence is not one-to-one. In my view, the entrepreneurship of private Chinese banks spared China from the worst effects of the Great Depression. In recent years, China's growing dependence on external markets and inflows of FDI has increased the nation's vulnerability to external disruptions. On three occasions – the Asian financial crisis of the late 1990s, the SARS outbreak in 2003, and the global financial meltdown of 2008-09, external shocks have, in my opinion, brought China's economy to a temporary standstill. On each occasion, swift policy action has warded off the prospect of large and protracted output declines.

## **Implications**

What do we learn from this survey?

Our review shows that interaction with global markets has consistently contributed to the growth and commercialization of China's economy and to the material well-being of its populace. There is a considerable association between periods of expanded access to international markets and growing domestic prosperity. The link between episodes of isolation from world markets – whatever the cause -- and domestic economic difficulty seems even stronger. Over the long term, the differential prosperity and responsiveness accruing to regions with the deepest involvement in international markets – including migration and investment as well as commodity trade – offers eloquent testimony to the cumulative benefits derived from generations of market experience. In short, China's economic history of the past 500 years, and particularly of the past half-century provides massive support for the proposition that access to markets, both at home and abroad, offers large, tangible long-term benefits to poor nations and poor people.

Where, exactly, do the gains from trade reside? China's historic and contemporary interaction with the international economy strongly confirms Paul Romer's notion that information blockage (rather than resource misallocation arising from price distortions) dominates the total cost arising from isolation, such as occurred during the early Qing period and again during China's 20<sup>th</sup>-century interlude of socialist planning. The astonishing ignorance of the outside world displayed even by highly educated elites prior to China's reform underlines Romer's view of "how costly it is in terms of domestic welfare when a poor nation indulges a taste for self-sufficiency and righteous indignation in its dealings with the rest of the world" (1993, p. 548).

China's economy has benefited from good fortune as well as deep reserves of human capital. China's recent export boom originated with an unexpectedly fruitful linkup between overseas entrepreneurs, mostly ethnic Chinese based in Hong Kong and Taiwan, and land and labor provided successively by China's experimental Special Economic Zones, by rural (or TVE) industries, and then by massive industrial estates that line China's long coast and employ tens of millions of migrant workers. The accidental coincidence of Chinese policy experimentation with the search for new production platforms on the part of these export-oriented businesses provided an opportunity that

turned out to provide immense benefits. While luck contributed to the steep growth of exports, this outcome was by no means assured. The Hong Kong and Taiwan entrepreneurs are accustomed to dealing in English as well as Chinese; they would surely have welcomed opportunities to set up shop in India had these been on offer. And the entrepreneurial capabilities of both the Hong Kong and Taiwan investors and of the domestic businesses that quickly followed their lead represent the payoff from reservoirs of knowledge and skill accumulated through centuries of participation in domestic and international exchange.

China was also fortunate in that its new economic openness coincided with major organizational innovations linked to reductions in transport and information management costs -- developments that facilitated the “outsourcing” of manufacturing operations across far-flung production networks widely separated from the final destination of the goods they churned out. The emergence of China as a major exporter just as the United States, the world’s largest market for imports embarked on debt-financed consumption binge provided a further accidental boost to China’s long post-reform boom. Again, while China benefited from these opportunities, the realization of these benefits depended on the application of human capital on the part of domestic public officials, managers, engineers, and workers. And here again, we encounter circumstances that represent the legacy of past generations of experience with markets and organizations, assets that survived disruptions of commerce arising from early Qing rulers’ efforts to destroy Ming loyalists and, more recently, from the protracted campaign against private business undertaken by Mao Zedong and the Chinese Communist party.

For China, as for other nations, participation in global markets does not provide unalloyed benefit. Global exchange may increase the prevalence of disease, narcotics, and criminality as well as the supply of beneficial imports. Shifting market forces may compel protracted and painful structural adjustments: the late Wang Hongchang remarked during the late 1990s that “whenever a new factory is built in the south, another factory goes bankrupt in China’s northeast.” The sharp decline occasioned by the global financial crisis in 2008-09, which resulted in the sacking of over 40 million workers, the bankruptcy of hundreds of thousands of firms, swingeing reductions in energy consumption and, in this author’s view, a brief excursion into falling aggregate output, shows that deep engagement with global markets can bring punishing costs.

Despite the episodes of havoc that global markets have visited on numerous Asian trading nations and now on China as well, China’s long-term interaction with the international economy, and especially its experience during the past half-century, powerfully illustrates the capacity of trade to improve the human condition.

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Table 1  
 Estimated Volume of China's Domestic Trade, 1869-1908  
 (Million *guiyuan* taels)

Year	Domestic Products	Import Goods	Import Share %	Nominal Trade Total		Price Index	Volume Index
				Taels	Index		
1869	852.65	74.76	8.1	927.41	100.0	100.0	100.0
1874	865.14	71.70	7.7	936.84	101.0	78.8	128.2
1879	866.35	91.60	9.6	957.95	103.3	75.3	137.2
1884	872.99	81.06	8.5	954.05	102.9	72.9	141.1
1889	1089.61	123.52	10.2	1213.13	130.8	83.5	156.7
1894	1085.91	180.58	14.3	1266.49	136.6	87.1	156.8
1899	1325.71	294.93	18.2	1620.64	174.7	109.4	159.7
1904	1610.96	383.28	19.2	1994.24	215.0	116.5	184.6
1908	1760.43	439.48	20.0	2199.91	237.2	129.4	183.3

Average annual growth 1869-1908 (%) 1.5

Source: Wu Chengming, "Estimate of Volume of Commerce in Modern China's Domestic Market," in Wu (2002, pp. 278-279).

Table 2  
China's Global Trade, Trade Share, and  
Trade Ratio, 1871-2008

Year	China's Trade US\$ Billion	China's Trade Ratio (%)	China's Share of World Trade (%)
1871-1884	0.2		1.3
1885-1900	0.2		1.3
1901-1914	0.5		1.5
1913	0.8		1.9
1915-1919	1.1		
1920-1929	1.4		2.4
1955	3.1	12.1	1.6
1960	3.8	8.8	1.4
1970	4.6	5.0	0.7
1980	38.1	12.5	0.9
1990	115.4	29.8	1.6
2000	474.3	39.6	3.6
2001	509.7	38.5	4.0
2002	620.8	42.7	4.7
2003	851.0	51.9	5.5
2004	1154.6	59.8	6.1
2005	1422.0	63.9	6.7
2006	1760.4		7.2
2007	2174.6		7.7
2008	2561.5		7.9

Sources: Dernberger (1975, p. 27);

Brandt, Rawski and Zhu (2007, p. 17)

China's total trade and share of world trade for 2000-08 from WTO data on world exports and imports, accessed 9-28-2009.

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WTO web  
site

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Date	Silver Stock, \$ Million		Population (Millions)	Per Capita Stock (kg)		Share in M2 Money	
	TR Midpoint	YP Hao		TR Midpoint	YP Hao	Silver (%)	Silver & Copper (%)
1720	655	930	195	0.136	0.193		
1807	828	1103	320	0.105	0.139		
1855	444	719	400	0.045	0.073		
1887	1135	1410	375	0.122	0.152		
1910	1393	1667	425	0.132	0.159	51.4	67.2
1933	2788		500	0.225		37.7	41.4
1936	1904		505	0.152		20.7	23.5

Sources:

Silver data for 1910-1936: midpoint of high/low Rawski estimates from Rawski 1989, p. 394; Y.P. Hao figure for 1910: sum of estimated amounts for silver bullion and coin from Hao 1986, p. 68.

Silver data pre-1910 derived recursively using estimates of silver inflow/outflow for 1500-1700, from estimates compiled in E. Rawski and T. Rawski 2008 for 1720-1807, 1808-1850, and 1855-1887, from Man-houng Lin 2006, p. 286. for 1887-1910, from Chinese Customs figures compiled in L. L. Hsiao 1974, p. 128.

Population: author's crude approximations following Perkins 1969, p. 216.

M2 Money Stock for 1910-1936: midpoint of high/low estimates from Rawski 1989, p. 394.

Note: "dollar" refers to early 20th century Chinese silver dollars

Conversion factors: \$1 equivalent to 1.3 troy ounces of silver (Rawski 1989, p. 365 note 3)  
\$1 = 1.52 Haikuan taels (figure for 1887-1895 from Man-houng Lin 2006, introduction).

These crude calculations ignore variations in the fineness of silver.



Table 4

Estimate of Average Annual Silver Flows To/From China, 1500-1910

Period	Years	Average Annual Flow Million Chinese \$	
		Inflow	Outflow
1500-1700	200	0.60	
1721-1800	79	2.19	
1808-1850	42		9.14
1856-1886	30	23.03	
1888-1910	22	11.68	

Sources: see notes to Table 3.

Table 5  
Daily Wages of Unskilled Workers in the Beijing Suburbs  
1807-1858

Year	Daily Wages in copper cash*	Copper/ silver conversion (cash/tael)	Wages in silver tael per day	Wages in grams of silver
1807	81	979	0.083	3.071
1808	83	1020	0.081	2.997
1812	81	1078	0.075	2.775
1813	80	1067	0.075	2.775
1820	95	1159	0.082	3.034
1822	99	1203	0.082	3.034
1824	83	1208	0.069	2.553
1825	88	1192	0.074	2.738
1827	88	1265	0.070	2.590
1829	95	1294	0.073	2.701
1830	96	1329	0.072	2.664
1831	92	1346	0.068	2.516
1832	89	1347	0.066	2.442
1835	94	1251	0.075	2.775
1836	85	1378	0.062	2.294
1837	96	1488	0.065	2.405
1838	91	1553	0.059	2.183
1841	98	1382	0.071	2.627
1842	100	1439	0.070	2.590
1845	86	1823	0.047	1.739
1846	96	2010	0.048	1.776
1847	87	2013	0.043	1.591
1848	68	2049	0.033	1.221
1849	80	2046	0.039	1.443
1850	94	1997	0.047	1.739
1852	93	2018	0.046	1.702
1853	93	2205	0.042	1.554
1854	90	2723	0.033	1.221
1856	110	4970	0.022	0.814
1857	105	3935	0.027	0.999
1858	130	4970	0.026	0.962

Source: <http://gpih.ucdavis.edu/Datafilelist.htm#Asia>  
<http://gpih.ucdavis.edu/Datafilelist.htm#Asia> (consulted 9-7-2009)  
 citing Gamble 1943. Cash wages doubled to allow for payment in kind.

\* Data in source are labelled "annual average," which I take to mean the average of recorded daily wages for each year.

Table 6 Anatomy of China's 2008-2009 Recession Monthly Commodity Output for Major Industrial Products, June 2008-August 2009 (Percent change vs. same month of previous year)							
	Monthly Figures for 2008				Monthly Figures for 2009		
	March	June	September	December	March	June	August
Percent <0	8.6	18.6	42.8	62.0	37.7	38.2	25.7
Median change (%)	15.2	9.3	3.3	-4.1	2.3	9.9	7.0
Electricity output	16.6	8.3	3.4	-7.9	-1.3	5.2	5.1
Value-added*	17.8	16.0	11.4	5.7	8.3	10.7	12.3
Energy Elasticity**	0.9	0.5	0.3	-1.4	-0.2	0.5	0.4

Source: [www.stats.gov.cn](http://www.stats.gov.cn), China Data Online, and other web sites showing standard monthly reports titled 工业主要产品产量及增长速度 and 工业增加值增长速度

\* Information for "above norm" firms (excluding those with annual sales below RMB 5 million).

\*\* a crude measure: % change in national electricity output/% change in industry VA  
 industry's share of 2007 electricity consumption was 75.3% (Yearbook 2008, Table 6-9)

Note: the number of commodities on monthly reports varies between 68 and 71.

Table 7 Quarterly Data on GDP Growth and Electricity Output, 2008 Q1 to 2009 Q2 (percent)						
Quarter Ending	GDP Growth		Electricity Output		Elasticity Coefficient	
	Current Q	YTD	Current Q	YTD	Current Q	YTD
March 08	10.6	10.6	14.8	14.8	1.4	1.4
June 08	10.1	10.4	11.7	12.9	1.2	1.2
Sept 08	9.0	9.9	4.7	9.9	0.5	1.0
Dec 08	6.8	9.0	-12.1	5.5	-1.8	0.6
March 09	6.1	6.1	-3.2	-3.2	-0.5	-0.5
June 09	7.9	7.1	-1.2	-2.2	-0.2	-0.3

Source: quarterly GDP announcements and monthly reports on commodity output.

Column labeled "Current Q" shows percent increase over the same quarter in the previous year.

Column labeled "YTD" shows cumulative year-to-date increase over the same period of the previous year.

Table 8								
Industrial Value-added and Power Output, Leading Provinces, Year Ending May 31, 2009								
Province	Power Output Growth (%)	Share of Industry VA 2007	Year-on-year Growth of Industrial Value Added (%)					
			Jan-May 2008	Jan-Sept 2008	Full Year 2008	June-Dec 2008*	Jan-May 2009	Year to** 31-May-09
Shandong	3.2	0.126	18.6	16.0	13.8	10.4	10.8	10.5
Guangdong	-2.6	0.121	13.3	13.3	12.8	12.4	3.1	8.5
Jiangsu	6.3	0.110	16.5	15.9	14.2	12.6	11.7	12.2
Zhejiang	-4.2	0.065	12.8	11.6	10.1	8.2	-2.0	3.9
Sum ***	1.3	0.422	15.6	14.5	13.1	11.2	6.9	9.4
Elasticity of power output wrt Industrial VA, year to 5-31-2009			0.143					

Source: Monthly power data from China Data Online; 2007 value-added shares from Yearbook 2008, Table 13-4. Cumulative data on provincial industrial growth from [www.stats.gov.cn](http://www.stats.gov.cn).

Notes: \* indicates approximate growth rates derived using simple interpolation. We have growth rates for five months (F) January-May 2008 and for the full year 2008 (Y). Estimated growth for seven months (S) June-December 2008 (S) is then derived from  $S = [Y - (5/12 * F)] / (7/12)$ .

\*\* Calculated in similar fashion:  $Y = (7S + 5F') / 12$ , where F' is the reported growth rate for Jan-May 2009.

\*\*\* For power output, percent increase in combined output for 4 provinces, 12 months to May 2008 = 100. For VA, weighted average of industrial growth for four provinces calculated using 2007 output shares as weights.

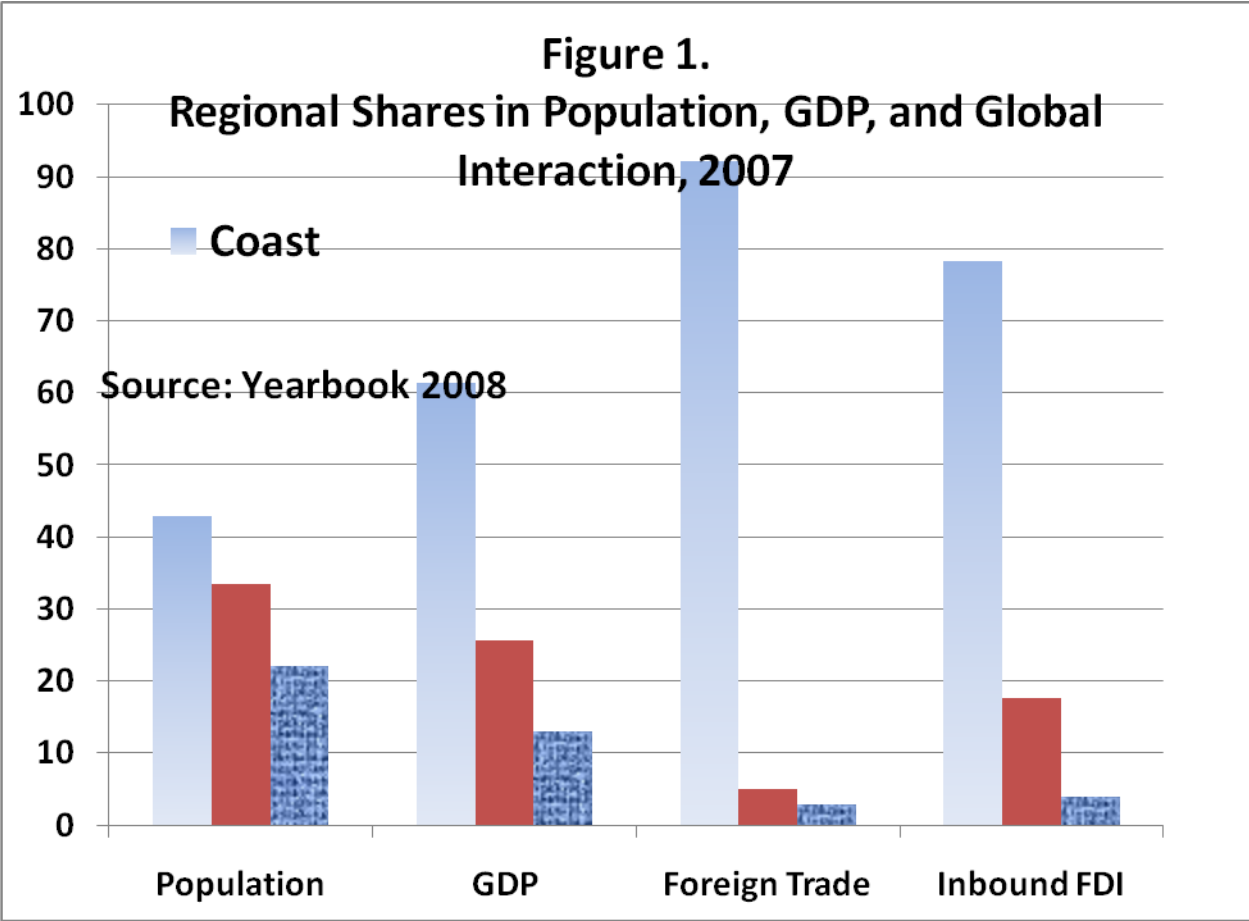


Figure 2  
**Analysis of Chinese Passenger Air Traffic, 1997/98**

V = annual passenger traffic volume (passenger-km)  
Y = average per capita income  
P = average ticket price (yuan per passenger-km)  
E = price elasticity of demand =  $\% \Delta V / \% \Delta P$  (E < 0)  
e = income elasticity of demand =  $\% \Delta V / \% \Delta Y$  (e > 0)

Central relationship:  $\Delta V$  depends on combined effect of  $\Delta P$  and  $\Delta Y$

$$\% \Delta V \approx E * \% \Delta P + e * \% \Delta Y \quad [1]$$

Known quantities:

$$\% \Delta V \approx 3 \text{ for } 1997/98$$

$$E \approx (-0.72, -2.33) \text{ (based on data in 价格理论与实践, no. 4 (2003), p. 11)}$$

$e \approx 1.15$  “Statistics show that every one per cent increase in Shanghai’s GDP will bring a rise of 1.15 per cent in passenger flow...” (*China Daily* 9 June 2003, p.11)

$$\% \Delta p \approx -8.6 \text{ (based on figures from China Eastern Airlines Annual Report)}$$

Approximate  $\% \Delta Y$  for 1997/98 from equation [1]

$$\% \Delta Y \approx (1/e) [\% \Delta V - E * \% \Delta P] \quad [1A]$$

$$= -2.6 - (-7.5)*E$$

If  $E = -0.75$ , then  $\% \Delta Y \approx -8$ ; If  $E = -2.33$ ,  $\% \Delta Y \approx -20$

Official figures for 1997.98: GDP growth 6.9% (nominal), 7.6% (real);  
population growth 0.8%, so  $\% \Delta Y \approx 6-7!!!$

Source: Yearbook 2008, Tables 2-1, 2-3, 3-1.

/fff2/invite/anu n09/paper/data and materials/air traffic...

**Figure 3. Elasticity of Power Consumption wrt Industrial Value-added, 1985-2009.**

