

# **The State and Market in China's Traditional Maritime Sector**

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### I. Introduction

#### a. The issue and debate

In the early fifteenth century, Admiral Zheng He and his gigantic armada did wonders; and scholars have long debated why the Chinese did not continue to achieve such maritime glory of the Western European kind.<sup>1</sup> Likewise, given the fact that through maritime trade, China once served in the world as the main supplier of silk textiles, ceramics, tea and as the main recipient of silver (so much so that China managed to establish its own silver standard), it is unclear why China did not take full advantage of its unique position in the world market as a launch pad to undergo its own capitalistic development and industrial revolution.

From the classical and neo-classical point of view, the market is always the single most important endogenous factor in the economy which ultimately determines the economic growth and development of a society. China, a traditional society, had fundamental deficiencies in its socio-economic system which hindered the function of the market. This in turn prevented efficient resource allocation, created wasteful practices, and consequently slowed down or stopped economic growth and development. However there is a problem with this perspective. If a society has a fully functional market as the prerequisite designated by the classical and neo-classical school, it must have been fully or nearly fully commercialised already. Conceptually, a fully commercialised economy needs to be a capitalist one in the first place. So, we eventually come back to Square One: we still do not know the mechanisms with which a high degree of commercialisation and capitalism were able to develop in history. Indeed, other than indicating what may be the 'best practice' under a well-entrenched capitalistic market economy, the classical and neo-classical school explains very little about the long-run evolution of capitalism itself. In other words, classical and neo-classical economics deal only with how to optimise resource allocation under a given system, not how to change the system itself. If this is taken, it becomes rather absurd to blame the market in traditional China, for example, for being too weak and too incompetent to match its capitalistic counterpart in Western Europe. The use of the classical and neo-classical theory to analyse and judge China's maritime market is therefore normative and often Eurocentric. This is in nature counterfactual, as China could never be another Europe.

On the other hand, in light of the New Institutionalism and New Institutional Economics, economic growth and development depends more on the state than the market, as the former sets up the rules of the game and the latter follows and makes the best use of those rules for individual advantages. In other words, the intelligent and far-sighted elite may be able to foresee the future and thus purposely set up 'good rules' for the game and wait for a growth miracle to take place. But, if such an idea never came across the elite's mind, the economy would not have a chance. So, the institution becomes the endogenous factor and

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<sup>1</sup> Here, the Mongol Yuan's naval undertakings earlier should also be mentioned. But, it was part of the Mongols' pan-Asian territorial expansion which differed in nature from Zheng He's voyages.

the market becomes an exogenous factor. Now, to judge traditional China with this thought, one will have every reason to fall into the trap of ‘bureaucratic determinism’ and ‘Confucian value determinism’ which is just another version of Oriental despotism. This will clash with the whole scholarship of local and grassroots history which shows that the state has a rather limited impact on people’s everyday life, more so during the premodern period. Local communities always have their own rules of their own game including trade which may have little to do with the state. Furthermore, plenty of evidence shows that ordinary people often outwit the elite, which means that they have their own agenda. If so, it becomes questionable as to whether the state should be regarded as the single most important determinant in economic growth and development.

From the consensus amongst economic historians of Western Europe, neither the market nor the state alone was enough to push an economy towards capitalism and industrial revolution. However, it was almost certainly a combination of interacting conditions (including those of the market and those of the state) that produced in the end the ‘European miracle’.<sup>2</sup>

Although neither the market nor the state is the single determinant for economic growth and development, the two factors are undeniably the most evident conditions for the shape and momentum of an economy. It is thus sensible to single them out for the purpose of this paper.

#### b. The approach

This paper will take a synthetic approach to examine how the Chinese maritime sector, the state and the market constantly interplayed with each other. Such interplay conditioned and shaped China’s maritime growth.

Inevitably, the current paper rejects the commonly practised counterfactual approach with which scholars use their hindsight and retrospective wisdom to tell us what the growth and development would look like if one or two factors, *ceteris paribus*, could have been different either in quality or quantity. This implies that we are more rational and clever than people in the past which is questionable. By abandoning this ‘counterfactualism’, the approach of this paper is strictly factual. And, nothing is held constant. The main task is to locate the points for the state and the market in the matrix of China’s socio-economic factors and explain why the maritime sector developed the way it did with the special emphasis on the role of the state and the market. In doing so, the interaction of the state and the market will be given its deserved attention.

In this paper, the concept of the maritime sector is used in a broad sense. It includes technology, investment in and output of maritime goods and services, trade, employment opportunities and patterns, urbanisation, as well as individual wealth and government revenue generated from maritime activities.

For the purpose of the current study, four periods are chosen: (1) the Song, (2) the Ming (with Zheng He), (3) the early and mid-Qing, and (4) the late Qing. Their distinctive patterns are to be analysed. As the purpose of this paper is to look at how and why a peculiar pattern evolved in China’s past, instead of probing any specific event, much of the information is extracted from secondary sources.

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<sup>2</sup> See E. L. Jones, *The European Miracle* (Cambridge: Cambridge University Press, 1981).



## II. Patterns in the past

### 1. The Song, a money-hungry state and a vigorous market

#### a. Peculiarities of the Song state

In many ways, the Song Period was marked by a great leap forward in commercialisation including the growth in the maritime sector. The Song period is thus commonly recognised as an era of China's medieval economic revolution.<sup>3</sup> In Eric Jones's words, Song China reached "within a hair's breadth of industrialising" (Jones 1981: 160). Not surprisingly, the Song was marked as the first period of strong and lasting maritime growth in Chinese history. In this historical context, the much publicised maritime achievement under the Mongol Yuan and 15th-century Ming was to a great extent a result of riding on Song's growth.

In many aspects, the Song was rather an unusual dynasty right from its very beginning. The Song (both Northern and Southern) was a period of crises: compared with the unprecedented external pressure from the Tartars and Mongols,<sup>4</sup> the Song state was inadequate, if not incompetent, in the provision of national security; and the polarisation among landholders reached a record level. However, these factors alone did not make the Song unique. Rather, the distinctiveness of this period lay in (1) a change in the governmental structure, (2) a change in landholding structure, and (3) a change in demographic distribution and redistribution between north and south. All these changes were in one way or another related to the Song establishment.

The weak state under the Northern Song was a result of a deliberate policy under the first Song monarch Zhao Kuangyin (Emperor Taizu, r. 960–76) who grabbed the throne by a military *coup d'état*.<sup>5</sup> With the constant fear of being toppled over by a *coup d'état* against himself, Zhao systematically stripped army officers and civilian bureaucrats of their power and claimed military, financial and judicial decision-making to be the exclusive responsibility of the Imperial Court,<sup>6</sup> ignoring the severe resource constraints of the centre.

On the other hand, with the legitimacy of the Song always questionable, Zhao Kuangyin needed to gain recognition and support from the citizens, especially the administrative class. To win over their support, a package was delivered: not only were the

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<sup>3</sup> See Mark Elvin, *The Pattern of the Chinese Past* (Stanford: Stanford University Press, 1973), pt. 2.

<sup>4</sup> Between 985 and 1284, there were in all 214 main military conflicts between the nomads and the Chinese, by far the most frequent amongst all the main dynasties. In most of these cases, China was the victim of the alien invasion; see Fu Zhongxia, Zhang Xing, Tian Zhaolin and Yang Boshi, *Zhongguo Junshishi Fujuan Shang* (*A Military History of China, Supplement I*) (Beijing: PLA Press, 1986), pp. 3–185. The Song territory was lost partly to the Jin Tartars and then entirely to the Mongols.

<sup>5</sup> See Tuo Tuo, *Song Shi* (*The History of the Song Dynasty*) (1345, Beijing: Zhonghua Books, reprint, 1985), ch. "Biography of Emperor Taizu."

<sup>6</sup> Zhao Xiukun, Tian Zhaolin, He Shaoheng, Cai Zhifu, He Shouquan, Wei Zhenfu, and Zhang Jiyin, *Zhongguo Junshishi* (*A Military History of China*) (Beijing: PLA Press, 1987), vol. 3, pp. 293–354; also Tang Jing and Zheng Chuanshui, *Zhongguo Guojia Jigoushi* (*A History of Administrative Structure in China*) (Shenyang: Liaoning People's Press, 1993), ch. 7.

Song bureaucrats paid higher salaries than any of their counterparts among all dynasties, but also extra official positions were created to accommodate members of the literati.<sup>7</sup>

Officials were also allowed to hold as many as 10 concurrent paid posts to fill the created vacancies for which they were paid but did not take charge.<sup>8</sup> Moreover, positions became inheritable by officials' descendants, which to a great extent made the Imperial examination-based bureaucrat recruitment system and meritocratic promotion mechanisms obsolete. These mechanisms were crucial in underpinning social mobility and maintaining the physiocratic touch to society.<sup>9</sup>

Meanwhile, partly for the purpose of creating employment, and partly for the sake of window-dressing, the Song army increased its recruits from 120,000 in 960 A.D. to 378,000 in 976 A.D., to 666,000 by 997 A.D. (versus a total population of some 16 million), to 912,000 (versus a total population of 19.9 million) by 1021 A.D., then to 1,259,000 by 1048 A.D. The number finally reached to a record level of 1,400,000 in 1049 A.D. (versus a total population of some 22.3 million).<sup>10</sup> In absolute terms, the increase was over eleven-fold with an annual increase rate of 2.8 per cent. In addition, the Song soldiers were exceptionally well paid. It is recorded during the Zhiping Reign (1064–7) that each soldier of the elite troops (*jinjun*) was paid 50,000 bronze coins per year and each soldier in the ordinary troops (*xiangjun*) 30,000. As a Song soldier was to remain in service till the

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<sup>7</sup>In terms of salaries, according to Song official records, a scale in cash and in rent can be demonstrate as follows, excluding numerous regular allowance in kind such as fuel and materials for clothes (as during 1063–77):

Position	Monthly salary (in bronze coins)	Salary land (in <i>mu</i> )
Prime Minister	300,000–400,000	–
Deputy Prime Minister	200,000	–
Minister	150,000	2,000 (116.0 ha)
Deputy Minister	50,000	–
Army General, First Rank	60,000–200,000	–
Army General, Second Rank	25,000–80,000	–
Army General, Third Rank	20,000–30,000	–
County Magistrate	12,000–22,000	100–200 (5.8–11.6 ha)

Source: Based on Tuo, *History of the Song*, pt. “Official Appointments;” Xu Song, *Song Huiyao Jigao (Edited Administrative Statutes of the Song Dynasty)* (1809, Beijing: Zhonghua Books, reprint, 1957), pt. “Official Appointments;” Compilatory Board of the *Encyclopaedia, Cihai: Jingji (Encyclopaedia: Economics)* (Shanghai: Encyclopaedia Publisher, 1978), ser. 3, p. 151.

In comparison, the salary of the highest rank, First Rank (*yipin*), under the early Qing was only 15 *liang* of silver, which was in nominal terms 15,000–30,000 bronze coins (see Sun Xugang, *Jianming Zhongguo Caizhengshi [A Compact History of Finance of Premodern China]*, 1988, Beijing: China's Finance and Economy Press, pp. 192–3). Taking inflation into account, the Qing salary was probably even lower. In terms of multiplication of official posts, the increase was fivefold at the prefecture (*zhou*) and country (*xian*) levels.

<sup>8</sup> Yang Zhijiu, *Zhongguo Gudai Guanzhi Jiangzuo (Bureaucracy of Premodern China)* (Beijing: Zhonghua Books, 1992), p. 283; Tian Zaoyang, *Zhongguo Gudai Xingzheng Shilue (A History of Administration in Premodern China)* (Beijing: New World Press, 1994), pp. 228–9.

<sup>9</sup> Pu Jian, *Zhongguo Gudai Xingzheng Lifa (Administrative Legislation of Premodern China)* (Beijing: Peking University Press, 1990), pp. 378–9; Yang, *Bureaucracy of Premodern China*, pp. 277–9.

<sup>10</sup> Liang Fangzhong, *Zhongguo Lidai Huko Tiandi Tianfu Tongji (Dynastic Data of China's Households, Cultivated Land and Land Taxation)* (Shanghai: Shanghai People's Press, 1980), pp. 7–8; Zhao *et al.*, *Military History of China*, pp. 300–1; Tian, *History of Administration in Premodern China*, p. 228.

age of 61 by law,<sup>11</sup> the troops thus formed a permanent deduction from the tax-paying labour force. On paper, the Song defence budget was 48,000–50,000 million bronze coins a year, occupying some 80 percent of the government annual budget.

But, the deliberately crippled command system helped China very little in Song's national defence: the swollen number of well-paid soldiers did not offset the incompetence of the army. As a result, the Song state resorted more to bribery of its northern enemy the nomads: huge sums of annual ransom to the Tartars from 1005 onwards (which did very little in stopping the Tartars' conquest) with silver (100,000–200,000 *liang* a year) and silk cloth (200,000–300,000 rolls a year).<sup>12</sup>

The dealings with the Chinese elite, the armed forces and the northern barbarians clearly indicate a major shift in the Chinese state policy from its Confucian norm which emphasises an honest, hard-working and simple life to commercialising the state activities. This led to massive official corruption and market profiteering which the Empire had tried to minimise or avoid since the Han Period. All of these led to an unprecedented financial burden on the state budget. Indeed, the Imperial Treasury was dogged by budget deficits:<sup>13</sup>

Year	Revenue (in 10 <sup>6</sup> coins)	Expenditure (in 10 <sup>6</sup> coins)	Balance
<b>Northern Song</b>			
997	70,893	86,950	-16,057
1007(?)	47,211	49,749	-2,538
1021	140,298	168,044	-27,746
1048	122,592	111,785	10,807
1049	126,252	126,252	0
1064	101,906	100,399	1,507
1065	116,138	120,343	-4,205
1086	82,491	91,910	-9,419
<b>Southern Song</b>			
1190	68,001	68,001	0
1253(?)	120,000	250,000	-130,000

This forced the state to find alternative sources of revenue to finance its internal and external expenses. First, through 'tax conversion' (*zhebian*) the tax rate was increased by 50 per cent to increase the actual tax revenue.<sup>14</sup> A poll tax on the males age 20 to 60 (*shending qian*) was introduced. In 1011, the poll tax revenue reached 45 million coins, about three times that from the Tax on Agriculture (*xiashui*).<sup>15</sup> Desperate measures, they helped little. It is reported in 1065 that the Song Treasury had in fact a total budget deficit of 157,200 million bronze coins.<sup>16</sup> There is little doubt that by the time Wang Anshi launched his land-tax reform, the Northern Song state finances were in deep trouble.

<sup>11</sup> Zhao *et al.*, *Military History of China*, p. 334.

<sup>12</sup> Tian, *History of Administration in Premodern China*, p. 228.

<sup>13</sup> Based on Wang Shengduo, *Liangsong Caizhengshi (A History of Government Finance of the Northern and Southern Song Periods)* (Beijing: Zhonghua Books, 1995), vol. 1, pp. 678–86.

<sup>14</sup> Zheng Xuemeng, Jiang Zhaocheng and Zhang Wenqi, *Jianming Zhongguo Jingji Tongshi (A Brief Panorama of Chinese Economic History)* (Harbin: Heilongjiang People's Press, 1984), p. 255.

<sup>15</sup> Hou Wailu (ed.), *Zhongguo Dabaike Quanshu Zhongguo Lishi (Encyclopaedia of Chinese History)* (Beijing and Shanghai: China's Encyclopaedia Publisher, 1992), p. 913.

<sup>16</sup> Tuo, *History of the Song*, Entry Accounting of ch. "Economy."

In this context, commerce was seen as the better revenue generator. Several measures were actively taken by the Song government. First, many initiatives were undertaken by the Northern Song government to reach out to lure foreign traders. In the early Song (in 967) Emperor Taizu (r. 960–75) sent eight court officials with four fleets loaded with Chinese goods to Southeast and South Asia ‘in order to attract foreign tribute, and exchange [Chinese products] for spices, raw medicine, rhinoceros horn, ivory, pearls and borneol’.<sup>17</sup> Later, in 987, Emperor Taizong (r. 977–97) again sent eight court officials along four sea routes to advertise Sino–foreign trade opportunities.<sup>18</sup>

Second, Customs Law was established in 1080 to reassure the merchants of non-interference from individual officials and of the fixed duty rates at a favourable 2–5 percent.<sup>19</sup>

Third, both stick and carrot were used to keep merchants astir. Official titles were granted to those who were able to attract imports.<sup>20</sup> The beneficiaries included foreigners. For example, the title of ‘General of Submission to Virtue’ (*guide jiangjun*) was conferred by the Imperial Court on Xinya Tuoluo, a merchant of Arab origin.<sup>21</sup> Meanwhile, customs officials closely watched merchants’ performance. Officials even picked up names from a government registration list and sent reluctant merchants overseas by force.<sup>22</sup>

Finally, the Song state dirtied its own hand by being directly involved in marketing. Under ‘Law of Market Trade’ (*shiyi fa*), the Imperial Medical Bureau (*taiyiju maiyaosuo*) monopolised imported medicine for resale.<sup>23</sup> In 1077, some 19 metric tons (32,000 *jin*) of frankincense went through the system at Guangzhou;<sup>24</sup> and in 1076–8, a total of 1,536.6 million bronze coins worth of frankincense was resold that way to the domestic market.<sup>25</sup> The returns from such dealings must have been high, so much so in 1125, the government invested 100 million bronze coins in each of the three Bureaux for Maritime Trade in Ningbo, Hangzhou and Guangzhou in the medicine trade.<sup>26</sup>

Under the following Southern Song, according to Li Xinchuan (1167–1244), a scholar official, the revenue shot up from some 10,000 million bronze coins in 1127 to 65,300

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<sup>17</sup> Xu, *Administrative Statutes of the Song Dynasty*, ch. “Zhiguan 44.”

<sup>18</sup> See Xu, *Administrative Statutes of the Song Dynasty*, ch. “Zhiguan 44.”

<sup>19</sup> Li Changshan (ed.), *Yuan Shi (History of the Yuan Dynasty)* (1370, publisher unknown), ch. “Shihuo Zhi, Shibo;” Tuo, *History of the Song*, vol. 186: ch. “Economy;” see also Li Zhaochao, “Luexi Songdai Guanshi Zhizheng (Brief Analysis of Commodity Tax in the Song Period),” *Jingji Kexue (Economic Sciences)*, 5 (1991), pp. 70–6.

<sup>20</sup> See Xu, *Administrative Statutes of the Song Dynasty*, ch. “Zhiguan 44.”

<sup>21</sup> See Deng Duanben (ed.), *Guangzhou Gangshi (A History of Port Guangzhou)* (Beijing: Maritime Press, 1986), p. 85.

<sup>22</sup> Xu, *Administrative Statutes of the Song Dynasty*, chs “Zhiguan” and “Xingfa.”

<sup>23</sup> Wang Huifang, “Quanzhouwan Chutu Songdai Haichuande Jinko Yaowu Zai Zhongguo Yiyaoshishangde Jiazhi (Importance in Chinese Medical History of the Imported Raw Medicine discovered from the Song Wreck in Quanzhou Bay),” *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 4 (1982), p. 64.

<sup>24</sup> Liang Tingran, *Yue Haiguan Zhi (History of the Customs of Guangdong)* (c. 1861, publisher unknown), vol. 3.

<sup>25</sup> See Deng, *History of Port Guangzhou*, p. 100.

<sup>26</sup> Xu, *Administrative Statutes of the Song Dynasty*, ch. “Zhiguan 44.”



million bronze coins in 1189,<sup>27</sup> an increase of over 650 per cent with the annual growth rate of 3.1 per cent over 62 years. In comparison with the Northern Song revenue peak of 60,000 million bronze coins in the period of 1068–85, this must have resulted from redoubling tax-collecting efforts, considering that this was done within a half of the territory with a declining population, the real increase in the per capita tax burden was phenomenal. It was openly admitted by a high-ranking official Li Xun that during the first three years of the Southern Song (1127–30), the rate of land tax was seven times as high as the previous Tang.<sup>28</sup>

At the time, China's traditional overland trading routes to Asia Minor were lost to the Tartars and Mongols, so new routes had to be found in the south, mainly across the waters to connect China with South and Southeast Asia and East Africa. Maritime trade was thus viewed particularly favourably by the authorities as the goose that laid golden eggs. With it, some radical measures were taken to promote maritime activities. Here, it is worth noting that during the Northern Song, the shift from taxing agriculture to taxing trade was to some extent a free choice by the state. But, under the Southern Song, with the loss of half of the Song territory to the Tartars, the financial dependence on trade was inescapable.

In this context, officials with commercial knowledge were favoured and quickly promoted. During 1163 to 1276, Quanzhou Prefecture (Fujian), the most active sea trade region of that time, supplied the Chinese bureaucracy with 14 top-ranking officials (prime ministers and *de facto* prime ministers), with an average of one such official every eight years.<sup>29</sup> Given that the Southern Song had in all 182 prefectures in its heyday,<sup>30</sup> such a disproportionately high concentration of top-ranking officials from Quanzhou implies strong trade orientation in the Southern Song administration. Port cities were deliberately nurtured to bring in revenue with staggering results. In 976, Quanzhou alone paid the government a levy of (1) imported goods of 105 metric tons (176,000 *jin*), (2) 61,000 rolls (*pi*) of silk cloth, (3) one metric ton of silver (27,000 Song *liang*) and (4) 2,010 million bronze coins.<sup>31</sup> In per capita terms, each Quanzhou resident would pay the state 4,160 coins, not to mention the other items. This dwarfed the empire-wide tax burden (as of 1021) of 264.5 coins per head, or 607.1 coins per household.<sup>32</sup>

By the Southern Song Period, the state financial dependency on trade only increased, as reflected by the tax revenues from maritime trade:<sup>33</sup>

Period	Annual maritime tax revenue (in 10 <sup>6</sup> coins)	Index
1087–99	416	100
1102–6	1,110	267
?–1159	2,000	481

<sup>27</sup> Li Xinchuan, *Jianyan Yilai Xinian Yaolu (Annals of Important Events since 1128)* (c. 1202, Beijing: Zhonghua Books, reprint, 1956), vol. 14: Entry "Revenue."

<sup>28</sup> Tuo, *History of the Song*, ch. "Economy."

<sup>29</sup> See Fu Zongwen, "Citong Gangshi Chutan (A History of Port Citong [Quanzhou], Continued)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 2 (1991), p. 128.

<sup>30</sup> See Tuo Tuo, *Song Shi (The History of the Song Dynasty)* (1345, Beijing: Zhonghua Books, reprint, 1985), chs "Geography 4–6," pp. 301–15.

<sup>31</sup> See Zhuang Weiji, Zhuang Jinghui, and Wang Lianmao, *Haishang Sichou Zhilude Zhuming Gangko Quanzhou (Quanzhou: A Well-Known Port for the Silk Routes)* (Beijing: Maritime Press, 1989), pp. 16–19.

<sup>32</sup> Population and taxation based on Liang, *Dynastic Data*, pp. 8, 135, 288.

<sup>33</sup> Based on Wang, *History of Government Finance of the Northern and Southern Song Periods*, pp. 723–4.

By 1131, the taxes on trade had made up half of the government's total revenue.<sup>34</sup> According to Wang Yinglin, a Southern Song scholar, the share rose to as much as 70 percent, amounting 44,900 million bronze coins.<sup>35</sup> On top of that, Fujian and Guangdong contributed 80 percent of the silver reserve held by the Imperial Treasury.<sup>36</sup>

There can be little doubt that the Song fiscal and trade policies were a result of a makeshift measure to ease a financial crisis rather than a well-thought out development plan for the economy. Now, what did this do to China's maritime sector of the time? It flourished in technology, output, trade and urbanisation, ushering in the first golden age of China's maritime growth and development.

## b. Development of maritime technology during the Song

The most noticeable technological achievement during the Song is embodied in two ship designs, both capable of sailing at sea. Both became classical Chinese ship designs. Their influence can be seen even today.

The first such design was the *fuchuan* (or the 'Fuzhou type'). So far, the earliest information concerning the *fuchuan* can be found in Song official records: in 1169, a total of 42 of the ships were built in Mingzhou (now Ningbo, Zhejiang Province).<sup>37</sup> The ship's main features were: (1) the use of a ballasted keel and bilge keels with a low deck length-beam ratio for stability; (2) a V-shaped bottom and the multiple sails (three to twelve sails as recorded) for speed; (3) multiple stern rudders for steering and (4) clinker-arranged planking for strength of the hull.<sup>38</sup> These features are confirmed by three Song-Yuan wrecks unearthed during 1974-9 at Quanzhou, Ningbo, and the Korean Coast.<sup>39</sup> Designed

<sup>34</sup> John Merson, *Roads to Xanadu, East and West in the Making of the Modern World* (Frenchs Forest, N.S.W.: Child and Associates and ABC, 1989), p. 61.

<sup>35</sup> Wang Yinglin, *Yuhai (Jade Sea Encyclopaedia)* (c. 1296, Hangzhou: Zhejiang Books, reprint, 1983), vol. 186: Entries "Economy", "Financial Management" and "The Song Revenue."

<sup>36</sup> As at 1161, see Liang, *Dynastic Data*, p. 299.

<sup>37</sup> Song Shou, *Song Huiyao Gao (Administrative Statutes of the Song Dynasty)* (1242, Beijing: Chinese National Library, reprint 1988), vol. 145: ch. "Shihuo, Entry 4."

<sup>38</sup> Wang Guanzhuo, *Zhongguo Guchuan (Ancient Ships of China)* (Beijing: Maritime Press, 1991), pp. 32-4; Zhang Xun (ed.), *Zhongguo Hanghai Kejishi (A History of Chinese Maritime Technology)* (Beijing: Maritime Press, 1991), pp. 61-2; also W. L. Schurz, *The Manila Galleon* (1938, Manila: R. P. Garcia Publishing Co., reprint, 1985), pp. 64-5; Duarte Barbosa, *The Book of Duarte Barbosa, An Account of the Countries bordering on the Indian Ocean and their Inhabitants*, translated into English by M. L. Dames (1518, Nendeln: Kraus Reprint Ltd, 1967), vol. 2, pp. 172-4.

<sup>39</sup> Quanzhouwan Songdai Haichuan Fajue Baogao Bianxiezu [Excavation Team of the Song Ocean Ship in Quanzhou Bay], "Quanzhouwan Songdai Haichuan Fajue Jianbao (Report on the Excavation of the Song Ocean Ship in Quanzhou Bay)," *Wenwu (Cultural Relics)*, 10 (1975), pp. 1-8; Lin Ying, "Mingzhou Shibo Shiliao (Historic Records of Overseas Trade in Ningbo)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 3 (1981), p. 90; Lin Hejie, "Quanzhouwan Songdai Haichuan Chenmo Huaijingde Yanjiu (A Study of the Circumstances and Environment for the Song Shipwreck in Quanzhou Bay)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 4 (1982), pp. 42-51; Xi Longfei and He Guowei, "Dui Ningbo Guchuande Yanjiu (A Study on the Unearthed Song Wreck in Ningbo)," *Wuhan Shuiyun Gongcheng Xueyuan Xuebao (Bulletin of Wuhan Institute of Water Transportation Engineering)*, 2 (1981), pp. 23-32; Wang, *Ancient Ships of China*, p. 32; Zhang *History of Chinese Maritime Technology*, pp. 61-72; Li Changyi, "Guanyu Xin-an Chenchuan Chongdie Qianjiexing Chuanti Jiegou He Liuti Texting Yanjiu (The

for deep water sailing, the Fuzhou ship of the Song was considered not suitable for the shallow waters along the Arabian Sea Coast because of its deep draft. As a result, the Song merchants had to stop in Quilon, southwest India, to change to other ships for the rest of the journey.<sup>40</sup>

The second type was the ‘sand beater’ or ‘shallow water ship’ (*shachuan*, Chinese bateau, literally ‘sand ship’).<sup>41</sup> During the Song, this type of vessel was used in large numbers in coastal and canal shipping.

During the Song Period, sea-going ships were commonly equipped with large sails.<sup>42</sup> The mechanical ingenuity of the Chinese rig spread stresses and cushioned shocks, which made trimming easy.<sup>43</sup> Multiple sails were the norm. The Song *kezhou*, or commercial ships, had as many as five large sails and ten jiggers, all made of cloth. It is recorded that sixty sailors were needed to operate such complex devices.<sup>44</sup> In addition, masts became foldable on the deck to prevent damage from storms in the open sea as well as to allow travelling under bridges, on rivers and through canals.<sup>45</sup> Apart from the sail, the fenestrated rudder was invented to reduce the reacting force from the water when the rudder was turned. This led to a hybrid, in the form of the balanced–fenestrated rudder, effectively minimizing the

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Clinker–Built Structure and the Hydromechanic Characteristics of the Unearthed Chinese Ship in Xin–an, Korea,” *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 2 (1992), pp. 117–28.

<sup>40</sup> Zhou Qufei, “Lingwai Daida (Knowledge about South China and Beyond),” Ji Jun (ed.), *Wenyuange Siku Quanshu (The Qing Imperial Complete Collection of Books in the Wenyuan Library)* (1178, Taipei: Taiwan Commercial Press, reprint, 1983), vol. 347, pt. 6, ch. “Waiguoguo;” see also Dietmar Rothermund, *An Economic History of India* (London: Routledge, 1988), ch. 2.

<sup>41</sup> Zeng Gongliang, *Wujing Zhongyao (Collection of the Most Important Military Techniques)* (1044, Shanghai: Commercial Press, reprint, 1934), ch. “Qianji.” In the Song Period, this type was called the “sand-bar hazard-proof ship (*fangshachuan*),” see Tuo, *History of the Song*, ch. “Bingzhi;” Li Zhaoxiang, *Longjiang Chuanchang Zhi (Records of the Dragon River Shipyard)* (c. 1370, publisher unknown). In Yuan times, it was called the “flat bottom sea vessel (*pingdi haichuan*),” see Song Lian, *Yuan Shi (The History of the Yuan Dynasty)* (1370, Beijing: Zhonghua Books, reprint 1976), ch. “Shihuo Zhi.” It was in the Ming Dynasty that the name of *shachuan* was finally fixed, which has caused some scholars to believe that this type of design had not appeared before Ming times, see Zhou Shide, “Zhongguo Shachuan Kaolue (On the Shallow Water Ships in China),” *Kexuishi Jikan (Collected Works on History of Sciences)*, 5 (1963), pp. 34–54; see also Elvin, *Pattern*, p. 98.

<sup>42</sup> For example, the total sail surface area of the three–mast Song ship (15.5 m x 5 m) unearthed in Ningbo was 95.4 square metres, with an average of 31.8 square metres each (see Xi and He, “Unearthed Song Wreck in Ningbo,” pp. 23–32). This is not too off the mark described in the Song literature: Song commercial ocean-going ships are said to have had often two large masts: 10 Song *zhang* (24.6 meters) and 8 Song *zhang* (19.7 meters) (see Zhang, *History of Chinese Maritime Technology*, pp. 64–5).

<sup>43</sup> Zhou, “On the Shallow Water Ships in China,” p. 44; G. R. G. Worcester, *The Junks and Sampans of the Yangtze* (Annapolis [Md]: Naval Institute Press, 1971), pp. 75–85, 163, 174–5; Joseph Needham, “Civil Engineering,” Joseph Needham (ed.), *Science and Civilisation in China*, vol. 4, pt. 3 (Cambridge: Cambridge University Press, 1971), p. 596 and figs. 1010–19; K. C. Danforth (ed.), *Journey into China* (Washington D.C.: National Geographic Society, 1982), pp. 162, 276–7, 280, 482–3; also Douglas Phillips–Birt, *Fore and Aft Sailing Craft* (London: Seeley, Service and Co., 1962), p. 67 and fig. 14.

<sup>44</sup> Xu Jing, *Xuanhe Fengshi Gaoli Tujing (Charts for the Imperial Envoy Fleet to Korea in 1122)* (c. 1123, publisher unknown).

<sup>45</sup> See Zhang Zeduan, *Qingming Shanghe Tu (Riverside Scene in the Qingming Festival)* (Twelfth century, publisher unknown); Shen Kuo (Shen Gua), *Mengxi Bitan (Notes of Dreams)* (1031–95, Beijing: Zhonghua Books, Beijing: Relics Press, reprint, 1975), vol. 14, pp. 13–14.

energy input for steering.<sup>46</sup> Adjustable multiple rudders were likely invented during the Song as well.<sup>47</sup>

During the Song, astronomical navigation was widely practised. Among many devices, the ‘Tang handy ruler’ (*tangxiaochi*) and the ‘star-measuring ruler’ (*liangtianchi*), were most prominent. Based on the principles of trigonometry, these devices estimated the latitude of ships’ positions by measuring the elevation and bearing between the horizon and Polaris or other recognized stars at a given time.<sup>48</sup> In 1974, a star-measuring ruler was unearthed from a Song wreck in Quanzhou as solid evidence.<sup>49</sup> Another breakthrough occurred in about 1044: the portable compass was first described as equipment to guide army units on manoeuvres at night and on cloudy days.<sup>50</sup> From then on, this novel device became commonly available,<sup>51</sup> and compass making became commonplace. For instance, the well-known Song technologist Shen Kuo (Shen Gua) alone described four ways of making such a device.<sup>52</sup> Apart from Shen’s there were at least two other methods during that time.<sup>53</sup> The improved compass was boxed with twenty-four divisions (15° each in the compass dial) instead of sixteen (22° 5' each in the earlier compass dials<sup>54</sup>) in an effort to make ship positioning more accurate.<sup>55</sup>

The compass was first used on Chinese ships perhaps in the early twelfth century as reported in 1117,<sup>56</sup> as follows:

*Ocean sailors locate ship positions by watching stars at night, watching the sun during the day, and following the compass on cloudy days.*

About a century later, in Southern Song times, the compass became indispensable on Chinese ships, as described by Zhao Rukuo (Zhao Rushi), customs officer in Fujian:<sup>57</sup>

<sup>46</sup> See Worcester, *Junks and Sampans*, *passim*, in particular p. 95.

<sup>47</sup> Xi Longfei, “Jiang Duo Kao (Research into Oars and Rudders),” *Wuhan Shuiyun Gongcheng Xueyuan Xuebao (Bulletin of Wuhan Institute of Water Transportation Engineering)*, 1 (1981), p. 25; Sun, *Nautical History of Premodern China*, p. 452; see also Needham, “Civil Engineering,” p. 654; Anthony Reid, *Southeast Asia in the Age of Commerce, 1450–1680* (New Haven and London: Yale University Press, 1993), p. 37.

<sup>48</sup> Sun, *Nautical History of Premodern China*, pp. 341–3; see also Han Zhenhua, “Woguo Gudai Hanghai Yongde Liangtianchi (The Use of the Star-Measuring Ruler in Maritime Activities of Premodern China),” *Wenwu Jikan (Collected Works on Cultural Relics)*, 2 (1980), pp. 218–9.

<sup>49</sup> See Han, “Use of the Star-Measuring Ruler.”

<sup>50</sup> Zeng, *Collection of the Most Important Military Techniques*, pt. 1, vol. 15.

<sup>51</sup> See Joseph Needham, “Physics and Physical Technology, Part I,” Joseph Needham (ed.), *Science and Civilisation in China*, vol. 4 (Cambridge: Cambridge University Press, 1962), pp. 279–92; Worcester, *Junks and Sampans*, pp. 100–1; Bai Shouyi (ed.), “An Outline History of China,” The Institute of the History of Natural Sciences (ed.), *Ancient China’s Technology and Science*, 2nd ed. (Beijing: Foreign Language Press, 1982), pp. 264a, 310, 325; Lin Wenzhao, “Magnetism and the Compass,” The Institute of the History of Natural Sciences (ed.), *Ancient China’s Technology and Science*, 2nd ed. (Beijing: Foreign Language Press, 1987), pp. 152–65; Zhang, *History of Chinese Maritime Technology*, pp. 231–4.

<sup>52</sup> Shen, *Notes of Dreams*, vol. 24.

<sup>53</sup> Sun Guangqi, *Zhongguo Gudai Hanghaishi (A Nautical History of Premodern China)* (Beijing: Maritime Press, 1989), pp. 438–9.

<sup>54</sup> The modern compass normally has sixteen positions of 22° 5' each, also.

<sup>55</sup> See Worcester, *Junks and Sampans*, p. 100; Merson, *Roads to Xanadu*, p. 63.

<sup>56</sup> Quoted from Zhang, *History of Chinese Maritime Technology*, p. 230.

*Sailing to the east from Hainan Island, sailors face sand-bars of a thousand li and rocks of ten thousand li, sky and water merge in one colour without end. Ocean-going ships travelling in these waters rely entirely on the compass: sailors watch the device day and night with every caution because a hair-breadth's mistake would cause disaster. It is a matter of life and death.*

The application of astronomical knowledge, the compass and the sea routes led to the making of Chinese navigation charts (*haitu*) during Northern Song times. In 1003, *A Chart to Overseas Countries (Haiwai Zhufan Tu)* was first presented to the throne.<sup>57</sup> In 1123, Xu Jing, a Southern Song envoy to Gaoli (Korea), produced another chart entitled *Comprehensive Charts of Islands on the Way to Korea (Shenzhou Suojing Daozhou Zhanyu Erweizhi Tu)*.<sup>59</sup> This technique had a profound impact on Chinese sailing.<sup>60</sup>

It is thus not surprising that by Song times, Chinese ships had been able to sail across the Indian Ocean in greater distances, directly from India/Sri Lanka to Qamar in the southeast coast of the Arabian Peninsula, covering some 4,000 kilometres.<sup>61</sup> With it, Chinese fleets reached just about all the corners of South and Southeast Asia and much of the north Indian Ocean. The Song achievement marked one of the most fruitful periods in Chinese maritime history (see Table 1, compared with the Ming).

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<sup>57</sup> Zhao Rukuo (Zhao Rushi), *Zhufan Zhi (Records of Foreign Peoples)* (1225, Beijing: Zhonghua Books, reprint, 1956), pt. 2, ch. "Hainandao."

<sup>58</sup> Li Tao, *Xu Zizhi Tongjian Changbian (Enlarged Comprehensive References for State Management)* (1183, publisher unknown), vol. 54.

<sup>59</sup> The work is better known for its alternative title of *Charts for the Imperial Envoy Fleet to Korea in 1122 (Xuanhe Fengshi Gaoli Tujing)*.

<sup>60</sup> Zhou Yusen, *Zhenghe Hanglu Kao (On Zheng He's Sea Routes)* (Taipei: Maritime Press, 1959); Institute of the History of Natural Sciences, Chinese Academy of Sciences, *Ancient China's Technology and Science* (Beijing: Foreign Language Press, 1983), p. 25; Haijun Haiyang Cehui Yanjiusuo and Dalian Haiyun Xueyuan Hanghaishi Yanjiushi (Naval Institute of Ocean Cartography and Department of Maritime History, and Dalian Sea Transportation Institute) (eds.), *Xinbian Zhenghe Hanghai Tuji (A New Compilation of the Navigation Chart of Zheng He's Voyages)* (Beijing: People's Communication Press, 1988); also see Sun, *Nautical History of Premodern China*, p. 523; Zhang, *History of Chinese Maritime Technology*, pp. 130–41; Joseph Needham, "Mathematics and the Sciences of the Heavens and the Earth," Joseph Needham (ed.), *Science and Civilisation in China*, vol. 3 (Cambridge: Cambridge University Press, 1959), pp. 556–60.

<sup>61</sup> Zhang Xun, *Woguo Gudaide Haishang Jiaotong (Sea Traffic in Premodern China)* (Beijing: Commercial Press, 1986), p. 65; Sun, *Nautical History of Premodern China*, pp. 405, 410.

Table 1. New Geographic Information, Song vs. Ming<sup>62</sup>

Period	Southeast Asia	South Asia	Arabian Sea	Red Sea	East Africa	Mediterranean <sup>a</sup>	Total
Southern Song	25	9	5	0	3	3	45
Ming <sup>63</sup>	6	2	1	2	4	0	15

Note: <sup>a</sup>Places in the Mediterranean region as recorded.

At this point, the development in sailing technology during the Song challenges the common view that the Chinese sea- and ocean-going knowledge reached a peak in Ming times with Zheng He's spectacular multiple voyages to the Indian Ocean.<sup>64</sup> In all accounts, Zheng's contribution to ship design and sailing scope was marginal.

All the achievements of the Song maritime technology were market-driven, at least in part.

### c. Growth in maritime input (investment) and output

In terms of investment device and pattern, the Song investors adopted the idea of joint ventures in shipping and leasing of vessel services.<sup>65</sup> This was later passed on to the Yuan state and merchants. Such arrangements took place between government and private traders, as well as among merchants themselves.<sup>66</sup>

<sup>62</sup> Data for the Southern Song are based on Zhao, *Records of Foreign Peoples*. (2) Data for the Ming Dynasty are from Ma Huan, *Yingya Shenglan (Tours to Great Sites Overseas)* (1451, Beijing: Zhonghua Books, reprint, 1955); Shen Fuwei, "Zhenghe Baochuanduide Dongfei Hangcheng (Zheng He's Treasure Fleet and Its Voyages to the Eastern African Coast)," Institute of Maritime History of China (ed.), *Zhenghe Xia Xiyang Lunwen Ji (Selected Works on Zheng He's Voyages in the Indian Ocean)* (Beijing: People's Communication Press, 1985), pp. 166–83; Naval Institute of Ocean Cartography et al., *Navigation Chart of Zheng He's Voyages*, pp. 84–98.

<sup>63</sup> There is a recent claim made by Gavin Menzies that Zheng He and his men sailed to the New World (1421, *The Year China Discovered the World* [London: Bantam Press, 2002]). But this is not substantiated by any Chinese record.

<sup>64</sup> See for example Sun, *Nautical History of Premodern China*; Zhang, *History of Chinese Maritime Technology*; Louise Levathes, *When China Ruled the Seas: The Treasure Fleet of the Dragon Throne, 1405–1433* (New York: Simon and Schuster, 1994).

<sup>65</sup> Zhu Delan, "Qing Kaihailing Houde Zhongri Changqi Maoyishang Yu Guonei Yanhai Maoyi, 1684–1722 (Sino-Japanese Traders in Nagasaki and China's Domestic Coastal Trade after the Lifting of the Trade Ban by the Qing Government, 1684–1722)," Zhang Yanxian (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)*, vol. 3 (Taipei: Academia Sinica, 1988), pp. 378–87.

<sup>66</sup> In Chapter 9 of *Mathematics in Nine Categories (Shuxue Jiuzhang)*, an authoritative textbook written by Qin Jiushao in 1247, there is one exercise:

*After the Customs' procedures and the reduction of the goods of the ship owner, there remains 5,088 liang of agalloch eaglewood [Aquilaria agallocha], 10,430 bags [bao] of pepper [40 jin a bag], and 212 cases [he] of ivory. These are the result of a joint investment of four partners: A, B, C and D. They also borrowed among themselves. Person A claims to an official that his investment includes*

Talking about maritime investment and output, nothing can be more relevant than the output of ships. Table 2 shows the number of ships built for the state sector during the Song.

Table 2. Seagoing Ships Built for the Song State<sup>67</sup>

Period	Year	Output of the year
Transport ships	1128	2,700
	1042	500
Warships	1129	200
	1169	270
	1192	100
	995	3,237
Unspecified ships	1090 <sup>a</sup>	3,000
	1114	2,500
	1165	500

Note: <sup>a</sup>Annual quota fixed by Emperor Zhezong (r. 1086–1100) in 1090.

The demand for ships largely came from the Song navy. To discourage the Tartars' further aggression, the Southern Song urgently built a defence line along the Yangzi River. In 1274, in Ezhou alone (in what is now Wuhan, Hubei Province), the build-up of the Song warships reached 10,000. Another 1,000 were stationed in Yingcheng (now Jiangling, Hubei Province) and an armada of 2,500 warships took charge of patrolling on the river. The Song Yangzi fleet thus totalled 13,500 ships. In addition to the navy, the Northern Song state regularly shipped large quantities of grain from the south to feed the northern population at a rate of 6 million *shi* (278,900 metric tons) per year. To facilitate the transport, a total of 1,400 ships (100-tonners) vessels were needed (with two turn-rounds a year). In all, there could have been some 15,000 large ships in the possession of the Song state. These ships became a huge drain on the Song Treasury.<sup>68</sup> The opportunity costs of

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*200 liang of gold, 4 bags of salt and 11 units [dao] of paper currency. Person B invested 800 liang of silver, 3 bags of salt and 88 units of paper currency. This totals 424,000 guan [1 guan = 1,000 coins]. It is known that Person A lent Person B the paper currency, Person B lent Person C the silver, Person C lent Person D the trade permit and Person D lent the gold to Person A. If all the debts are to be paid and the foreign goods to be shared according to the original investment shares, what were the initial prices for silver, salt and trade permit? Proportionally, how much agalloch eaglewood, pepper and ivory does each person get?*

<sup>67</sup> Data based on Song, *Administrative Statutes of the Song Dynasty*, vol. 145: ch. "Shihuo Wushi;" Tuo, *History of the Song*, vol. 175: ch. "Shihuo Shang San;" Song, *History of the Yuan Dynasty*, chs "Shihuo zhi Haiyun," "Shizu Jisi," "Shizu Jiwu," and "Shizu Jiba;" Sun, *Nautical History of Premodern China*, p. 370; Wang, *Ancient Ships of China*, p. 38; Zhang, *History of Chinese Maritime Technology*, pp. 79–83.

<sup>68</sup> The cost of building and maintaining the Song navy was very high. In Song times, a small ship of 15.4 metres by 3.7 metres (5 Song *zhang* by 1.2 Song *zhang*) cost 400,000 bronze coins; a warship of medium size cost one million coins, and a large ship cost 10–20 million, see Xu, *Administrative Statutes of the Song Dynasty*, ch. "Shihuo Zhi;" Lin Shimin, *Haishang Sichouzhi Lude Zhuming Haigang Mingzhou (Ningbo – A*

these ships had to be great for China's maritime commercial expansion and maritime exploration (of Zheng He's type), too.

The private sector was also very active in shipbuilding. By the end of the Southern Song, a maritime tycoon, Pu Shougeng of Middle-Eastern origin, owned 400 sea vessels.<sup>69</sup> Given that a Song sea-going ship of a large size cost 10–20 million bronze coins,<sup>70</sup> Pu's capital investment can be estimated at 4,000–8,000 million bronze coins.<sup>71</sup>

Another area to look at is maritime infrastructure. To take bridges in coastal regions as an example, the Song Period was marked by a sudden increase in bridge construction in places like Quanzhou of Fujian Province. In all, 397 bridges were built during the premodern era to link land to the waterfront.<sup>72</sup> Among them, 100 were built during the Song with a total length of some 30 kilometres. Made of granite, some of the bridges cost as much as 14 million bronze coins each at the Song price.<sup>73</sup> In terms of material input, the surface of 'Bridge of Five li Long' (*wuli qiao*) near Port of Safety (*anping gang*) was made of over 2,000 granite slabs, one metre in both height and width. The total stone input could be 10,000 cubic metres.<sup>74</sup> The aggregate stone and cost to build those 100 Song bridges had to be many times of that.

Evidence shows that most of the bridge-building projects were sponsored by the private sector, mainly sea merchants.<sup>75</sup> Such magnitude of investment clearly reflects the profitability of the maritime sector. This is compatible with some recorded cases in which individuals became extremely wealthy. For example, it is recorded that Yang Ke, a Southern Song sea merchant, managed to accumulate two billion bronze coins (*qian*),<sup>76</sup>

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*Well-known Port for the Silk Routes*) (Beijing: Maritime Press, 1990), p. 33. If it is supposed that all the ships were of medium size at one million each, the initial cost of the Song fleet would be 13,500 million bronze coins. That was not all. Evidence shows that ships were pulled out of service for maintenance as frequently as once a year at a cost of about half the initial purchase price, see Chen Xiyu, "Songdai Daxing Shangchuan Jiqi Liaode Jisuan Faze (Large Commercial Vessels in Song Times and the Formulae for the Estimation of Their Sizes)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 1 (1991), p. 56. So, the total cost of the yearly maintenance would be 6,750 million bronze coins. These two items alone, namely the aggregate government wage bill and the cost of the naval fleet, totalled some 91,000 million bronze coins.

<sup>69</sup> Zhuang *et al.*, *Quanzhou*, p. 60.

<sup>70</sup> Xu, *Administrative Statutes of the Song Dynasty*, ch. "Shihuo Zhi."

<sup>71</sup> For Pu's wealth, see also Kuwahara Jitsuro, "On P'u Shou-keng," *Memoirs of the Research Department of Tokyo Bunko*, 7 (1935), pp. 58–60.

<sup>72</sup> Li Donghua, "Songyuan Shidai Quanzhou Haiwai Jiaotongde Shengkuang (Overseas Communication from Quanzhou during the Song–Yuan Period)," *Zhongguo Haiyang Fazhanshi Lunwenji Bianji Weiyuanhui (Editing Committee for Maritime History of China)* (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1984), vol. 1, pp. 25–7; Zhuang *et al.*, *Quanzhou*, pp. 45–51.

<sup>73</sup> Zhuang *et al.*, *Quanzhou*, pp. 46–7.

<sup>74</sup> Institute of the History of Natural Sciences, *Ancient China's Technology and Science*, pp. 451–3; Lin Renchuan, *Mingmo Qingchu Siren Haishang Maoyi (Private Maritime Trade during the Late Ming and Early Qing Period)* (Shanghai: East China Normal University Press, 1987), Photo 1; Zhuang *et al.*, *Quanzhou*, pp. 47–50 and Photo 6.

<sup>75</sup> See Li, "Overseas Communication from Quanzhou," pp. 127–8; Zhuang *et al.*, *Quanzhou*, p. 49; Hugh R. Clark, "Muslims and Hindus in the Culture and Morphology of Quanzhou from the Tenth to the Thirteenth Century," *Journal of World History*, 6 (1995), pp. 49–74.

<sup>76</sup> See Hong Mai, *Yijian Zhi (Anecdotes of the Song Dynasty)* (c. 1202, publisher unknown), vol. 6.



equal to one-third of the money supply of the Song state in the later eleventh century 1073.<sup>77</sup>

#### e. Maritime trade

The actual scale and scope of China's maritime trade under the Song have remained largely unknown. However, we may take the geographic knowledge obtain under the Song (see Table 1) as a proxy of the geographic scope for the Song sailors to visit and/or for Song goods to be exported.

In terms of the state-run maritime activities, the Song very much stuck to oriental 'tributary exchange' (*chaogong maoyi*). But the way to do business seemed to be altered. Imperial envoys were sent from China to lure overseas countries to 'pay tribute'. This was later copied by Zheng He.

The very nature of this 'tributary exchange' was revealed in 1136 when the Dali Kingdom paid 'tribute' of 500 horses and some elephants to the Northern Song Dynasty. The horses were accepted but the elephants were declined.<sup>78</sup> Undoubtedly, the animals were not gifts. So, the elephants were not worth having: they were of little use, cost too much to keep, and their price was rated too high

The most visible export from Song China was the Chinese currency. Chinese government was heavily involved in the trade. In 1077, the Song government 'granted' India 81,800 *min* of copper coins (1 *min* = 1,000 coins) and 52,000 *liang* of silver.<sup>79</sup> In 1242, Japan shipped 100,000 *min* out of China,<sup>80</sup> an amount equivalent to China's copper money supply for a year in the twelfth century.<sup>81</sup> Given that export of Chinese coins was granted by the Song state, these figures can be legitimately taken as China's payment of the state-run foreign imports under the disguise of tribute exchange. If so, the total value for the Song state-run maritime trade could well be some 160,000 *min* with India (in 1077), and 200,000 *min* with Japan (in 1242), respectively. The total value of the Song state foreign trade must have been greater since India and Japan were only two of the many trading partners of China. Recent archaeological findings have indicated that two thirds of the unearthed ancient coins in Japan and Vietnam were Song coins, suggesting that the same proportion of the Song currency once dominated the monetary circulations in these two countries.<sup>82</sup> Apart from government dealings, sea-going merchants, Chinese or non-Chinese, regularly

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<sup>77</sup> See Elvin, *Pattern*, p. 149.

<sup>78</sup> Tuo, *History of the Song*, ch. "Shihuo Zhi."

<sup>79</sup> Tuo, *History of the Song*, ch. "Wangnian Zhuan."

<sup>80</sup> To show the volume of the metal, according to the Southern Song mintage standard, to cast 1,000 bronze coins needed 2.5 *jin* of copper, 1.94 *jin* of lead, 0.19 *jin* of tin and 5 *jin* of charcoal (Wang, *History of Government Finance of the Northern and Southern Song Periods*, vol. 1, pp. 371–2). Given that the Song measure of *jin* is 596.82 grams, this 100 million coins took 276.3 metric tons of metals (149.2 tons of copper, 115.8 tons of lead and 11.3 tons of tin) and 298.4 tons of charcoal to make. This should be counted as maritime investment and output.

<sup>81</sup> Luo Yaping, "Nansong Qianhuang Chengyin Tanta (On the Causes of Monetary Shortage in the Southern Song Dynasty)," *Huangzhou Daxue Xuebao (Bulletin of the University of Hangzhou)*, 3 (1992), p. 80; Liu Sen, "Songdai Qianjian Yanjiu (Study of the Mints of the Song Dynasty)," *Zhongguoshi Yanjiu (Study of Chinese History)*, 3 (1992), p. 117.

<sup>82</sup> Liu Sen, "Songdai Zhongyue Liangguo Huobi Wenhua Jiaoliushi Shu (On China's Currency Outflow to Vietnam during the Song Period)," *Zhongguo Qianbi (Monetary China)*, 1 (1992), pp. 36–40.

shipped Chinese coins out of China. The continuous outflow of Chinese mintage contributed greatly to the Song monetary shortage.<sup>83</sup> This caused serious concern to the Imperial Treasury and a law was passed to ban such private dealings.

Related to the afore-mentioned government monopoly over medical materials, archaeological discovery shows that the extent of the Southern Song commercial activities reached much of the Northern Indian Ocean. From a medium size Southern Song ship wreck discovered in Quanzhou Bay of Fujian Province in the mid-1970s, a ship load of imported spices, perfume and medicine from overseas was excavated.<sup>84</sup> A chromatographic analysis of samples shows that some of the goods came from the East Coast of Africa.<sup>85</sup>

#### f. Maritime-related development: urbanisation in port regions

Maritime activities changed China's economic landscape, at least along its southeast coast. According to the Northern Song census in 1102, of the total 298 prefectures, ten had over 200,000 households. Among them, three were seaports: Lin-an in Zhejiang, Fuzhou, and Quanzhou in Fujian. Despite the limited land resources for farming, population in these ports grew steadily between 980 and 1102/1241, surpassing the growth in capital city of Kaifeng.<sup>86</sup>

Moreover, these port prefectures had a high degree of urbanisation. In Northern Song times, about 50 percent of the Quanzhou's residents were urban.<sup>87</sup> Should the combined

<sup>83</sup> Luo, "Monetary Shortage in the Southern Song Dynasty," p. 80.

<sup>84</sup> Lin Gengsheng, "Gudai Cong Hailu Yinjin Fujiande Zhiwu (Introduced Plants in Premodern Fujian through Sea Routes)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 4 (1982), pp. 87–91.

<sup>85</sup> Zhang Wengong, "Quanzhouwang Songdai Chenchuanzhong Ruxiangde Boceng Sepu Jianding (Chromatographic Analysis of the Frankincense from the Song Shipwreck in Quanzhou Bay)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 4 (1982), pp. 56–9.

<sup>86</sup> The change in the distribution of population is shown as follows:

Year		989		1080		1102		1241	
Name	Province	Household	Index	Household	Index	Household	Index	Household	Index
Fuzhou	Fujian	94,470	100	–	–	211,552	224	–	–
Lin-an	Zhejiang	70,457	100	202,806	288	203,574	289	–	–
Quanzhou	Fujian	96,581	100	–	–	201,406	209	255,758	265
Kaifeng	Henan	178,631	100	235,599	132	261,117	146	–	–

Source: Data based on Liang, *Dynastic Data*, pp. 132–60.

<sup>87</sup> Li, "Overseas Communication from Quanzhou," pp. 22–3. If such a percentage also existed in the other two port prefectures, Fuzhou and Lin-an, the total urban population in ports could be 308,266 households, or some 1.5 million people. In Song times, there were in all nine seaports (see Zhao, *Records of Foreign Peoples*; Wang Dayuan, *Daoyi Zhilue [Veritable Records of Overseas Countries and Peoples]* [1349,

population of the other six ports be counted as the equivalent of one ‘super-port’, the estimated sea trade–related urban population (merchants, artisans, sailors and so forth) of those ports was likely to be over 400,000 households. It is also known that in the beginning of the twelfth century under the Northern Song, the total registered population in China was 20,264,307 households.<sup>88</sup> Thus the urban population of all these ports was likely to be 2 percent of China’s registered total.<sup>89</sup>

Such a high degree of urbanisation suggested some sort of structural change was occurring in China’s port regions as citizens left farming and made their livelihood in the secondary and tertiary sectors. Not surprisingly, Xie Lü, a poet of the Northern Song once wrote in part: ‘Quanzhou is an overpopulated hilly land with poor soil . . . South to Quanzhou lies the endless sea, to foreign land farmers are busy building ships to sail.’<sup>90</sup>

In conjunction with the rise of urbanisation, maritime trade also transformed some ports into cosmopolitan centres. Foreign traders immigrated to those ports permanently in considerable numbers. As a result, as documented in 1163 by Lin Zhiqi, Commissioner for Maritime Trade, a cemetery for Muslim immigrants was established in a suburb of Quanzhou, probably the first of its kind on Chinese soil.<sup>91</sup>

Some maritime immigrants made a fortune in trade, an example being Pu Shougeng who was not only rich but also so prominent in the local community that he occupied the office of Director (*tiju*) in Quanzhou for 30 years.<sup>92</sup> Evidently, many immigrants married local Chinese girls and started new families. Such intermarriages even involved the Chinese upper classes including the royal circle: in the late eleventh century, a foreign merchant living in Guangzhou married a Chinese princess and eventually became a court official.<sup>93</sup> A relative of Pu Shougeng also made several attempts to marry another Chinese princess.<sup>94</sup> This created some social problems, and the Song state had to impose regulations to limit marital involvement of members the royal family.<sup>95</sup> But, the most visible and most significant consequence of this practice was the formation of the Hui (*huihui* or *huizu*, literally ‘returnees [to Mecca]’), genetically half Middle–Eastern and half Chinese, a result of the intermarriages between Arab/Persian merchants and Chinese women with the inflow of Muslim maritime traders.<sup>96</sup> The Hui speak Chinese and practice Islam (in theory). Over time, the Hui formed the largest among all the ethnic minority groups in Mainland China.

#### g. Remarks on the Song

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publisher unknown]; Zhou Dagan, *Zhenla Fengtu Ji [Travels to Cambodia]* [Yuan Dynasty, publisher unknown]).

<sup>88</sup> See Liang, *Dynastic Data*, p. 152.

<sup>89</sup> With the assumption here that 80 percent of the Chinese were rural, this could mean that the maritime related population counted some 10 percent of the total urban Chinese (see Li Bozhong, “Rengen Shimu Yu Mingqing Jiangnan Nongminde Jingying Guimo (The Practice of Ten *Mu* per Farmer and the Scale of the Traditional Peasant Economy),” *Zhongguo Nongshi (Agricultural History of China)*, 1 (1996), pp. 3–4.

<sup>90</sup> Quoted in Li, “Overseas Communication from Quanzhou,” p. 3.

<sup>91</sup> See Li, “Overseas Communication from Quanzhou,” pp. 28–9.

<sup>92</sup> Wu Zimu, *Mengliang Lu (Recorded Dreams)* (1334, Beijing: China’s Commercial Press, reprint, 1980).

<sup>93</sup> Zhu Yu, *Pingzhou Ketan (Pingzhou Table Talk)* (1119, publisher unknown), vol. 2.

<sup>94</sup> See Zhuang *et al.*, *Quanzhou*, pp. 58–9.

<sup>95</sup> See Deng, *History of Port Guangzhou*, vol. 1, p. 87.

<sup>96</sup> For Quanzhou, see Clark, “Muslims and Hindus in the Culture and Morphology of Quanzhou,” p. 61.

The Song was a period of high tolerance towards maritime activities by the state. It can be no doubt that as the state became pro-market, the Chinese population in the coastal regions plunged themselves into the world of sea trade. In a sense, the Song was a period of proto-mercantilism. It began from a need for more revenue but ended with a wide range of unintended consequences. The results were astonishing in many areas, technology, trade, investment, production and urbanisation. The Song maritime love affair even left a prominent mark on China's population genetically in the form of the formation of the Hui.

The legacy of the Song state and market continued. The policy of the Song state was actively copied by the Mongol conquerors, beneficial to the new master of the Chinese Empire.

## 2. The early-Ming, a power-hungry state which bullied the private sector

Under the Ming, the state policy made a sharp U-turn towards agricultural fundamentalism (*zhongnong*), reminiscent of the distant past under the previous Western Han Dynasty (206 B.C.–8 A.D.). Farming was encouraged, taxes were lowered and commerce was snorted at.

It was under these circumstances that Zheng He carried out his seven voyages. If anything, these voyages were out of the tune with the Ming Imperial Court. Such policy inconsistency plus the spectacular maritime grandstanding has caused continuous debate to the present date. In effect, (1) Zheng He's maritime activities were largely compatible with the afore-mentioned sharp U turn towards agricultural fundamentalism; (2) Zheng He's achievement was based chiefly on the maritime growth and development during the Song; (3) Zheng He's voyages stifled the private sector as the imperial project siphoned away the best artisans, best sailors and hijacked in many ways private trade.

So, if anything, the Ming voyages represented a state failure in protecting and sustaining the maritime sector. Put it bluntly, the voyages were parasitic to the Ming economy in general and to the maritime sector in particular. It cost the market dearly.

### a. Peculiarities of the Ming state and the nature of Zheng He's voyages

Under the Ming, maritime trade continued but the market conditions were drastically altered. When Zhu Yuanzhang (Emperor Taizu, r. 1368–98) and his rebel followers tore down the Mongol Yuan, the first thing they did was to cash in his early promise of land-ownership to the peasantry, a promise which had been made along with the restoration of Chinese rule. The maritime sector suffered a direct hit. In early Ming times, a comprehensive ban, known as 'no inch of board being allowed to enter the sea' (*cunban buzhun xiahai*), was imposed on foreign trade because, as commonly believed, after the chaos at the end of the Yuan Dynasty priorities were given to agriculture, national defence (against the Japanese), and internal security (against piracy and rebellion) at the expense of trade under the new regime.<sup>97</sup>

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<sup>97</sup> Dong Lun, *Ming Taizu Shilu (Veritable Records of Emperor Taizu of the Ming Dynasty)* (c. 1399, Taipei: Academia Sinica, reprint, 1961), vol. 177; Qiu Xuanyu, "Mingchu Yu Nanhai Zhu Fanguozhi Chaogong Maoyi 1368–1449 (Regular Tributes of Exotic Goods and Bestowal of Chinese Goods between China and

There was no doubt that the Ming ban on maritime activities increased the transaction costs for the private sector. It did not mean, however, that China's maritime activities came to a full stop. With the ban on the private sector, the Ming state took over. Zhu Yuanzhang himself was directly involved in maritime trade.<sup>98</sup> Zhu even went to the lengths of sending ships with 36 sailor families from Fujian to the king of Ryukyu as a 'gift' to facilitate the bilateral trade.<sup>99</sup> In return, from Ryukyu, the Ming government regularly imported not only horses and sulphur for military purposes but also exotic goods such as spice, sapanwood, and frankincense.<sup>100</sup> It is in this context of capturing the entire maritime sector by the notoriously coercive Ming state that China's trading door was still narrowly open and foreign traders were cautiously welcomed. The commonly held belief that Ming's new order stopped maritime trade is highly questionable.<sup>101</sup> What happened was that there was a forceful handover of the maritime sector from the private sector to the state.

To facilitate the attempted monopoly of the sea trade, the Ming administration established the 'Chartered Trading House' (*shibosi yahang*) in port cities. In Guangzhou, the number of trading houses expanded from 13 to 36.<sup>102</sup> These commercial bodies were responsible for all foreign imports and Chinese exports, at least according to law. To ensure all the maritime imports were firmly controlled by the state, a trade licence system was established. In 1383, each country trading with China was given two hundred maritime trading passes.<sup>103</sup> If one pass was used for a ship, two hundred vessels could be sent to China from each of these countries. The amount of trade behind this figure was substantial. Apart from this 'hard monopoly', there was 'soft monopoly' which was designed to control the Chinese at home. It took the form of 'sailing permits' (*chuanyin*) issued to private sea traders who sailed to overseas places with the Ming state permission.<sup>104</sup> Those who dared to sail and trade without the Ming licence or permit faced criminal justice and punishment.<sup>105</sup>

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Countries in South Asia, 1368–1449),” Zhang Bincun and Liu Shiji (eds.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1993), vol. 5, pp. 114–20.

<sup>98</sup> Cao Yonghe, “Shilun Mingtaizude Haiyang Jiaotong Zhengce (On Emperor Taizu's Maritime Policy in the Ming Dynasty),” Editing Committee for *Maritime History of China* (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1984), vol. 1, p. 57. Also, Dong, *Veritable Records of Emperor Taizu*, vols. 95, 105.

<sup>99</sup> Cao Yonghe, “Ming Hongwuchaode Zhongliu Guanxi (Relationship between China and Ryukyu under Hongwu Reign [1368–98 A.D.] of the Ming Dynasty),” Zhang Yanxian (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1988), vol. 3, pp. 305–8. Also, Yang Guozhen, “Mingdai Minnan Tong Liuqiu Hanglu Shishi Gouchen (A Study of Sea Routes between South Fujian and Ryukyu in the Ming Period),” *Haijiaoshi Yanjiu (Research in the History of Sea Communication)* 2 (1991), pp. 16–20.

<sup>100</sup> See Cao, “Relationship between China and Ryukyu,” pp. 294–310.

<sup>101</sup> See for example Dong, *Veritable Records of Emperor Taizu*, vol. 177; Qiu, “Regular Tributes of Exotic Goods and Bestowal of Chinese Goods,” pp. 114–20.

<sup>102</sup> See Deng, *History of Port Guangzhou*, pp. 160–2.

<sup>103</sup> Deng, *History of Port Guangzhou*, p. 136.

<sup>104</sup> See Huang Shengzhang, “Mingdai Houqi Chuanyinzhi Dongnanya Maoyigang Jiqi Xiangguande Zhongguo Shangchuan Shangqiaozhu Yanjiu (A Study of Sailing Permits to Trading Ports in Southeast Asia, and Chinese Ships and Merchants Involved during the Late Ming Dynasty),” *Zhongguo Lishi Dili Luncong (Forum for Chinese Historical Geography)*, 3 (1993), pp. 45–102.

<sup>105</sup> To take illegal trade with copper as an example:

On the other hand, to satisfy the appetite of the Ming state for foreign goods and trade revenue, the Ming state made the greatest efforts in premodern Chinese history, by sponsoring Zheng He's maritime expeditions for over three decades. Zheng's superior, Emperor Yongle (r. 1403–24), understood that two basic conditions had to be met if the Empire was to see the traditional Sino-foreign tributary trade flourish: (1) the participation should be voluntary so foreign countries should be lured not forced to trade with China; and (2) profit on the foreign trading partners' part should be guaranteed thus the trade could continue.<sup>106</sup> One of Zheng's basic missions was to attract as many as possible potential future trading partners (rather than to carry out trade by Zheng in real time) for the Ming. What was not addressed though was whether the Ming Treasury was able to afford to continually pour resources into financing Zheng He's overseas trips without financial returns from Zheng's fleet.

The true nature of the Ming voyages was military as well as diplomatic since: (1) Zheng's fleet was heavily armed and the great majority of the passengers were soldiers to 'show off China's wealth and strength overseas';<sup>107</sup> (2) forces were used to suppress Sumatra-based Chinese rebels (in 1404), to attack 'unfriendly' Xilanshan (in present-day Sri Lanka) (in 1410–1), and to put down a riot in Sumatra (in 1413–5);<sup>108</sup> (3) one objection of the voyages was to hunt for Zhu Yunwen (Emperor Huidi, r. 1398–1402) who was reported to have escaped by sea after Zhu Di's *coup d'état* in 1402.<sup>109</sup> Zheng He's voyages were thus the largest scale man-hunt on water in the premodern world.<sup>110</sup>

Not surprisingly, there was no sign that the voyages were able to make any decent economic returns from their super-long voyages, not for the Ming state at least. Instead, from the very start, Zheng He's fleet represented a heavy financial burden to the Imperial Treasury. This was a major step backwards from the business practices of the previous

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Punishment	Copper Atonement ( <i>jin</i> )	kg
Whipping ( <i>chixing</i> ), 10–50 times	1–5	0.6–3.0
Stick Flogging ( <i>zhangxing</i> ), 60–100 times	6–10	3.6–6.0
Jail ( <i>tuxing</i> ), 1–3 years	20–30	12.0–17.9
Exile ( <i>liuxing</i> ), 2,000–3,000 <i>li</i>	80–100	47.7–59.7
Hanging ( <i>jiaoxing</i> ) or Beheading ( <i>zhanxing</i> )	120	71.6

Source: Data based on Ya Sha (ed.), "Junsh Falü Juan (Volume on War and Law)," Wang Shuliang, Fang Ming, Yang Huilin, Jin Hui and Hu Xiaoling (eds.), *Zhongguo Wenhua Jingshua Quanjì (A Collection of the Essence of Chinese Culture)* (Beijing: China's International Broadcasting Press, 1992), pp. 84–6, 199–200, 438–40, 441.

<sup>106</sup> See Gungwu Wang, *China and the Chinese Overseas* (Singapore: Times Academic Press, 1991), pp. 58–9.

<sup>107</sup> Zhang Tingyu (ed.), *Ming Shi (The History of the Ming Dynasty)* (1735, Beijing: Zhonghua Books, reprint, 1974), ch. "Zheng He Zhuan;" also Xie Fang, "Zhenghe Haiwai Yongbing Luelun (On Zheng He's Military Activities Overseas)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 2 (1992), pp. 13–20.

<sup>108</sup> Yang Shiqi, *Ming Chengzu Shilu (Veritable Records of Emperor Chengzu of the Ming Dynasty)* (c. 1425, Taipei: Academia Sinica, reprint, 1961), vols. 52, 71; Zhang, *History of the Ming Dynasty*, ch. "Sumendala Zhuan;" also Xie, "Zheng He's Military Activities Overseas."

<sup>109</sup> Zhang, *History of the Ming Dynasty*, ch. "Zhenghe Zhuan."

<sup>110</sup> See Wang, *China and the Chinese Overseas*, pp. 58–9. It is not surprising that Zheng's voyages were suspended immediately when the usurper Zhu Di (Emperor Chengzu, r. 1402–24) was convinced in 1423 that his nephew Zhu Yunwen had died, see Zhang, *History of the Ming Dynasty*, ch. "Huying Zhuan."

Song and Yuan states which were known for making handsome returns to the state coffers. Indeed, from what Zheng He and his men actually did on their voyages, an attempt to make profit from market exchange was absent, although they may have traded Chinese goods for food and water to sustain themselves.

However, compared with the massive operations under the Yuan, Zheng He's sailing with some 200 vessels and over 20,000 marines,<sup>111</sup> was not the greatest naval undertaking on scale in Chinese history. During 1274–93, in the invasion of Japan, Vietnam and Java, between 900 and 4,400 warships were employed in each campaign.<sup>112</sup> Documents also show that there were over 15,000 warships in a Yuan naval build-up near the East China Sea in preparation for further invasion of South and Southeast Asia.<sup>113</sup> Thus, Zheng He's naval power was not unique. From records of China's diplomacy by sea, it is obvious that Zheng He's operation was not the only case of its kind in Chinese history. Even Zheng He's round-Asia marathon was by no means unprecedented in Chinese history: twelve centuries earlier, a precedent was set during the Three Kingdoms Period (220–280 A.D.) when Sun Quan, King of Wu, sent Zhu Ying and Kang Tai overseas for a twenty-year-long diplomatic mission, visiting Southeast Asia, the Asian Sub-Continent, the Arabian Sea Region and even the Eastern Roman Empire, not to mention the Song cases. It is time for us to put Zheng He and his voyages in a place they really deserve.

## b. Developmental status of maritime technology under Zheng He

### (1) Ship type and size

Vessels in Zheng He's fleet have been identified as the 'Fuzhou type' (*da fuchaun*).<sup>114</sup> This technology was already developed during the Song Period.<sup>115</sup> The best archaeological evidence is the wreck of a Yuan cargo ship sunk in 1323 which was discovered near South Korean coast in 1976.<sup>116</sup> Zheng He's ships were large, but not beyond the capacity of Chinese shipbuilding in the Tang–Song–Yuan Period (618–1368). Before the Ming, the 'divine ships' (*shenzhou*) were already 90 metres in length and 28 metres in beam. These measurements were similar to those for most vessels in Zheng He's fleet, the exceptions being the 'treasure ship' (*baochuan*) and the 'horse ship' (*machuan*).<sup>117</sup> Therefore, it is

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<sup>111</sup> Gavin Menzies' claim enlarges Zheng He's sailing range to the New World, see his *1421, The Year China Discovered the World* (London: Bantam Press, 2002).

<sup>112</sup> Song, *History of the Yuan Dynasty*; Ke Shaomin, *Xin Yuan Shi (A New History of the Yuan Dynasty)* (Tianjin: Xushi Tuigengtan Press, 1920), chs "Riben Zhuan" and "Zhaowa Zhuan;" Chen Bangzhan, *Yuanshi Jishi Benmo (Complete Record of the Yuan Dynasty)* (1606, Beijing: Zhonghua Books, reprint, 1979), vol. 5; see also Elvin, *Pattern*, p. 220.

<sup>113</sup> Chen Yanhang, "Make Boluo Youji Zhong Citong Haichuande Tantaos (On the Sea Vessels in Citong Port as Recorded by Marco Polo)," *Haijiaoshi Yanjiu (Research in the History of Sea Communication)*, 2 (1992), p. 32.

<sup>114</sup> Sun, *Nautical History of Premodern China*, pp. 491–2; Zhang, *History of Chinese Maritime Technology*, pp. 99–105.

<sup>115</sup> Zhang, *History of Chinese Maritime Technology*, pp. 61–2.

<sup>116</sup> Wang, *Ancient Ships of China*, p. 32.

<sup>117</sup> For the Song period, see Zhang, *Sea Traffic in Premodern China*, pp. 48; Zhang, *History of Chinese Maritime Technology*, pp. 62–72; Wang, *Ancient Ships of China*, pp. 31–2. For Zheng He, see Wang, *Ancient Ships of China*, p. 40; Zhang, *History of Chinese Maritime Technology*, p. 101.

sensible to say that from the ship design point of view, Zheng He's fleet represented the technological achievements made three or four centuries earlier by the Songs.

Even the passenger-ship ratio in Zheng He's fleet was not unprecedented: in 1292, Marco Polo was sent by Kublai Khan to escort a Yuan princess to Persia from Fujian. Polo's fleet had 13 ships, each containing 200 passengers plus 5,000–6,000 piculs of pepper.<sup>118</sup> Later, in 1324, Ibn Batuta, a Moroccan traveller who was sent on an embassy to Yuan China, described the Chinese ship he took as having 1,000 passengers.<sup>119</sup> Polo's ships seemed to have a size similar to – and Batuta's was almost certainly larger than – Zheng He's average in 1412.

From the above information, it is reasonable to state that improvements in ship design and construction under Zheng He were marginal compared with Song and Yuan types.

## (2) Navigation

In terms of the use of the compass, the Songs were the first group to employ and perfect the device. By the end of the thirteenth century at the latest, operating the compass for navigation had become a profession on Chinese ships.<sup>120</sup> Sophisticated compass-guided sea routes were well developed also during the Song. During the break between his sixth and seventh voyages, Zheng He had a seaway compass chart entitled *Navigation Chart of Zheng He's Voyages (Zhenghe Hanghai Tu)* compiled.<sup>121</sup> Zheng He's chart may contain more detailed and streamlined information.<sup>122</sup> But, again, this was quantitative improvement without a technological breakthrough.

Overall, Zheng He contributed little to the improvement of the use of compass during his voyages.<sup>123</sup>

## (3) New geographic information

From the data in Table 1, new places across the sea discovered and recorded during the Ming were one-third of those under the Song. This indicates that diminishing returns from maritime inputs kicked in after the Song.

### c. Maritime input and output and the costs to the economy

There can be no doubt that the total investment in Zheng He's fleet was enormous. If we use the afore-mentioned Song price for a large ship at 10,000–20,000 *guan* each as a proxy, Zheng He's 200 sea-going ships would cost at least 20 million *guan*, or 20 billion coins. It is known that during 1413 to 1435, the Chinese population remained stable at the level of

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<sup>118</sup> Zhang, *History of Chinese Maritime Technology*, pp. 88–9.

<sup>119</sup> Wang, *Ancient Ships of China*, p. 32; Zhang, *History of Chinese Maritime Technology*, p. 89.

<sup>120</sup> Wu, *Recorded Dreams*, vol. 12 “Jianghai Jianchuan.”

<sup>121</sup> See Zhang, *History of Chinese Maritime Technology*, pp. 129–53.

<sup>122</sup> See Zhang, *History of Chinese Maritime Technology*, pp. 130–41.

<sup>123</sup> Gong Zhen, *Xiyang Fanguo Zhi (Journeys to Foreign Countries in the Indian Ocean)* (Ming Dynasty, Beijing: Zhonghua Books, reprint, 1961), “Preface.”



51 million.<sup>124</sup> Zheng's fleet would thus cost each Chinese a minimum of 392 coins. Considering the extra-ordinary size of some of his vessels, the cost per capita may have well been doubled. To put this in the Ming tax perspective, this represents a burden similar to that of the end of the Ming, a period notorious for extra levies.<sup>125</sup> All of these estimates do not include the cost of the salaries of victuals for Zheng He's sailors and marines in their ten of thousands. These were only the accounting costs of Zheng He's undertakings at sea. Nevertheless, they worked as a deduction of the capital of the private maritime sector. So, the impact was undoubtedly negative for the private economy.

It seems that the costs alone were not much of a problem for the Ming economy, at least in the short run. Otherwise, Zheng He's voyages could not have happened and his alleged achievement could not have been made. However, (1) given the resource constraints faced by any economy, as the availability and accessibility of capital, labour and materials are not completely elastic at any given time; and (2) considering the non-commercial nature of Zheng He's activities which yielded practically no monetary returns for the Ming economy, what was Zheng He's gain in the form of capital, labour and material inputs took resources from the private sector. To take the composition of Zheng He's crew as an example, Zheng He's armada was not a maritime academy to train sailors. He only recruited experienced sailors from China's coastal provinces.<sup>126</sup> So, the backbone of Zheng He's fleet came from the existing sailing communities in China with maritime knowledge accumulated over generations. The problem here is that once these sailors were drafted to Zheng He's military machine, they had to give up their own private businesses in sailing, trading and fishing. The opportunity costs for the Chinese private sector, a factor that has been completely overlooked so far, must have been huge. In other words, the Ming state hijacked and harmed the Chinese maritime sector in an unprecedented fashion, unequalled in degree during peacetime in the entire Chinese history. In the context of the accounting and opportunity costs, and from the market economy point of view, Zheng He's voyages should be condemned rather than praised.

Evidently, in the long run, Zheng He's joy ride was unsustainable: his fleet proved to be a major drain to the Ming coffers and thus had to be stopped. What surprises us is it took so long for the Ming state to reach such a conclusion. This only shows just how 'market illiterate', if not completely stupid, the Ming ruler really was. This represented a major step backwards from the shrewd state profiteering during the Song (and the Yuan).

#### d. Maritime trade under Ming monopoly, bans and restrictions

Under the Ming, the market conditions for the private maritime traders were just about the worst in Chinese history. Apart from the state monopoly and state elbowing against the

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<sup>124</sup> Liang, *Dynastic Data*, p. 8.

<sup>125</sup> At the end of the Ming, there was a surge of tax burden in the form of numerous annual surcharges and levies (called 'Northern-border Defence Levy' *liaoxiang*, 'Land Surcharge' *tianfu jiapai*, 'Miscellaneous Levy' *zaxiang zengjia*, 'Salt Surcharge' *yanke jiapai*, and 'Customs Surcharge' *guanshui jiapai*). In 1626, these charges reached the peak of 10,994,480 *liang* of silver for the year. Given that China had in 1626 a total of 51,655,459 taxpayers, the surcharge burden was 0.213 *liang* per head, or 400 coins per head maximum (based on Liang Fangzhong's *Dynastic Data of China's Households, Cultivated Land and Land Taxation*, pp. 10 and 379).

<sup>126</sup> Gong, *Journeys to Foreign Countries in the Indian Ocean*, "Preface."

private sector, some specific restrictions were imposed on private ship-owners regarding the number of mast and loading capacity. For example, from 1522 onwards, the Ming authorities only allowed a single mast on each privately owned vessel.

However, the effectiveness of such bans was always doubtful. Under the ban, maritime trade simply continued in the form of smuggling (*zousi*, a very individualistic word in the Chinese vocabulary, literally meaning “operating for one’s private benefit”). Between 1436 and 1510, illegal trade became rampant:<sup>127</sup>

*Rich and powerful families sometimes sail huge ocean-going ships to undertake illegal overseas trade. As a result, the lawbreaking thugs get a source of profit while the government gets nothing.*

In the following period of 1521–66, smuggling activities went from bad to worse:<sup>128</sup>

*Lawbreakers not only illegally built ocean-going ships and sailed overseas, but also established networks and brazenly dressed as Japanese pirates to undertake armed smuggling.*

Some of the smugglers’ rings were very large and sophisticated. In the fourteenth century, during Zhu Yuanzhang’s reign, Zhang Ruhou and Lin Fu had at least twenty ocean-going ships for their armed smuggling operations near Zhancheng (now in Vietnam).<sup>129</sup> The fleet was once found to have a cargo of 70,000 *jin* of tropical dyewood (about 42 metric tons), obviously for trade. In the fifteenth century, one group led by Chen Zuyi had 5,000 men.<sup>130</sup> Another group was able to fight a sea battle against the super fleet of Zheng He.<sup>131</sup> In the sixteenth century, at least 1,000 smuggling ships were based on Shuangyu Islands near Zhejiang coast.<sup>132</sup> Another fleet of several hundred ships under Wu Ping and Zeng Yiben successfully defeated the best Ming naval commanders, Yu Daqiu and Qi Jiguang.<sup>133</sup> Also, in the sixteenth century, Wang Zhi, known as ‘King of the Clean Sea’ (*jinghai wang*), led his fleet of several hundred warships to launch a full scale attack upon cities on the long coast of China. It was reported in the period of 1552 through 1557

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<sup>127</sup> Zhang Xie, *Dongxiyang Kao (A Comprehensive Maritime History)* (1616, Beijing: Zhonghua Books, reprint, 1981), ch. “Shuixiang Kao.”

<sup>128</sup> Zhang, *Comprehensive Maritime History*, ch. “Shuixiang Kao.”

<sup>129</sup> Dong, *Veritable Records of Emperor Taizu*, vol. 48.

<sup>130</sup> Zhang, *History of the Ming Dynasty*, ch. “Sanfuoqi Zhuan;” Yang, *Veritable Records of Emperor Chengzu*, vol. 52; see also Carrington Goodrich and Fang Chaoying, *Dictionary of Ming Biography, 1368–1644* (New York and London: Columbia University Press, 1976), pp. 195–6, 198–9.

<sup>131</sup> Yang, *Veritable Records of Emperor Chengzu*, vol. 52.

<sup>132</sup> Xu Jie and Zhang Juzheng, *Ming Shizong Shilu (Veritable Records of Emperor Shizong of the Ming)* (c. 1567, Taipei: Academia Sinica, reprint, 1961), vol. 350; for the case in Fujian, see Chang, Pin-tsun, *Chinese Maritime Trade: the Case of Sixteenth Century Fu-chien (Fukien)* (Doctoral Dissertation, Princeton University, 1983).

<sup>133</sup> Zhang, *History of the Ming Dynasty*, ch. “Yudaqiu Zhuan.”

that Wang's fleet 'came and went as it wished as if it sailed in a no-man zone, and the Imperial forces dared not encounter the smugglers'.<sup>134</sup>

Gradually, the influence of the market infiltrated the Ming state politics. Some high-ranking officials became involved and lived double lives. For example, Lin Xiyuan (c. 1480–1560) served the empire as a chief judge in the capital Nanjing (in 1530), while his family in Fujian owned a large commercial seagoing fleet with a business network spreading to Southeast Asia. He openly supported maritime trade and thus came into conflict with Fujian Governor Zhu Wan.<sup>135</sup>

There was no secret that maritime smuggling was often backed by influential officials. It is reported that under the reign of Emperor Xianzong (r. 1464–87) civilians and officials in the coastal regions 'always collaborate with each other in the name of Imperial Business Missions, illegally building ocean-going ships and sailing overseas [for trade] with no permission'.<sup>136</sup> During the sixteenth century, the official-smuggler collaboration became institutionalised with careful scheduling of shipping, skilful forgery of documents and seals, and systematic cover-up of vessels, sailors, and goods.<sup>137</sup>

As the smugglers' influence went from strength to strength, in 1640, Zheng Zhilong, the king of smugglers of the time,<sup>138</sup> was offered by the Ming Court amnesty and the key position of Commander in General (*zongbing*) in charge of the whole Fujian Province.<sup>139</sup>

#### e. Decline in maritime-related development

As the Ming state moved away from the Song quasi-mercantilism and resorted to a type of state-ownership and state control (very similar to Stalin's communism), the accounting cost (in terms of the state tax burden), opportunity costs (in terms of what would otherwise have been kept by the private sector) and transaction costs (in terms of what it took to do business in market places) all rocketed. Inevitably, there was a sharp decline in both maritime market activities and maritime-related development.

First, the number of state-run shipbuilding centres declined.<sup>140</sup> Second and most telling, the Chinese population in the coastal regions declined steadily during the Ming. On the

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<sup>134</sup> Ji Liuqi, *Mingji Beilue (A Short History of North China)* (1671, publisher unknown), vol. 11 "Zhengzhilong Xiaozhuan;" Zhang, *History of the Ming Dynasty*, ch. "Ribei Zhuan."

<sup>135</sup> See Goodrich and Fang, *Dictionary of Ming Biography*, pp. 919–22.

<sup>136</sup> Yang, *Veritable Records of Emperor Chengzu*, vol. 103.

<sup>137</sup> See Hu Zongxian, *Chouhai Tubian (An Illustrated Seaboard Strategy)* (1565, publisher unknown), vol. 4.

<sup>138</sup> Zheng was an international figure of the time. He began his career in Macao as a Catholic convert (known as Nicholas Iquan) and inherited a Chinese-run international contraband business empire from Li Dan (known in the West as Captain Andrea Ditties) after winning the support of a Fujian gang in Hirado, where he was based and married a Japanese woman. In the entire Ming–Qing Period, ships of Zheng's family formed probably the largest private fleet in Asia. Zheng's sea trade operation in terms of cargo tonnage is believed to have been seven to eleven times greater than that of his Dutch competitors in trade with Japan, see Sun, *Nautical History of Premodern China*, p. 590; see A. W. Hummel (ed.), *Eminent Chinese of the Ch'ing Period (1644–1912)* (Taipei: Ch'eng–Wen Publishing Co., 1967), pp. 110–11.

<sup>139</sup> Ji, *Short History of North China*, ch. "Zhengzhilong Xiaozhuan."

<sup>140</sup> Some data to show the change:

Period	No.	Location	Annual output
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other face of the same coin, the gravity of Chinese population growth shifted inland: apart from a moderate growth in Nan Zhili (Anhui and Jiangshu), the decline was all-rounded.<sup>141</sup> This suggests that the coastal economy was no longer capable of feeding the same proportion of the population. Such a loss in the population-supporting capacity was almost certainly a direct result of the Ming state policy over maritime trade.

All these reveal that although the market fought back through smuggling, the mounting costs for China's private maritime operators caused in the end a recession in the sector.

Song	24	Jinzhou, Jizhou, Tanzhou, Hengzhou, Dingzhou, Chuzhou, Sizhou, Ganzhou, Hongzhou, Jizhou, Wenzhou, Ningbo, Xiuzhou, Pingjiang Fu, Fuzhou, Songjiang, Zhenjiang, Nanjing, Xuzhou, Meizhou, Jiaozhou, Huzhou, Guangdong Lu, Fujian Lu	3,000
Ming	12	Fujian, Tianjin, Zhejiang, Hunan, Guangdong, Jiangxi, Suzhou, Anhui, Anqing, Taiping, Zhenjiang, Yangzhou	500

Source: Data based on Song, *Administrative Statutes of the Song Dynasty*, ch. "Shihuo Wushi;" Zhang, *History of the Ming Dynasty*, ch. "Shihuo Zhi;" Zhang, *Sea Traffic in Premodern China*, pp. 22–3, 66; Sun, *Nautical History of Premodern China*, pp. 116–17, 180–2, 251, 351–2; Wang, *Ancient Ships of China*, pp. 28–9; Zhang, *History of Chinese Maritime Technology*, pp. 79–81; Wang Zhijin, "Qinhan Shiqide Chuanbo Zhizaoye (The Shipbuilding Industry in the Qin–Han Period)," *Xueshu Yuekan (Academic Monthly)*, 1 (1993), pp. 156–64.

<sup>141</sup> Changes in regional weight of Chinese population, 1391–1578 (% of the total):

Region		1393	1491	1578
Maritime zone	Songjiang	2.4	2.2	2.0
	Zhejiang	20.1	16.5	14.5
	Fujian	7.7	5.6	4.9
	Guangdong	6.3	5.1	5.0
	Nan Zhili	18.0	16.6	19.5
Maritime hinterland	Huguang	7.3	5.5	5.1
	Jiangxi	14.6	15.0	12.6
Inland	Henan	3.0	4.8	6.0
	Shaanxi	2.8	3.4	3.7
	Sichuan	2.0	2.8	2.5
	Yunnan	0.6	0.2	1.3

Source: Based on Liang, *Dynastic Data*, pp. 205–7.

## f. Remarks on the Ming

The Ming Period was a 'dark-age' for the Chinese maritime sector and its development. The combination of Ming trade monopoly over maritime trade (which put a lid on the private sector) and Zheng He's extravagant voyages (which unplugged the private sector) created very hostile conditions for the market to operate in the private hands. So, the decline was inevitable.

In this context, the importance of Zheng He's alleged achievements should not be overplayed.

## 3. The early and mid-Qing (1644 – c. 1799), how the market bounced back

### a. The Manchu state, a copy-cat of the Ming

The Manchu rulers copied the Ming policy of maritime monopoly including ban on private maritime trade. This had been widely condemned, probably too harshly compared with the Ming. However, the Qing state did not artificially channel resources (capital, labour and materials) to a scheme similar to that of Zheng He. In nature, the Qing policy was geared more towards minimising the threat from Ming Loyalists headed by Zheng Chenggong (Zheng Sen), Japanese-Chinese pirates and smugglers than maintaining a high degree of trade monopoly of the Ming type.<sup>142</sup>

Such a threat was not trivial. For example, Zheng Chenggong's navy once reached a standard equal to the Europeans in Asian waters. During the period from 1647 to 1654, Zheng's fleet raided the main cities in Fujian and Guangdong provinces, invaded Shandong Peninsula, captured Zhenjiang along the Yangzi, and laid siege to Nanjing. In 1662, this fleet launched a major attack from the Penghu Islands and captured Taiwan as a permanent base.<sup>143</sup> The Manchu government navy could not match the naval power of the Ming loyalists. Zheng Chenggong even managed to drive the Dutch out of Taiwan in 1662, although the Dutch were at that time a rising global sea power and had just defeated the Spanish in Taiwan in 1642. Beating the Dutch demonstrated that Zheng Chenggong's naval power was at least equal, if not superior to, the Europeans in Asia of that time.<sup>144</sup>

More importantly, the implication of the Qing maritime ban was not complete. In 1661 through 1683, the very period when the allegedly strict maritime trade ban was carried out ruthlessly by the Manchu conquerors, unlawful sea trade was protected in pockets of China by the three most powerful Chinese officials at the Qing Court: Wu Sangui in charge of Yunnan and Guizhou, Shang Kexi ruling Guangdong, and Geng Jingzhong governing Fujian.<sup>145</sup> Therefore, half of China's coast was indeed wide open to maritime trade. The

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<sup>142</sup> Wang Hongbin, *Qingdai Qianqi Haifang Sixiang Yu Zhidu (Mindset and Institution of Coastal Defence during the Early Qing Period)* (Beijing: Social Science Literature Press, 2002), chs. 1–2.

<sup>143</sup> Sun, *Nautical History of Premodern China*, pp. 296–8.

<sup>144</sup> For archeological evidence, see Zhuang Fangrong and Wu Shuying, *Taimin Diqu Guji Xunli (Survey of Architectural Relics in Taiwan)* (Taipei: Cultural Construction Committee, 1985), pp. 198, 259.

<sup>145</sup> See Zhu Delan, "Qingchu Qianjieling Shi Zhongguo Chuan Haishang Maoyizhi Yanjiu (On Trade Activities of Chinese Ships under the Qing Law of Antimaritime Immigration from the Coastal Region)," *Zhongguo Haiyang Fazhanshi Lunwenji Bianji Weiyuanhui* (Editing Committee for *Maritime History of*

Qing state left other loopholes, too. For example, deep-sea fishing was not banned and thus some cargo vessels disguised as fishing boats were able to leave China without trouble.<sup>146</sup>

It is fair to say that all the early and mid-Qing bans on maritime activities were short-lived and not enough to kill off the Chinese desire to sail at sea either legally or illegally. The Qing state did not repeat the Ming practice of wasteful state-run showy offshore parades, nor did it hijack the entire maritime sector for unproductive activities. So, something was left for the private sector to play with. And, this allowed the market to function (even if not as fully as during the Song). So, the Qing state policy had mixed results, some rather positive.

#### b. Maritime technology during the early and mid-Qing

The most damaging to the Chinese maritime technology was not the ban but shipbuilding restrictions imposed by the Qing state. Following the Ming practice with which private ship-owners were allowed to have one mast on each vessel, the Qing authorities were slightly more lenient by permitting two masts on each vessel with a maximum loading capacity of 500 *shi* (36.2 metric tons).<sup>147</sup> Such a ship was the equivalent of the medium-size ships in Song times. In return, privately owned ships were allowed to sail out of China. The whole idea of such restrictions was to make sure no private ship was able to out-sail the Qing naval vessel in terms of speed and duration. So, the technical ceiling was set at the level of the Qing naval vessels (which was in turn determined by the Qing state budget allocated for naval defence). Given the Qing state only controlled a small percentage of China's total GDP, hardly beyond the 5 percent mark;<sup>148</sup> a tight naval budget was inevitable.<sup>149</sup> A tight budget for the Qing navy determined a passive defence strategy with small and slow ships guarding China's long coast. As for why and how the Qing state decided to take so little from the economy, the ultimate answer lies in its attempt to consolidate the Manchu legitimacy to rule China through the adoption of Confucian benevolent statecraft. Indeed, the restrictions on private ships were resulted from a long chain of rather rational policy-making processes of the Qing state.

With this trade-off between ship size and sailing permit, the private sector was forced to take up a second best choice in technology embodied in medium size ships. From the market operation point of view, such a compromise was not only necessary but also rational: as long as the compromise was able to lower the transaction costs, it was worth doing.

#### c. Maritime trade

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China) (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)*, vol. 2 (Taipei: Academia Sinica, 1986), pp. 142–3, 154–6.

<sup>146</sup> Zhu, "Trade Activities of Chinese Ships under the Qing Law," pp. 110–31.

<sup>147</sup> Zhang, *Sea Traffic in Premodern China*, p. 89; Sun, *Nautical History of Premodern China*, p. 573.

<sup>148</sup> Albert Feuerwerker, "The State and the Economy in Late Imperial China," *Theory and Society*, 13 (1984), p. 322.

<sup>149</sup> Wang, *Mindset and Institution of Coastal Defence*, ch. 3.

Under the Qing, as during the Ming, the ban on maritime activities was not as effective as the state originally hoped for. It is recorded:<sup>150</sup>

*Although this Dynasty has imposed a strict ban on maritime trade allowing no single piece of board to enter the sea, powerful merchants bribe law-enforcement officials, collaborate secretly with Zheng's [Chenggong] regime in Amoy and then sail to overseas countries.*

During the early Qing maritime bans (1655–82), as many as 1,009 Chinese merchant ships managed to visit Japan.<sup>151</sup> Only half of the ships were actually reported.<sup>152</sup> During the same period, another 895 ships sailed to Luzon.<sup>153</sup> In all, 1,904 ships sailed out of China during the 27-year long ban, averaging 70 ships going out each year. If other repertoire destinations are added, such as Vietnam, Java and Sumatra, the figure must have been much greater, at least doubled. On the domestic front, shipping was even more active. In the late seventeenth century, a fleet of about 3,500 ships travelled between Shanghai and Liaoning (in south Manchuria) for cotton cloth, tea, bean products, and wheat.<sup>154</sup> The capacity of these ships was between 65,000 and 400,000 *jin* (38.8 and 238.8 metric tons, respectively).

So, trade went on under the Qing bans. But how was it done? Evidence suggests that much of the maritime trade was in the hands of maritime smugglers as the market found its own way out by offering high returns. The reason was purely economic: if the profit from illegal trade is high, a society has a strong tendency to break the law. In other words, high maritime trade profits from smuggling operations increased the 'opportunity cost' of remaining a lawful citizen and an upright official, a common phenomenon seen in the black market economy anywhere in the world. It is reported that a Qing smuggler named Shen Shangda was able to make up to 5,000 *liang* of silver (186.6 kg) from a trip. In 1681, when the Qing authorities decided to do something about his smuggling ring, they confiscated Shen's assets worth 975,936 *liang* of silver (36.4 tons).<sup>155</sup>

To tackle the problem of the black market, the Qing state began to compromise. In the eighteenth century, restrictions replaced outright bans and amnesties were granted to offenders. For example, between 1717 and 1727, maritime merchants and sailors were allowed to sail out of China as long as (1) they were cleared by official investigation of misconduct and criminal records, (2) they had reputable citizens as guarantors, and (3) they

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<sup>150</sup> Yu Yonghe, *Bihai Jiyou (Travels in Profitable Waters)* (1835, Taipei: Bank of Taiwan, reprint 1959), vol. 2, p. 146.

<sup>151</sup> Han Sheng, "Qingchu Fujian Yu Ribende Maoyi (Trade between Fujian and Japan during Early Qing Times)," *Zhongguo Shehui Jingjishi Yanjiu (Study of Chinese Socio-economic History)*, 2 (1996), p. 59.

<sup>152</sup> Zhu, "Trade Activities of Chinese Ships under the Qing Law," pp. 110–35.

<sup>153</sup> Qian Jiang, "1570 – 1760 Nian Zhongguo He Lusong Maoyide Fazhan Ji Maoyi-e-de Gushuan (Development of Sino-Luzon Trade and Estimates of the Trade Volume)," *Zhongguo Shehui Jingjishi Yanjiu (Study of Chinese Socio-economic History)*, 3 (1986), p. 74.

<sup>154</sup> See Elvin, *Pattern*, p. 214.

<sup>155</sup> See Deng, *History of Port Guangzhou*, p. 178; Huang Qichen, "Mingqing Guangdong Shangbang (Merchant Groups in Guangdong during the Ming-Qing Period)," *Zhongguo Shehui Jingjishi Yanjiu (Studies of Chinese Economic History)*, 4 (1992), p. 33.

promised to return to the departure port.<sup>156</sup> Once sailing out, the merchants had almost complete freedom. It was reported in 1720 that, of over 1,000 ocean-going ships built each year to sail overseas, only half returned to China. The rest broke their promises to the Qing state and stayed overseas to make more money.<sup>157</sup> Later, granting amnesty became frequent, in 1796–1820, a total of 7,043 illegal maritime activists received amnesty from the Qing state.<sup>158</sup> By then, China’s maritime trade was in effect legalised. So, despite these written restrictions, the Qing sea-goers enjoyed far more freedom than their Ming counterparts.

Consequently, by the mid-Qing period (18th century) private-run Sino-Asian maritime trade bounced back perhaps to the Song level in terms of its scope if not the scale (see Table 3)

Table 3. Export and Import by the Private Sector during the mid-Qing<sup>159</sup>

Region	Export	Import
Japan	ceramics, sugar, raw silk silk products	copper, silver, gold, seafood, hide, swords
S.E.A. <sup>a</sup>	ceramics, umbrellas, cloth, paper, sandals, raw silk, silk products, sugar	rice, spices, timber, cotton, raw medicine, cloth, silver, arms, ships <sup>b</sup>
W.A.A	ceramics	gems, spices, ivory

<sup>156</sup> Kun Gang, *Guangxu Daqing Huidian Shili (Collection of the Qing Administrative Records under the Order of Emperor Guangxu)* (1899, publisher unknown), vol. 629.

<sup>157</sup> Qi Zhaonan, *Qingchao Wenxian Tongkao (Comprehensive Study of Qing Records)* (1787, publisher unknown), vol. 33.

<sup>158</sup> Zhang Zhongxun, “Qing Jiaqing Nianjian Minzhe Haidao Zuzhi Yanjiu (On Pirates’ Organisations in the Fujian and Zhejiang Regions during the Jiaqing Reign [1796–1820 A.D.] of the Qing Dynasty),” *Zhongguo Haiyang Fazhanshi Lunwenji Bianji Weiyuanhui (Editing Committee for Maritime History of China)* (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)*, vol. 2 (Taipei: Academia Sinica, 1986), p. 187.

<sup>159</sup> Data based on Jiang Risheng, *Taiwan Waiji (Unofficial History of Taiwan)* (c. 1709, Fuzhou: Fujian People’s Press, reprint, 1983), vol. 13; Zhou Kai, *Xiamen Zhi (A History of Amoy)* (Qing Dynasty, publisher unknown), vol. 5 “Chuanzheng;” Anon, *Qing Shizong Shilu (Veritable Records of Emperor Shizong of the Qing Dynasty)* (1735, Taipei: Hualian Press, reprint, 1964), vol. 66; Anon, *Qing Gaozong Shilu (Veritable Records of Emperor Gaozong of the Qing Dynasty)* (1799, Taipei: Hualian Press, reprint, 1964), vols. 285, 424; Bian Xiaoxuan and Zheng Xuemeng, *Wudai Shihua (A History of the Five Dynasties)* (Beijing: Beijing Press, 1985), p. 102; Huang Shijian, *Yuanchao Shihua (A History of the Yuan Dynasty)* (Beijing: Beijing Press, 1985), pp. 134–5, 201, 204; Sun, *Nautical History of Premodern China*, pp. 298, 379, 601; see also Lin, *Private Maritime Trade*, ch. 6 and Lin Renchuan, *Fujian Duiwai Maoyi Yu Haiguan Shi (A History of Fujian’s Foreign Trade and Customs)* (Xiamen [Amoy]: Lujiang Press, 1991), pp. 47–56; Weng Dujian (ed.), *Zhongguo Minzu Guanxishi Gangyao (A Compact History of Relationships among Nationalities in China)* (Beijing: China’s Social Sciences Press, 1990); Moira Tampoe, *Maritime Trade between China and the West* (Oxford: British Archaeological Reports, 1989), pp. 131–4.



Note: S.E.A.–Southeast Asia; W.A.A.–West Asia and Africa; <sup>a</sup> including *entrepôt* trade with Europe and the Americas; <sup>b</sup> Chinese designed ocean-going ships were imported from overseas to cash in the cheap labour and materials in Vietnam and Siam.

Sea merchants became once again wealthy, which can be seen from their donations and contributions. In the period between 1780 and 1817, Pan Youdu, a chartered sea trader, donated for various reasons a total of 800,000 *liang* of silver (29.8 tons) to the court.<sup>160</sup> However, this amount did not create any financial crisis in Pan’s business empire: in 1820, Pan’s family fortune was estimated as 10 million Mexican silver coins (7.2 million *liang* or 268.6 tons). Twenty years later, the figure was doubled.<sup>161</sup> Some Chinese merchants also made great fortunes on foreign soil.<sup>162</sup> The returns made from maritime trade enabled some sea trader to live like kings. For example, Zheng Zhilong built for himself a palace several *li* long decorated with silk, gold and jade.<sup>163</sup>

#### d. Maritime–related development

Not surprisingly, maritime-related development began to pick up during the early and mid-Qing. This can be shown by the same indicator of population growth in different regions. Clearly, there was a shift of growth momentum from Jiangsu, Zhejiang and Fujian towards Guangdong. The relative decline of Jiangsu, Zhejiang and Fujian was compensated by the growth in the maritime hinterland of Anhui, Hubei and Hunan.<sup>164</sup>

<sup>160</sup> Chen Guodong, “Pan Youdu (Pan Qiguan Ershi): Yiwei Chenggongde Yanghang Shangren (Pan Youdu [Pan Qiguan, the Second]: A Successful Chartered Foreign Trade Dealer),” Zhang Bincun and Liu Shiji (eds.) *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1993), vol. 5, pp. 217, 254–5, 266–7, 269, 275, 277–8; C. J. A. Jörg, *Porcelain and the Dutch China Trade* (Lange: Martinus Nijhoff, 1982), p. 80.

<sup>161</sup> Chen, “Pan Youdu,” p. 245.

<sup>162</sup> J. D. Vaughan, *The Manners and Customs of the Chinese of the Straits Settlements* (1879, Singapore: Mission Press; Singapore: Oxford University Press, reprint, 1971), p. 2.

<sup>163</sup> Lin, *Private Maritime Trade*, pp. 129–30; see also D. S. Howard, *Chinese Armorial Porcelain* (London: Faber and Faber, 1974), p. 26.

<sup>164</sup> Changes in regional weight of Chinese taxpayers (% of the total), 1661–1820:

Region	1661	1685	1724	1753	1766	1812	1820
Maritime zone							
Jiangsu	–	11.5	10.7	12.3	11.3	10.5	7.6
Zhejiang	12.9	12.0	10.7	8.4	5.5	7.3	7.9
Fujian	6.9	6.0	5.7	4.6	3.9	4.1	5.3
Guangdong	4.7	4.7	5.1	3.9	3.3	5.0	6.2
Maritime hinterland							
Anhui	–	5.6	5.4	2.3	11.1	9.4	9.8
Hubei	3.6	1.9	1.8	4.4	4.0	7.6	8.4
Hunan	–	1.3	1.3	4.2	4.2	5.2	5.3
Jiangxi	9.3	9.0	8.6	4.9	5.5	6.4	6.8
Inland							
Shanxi	7.1	6.8	7.0	5.0	5.0	3.9	4.2
Henan	4.3	6.0	8.1	6.9	7.9	6.4	6.8
Shaanxi	11.4	9.4	8.5	3.7	3.5	2.8	3.5

Monetarily speaking, the most important development during the early and mid-Qing was the intake of large quantities of foreign silver which made China a ‘silver black-hole’ in the world market of the time.<sup>165</sup> It was said that ‘the Chinese were not buyers, but sellers, and they demanded silver in exchange for their goods’.<sup>166</sup> From the accounts of H. B. Morse from 1699 to 1751, as much as 91.6 percent of the total value of the British exports to China took the form of silver. From the viewpoint of international trade, this actually shows China’s total dependency on foreign supply of precious monetary metal.<sup>167</sup>

Having the large quantities of monetary silver for such a long period enabled China to establish a silver standard. So, China’s timeless state mints became obsolete. And, in the first half of the nineteenth century many provincial mints stopped casting bronze coins.<sup>168</sup> The establishment of the silver standard was done mainly by the private sector, a unique case in world history.

Eventually China paid a heavy price for such dependency: with the rise of opium imports, China’s silver reserves quickly drained out which caused a severe monetary shortage and deflation.

#### e. Remarks on the early Qing and mid-Qing

The Qing state was more market-friendly than the previous Ming on two accounts. First, it did not have the will (and the resources) to hijack the private sector. Rather, it compromised with the private sector and eventually let it free (or almost free). Second, it did not repeat the economically irrational voyages of the Zheng He’s kind. The end result was a renaissance of maritime activities from a low ebb under the suffocating, oppressive Ming rule.

#### 4. The late Qing (c. 1800–42), how the market grew

##### a. State policy of monopoly with the help of the private sector

The Qing government monopoly was established in around 1757, the same time as Guangzhou (Canton) was opened as China’s sole port for maritime trade with other countries. Accordingly, in Qing times, the maritime merchants were called ‘ocean-trade dealers’ (*yanghang*), ‘ocean-trading goods dealers’ (*yanghuo hang*) or ‘Imperial Chartered

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Yunnan	0.5	0.6	0.6	1.0	1.0	1.5	1.7
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Source: Based on Liang, *Dynastic Data*, pp. 391–410.

<sup>165</sup> Richard von Glahn, “Myth and Reality of China’s Seventeenth-Century Monetary Crisis,” *The Journal of Economic History*, 2 (1996), p. 433.

<sup>166</sup> Schurz, *Manila Galleon*, p. 68.

<sup>167</sup> H. B. Morse, *The Chronicles of the East India Company Trading to China, 1635–1834* (Oxford: Oxford University Press, 1926–9), vol. 1, pp. 307–13.

<sup>168</sup> See Wang Qingyun, *Shiqu Yuji (A Personal Record of the Qing Dynasty)* (1858, Beijing: Beijing Classics Press, reprint, 1985), pp. 207–8; also Yuan Yitang, “Qingdai Qianhuang Yanjiu (A Study of Money Shortage in the Qing Dynasty),” *Shehui Kexue Zhanxian (Front of Social Sciences)*, 2 (1990), pp. 182–8.

Houses' (*gonghang* or, commonly, Cohong). This is commonly known as the *Canton-Cohong* system.

The chartered maritime trade dealers represented a new breed of merchants. In the Qing Dynasty, they were selected by the government and enjoyed the right as the sole agents to operate in foreign trade. In return, the dealers were responsible for customs control of imports and exports, payment of commercial taxes, and liaison between foreign traders and ordinary Chinese merchants, as well as between foreign traders and the Chinese authorities.<sup>169</sup>

Until 1842 when the Nanking Treaty was signed, these merchants were practically in charge of the entire Sino-foreign seafaring trade. Such power and responsibility of Chinese merchants was unprecedented in Chinese history: for the first time, the Chinese Imperial government gave a group of private merchants such a position in an area that had been traditionally viewed as the exclusive domain of the Imperial government since the Yuan. The merchants were thus properly called by the English, the “king’s merchants” or ‘great mandarin merchants’ of the Chinese Empire.<sup>170</sup> In doing so, the Qing government faced a constant dilemma: (1) according to the Confucian doctrine the merchant class is useful but untrustworthy, yet (2) according to the rule of the ‘market game’ the merchant class is the most qualified player on all accounts, and thus they should be trusted. The fact that those merchants were chartered shows enormous trust, a very un-Confucian approach.

In this context, it becomes easy to understand (1) why the Qing authorities viewed the chartered sea merchants as moneymaking machines of the government and (2) why business failures of those merchants often gave provocation to the throne and they were often extraordinarily heavily punished. The Qing government had great expectations of these privileged dealers whose exclusive right came with the proviso that no bankruptcy should ever occur. Therefore, it is misleading to view the harsh penalties upon chartered maritime merchants as hard evidence of government universal antitrade policy. The penalties were regarded as a reasonable price for the monopolistic power granted to a small number of individual traders.

#### b. Impact of the Qing monopoly

The *Canton-Cohong* system was in nature a trade monopoly. Tea produced in Fujian had to travel some 1,400 kilometres south before being exported. The cost of inland transport accounted for one-third of the free on board (FOB) price. This added price was for the foreigners an increase in their costs in doing business with China.

But the impact of the *Canton-Cohong* system was not all negative on the Chinese economy. It did create a lot of jobs for China’s maritime hinterland. Therefore, what the West lost was what China gained: the monopoly-cum-inland transport sustained an economy worth 600,000 *liang* of silver (22.4 metric tons) per year for the 150,000-*dan* tea trade alone.<sup>171</sup> To support that the average wage rate was one *liang* of silver per month,<sup>172</sup>

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<sup>169</sup> For a case, see Chen, “Pan Youdu,” pp. 245–300.

<sup>170</sup> See Jörg, *Porcelain and the Dutch China Trade*, p. 66.

<sup>171</sup> Lin, *History of Fujian’s Foreign Trade and Customs*, pp. 234–6.

<sup>172</sup> Based on the wage rate for artisans of the Ming Period, see Yang Jie (ed.), *Jiangsu Hangyun Shi (A Maritime History of Jiangsu)* (Beijing: People’s Communication Press, 1989), pp. 137–8.

this would support the livelihood of 50,000 transport workers, or 200,000 people if the workers' families were included. This was a typical 'linkage effect' on the economy. Tea was only one of the many export items of the time. And, Fujian was only one of the locations for supply. One also needs to take into account of foreign imports via Guangzhou to the rest of the Empire. More linkages must have followed: roads had to be built, transport vehicles made and storage arranged. In addition, surplus food would be crucial to feed those working for the Guangzhou monopoly network. So, our estimates of 200,000 people need to be multiplied. This is highly compatible with the population growth pattern in the maritime hinterland.

So, it is fair to say that although the Qing monopoly did not (and should not) reach a Pareto optimum for all trading parties, it did benefit some Chinese (be it a chartered merchant or a transport coolie).

c. How it ended: opium trade, trade deficits, and the opium war

As China's door for trade was never closed but monopolised, the West had two hurdles to overcome: its own trade deficits and the Qing monopoly. It was a hopeless task until opium was discovered as an equaliser in trading with China. Soon, China's tea export was offset by opium instead of silver. Not only that, in 1817–19, for the first time, China had a trade deficit with Britain and India. From then on, China's hard-earned silver began to flow out at a speed much faster than imports of the metal during the previous periods. The *Canton-Cohong* system tumbled, as trade surpluses were no longer guaranteed.

The response of the Qing state was to ban the opium trade. It was a passive measure trying to stifle opium trade at home rather than enhancing China's monopolistic supply overseas. As Britain had too much to lose from the opium sales, the ban together with the confiscation of foreign opium stock triggered the invasion of the British gun-ships.<sup>173</sup> The rules of the game were unilaterally changed by the West from peaceful market exchange (in which the West had some comparative advantage) to armed confrontation (in which the West possessed the *force majeure*). The gamble paid off. In 1842, the Nanking Treaty was signed. Opium was legalised. Foreign traders' losses were compensated. The British had free access to China's market with their property rights protected.

After the Opium War the Qing monopoly was thoroughly dismantled: from 1842 to 1901, China signed 26 treaties for 73 concessions with 12 foreign powers including unilateral most-favoured-nation treatment for trade, consular jurisdiction, access to the interior, permanent residency for foreigners, the right to deploy foreign armed forces, war reparations and territorial concessions.<sup>174</sup> Between 1842 and 1900, China's war reparation premiums totalled 713 million *liang* of silver (26,600 metric tons), equivalent to 22 years of the Qing annual agricultural tax income.<sup>175</sup>

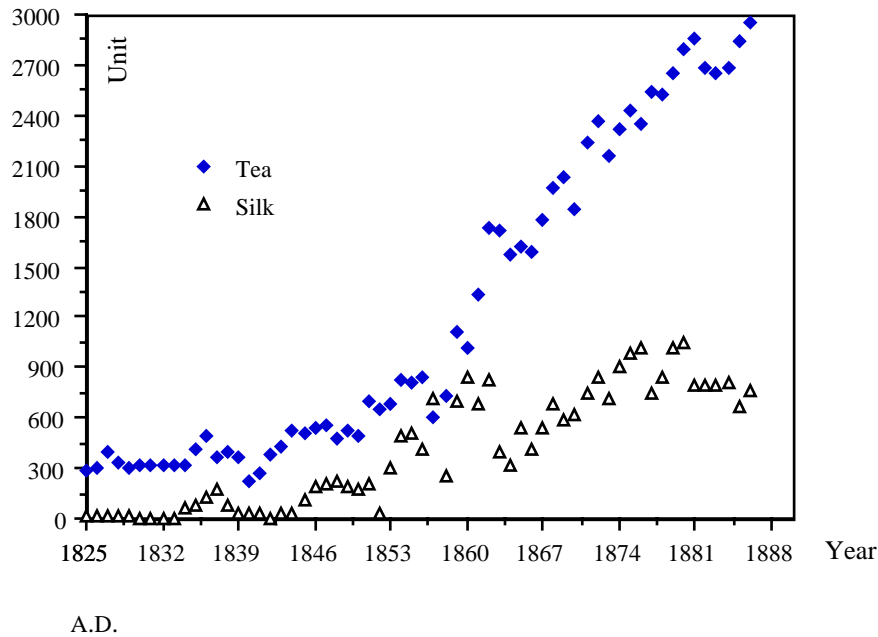
The late Qing Period marked the beginning of the end of the state monopoly over maritime history. As trade became freer, the market grew faster. China's tea and silk exports rocketed after 1840 (see Figure 1).

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<sup>173</sup> Arnold Toynbee (ed.), *Half the World: the History and Culture of China and Japan* (London: Thames and Hudson, 1973), ch. 11.

<sup>174</sup> Zhao Dexin (ed.), *Zhongguo Jingjishi Cidian (Dictionary of Chinese Economic History)* (Wuhan: Hubei Dictionary Press, 1990), pp. 874–80.

<sup>175</sup> Zhao, *Dictionary of Chinese Economic History*, pp. 874–80; Tang Xianglong, *Zhongguo Jindai Haiguan Shuishou He Fenpei Tongji (Statistics of Customs Revenue and its Distribution in Modern China)* (Beijing: Zhonghua Books, 1992), p. 33; Liang, *Dynastic Data*, pp. 387, 397–8, 401, 415–6.

Figure 1. Rise in Tea<sup>a</sup> and Silk<sup>b</sup> Exports<sup>176</sup>

Note: <sup>a</sup>100,000 jin; <sup>b</sup>10,000 jin.

The market for other exports expanded quickly, too. In the end, China's foreign trade grew over six-fold (by 1910) in its total value:<sup>177</sup>

Year	Value in silver <i>liang</i> (metric ton)		Growth index
1861	110,465,280	(4,120.4)	100
1871	215,676,120	(8,044.7)	196
1881	301,694,420	(11,253.2)	274
1891	402,676,620	(15,019.8)	366
1901	437,310,820	(16,311.7)	398
1910	706,814,280	(26,364.2)	643

<sup>176</sup> Based on Lin Manhong, "Zhongguode Baiyin Wailiu Yu Shijie Jinyin Jianchan [1814–1850] (China's Silver Outflow and Decline in Gold and Silver Outputs in the World [1814–1850])," Wu Jianxiong (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1991), vol. 4, pp. 30–5.

<sup>177</sup> The calculation is based on the ceiling customs duty rate of 5 percent; see Yan Zhongping (ed.), *Zhongguo Jindai Jingji Tongji Ziliao Xuanji (Selected Statistical Data for Modern China's Economy)* (Beijing: Sciences Press, 1953), p. 60. With the formula  $V_i = \frac{C_i}{r}$ , where  $V_i$  is the total value of goods traded during period  $i$ ;  $C_i$ , the aggregate customs duties paid during period  $i$ ; and  $r$ , the ceiling duty rate being 2.8 percent before 1842, based on Sun Xugang (ed.), *Jianming Zhongguo Caizhengshi (A Compact History of Finance of Premodern China)* (Beijing: China's Finance and Economy Press, 1988), p. 190.

In the opium sector, the legalisation of opium allowed China's own supply to respond to the market demand and hence led to an import substitution of the drug. The home-grown supply steadily squeezed out imports of the drug. So, around 1899 opium imports dropped from the early 44.5 to 13.8 percent of China's total imports in value.<sup>178</sup>

#### d. Remarks on the late Qing

The reincarnation of the Ming state monopoly during the late Qing was double-edged for the market. It increased the transaction costs for the foreign traders but created employment opportunities for the Chinese. This was to a great extent benign to the Chinese economy and domestic market. The Opium War and its related changes in the state and market helped maritime growth although it definitely produced a loser in the Qing state at the very least.

### III. Final conclusion

Regarding maritime growth and development in terms of technical know-how, production capacity (such as shipbuilding), geographic discovery, trade performance and regional advancement, the Chinese state and market showed their own dynamics.

Overall, the Song Period was by far the most pro-market. It even had quasi-mercantilism. But the Song growth was unsustainable in the long run because of the mismanagement of China's national defence by the money-hungry state. This shows that the market is a dependent variable on the quality of the state. The Song failure was thus a state failure in the end. The Ming portrayed a false image of an Asia super sea power to the outside world.<sup>179</sup> But inside, the market was extremely weak due to the state discrimination against private commercial activities in general and the state hijacking of the maritime sector in particular. A sharp decline in China's maritime growth was inevitable.

The early and mid-Qing and the late Qing shared some features as the state behaved more tolerantly towards the private sector. During the late Qing, the state ceased making enemies with maritime merchants. Instead, it forged an alliance with merchants to operate the *Canton-Cohong* monopoly which undoubtedly benefited a lot of ordinary Chinese at the cost of the foreign traders. Although the Qing monopoly was ended by external force, it does not automatically mean that the Qing state was entirely responsible for what China lost with the ending of the state monopoly. Given the fact that beneficiaries of the Qing monopoly were the Chinese and that the Opium War was lost due to the British military supremacy, a state failure of the Qing is at best partial. The opening up of China's foreign trade from the Qing monopoly helped the growth of in China's maritime trade until the very end of the Qing (1911). Whether such a growth was sustainable at the same time is beyond the capacity of this paper.

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<sup>178</sup> Chen Ciyu, "Yi Zhong Yin Ying Sanjiao Maoyi Wei Jizhou Tantaoshiji Zhongguode Duiwai Maoyi (Study of Nineteenth Century Sino-foreign Trade based on the Trade Triangle of China, India and Britain)," Editing Committee for *Maritime History of China* (ed.), *Zhongguo Haiyang Fazhanshi Lunwenji (Selected Essays on the Maritime History of China)* (Taipei: Academia Sinica, 1984), vol. 1, pp. 156-7.

<sup>179</sup> Cf. Jung-Pang Lo, "The Emergence of China as a Sea Power during the Late Sung and Early Yuan Periods," *Far Eastern Quarterly*, 14 (1954-5), pp. 489-503.

So, overall, the Song pattern was commercially desirable but politically and militarily damaging. The Ming pattern was politically and militarily motivated but commercially disastrous. The Qing pattern took a middle way and could have been sustainable without external shock of the *force majeure*.

All considered, the market was rather weak as a driving force for China's maritime growth and development. There seems to have been a lack of investment by the private sector. The ultimate reason for that may have been two-fold: (1) a rural bias of the economy because of China's successful high-yield agriculture which guaranteed returns, and (2) a relative egalitarian land-holding which created few rich investors and patrons for sea-going activities. So, in the end, there was a heavy dependence on the state for funds and initiatives because the state was where the money was. Ironically, such a weak market was economically rational and was determined by the market itself.

If so, one cannot blame the state as the sole 'guilty party'. Unlike the European tradition of mercantilism, the state in China was not really designed to develop the maritime sector. If one wants to dig even further to find out why post-Song China did not have mercantilism, the reason may have been deeply rooted in China's empire system which rejected feudalism: the Chinese empire was built on a state-peasant alliance and thus had to be physiocratic.<sup>180</sup> In comparison, a feudal king had the need to bypass his lords by creating a state-merchant alliance. It was this alliance that opened opportunities for capitalism. In this context, maritime growth in Europe was directly linked to feudalism, mercantilism and capitalism; while feudalism, mercantilism and capitalism were exactly what were missing in China. Hence, the growth trajectory of China's maritime sector was dictated all the way by its empire system and its state-peasant alliance.

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<sup>180</sup> See K. G. Deng, "Development and Its Deadlock in Imperial China, 221 B.C.–1840 A.D." *Economic Development and Cultural Change* (vol. 51, no. 2, January 2003), pp. 479–522.



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