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Establishing statistical foundations of a chronology for the great divergence: a survey and critique of the primary sources for the construction of relative wage levels for Ming–Qing China†

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This article is a survey and critique of recent endeavours to establish statistical foundations for a chronology for the great divergence based upon trends and levels in relative wages. Our reading of the bibliography in Chinese labour history, together with a preliminary investigation into other primary sources, suggests that the Kuznetsian paradigm for empirical economics may not be viable for the construction of analytical narratives for the Chinese and other premodern imperial economies in South and West Asia. Nevertheless, two datasets currently in print will continue to be quoted to lend support to numerically grounded speculations for levels and trends in real wages and welfare for the families of wage-dependent urban workers in China over the eighteenth century. Statistical evidence for the Ming and Qing dynasties calibrated for the purposes of comparing real wage levels for wage-dependent labour between China and western Europe can, however, be placed on a spectrum for accuracy and inferential analysis that runs from 'unfounded guess work' to 'plausible conjectures'. The unwelcome contention of this article is that the data published and potentially available for China (and probably for India and the Ottoman Empire) stand close to the unfounded guess work end of that spectrum. Meanwhile, and as a speculative conclusion, we offer a conjecture that the 'real wages' for Qing China's tiny proletariat, whose income included high proportions of wages in kind, have remained as elusive as they were when the real wage debate began a decade ago.

In recent decades economic historians have resituated the scientific, technological, and economic achievements of western societies in a global context. Their classical predecessors, particularly Adam Smith, Karl Marx, and Max Weber, left them with approaches, a vocabulary, and several suggestive hypotheses that have been taken forward, modified, and also rejected by two generations of postwar research, exploring models and narratives that purport to explain the rise of the west.[1] There are now libraries of books and articles dealing with Asian agricultures, industries, towns, commercial networks, communications, trade, science, technologies, cultures, business organization, taxation, state

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[1] See the comprehensive bibliographies in Vries, *Escaping poverty*, and Morris, *Measure of civilization*.

systems, government policies, and so on, covering the last millennium.[2] Most of this impressive but still far from comprehensive volume of research in history and the social sciences has been written largely by specialists in area studies from North American, European, Australian, and Japanese universities. Not long after the Second World War and during the era of decolonization, scholars were offered an opportunity provided by the accumulation of an extensive body of knowledge—long available in the case of Europe and North America, but emerging with regard to Asia, the Middle East, Africa, and Latin America—to reposition their hitherto disconnected analyses of wealth and poverty, one against the other, in order to construct global economic histories that might have satisfied the aspirations of Montesquieu, Voltaire, Smith, and their 'enlightened' followers and pleased Weber and Marx.[3]

Published interpretations of this accumulating body of monographs in area studies has led to ideologically driven debates between Eurocentric, Sinocentric, and Indocentric historians concerned with either reaffirming or undermining all canonical narratives about the rise of the west. Perhaps the divergence debate will fade away if and when surveys appear from Chinese, Indian, Japanese, African, Arab, Latin American, and other scholars of world history from universities outside the west.[4] Meanwhile, a virtually unmanageable volume of modern research has at least qualified traditional and simplistic perceptions that only Europe and its settlements overseas had developed institutions and beliefs approximating to the political, legal, cultural, and religious conditions required for the formation of markets, and a process of Smithian growth centuries before other continents.[5] As Hodgson observed decades ago: 'All attempts ... to invoke pre-Modern seminal traits in the Occident can be shown to fail under close historical analysis'.[6]

Braudel, Chaudhuri, Goody, Frank, Wong, Marks, Pomeranz, Goldstone, Hobson, Parthasarathi, and other global economic historians, whose names and books are included in the recent and comprehensive bibliography constructed by Vries, would agree.[7] Jones continues to revise and reformulate some of the positions he adopted in the first edition of *The European miracle* in 1981.[8] From his illuminating comparisons of levels and types of development achieved by Europe and Asia in the early modern period, Braudel inferred that 'the *populated* regions of the world, faced with demands of numbers, *seem* to us to be quite close to each other'. However, there is, he asserted:

> a 'historiographical' inequality between Europe and the rest of the world. Europe invented historians and then made good use of them. Her own history is well-lit, and can be called as evidence or used as a claim. The history of non-Europe is still being written. And until the balance of knowledge and interpretation has been restored, the historian will be reluctant to cut the Gordian knot of world history.[9]

[2] Manning, *Navigating*.
[3] Sogner, ed., *Making sense*; Mazlish and Buultjens, eds., *Conceptualizing*.
[4] Bagchi, *Perilous passage*; Iggers and Wang, eds., *Global history*.
[5] Pomeranz, 'Without coal?'; Acemoglu and Robinson, *Why nations fail*.
[6] Hodgson, *Rethinking*, p. 86.
[7] Vries, *Escaping poverty*.
[8] Jones, *Growth recurring*.
[9] Braudel, *Civilization and capitalism*, p. 134.

Braudel was surely wise to postpone attempts to construct explanations for the bifurcation in productivities and living standards between Europe and Asia (discernible sometime before 1800, transparent by 1900, and stark in our own times), if only because the research required to measure and to date economic outcomes signifying divergence across advanced and backward regions of Eurasia for several centuries before the latter half of the nineteenth century remains at a preliminary stage and might turn out to be impossible to achieve.

Meanwhile, samples of relevant, but partial, data which refer to levels of urbanization, balances of commodity trade, life expectancies, heights, and calorific consumption levels for specific locations (usually large towns) in East, South, and Southeast Asia, as well as the Ottoman Empire, qualify traditional views that average standards of living afforded by the economies of western Europe for the majorities of their population were discernibly superior before the age of revolutions (1756–1815).[10] Unfortunately almost all the data collected and potentially available on most aspects of the economies ruled by the imperial regimes of early modern Asia remain sparse, insecure, and difficult to interpret.

This situation remains in contrast to Europe, where a voluminous literature in comparative economic history, designed to explore the origins of relative levels of productivity achieved by the nations, regions, towns, and villages of that continent, depends upon a framework of analysis and statistical indicators derived from economics, which helps historians to specify and to estimate how average incomes, real wages, and labour productivity might plausibly have evolved through time. For Britain, Holland, Iberia, Sweden, and France, several indicators go back (as conjectural political arithmetic) to the late seventeenth century. For Britain, they have recently been extended as far back as 1280.[11] Official statistical investigations to track the growth and fluctuations for a wider range of non-western economies, and for the world economy as a whole, first came on stream during the Great Depression.[12] A sustained institutional commitment to economic measurement on a global scale has, however, only matured under the auspices of the United Nations and its subsidiary organizations (particularly the Organisation for Economic Co-operation and Development and the World Bank) over the last 50 years.[13] That programme has stimulated a group of assiduous statisticians to try to extend backwards through time the impressive base of data available for recent years to compare and to track long-run developments in the wealth and poverty of all nations. Most of them (recognizing the pioneering work of Kuznets as a 'paradigm' for their work) have endeavoured to make serious contributions to a body of salient economic facts and placed some more or less plausible estimates at our disposal.[14] Statistically based exercises are being carried out with the aim of measuring GDP per capita, real wages, consumption standards, heights, health, and mortality as well

[10] Frank, *Re-Orient*; Allen, Bengtsson, and Dribe, eds., *Living standards*; Baten, Ma, Morgan, and Wang, 'Evaluation of living standards'; Özmucur and Pamuk, 'Real wages'.

[11] Broadberry and O'Rourke, eds., *Cambridge economic history*; Broadberry, Campbell, Klein, Overton, and van Leeuwen, *British economic growth*, ch. 6, which contains a survey of the most recent databases for long-run nominal wage data collected and calibrated by Allen, Clark, and Munro.

[12] Bairoch, *Economic development*.

[13] Maddison, *World economy*.

[14] Amsden, *Rise of the rest*.

as the productivity of land and labour for samples of populations and workforces located in particular regions of India, China, Japan, and Southeast Asia. These are beginning to widen the database at the disposal of social scientists who wish to conduct systematic and quantified comparisons into the standards of living offered by Asian as well as European economies to their populations over pre-modern centuries before the industrial revolution.[15]

Nevertheless, the base of *reliable* economic data seems pretty well truncated in its chronological coverage to the twentieth century. Even that limited statistical evidence has allowed far more scope for the comparative analysis of development among currently affluent European, North American, and Australasian societies than it does for long-run historical comparisons across Europe, Africa, Asia, and the Americas. Although Japan is now in the frame and the situation is improving, a paucity of data continues to handicap academics who lack any clear sense of *when* divergences both in productivity and related standards of living between European and Asian economies clearly emerged.[16] Yet most believe (correctly) that an accepted chronology is a precondition for the analysis of *why* path-dependent intercontinental differences in economic efficiency and social welfare had become discernible by the eighteenth century and indisputably transparent by 1900.

Meanwhile, an early modern world of 'surprising resemblances' has been exposed in a book by Pomeranz.[17] That famous book and the debate it stimulated has called into question the unsubstantiated and unquantified assertions that the political, institutional, and cultural frameworks (as well as modes of production) within which economic activities in Asia were embedded for centuries before the industrial revolution, differed from Europe in ways that clearly and significantly impeded the evolution and integration of commodity and factor markets, the development of financial intermediation, the spread of private property rights, the operation of mercantile networks, proto-industrialization, the commercialization of agriculture, and patterns of differentiated consumption.[18]

I

Although contrary representations (derived from canonical accounts by Smith, Marx, and Weber) of European economies moving gradually but inexorably ahead for centuries on path-dependent trajectories, operating only within the western promontory of the Eurasian landmass, continue to be published, they now look less tenable.[19] Most protagonists participating in debates on the great divergence recognize, however, that the base of statistical evidence available for systematic comparisons of standards of living across the economies of Eurasia remains in serious need of extension, repair, and validation.[20] Most historians, but not all economists, are convinced, however, that prospects for the construction of plausible

[15] Federico, *Feeding the world*; Barbier, *Scarcity and frontiers*; Fogel, Fogel, Guglielmo, and Grotte, *Political arithmetic*.

[16] Williamson, *Trade and poverty*.

[17] Pomeranz, *Great divergence*, p. 29.

[18] See the special issues of *Journal of Asian Studies*, 61 (2002); *Canadian Journal of Sociology*, 31 (2006); and *Historically Speaking* (Sept. 2011).

[19] Landes, *Wealth and poverty*; Duchesne, *Uniqueness*.

[20] Deng and O'Brien, 'Clarifying data'; eisdem, '"Creative destruction"'.

conjectures for that most widely used of indicators, namely levels of GDP per capita for China, India, and the Ottoman Empire, are entirely remote.[21]

Stimulated by the pioneering research of Allen and van Zanden, a research programme and bibliography of publications testifies to an expectation that this task could be more expeditiously and reliably accomplished by collecting, validating, and comparing data for nominal money wages with indices that measure the costs of foodstuffs, clothing, and other basic necessities, purchased by wage-dependent labourers for their families resident in Eurasian towns for 'clusters' of benchmark years in 1600–50, 1650–1700, 1700–50, 1750–1800, and 1800–50.[22]

For the west, the methodological and inferential problems involved in the collection, validation, calibration, and comparison of data for levels of 'real' wages per day received by labourers and craftsmen performing comparable tasks, largely in urban but also in agrarian contexts, have been thoroughly discussed at theoretical and empirical levels.[23] The bibliography for exercises comparing real wages through time and across space for waged workers employed in Europe's towns and farms is extensive and entirely familiar to labour economists, as well as economic and social historians. Imperfections in the data have been recognized and improvements continue to be made. Meanwhile, it forms *a*, if not *the*, core statistical component of current debates in quantitative economic history concerned with long-term and cross-country changes in standards of living afforded to majorities of their populations by Europe's regional and national economies.[24] Unfortunately, as we will now endeavour to show, the dependable statistical evidence available for labour working in Asian cities and villages is neither comparable in scale and scope, nor anything but problematical to convert into numbers that could facilitate comparisons across Eurasia.[25]

Several caveats familiar to historians who have engaged with the complexities of drawing inferences from the more extensive transparent and secure data available from comparisons of real wage levels across the economies of pre-modern Europe should preface the process of validating the disappointing evidence that has been published, not only for China, but for Japan, India, and the Ottoman Empire as well.[26] First and foremost is the fact that data on Asian daily wage rates recently uncovered for these centuries refer to significantly lower proportions of the workforce than was the case for Europe—particularly for England and the Netherlands, where transitions to dependence on wages for the incomes and expenditures of family units had proceeded further and faster than elsewhere in the west and the east.[27] For example, most of the ratios of wage-dependent workers (that is, full-time waged workers) to the total workforce published by economic historians for the Qing Empire were within the 3.0 per cent range of the

[21] Maddison, *Chinese economic performance*; Broadberry, 'Accounting for the great divergence'.

[22] van Zanden, 'Wages and the standard of living'; Allen, 'Great divergence in European wages'. For the most recent comparison, see idem, 'High wage economy', p. 7.

[23] Scholliers, ed., *Real wages*; Scholliers and Schwarz, eds., *Experiencing wages*; Clark, 'Price history of English agriculture'; idem, 'Long march of history'.

[24] Allen, 'Real wage rates'; Broadberry, 'Accounting for the great divergence'.

[25] Allen et al., eds., *Living standards*.

[26] Bassino and Ma, 'Japanese unskilled wages'; Özmucur and Pamuk, 'Real wages'; Allen, 'India'.

[27] Lucassen, 'Rise'.

total population.[28] Our counterfactual calculations, which divide official figures for modal annual expenditures by the Qing state into labour time equivalents, indicate that at an annual income level per worker of 18 silver taels (*liang*) the state would have employed only 4 per cent of China's workforce.[29] This situation had changed little as late as the 1920s, when the total number of wage-workers in China's modern industry was about one million, or 0.2 per cent of China's population (of about 440 million). Together with another 10 million traditional urban handicraftsmen and service workers, this comes to 2.3 per cent of China's total population.[30] Even for a port city such as Tianjin, that ratio was only 12.4 per cent.[31] Shanghai had 223,000 factory workers among its three million residents (less than 8 per cent of that city's population) in the 1930s.[32] Marxist historians participating in debates concerned with 'the sprouts of capitalism' recognized that a Chinese proletariat took a long time to emerge.[33]

Records that have been uncovered (for both continents, but particularly for Asia) also refer to a limited range of occupations, dominated by unskilled jobs in agriculture and urban construction, supplemented by a range of more confined references to wage rates for skilled occupations—again dominated by craftsmen employed in urban building industries.

Third, the framework of institutions surrounding Asian labour markets and the terms of contracts or conventions for the employment of waged labour has continued to be difficult to clarify, particularly for those involving wages paid by governmental authorities who often recruited labour to work on building sites and industrial workshops on terms that approximated to corvée. The Ming and Qing state tended to remunerate them with unknown and variable proportions of payments in kind (called *gongshi* 工食), which included food, clothing, shelter, and so on, supplemented by politically decreed sums of money (*gongjia* 工价),[34] which were only a part of the 'living wage'.[35]

Fan, a recognized expert on the Qing economy, has revealed that from 1651 to 1745 payments in kind for workers employed in the three state-owned silk factories in the Lower Yangtze was 1.2 *shi* of rice per month, regardless of fluctuations in food prices.[36] Weavers contracted under a putting out arrangement with these factories were paid in food only.[37] Another set of data for 1573–1908 show that the share of payments in kind for rural waged workers remained in the 70–80 per cent range (table 1).[38] Peng, a Chinese economist and expert on proto-industrialization in the Qing period, analysed official documents which revealed that the same pattern

[28] Li, Wei, and Jing, *Mingqing Shidaide Nongye* , p. 336. This work, over 500 pages long, is based on records for Qing criminal proceedings during the period 1787–1820.

[29] Zhao, *Qingshi Gao*, vol. 125, 'Shihuozhi 6'.

[30] Fairbank, ed., *Cambridge history of China*, p. 36.

[31] Li et al., *Mingqing Shidaide Nongye*, p. 336.

[32] Xu, *Shanghai Jindai Shehui Jingji*, p. 275.

[33] Liu, 'Jiawu Zhanzhenghou Zhiyoude Zibenzhuyide Nongye'.

[34] This part of the wage was traditionally called 'family comfort money'. For remittances, see Theobald, *War finance*, pp. 162–3.

[35] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 105, 108; also, Campbell and Lee, 'Free and unfree labor'; Li et al., *Mingqing Shidaide Nongye* , pp. 167, 230–42, 438–41, 496–9.

[36] Fan, 'Qingdai Qianqi Jangnan Zhizaode Jige Wenti', pp. 80, 87.

[37] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 113–14.

[38] Li et al., *Mingqing Shidaide Nongye*, pp. 365, 366, 440, 441; Fang, 'Qingdai Qianqi Jiangnande Laodongli Shichang', p. 9.

Table 1. *Payments to rural wage workers in the Lower Yangtze Delta*

Period	*Payment in food*	*Payment in cash*
1573–1619	81.6%	18.4%
1628–44	86.5%	13.5%
1861–74	71.0%	29.0%
1875–1908	67.5%	32.5%
Average	76.6%	23.4%

Sources: Li et al., *Mingqing Shidaide Nongye Zibenzhuyi Mengya Wenti*, pp. 365, 366, 440, 441; Fang, 'Qingdai Qianqi Jiangnande Laodongli Shichang', p. 9.

Table 2. *Payments to urban wage workers in the Lower Yangtze Delta in the eighteenth century*

Categories of workers	*Payment in food*	*Payment in cash*
Unskilled (1)	67%	33%
Unskilled (2)	75%	25%
Semi-skilled	67%	33%
Skilled (1)	33%	67%
Skilled (2)	43%	57%
Average	57%	43%

Source: Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 97, 100, 107.

characterized payments for over 7,000 textile workers employed by the state in the Lower Yangtze during the eighteenth century (table 2).[39] Money wage rates were moreover often recorded in China, in an officially designated numeraire or unit of account (the silver tael) convertible into 'ready cash' at purchasing power parities that were subject to considerable degrees of variance from locality to locality and across time.[40]

Other and far more limited Asian sources for daily wage rates cited in judicial and company records that refer to employment in sectors, firms, and occupations in the private sector are, as we show above, either under-specified or collected from the archives of foreign multinationals that paid high seasonal wages to Chinese workers servicing ships for the weeks that they remained in port.[41] Often the evidence for wages refers to payments to landless unmarried males and females working with and for their own kin. Last but not least, the procedures used to convert evidence for daily wage rates into annual family incomes often depend upon guesses about the numbers of days worked per annum or per season and the supplementary income provided by wives and children.[42]

All of these problems encountered by Chinese historians have seriously compromised the deployment of wage rates as proxies for labour productivities and *pari passu* as a statistical basis for the construction of modal family incomes received by unskilled and skilled workers across Asia.[43] No historian who has

[39] Peng, *Zhongguo Jindai Shougongyeshi Ziliao*, pp. 396–413.
[40] Kishimoto, *Shindai, Chūgoku, Nobukka to Reoizai hendō*; Theobald, *War finance*, p. 26.
[41] van Dyke, *Canton trade*.
[42] Allen, 'Agricultural productivity'.
[43] Booth, '*Living standards*'.

attempted to grapple with the meagre and ambiguous records for China, India, and the Ottoman dominions suggests that Asia's labour markets for this period could be analysed by resorting to the neo-classical models and assumptions that have been utilized to support chains of inferences based on accounts recorded by institutions for the daily wage rates paid to unskilled and skilled labour in the west.[44]

We will now proceed to elaborate a critique of a recent and scholarly attempt to collect and calibrate evidence for nominal daily wage rates recorded for Chinese workers employed by the imperial state and by private firms. This will be done in order to illustrate the complexities involved and to expose the heroic, but contestable, assumptions necessary for the construction of numbers that could potentially be compared with the albeit important but more voluminous and less ambiguous data published for Europe.[45]

II

We begin by commending the stimulus that Broadberry and Gupta's pioneering attempts have imparted to ongoing programmes for quantification designed to collect and calibrate wage data for pre-modern China and India. They would, however, almost certainly recognize that their figures published in 2006 for nominal daily wage rates for agricultural labourers employed in the Yangtze Delta are based on two quotations that are not fully specified in either of the secondary sources that they cite and cannot stand as representative estimates for modal wage rates for unskilled Chinese manpower labouring in the provinces in the Lower Yangtze Delta.[46]

Their initiative has been taken forward by a research group led by Moll-Murata. This group has compiled an extensive base of nominal wage data from a publication of the Qing government entitled *Wuliao jiazhi zeli* (*Regulations and precedents of prices of material inputs*) for 15 Chinese provinces from 1769 to 1795. The document refers to 905 districts of the empire's 2,074 administrative units (including 1,672 counties and 402 county equivalent units).[47] The group added six subsidiary and micro sets of data to the core database. Their data are accessible and properly referenced on a website devoted to international and social history.[48]

In a section of a report on the data headed 'Efficiency and reliability of wage regulations', Moll-Murata recognizes that 'we have no evidence how the 1769 wage regulations were realized in everyday routine'. She then suggests that observed

[44] For Spanish America, see Dobado-Gonzáles and García-Montero, 'Neither so low or so short'.

[45] Data published for England are available in Allen, Bassino, Ma, Moll-Murata, and van Zanden, 'Wages, prices, and living standards in China, Japan, and Europe'. The data for Europe are fully referenced in Deng and O'Brien, 'Nutritional standards of living'.

[46] Broadberry and Gupta, 'Early modern great divergence'; Deng and O'Brien, 'Nutritional standards of living'.

[47] Zhao, *Qingshi Gao*, vols. 54–81. We note a claim that casts doubt on the coverage of this sample. Beijing alone contained four, and not 24, districts during the Qing; see Allen et al., 'Wages, prices, and living standards' (2011), p. 12, tab. 1.

[48] They include: (1) wages for public works in Beijing, 1659–1736 (by Moll-Murata); (2) wages for the Yuanmingyuan Garden Villa, 1766 (by Moll-Murata); (3) wages for arsenals and shipyards, 1769–1816 (by Moll-Murata); (4) wages for silk weavers in Suzhou and Beijing (by Moll-Murata); (5) wages for printing and publishing in Beijing, 1694–1815 (by Moll-Murata); and (6) wages paid on the free market, 1735–1820 (by Ma and Zhang, and revised by Moll-Murata); available on the International Institute of Social History (IISH) website at http://www.iisg.nl/hpw/data.php#China.

deviations across (and within) provinces might justify an assumption that 'these wage norms reflect a trend to adjustment to the market situation'. Although she notes, however, that this was not the case for prices willingly accepted by the bureaucracy for commodities and wages (for Rehe Province), or for the long-term stability in nominal wages cited in the government regulations (for Jiangsu Province). On the important issue of the degree to which the wage norms were or were not supplemented by the provision of additional food, drink, and shelter, she argues that 'it seems unlikely that any provisions were given tacitly without being accounted for'. Nevertheless, she cites several examples where 'monetary wages' were supplemented by 'wages paid in kind instead of cash'.[49]

Correctly, but for reasons that are not elaborated upon, only a selection of the official sources recording these wage rates/norms were utilized by five authors of a working paper that deployed the data gathered by Moll-Murata and her team to construct a leading article entitled 'Wages, prices, and living standards in China, 1738–1925: in comparison with Europe, Japan, and India' for a special issue of the *Economic History Review* on Asia in the great divergence published in 2011.[50] We simply observe that the unutilized data from government sources placed on the web could only have been rejected by the authors of this seminal paper for sound reasons. They too surely recognized that the primary sources they had consulted were often undated; referred to a single prefecture; cited a common wage for a wide range of skills; displayed a single wage scale for all 18 provinces in 1816, suggesting that unskilled labour was remunerated at the same wage across the empire; indicated a stable wage rate for building workers employed in the Yuanmingyuan Park between 1723–36 and 1860; included figures for monthly wages that omitted an unknown amount of payments in kind for 'families'; exposed an inexplicable decline of around 90 per cent in the piece rate offered to one category of skilled labour in the printing industry between 1705 and 1851–61; and so on.[51]

We concluded that after close examination most of Qing China's official sources consulted for the special issue contain data on wage rates that turned out to be too difficult to validate and too complex to interpret. Yet several of the official sources that were by default utilized by the authors also remain ambiguous. In our view, these data do not seem fit for the purpose of comparing levels of real income derived from wages across Eurasia.[52] Nevertheless, the authors opted to merge figures from official and private sources in order to construct a database for nominal daily wage rates and, by selection, interpolation, and calibration, for estimates of annual earnings for unskilled labourers employed in three major Chinese cities—Beijing, Suzhou, and Canton—between 1740 and 1820.[53] The primary sources selected for that purpose included, first, the Imperial record cited above for 1769 which refers to daily wage rates in just over 900 districts payable to an unrecorded number of

[49] Moll-Murata, 'Remarks on *Wuliao jiazhi zeli*', pp. 6–7.

[50] Allen et al., 'Wages, prices, and living standards' (2005); Allen et al., 'Wages, prices, and living standards' (2011).

[51] See ibid.; Moll-Murata, 'Wage data in *Da Qing Huidian Shili*'.

[52] The seven datasets compiled by Moll-Murata are on the International Institute of Social History website at http://www.iisg.nl/hpw/data.php#China; see Moll-Murata, 'Prices and wages, China'; eadem, 'Wage data in *Da Qing Huidian Shili*'.

[53] Allen et al., 'Wages, prices, and living standards' (2011), pp. 17, 30, 31.

workers employed on 945 governmental construction sites across the Qing Empire, supplemented by a smaller set of wage rates fixed by the state for employees in its armament factories for 1813;[54] second, 63 quotations of daily wages from the accounts of the Dutch East India Company paid to labourers to load and repair its ships docked in Canton over the eighteenth century;[55] third, 188 underspecified quotations culled from testimonies contained in the Qing judicial records for *c.* 1740–1820;[56] fourth, six piece rates negotiated with a gild representing semi-skilled workers converted to daily rates for cotton manufacturing in Suzhou for 1693, 1701, 1715, 1730, 1772, and 1795;[57] and fifth, daily money wages paid to an unknown but presumably very small number of unskilled labourers employed by just one fuel store outside Beijing for the years 1807–20 extended for the ongoing period of accelerated divergence from 1820 to 1914.[58]

This investigation into Chinese wage data is an entirely welcome contribution to the meagre base of statistical evidence available for the economic history of Qing China. However, for the purposes of locating a chronology for the divergence debate, it will be necessary to clarify the nature and to assess the quality of the meagre and imperfect sources for *nominal* wage rates that the authors uncovered for the period that preceded divergence with the west.

To that end, the most geographically extensive and data-rich primary sources utilized by the authors placed on websites (and cited in footnotes 12 and 21 of their article) are Qing records listing figures for 'government regulated' money wages for workers employed on public construction sites in 1769 as well as 1723 and 1736 and a smaller sample for employees in military factories in 1813. Records were located for 15 provinces and 945 districts (prefectures/counties) of China. Apparently, the nominal wage data presented in table 1 of the article has been calibrated from over 2,000 figures for wage rates for master artisans (translated into skilled labour) and labourers (translated into unskilled labour).

As published, the calculations refer to mean nominal wages in public construction in 1769–95 and in arms manufacture in 1813 payable within the boundaries of districts. District-wide averages were then converted to means for the number of districts contained in 21 regions of China. As constructed the regional averages were not, however, weighted by a region's share of China's total population, which varied from one million for Manchuria to around 30 million for Jiangsu Province in the Yangtze Delta.[59]

Furthermore, variance around the means calibrated for districts, prefectures, and provinces (18 of them) is not indicated. Scrutiny of the raw data on websites cited in footnotes reveals that intra-regional and cross-regional differentials for

[54] Details of the IISH datasets are as follows: Chen, Chen, Kiefner, Moll-Murata, Zhang, and Ma, 'Regulated wages'; Moll-Murata, 'Regulated wages paid by the state'; eadem, 'Wages for construction workers in public service'; eadem, 'Wages for armament'; eadem, 'Wages for silk weaving'; eadem, 'Wages for printing'. However, there is no location-specific time series yielded from these datasets. Rather, the Qing Empire is taken as a homogenous unit and a regional (provincial or prefectural) wage rate is taken for the empire-wide norm, despite the fact that Qing China had 18 provinces and that regional differences were often huge, according to Chi, *Key economic areas*, and Buck, *Land utilization*.

[55] van Dyke, *Canton trade*.

[56] Allen et al., 'Wages, prices, and living standards' (2011), p. 14; Ma, Zhang, and Moll-Murata, 'Wages on the free market'.

[57] Allen et al., 'Wages, prices, and living standards' (2011), pp. 10, 34.

[58] Ibid., pp. 34–5.

[59] Ibid., pp. 11–13.

wage rates for the same occupations could be very far apart.[60] We suggest that the meaning and provenance of these regional and imperial averages set out in table 1 are insecure. Above all, and as calculated, the wage rates for unskilled labour cited in that table 'look' closer to 0.04 taels of silver per day than the higher figures of 0.09–0.10 taels per day adopted by the authors, interpreted as outer bound estimates for nominal daily wages paid to workers employed in Beijing, Suzhou, and Canton.[61]

Over the decade 1765–74, a daily wage rate of 0.04 taels of silver would purchase 1.9 kg of the second grade white rice at a seasonally low autumn price in the Yangtze Delta.[62] That quantity of edible grain translates into 1,710 kilocalories of nutrients per capita for a family of four persons and 1,368 kilocalories for a family of five. Both levels fall below the 2,100 kilocalories prescribed by the Food and Agriculture Organization for food security.[63] In short, official primary sources recording recommended daily wage norms for unskilled labour employed by the Qing state almost certainly refer to monetary payments that were (contrary to the supposition of Moll-Murata) *net* of the food, shelter, clothing, and other wage payments in kind that were managed and supplied by departments other than the Ministry of Revenue, which maintained responsibility for transfers as monetary salaries and wages to bureaucrats and soldiers as well as workers employed by the Qing state.[64] This reading of the primary sources derives added plausibility from the constancy of the wage norms across space and time published in the official sources consulted by the authors.[65] Prima facie, the Chinese state preferred to deal with problems generated by rising and fluctuating prices for food and other necessities required by and for its own employees by purchasing and supplying them with food and other wage goods (*gongshi* 工食).[66] Thus, there seems to be no reason to accept the authors' claim that their wage norms were nearer to the market rates than other official sources.[67]

Laudably, they endeavoured to ascertain 'how accurately' wages 'recommended' by the imperial state approximated to wages offered by the private sector of the economy 'by juxtaposing them' against a broader dataset of 264 scattered wage quotations from many private sources from different parts of China.[68] Nevertheless, scrutiny of this particular evidence for an unregulated labour market does not inspire confidence that such different types of wage data could be 'pooled' to form a secure database for the purposes of comparison with harder evidence for nominal wage data available for western Europe which represents the outcomes of demand and supply interacting in contexts that approximated to proto-labour markets.[69]

[60] Ibid., p. 14, nn. 20 and 21.
[61] Ibid., p. 12, tab. 1.
[62] Wang, 'Database of grain prices'; Yu, *Zhongguo Jiage Shi*, pp. 900, 904; Huang, *Zhongguo Lidai Wujia Wenti Kaoshu*, pp. 330–9.
[63] FAO, 'Food energy'.
[64] Peng, *Zhongguo Jindai Shougongyeshi Ziliao*, pp. 396–413; idem, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 97, 101, 107; Zhao, Tian, He, Cai, He, Wei, and Zhang, *Zhongguo Junshi Shi*, vol. 3, p. 459; He and Wei, eds., *Huangchao Jingshi Wenbian*, p. 868.
[65] Allen et al., 'Wages, prices, and living standards' (2011), pp. 11–14.
[66] Li et al., *Mingqing Shidaide Nongye*.
[67] Allen et al., 'Wages, prices, and living standards' (2011), p. 11, n. 12.
[68] Ma et al., 'Wages on the free market', p. 29.
[69] van der Linden and Lucassen, 'Prolegomena'.

Indeed and with transparency, the authors admit that the entire set of wage data they have assiduously collected for location in the divergence debate, and which refer to both the public and private sectors of the Chinese economy, may not be fit for that purpose. As they observe, their data display:

> a general lack of comparability due to the multiplicity of labour contracts, payment systems, and currency units. Employment contracts could last for a day, a month, or a year, and careful attention must be given to the number of days worked in a month or a year to reduce the payment information to a consistent daily rate. There are many cases for which food allowances were given in addition to cash payments. Possibly the *most difficult issue* of all is the quotation of wages in different currency units (copper coins, silver taels) with exchange values that were both highly localized and fluctuating over time.[70]

They conclude that 'studies not taking full cognizance of these problems can be very misleading'.[71]

An older generation of economic historians, who also encountered and debated this particular and 'most difficult of all issues' in their endeavours to convert more abundant and transparent evidence for Europe's urban wage rates into a common numeraire such as grams of gold or silver, might well conclude that the complexities embodied in the pre-modern Chinese monetary system could well be insurmountable.[72] The presence of this barrier to quantification has been attributed by monetary historians of China to the persistence of the empire's traditional and virtually unregulated monetary system based on silver and copper that operated with high transaction costs for market exchanges, and to some degree for taxation.[73]

Silver utilized for transactions by and with the state and for wholesale trade served the empire as a unit of account and a store of value, but not as a currency minted into coins of a standardized and officially sanctioned denomination, weight, or finesse.[74] As a precious metal it functioned basically as a numeraire. Its purchasing power depended, moreover, on several attributes embodied in the size and form in which it was offered in payment for commodities, services, and the settlement of debts. For example, in its most convenient and reliable form, namely, as imported foreign coins (particularly Mexican dollars), silver commanded a premium of up to 25 per cent over bars, ingots, and fragments of the precious metal.[75] Even the familiar silver ingot (the '*sycee*' or 'shoe') varied in weight and finesse from place to place because assayers cast the metal into ingots of various sizes and finesse in accordance with customers' needs and with local conventions and preferences.[76] Silver-hoarding was institutionalized.[77] Interesting evidence from Évariste Régis Huc (1813–60), a French missionary Catholic priest who famously travelled across 11 provinces of the Qing Empire in 1841–6, suggests that during the mid-nineteenth century daily transactions in China Proper were conducted with copper

[70] Allen et al., 'Wages, prices, and living standards', p. 13 (emphasis added).
[71] Ibid.
[72] Scholliers and Zamagni, eds., *Labour's reward*; Mayhew, 'Prices in England'.
[73] Peng, *Zhongguo Huobi Shi*; von Glahn, *Fountain of fortune*.
[74] Deng, 'Miracle or mirage?'.
[75] Irigoin, 'Trojan horse', pp. 8–11.
[76] Kuroda, 'Anonymous currencies'.
[77] Chen and Liu, 'Gongfu, Shichang Yu Wuzhi Shenghuo'.

cash and, to a lesser extent, silver bullion (instead of Spanish/Mexican coins); and the only region where silver coins were in routine use was Tibet.[78] This explains why a classic account of the Chinese monetary system concluded that 'only examination of the local system at a particular time can determine the basis of the standard'.[79] Predictably, dealers in money emerged in every corner of the empire.[80]

All citations of nominal wage rates in primary sources expressed in silver taels (and even in copper cash) need validation. References to nominal wages in silver taels can only be transformed into real wages as the product of conversions from or into copper cash—which remained, until the twentieth century, the dominant medium of exchange utilized by wage-dependent workers and their families for the purchase of commodities.[81]

Furthermore, most retail and an unknown proportion of wholesale transactions were conducted with copper cash (*wen*) made largely of copper minted by multiple provincial but official mints. These coins were certified but never standardized into a stable imperial set of weights and denominations.[82] Thus a debt of '1,000 might be paid in 1,000 good copper coins ... whereas a food shop might expect only 780 coins of inferior quality'.[83] Coins were cast in different ways, with different denominations and copper content, at provincial mints at different times. Their quality, acceptability, and purchasing power, nominally regulated by the imperial state, varied significantly across space and time.[84]

Literally strung together into units of higher denomination of 1,000, 625, and 500 coins and assayed by private money dealers, copper coins embodied vintage as well as scale effects.[85] Thus strings of coins minted under dynasties before the Qing exchanged at a significant premium over current and more recently minted coins. Good old copper coins even operated as stores of value and circulated over more extended spaces and markets.[86] Counterfeiting remained rife and virtually uncontrollable, so that monetized transactions and purchases in imperial China operated with several grades of official, illegal, and imperfectly arbitraged copper coins along with privately assayed and heterogeneous *liang* or taels of silver ingots and foreign coins.[87]

In short, the empire's monetary 'systems' remained virtually unregulated and the ostensibly low levels of efficiency at which they operated depended upon a plethora of private financial intermediaries dealing in a variety of silver taels and foreign coins, as well as a multiplicity of good, inferior, and counterfeit copper cash that the majorities of the populations (including wage earners) of the Ming and Qing Empire utilized to purchase goods and services. Taels retained their function as stores of value for intra-imperial and foreign trade, for the settlement of debts, and for transactions at officially decreed rates of exchange within and without the

[78] Huc, *Souvenirs*.
[79] King, *Money and monetary policy*, p. 46.
[80] Deng, 'Miracle or mirage?'
[81] Kuroda, 'Copper coins chosen'; idem, 'Anonymous currencies'.
[82] von Glahn, *Fountain of fortune*.
[83] King, *Money and monetary policy*, p. 46.
[84] Kuroda, 'Copper coins chosen'.
[85] King, *Money and monetary policy*, pp. 53–60.
[86] Kuroda, 'Copper coins chosen'.
[87] Lin, 'Jiadao Qianjian Xianxiang Chansheng Yuanyin'; Kuroda, 'Anonymous currencies'.

state.[88] Nevertheless, as a leading expert on the Qing monetary system and policy concluded, 'in China ... every monetary transaction was to an extent an exchange transaction'.[89]

The authors of this leading article certainly recognized the problems involved in converting money wage rates cited in official documents as silver taels into copper cash or *wen*, and resorted to a collection of exchange rates collected by Vogel.[90] Unfortunately the data in Vogel's scholarly article are geographically confined to the hinterland around Beijing and to datasets for *official* exchange rates between a silver tael of 37.5 grams of silver and copper cash, which display considerable variations across the provinces of China.[91]

Furthermore, bimetallic ratios between copper and silver on the one hand and between silver and copper with rice on the other that Vogel also published display high degrees of variance through time and across space.[92] It is our view that no record has been published for intra-imperial exchange rates that could avoid the ambiguities attached to the purchasing power of wages cited as payments in silver taels or copper cash.[93]

Even if the barriers to quantification posed by the Qing monetary system could be circumvented, fastidious historians with their commitments to a disciplined validation of contexts and sources may continue to maintain that most of the evidence (particularly for the state's recommended wage scales documented in official sources) uncovered by this and other historical research into nominal rates paid to the pre-modern workforce of China is not yet transparent, accurate, or extensive enough to help with the problem of locating the origins, onset, and progression of economic divergence between the Occident and the Orient. That stance of scepticism can, moreover, be supported by scrutiny of the larger database from which the authors selected 327 disparate observations (clustered between the 1740s and the 1800s) which they pooled in order to estimate a wage regression for eighteenth century China.[94] We have supplemented and compared their evidence with our own smaller dataset of nominal wage rates collected from another primary source and from a selection of books and articles published by Chinese economic historians with recognized expertize on that empire's labour markets.[95]

Nominal wage rates have moreover long been recognized as the most intractable source of evidence for the measurement of productivity and standards of living for European economic history.[96] For China's far less extensive integrated and competitive labour markets, the information required to standardize observations for nominal wage rates into plausible estimates for the annual earnings of wage-dependent proletarians is rarely recorded or clarified by the primary sources.[97]

[88] Chen, 'Flexible bimetallic exchange rates'.
[89] King, *Money and monetary policy*, p. 46; and see Wong, 'Evolution'.
[90] Vogel, 'Chinese central monetary policy'.
[91] Yu, *Zhongguo Jiage Shi*.
[92] Vogel, 'Chinese central monetary policy'.
[93] Allen et al., 'Wages, prices, and living standards' (2011), p. 13, n. 16.
[94] Ibid., pp. 14–15.
[95] Liu, Deng, and O'Brien, 'Sample'; Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu'; Campbell and Lee, 'Free and unfree labor'; Li et al., *Mingqing Shidaide Nongye Zibenzhuyi Mengya Wenti*, pp. 167, 230–42, 438–41, 496–9; Liu, 'Jiawu Zhanzhenghou Zhiyoude Zibenzhuyide Nongye Guyong Laodongde Fazhan', p. 29.
[96] Munro, 'Money and coinage'.
[97] For sustained endeavours to analyse European wage data, consult Munro's website: https://www.economics.utoronto.ca/wwwfiles/archives/munro5.

III

Having scrutinized the primary sources cited in footnotes for this heuristic voyage of discovery into the range of evidence available for Chinese wage rates, consulted the secondary literature on the empire's labour markets, and engaged with our own smaller sample of nominal wage rates for unskilled labour, we wish to make a number of critical but hopefully helpful observations on the estimates offered by this exploratory contribution to the wage history of Qing China.

First, Chinese primary sources provide entirely limited information on payments in kind (food, shelter, clothing, tools, and so on). The assumption that if the source made no mention of such payments then none occurred is, as the secondary literature on labour markets and waged labour suggests, insecure, particularly for labourers employed on remote construction sites and for annual contracts in agriculture.[98] Our own perceptions, and those of Peng and other historians who have published work on Chinese labour markets, suggest that nominal wage rates recorded on a monthly and annual basis are for contracts where persistently high proportions of total annual earnings consisted of payments in kind.[99]

Such payments were, moreover, a feature of many pre-modern wage systems. They alleviated risks associated with fluctuations in food prices and the difficulties of securing currency in the forms and denominations required to remunerate labour.[100] Observations in the primary sources for China that specify nominal wage rates that fell and/or moved below the levels required to purchase subsistence at local prices could only, we suggest, refer to government contracts for employment that included food and other supplementary payments. Otherwise the Confucian state was not paying living wages either to the soldiers or to the unskilled labourers and their families whom it employed.[101]

Third, and given that the primary sources provide clear evidence for a skill premium both for the wage norms specified by the state and nominal wage rates offered by private firms, the pooling or conflation of observations for skilled and unskilled labour imparts an upward bias to data that historians may wish to reconfigure and mobilize for comparisons with the real wages received by *unskilled* workers in the west.

Fourth, Chinese sources refer to annual, monthly, weekly, and daily wage rates, but supply virtually no information on the number of days or hours worked, which is required in order to generate estimates for annual earnings. For reasons that are not elaborated, the authors converted observations for nominal wage rates expressed on a monthly or annual basis into daily rates on the puzzling assumption that these observations referred to 15 days a month and 60 days a year.[102]

[98] Moll-Murata, 'Regulated wages paid by the state'; eadem, 'Remarks on "Wages for armament"'; eadem, 'Remarks on "Wages for silk weaving"'; 'Remarks on "Wages on the free market"'; eadem, 'Remarks on *Wuliao jiazhi zeli*'; 'Wage data in *Da Qing Huidian Shili*'; eadem, 'Wages for armament'; eadem, 'Wages for printing'; eadem, 'Wages for silk weaving'.

[99] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu'; Li et al., *Mingqing Shidaide Nongye* ; Liu, '1600–1840 Nian Zhongguo Guonei Shengchan Zongzhide Gusuan'; Campbell and Lee, 'Free and unfree labor'; Li et al., *Mingqing Shidaide Nongye*.

[100] Lucassen, 'Rise'.

[101] He and Wei, eds., *Huangchao Jingshi Wenbian*.

[102] Allen et al., 'Wages, prices, and living standards' (2011), p. 14, n. 20.

Fifth, as we have already noted, considerable ambiguities and uncertainties surround the meaning and validity of most of the observations for nominal wage rates recovered from governmental sources. Their stability over long periods of time and limited variation across space leaves the impression that these records are often analogous to pay scales promulgated by the Qing state for the remuneration of soldiers and bureaucrats. Such scales normally included pay plus cost of living allowances.[103] They have only a tenuous resemblance to the daily wage rates generated by contexts approximating to markets for labour in western Europe.[104]

Although the authors prudently discarded much of the wage data collected from several official sources, they made the questionable strategic decision simply to merge a potentially significant share of the observations derived from official records for 1723, 1736, 1769, and 1813 into a pool of 327 figures for nominal daily wage data clustered in time between 1749 and 1820. Nevertheless, most of their 'scattered wage quotations' certainly relate to labour employed by the private sector and were indeed drawn 'from many sources and for different parts of China'.[105]

On close inspection, it seems that even these ostensibly more promising figures originated in judicial records and first appeared in the publications of three Chinese economic historians: Peng, Wei, and Wu. They are referenced but not appraised in the paper by Ma et al.[106] We were alerted to the complexities of deriving hard data from legal records by various Chinese scholars who have surveyed copper cash wages for 6,100 criminal cases recorded in the Qing Imperial criminal records, *Xingke Tiben*. These records indicate that variations in annual earnings from agricultural work ranged from 2,000 to 6,400 *wen*. For handicrafts they ranged from 5,000 to 12,000 *wen*.[107]

Furthermore, our own smaller and complementary sample of wage quotations published in secondary sources is also based on comparable judicial records. It has been placed on our website and includes a disparate and difficult to standardize range of figures for nominal annual wage rates for both skilled and unskilled labour employed mainly in agriculture and in just four industries: coal, charcoal, bricks, and bricklaying.[108] Our perception is that the figures collected for wage rates from legal proceedings display extraordinary degrees of variance for comparable occupations over time and across the empire. Contracts and contexts for the wage rates by occupation are almost never specified, let alone elaborated in Chinese legal sources. It is impossible to verify the hours, days, weeks, or months worked. Potential payments in kind or any other conditions for employment are not specified. Chinese historians of labour are pretty clear that food and other payments in kind dominated contracts for unskilled labour until well into the twentieth

[103] He and Wei, eds., *Huangchao Jingshi Wenbian*.

[104] Lucassen, 'Rise'.

[105] Allen et al., 'Wages, prices, and living standards' (2011), pp. 13–17 (quotations on p. 13); also Ma et al., 'Wages on the free market'.

[106] Allen et al., 'Wages, prices, and living standards' (2011), pp. 13–17; Ma et al., 'Wages on the free market'.

[107] Jiang, 'Mingqing Shiqide Beifang Laodongli Shichang', pp. 86, 88; Huang, 'Qingdai Nongcun Changgog Gongjia Zongheng Tan'; Wu, 'Qinggiangi Nongye Gugongde Gongzi', pp. 22–3; Jiang and Cao, 'Huoliantie Shidaide Shicang Zhuanxing'; Peng, *Zhongguo Jindai Shougongyeshi Ziliao*, pp. 396–413; Li et al., *Mingqing Shidaide Nongye Zibenzhuyi Mengya Wenti*, pp. 230–2, 242.

[108] Liu et al., 'Sample'.

century.[109] Judicial records do not provide the homogeneous and transparent evidence required to calculate the incomes received by wage-dependent labourers employed by private firms in the Qing Empire during the centuries preceding and succeeding the great divergence.

IV

Our critique of a serious and illuminating academic endeavour to compare levels of real wages between China and Europe and thereby provide statistical underpinnings for a chronology for the great divergence does not intend to conclude on a negative note. Quantification is nothing more than a cumulative process of gathering, reviewing, and revising statistical evidence until a frontier for consensus and acceptability or agnosticism is reached. Furthermore, the methods pioneered by Allen to convert nominal into real wages and real family incomes remain innovatory, relevant, and entirely heuristic for such purposes of comparison. Unfortunately, the data currently available for nominal wage rates paid either by the state or represented by citations from judicial proceedings for Qing times (1644–1911) seem to be neither voluminous, transparent, nor contextualized enough to serve as proxies for average daily wages or for the standards of living afforded by the private sector of the Chinese economy to a definable group of unskilled urban and agricultural workers at the bottom end of an income distribution scale. There may be nominal wage data in primary sources for Chinese cities that could be defended as wages paid to comparable but far larger proportions of European workforces. However, the figures uncovered by these preliminary exercises for comparisons across Eurasia suggest that more secure and transparent evidence could be hard to find. That is probably because the contractual, monetary, and other conditions within which unskilled (and to a lesser extent skilled) labour was employed in both the rural and urban sectors of the Qing and other Asian economies, exemplifying significant differences with the west, add up to serious impediments to quantification. The institutional contexts which framed the returns for work performed by the vast majorities of the Chinese and other Asian workforces (including wage labourers) differed to a degree that has and might continue to frustrate scholarly attempts at meaningful statistical comparisons.

Prudentially Allen et al. resisted the temptation to make strong claims based on empire-wide averages derived from such a disparate pool of data that prima facie seems so difficult to define, validate, and standardize. Instead they opted to present the data at their disposal as indices that purport to refer to standards of living offered by the pre-modern and pre-divergence Chinese economy to wage-dependent unskilled labour employed in just three large cities: Beijing, Suzhou, and Canton. They depicted these estimates as 'reasonable' for a substantial part of the population at the relatively low end of the income distribution.[110]

[109] Liu, 'Jiawu Zhanzhenghou Zhiyoude Zibenzhuyide Nongye Guyong Laodongde Fazhan'; Liu, 'Shengzhou Gongzi Zhidude Yange'.

[110] Allen et al., 'Wages, prices, and living standards' (2011), p. 29, also pp. 17, 30, 31.

For purposes of comparison with their counterparts employed in European cities the authors' figures cited for nominal daily wage rates have been converted from purchasing power parities and monetary units expressed in grams of fine internationally traded silver at the rate of exchange between copper cash *wen* and silver taels derived from a seminal article by Vogel. Vogel's rates, to repeat, do not, however, provide the local rates of exchange required to capture the multiple purchasing power parities of the coins when actually spent by Chinese workers and their families: 45.6 *wen* of copper cash as a base line average for the Yangtze Delta; 90.0 *wen* for Suzhou (the commercial capital of that region); 89.7 *wen* for Beijing; and 83.6 *wen* for Canton.[111]

Two primary sources, already appraised, are cited to support the figures generated by the regression for weavers' wage rates in Suzhou and for dockers' wage rates in Canton. For Canton, a range from 30 to 80 *wen* is cited in the basic data, which refer to short-term seasonal rates.[112] For Beijing, the wage rate predicted by the regression derives support from just a single primary source (a single private fuel store outside the capital city) and presumably for a tiny number of workers.[113]

The selections for Canton and Suzhou as well as Beijing are, however, justified, quoted, and continue to be cited on the grounds that as a bench-mark for comparisons with European urban wages in the following sections *we chose* the optimistic version of 0.08–0.1 taels wage rate for the eighteenth century in order to test the revisionists' claim at its favourable margin. It is also believed that seventeenth-century nominal wage levels may not be far from the levels of the eighteenth and nineteenth centuries.[114]

The procedure of deploying outer bound estimates to test the potential validity of hypotheses is heuristic, but needs to be accompanied by some discussion of its plausibility in relation to the spectrum of nominal daily wage rates cited and utilized as data for calibrations into a numeraire for comparisons. That spectrum ranges from 30 copper cash (the government-decreed 'norm' for monetary payments to unskilled labour working in Fujian in 1769) to around 160 copper cash for skilled construction workers employed for work at a palace in Shenyang (in Manchuria) between 1723 and 1736 and an imperial villa outside Beijing in 1766.[115]

Our scrutiny of the entire collection of citations for daily wage rates and/or money wage 'norms' published by the authors for skilled and unskilled labour in the 1690s to 1820 leaves us, moreover, with the impression that a majority of the figures look closer to a *modal* rate of 40–50 copper cash per day than the 80–100 copper cash range generated by a regression.[116] That impression implies that if 0.04 taels were by default to be utilized by economic historians as a modal or representative nominal daily rate of pay in money for wage-dependent workers employed in Chinese cities, two contestable inferences would follow.

[111] Vogel, 'Chinese central monetary policy'.
[112] van Dyke, *Canton trade*.
[113] Illustrated in fig. 1 of Allen et al., 'Wages, prices, and living standards' (2011), pp. 34–6.
[114] Li, *Agricultural development*, p. 94; Allen et al., eds., *Living standards*; Broadberry and Hindle, 'Editors' introduction'.
[115] Allen et al., 'Wages, prices, and living standards' (2011), p. 12, tab. 1; Allen, 'Pessimism preserved'; Moll-Murata, 'Remarks on *Wuliao jiazhi zeli*'; eadem, 'Wages for construction workers'.
[116] Allen et al., eds., *Living standards*.

First, it could suggest that divergence may have been present for some centuries before 1750—favoured by the California School as marking its onset. Prima facie the currently accessible database for nominal wages may have been visible and widening in the 1600s. Second, the published data for nominal wage rates, combined with Allen's innovatory methods for conversion into real wage levels afforded by the relatively backward urban economies of eastern and southern Europe for their unskilled labourers at lower ends of the income distribution, would look superior to the real incomes affecting the lives of their counterparts in China and almost certainly in India and the Ottoman dominions as well. Since neither of these inferences could be validated by a base of nominal wage data secure enough for transcontinental comparisons, the recommendation that flows from this survey and critique is to remain sceptical towards all published comparisons of wage levels and trends for the Chinese and by extension other Asian empires.[117]

Meanwhile, and since recent endeavours to provide statistical foundations for the divergence debate in the form of relative levels and trends for Europe and China has run into the buffers of Qing primary sources, nothing more than entirely speculative numerical conjectures could be constructed from the extensive body of nominal wage data collected by Moll-Murata and her associates and analysed by Allen et al. Nothing that could be represented as more secure and plausible proxies for the standards of living for Chinese families in Qing times will, moreover, emerge from our attempt to supplement their evidence with an alternative conjecture based on Peng's research.

Peng's publications, as a professor of economics at the Institute of Economics of the Chinese Academy of Social Sciences for most of his distinguished career, continue to be regarded as authoritative and reliable scholarship on the labour markets, wages, prices, and proto-industrialization of Qing China.[118] Along with other historians and social scientists of his generation, Peng recognized that the market for labour in Qing times operated with wages that were an admixture of *gongshi* and *gongjia* (payments in money with payments in kind).[119] He was, moreover, critical of Marxists who, in their search for 'the sprouts of capitalism', created 'an illusion of wage workers living on monetary wages'.[120]

Peng's sample of statistics compounded for wages in money plus daily rations for food was derived from data that he collected and calibrated into taels of silver to represent payments made over the eighteenth century to 7,055 workers employed in three state-owned enterprises located in Suzhou, Shanghai, and Hangzhou. These large cities were located in the most economically advanced region of the Qing Empire. The three factories studied by Peng produced a high value added textile, namely woven and patterned silk cloth, and employed a workforce which included 5,512 skilled weavers and patterners. The remaining 22 per cent of this workforce consisted of their semi-skilled assistants and a fraction of unskilled ancillary labour

[117] Broadberry and Gupta, 'Early modern great divergence'; Sivramkrishna, 'Ascertaining living standards'; Parthasarathi, 'Rethinking wages and competitiveness'.

[118] Peng, *Zhongguo Jindai Shougongyeshi Ziliao*; idem, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu'.

[119] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 105, 108. See also Li et al., *Mingqing Shidaide Nongye Zibenzhuyi Mengya Wenti*, pp. 167, 230–2, 233–8, 242, 317, 365–6, 438–41, 496–9; Liu, 'Jiawu Zhanzhenghou Zhiyoude Zibenzhuyide Nongye Guyong Laodongde Fazhan'; Liu, 'Shengzhou Gongzi Zhidude Yange'; also see Theobald, *War finance*, pp. 162–3.

[120] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', p. 108.

Table 3. *Numerical conjectures for the daily wages and family incomes of wage dependant urban workers in eighteenth century Qing China*

	Daily wage (silver taels)		*Daily wage[a] (kg of edible rice)*		*Family income[b] (kilocalories per capita)*	
Category	*Peng*	*Allen*	*Peng*	*Allen*	*Peng*	*Allen*
Skilled labour	0.10	–	4.97	–	3,578	–
Semi-skilled	0.09	–	4.47	–	3,218	–
Unskilled	0.05	–	2.49	–	1,789	–
Waged workers	–	0.09	4.47	–	–	3,218

Notes: *a* Converted at average prices for 1742–6 of 1.51 taels per *shi*, for 1818–20 of 2.36 taels per *shi*, and one *shi* equals 75 kg: Wang, 'Database of grain prices'.
b Converted at one kilogram of edible rice = 3,600 kilocalories per capita per day and 2,100 kilocalories is 'food security'; FAO, 'Food energy'.
Sources: Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu', pp. 97, 107; Allen et al., 'Wages, prices, and living standards' (2011).

engaged in menial tasks. Peng's figures, reported as simplified averages in table 3, refer to payments in money and rice to three categories of waged workers employed by a luxury industry selling most of its output to the state. In our view, their jobs and wages can be plausibly represented as among the best available to China's entirely small wage-dependent urban workforce during the eighteenth century.[121]

In table 3 we have compared gross wages for three categories of labour recorded by Peng with the daily wages expressed in taels of silver for unskilled wage-dependent labour, constructed as best they could from a far larger but flawed database of observations analysed by Allen et al. In order to simplify and facilitate comparisons between two numerical conjectures for wages that are in print, we have recalibrated the latter's preferred estimates for nominal wages reported in taels of silver for Beijing, Suzhou, and Canton into a single averaged money wage which embodies negligible degrees of variance across the three cities.

Our next calibration (column for 'family income') converted Peng and Allen et al.'s figures into kilograms of edible rice using Wang's widely cited data for autumnal prices of rice as reported in official documents for Songjiang in the Yangtze Delta. The kilograms so derived were then transformed into kilocalories per capita for families of five in order to facilitate and offer an element of quantified speculation to conjectures about standards of living affecting the families of wage-dependent workers in urban locations in the Qing Empire.

Comparisons of Peng's small and particular sample of figures with the estimates for Chinese wage levels that Allen and his co-authors settled upon allows for direct comparisons with numbers for China that are currently quoted for purposes of comparison with estimates for real wages earned by their counterparts in European, Indian, and Ottoman cities.[122] First, we observe that guesstimates for nominal daily wages which contain no mark-ups for payments in kind are almost double the wage cited by Peng, which includes an allowance for generous rations of food for unskilled labour. Prima facie the estimate for this category of labour preferred by Allen et al. stands close to the nominal daily wage (that includes rice) paid to highly skilled wage-dependent labour employed by an industry producing a luxury

[121] M. Li, *Qingmo Minchu Zhongguo.*
[122] Voigtländer and Voth, 'Gifts of Mars'.

textile for a state claiming to operate within the context of norms proscribed for a moral economy.[123]

Over the eighteenth century the state of China employed skilled industrial workers and soldiers at levels well above that required to maintain a family of five in food security.[124] Peng's research can be interpreted to suggest that in eighteenth-century China a skilled worker with a job in a silk factory needed to work less than half the year in order to obtain the remuneration required to feed himself and a family at bare-bones subsistence levels. Families of wage-dependent urban workers without skills (even those fortunate enough to be employed in a luxury industry) were remunerated in money and kind at levels that fell marginally below that prescribed by modern science for food security, and only by working all year round. Thus on the data constructed and selected as plausible by Allen et al. and from money wages alone, unskilled wage-dependent workers employed in Chinese cities could support families at standards of living that look both respectable and close to the levels enjoyed by their counterparts—namely the families of unskilled construction workers employed in the towns of southern England.[125]

An alternative set of inferences could be drawn on the basis of Peng's gross wage for unskilled labour (0.05 taels per day) and from the figure of (0.04 taels) per day cited by Allen et al. for the money wage of unskilled labour employed in the Yangtze Delta. These numbers, calibrated into kilocalories per capita per day, lend numerical support to a representation of Chinese families dependent on the wages of unskilled urban labour as afflicted by conditions of food insecurity and poverty that look discernibly worse than those experienced by their counterparts in any city in western, eastern, or southern Europe. They might also support an inference that the great divergence could well have been on stream for some time before 1700.

To speculate further about possible trends in Chinese wages before divergence would, however, require indices for nominal gross daily wage rates for unskilled labour, an acceptable price index for edible rice, and a series of localized rates of exchange between silver taels (the numeraire reported in official primary sources) and copper cash or *wen* (the currency used by workers and their families to purchase commodities and services). Alas, the annual price of husked rice for the Yangtze Delta is the only secure primary source available to historians.[126] Wang's data for the period between the second half of the seventeenth century and the first half of the nineteenth century display an unmistakeable and sharp upward trend for this staple nutrient.[127] Almost the entire body of primary data collected by Moll-Murata and her associates, as well as other secondary sources, suggests that the Qing state almost never revised the money wage rates for its employees, including soldiers.[128] Government officials perceived that the remuneration paid in the form of food probably took care of any otherwise malign inflationary tendencies in the prices of basic foodstuffs, particularly for unskilled labour, who, as Peng noted, received the highest share of their gross wage as a daily ration of rice.

[123] Peng, 'Qingdai Qianqi Jiangnan Zhizaode Yanjiu'; Wong, *China transformed*; Deng, *Premodern Chinese economy*.
[124] Each Manchu Banner soldier was paid 36 taels a year plus 5 *shi* of stipend rice; see He and Wei, eds., *Huangchao Jingshi Wenbian*, p. 868; Zhao et al., *Zhongguo Junshi Shi*, vol. 3, p. 459.
[125] Deng and O'Brien, 'Clarifying data'.
[126] Yu, *Zhongguo Jiage Shi*, pp. 857–62; Lin, *China upside down*, pp. 86–7.
[127] Wang, 'Database of grain prices'.
[128] He and Wei, eds., *Huangchao Jingshi Wenbian*.

The rising trend in the price of rice, coupled with the stability of recorded money rates for employment in the state sector, will leave historians with the impression that standards of living for wage-dependent urban labour declined over time under the Qing regime—unless of course it can be demonstrated that the monetary component of their gross wage denominated in silver was convertible into a quantity of copper coins that was sufficient to offset the documented upward trend in the price of rice. On a worst-case scenario or speculation, namely, stable money wages and rates of exchange between taels and *wen*, the wages of unskilled labour as recorded by Peng could have fallen to levels well below those required to support a family of four or five people even by working all year round. Both Peng's and Allen et al.'s lower bound estimates for unskilled labour suggest that incentives for labour to move from villages into urban jobs were absent in the Yangtze Delta over the eighteenth century and perhaps in earlier centuries as well.

Another and equally valid response from historians who remain resolutely fastidious about facts is that the current programme of research, which has laudably endeavoured to construct an explanation for the great divergence based upon secure statistical foundations, may have to recognize that the Kuznetsian paradigm for reciprocal comparisons between Europe and the empires of Ming–Qing China, Mughal India, and Ottoman Turkey is simply not viable.[129] In our view perhaps the best way forward is to concentrate on the comparative analysis of institutions in the East and the West.[130]

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[129] Fogel et al., *Political arithmetic.*
[130] North and Thomas, *Rise of the western world.*

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