

# The Great Money Divergence: European and Chinese Coinage before the Age of Steam\*

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## 1. Introduction

Economic historians have of late been preoccupied with mapping out and dating the “Great Divergence” between north-western Europe and China. However, relatively few studies have examined the path dependencies of either region insofar as the dynamics monetization, the spread of fiduciary currency or their implications for financial factor prices and domestic-market integration *before* the discovery of the New World. This article is designed to highlight the need for such a comprehensive scholarly undertaking by tracing the varying modes of coin production and circulation across Eurasia before steam-engines came on stream, and by examining what the implications of this currency divergence might be for our understanding of the early modern English and Chinese economies.

“California School” historians often challenge the entrenched notion that European technological or economic superiority over China had become evident long before the

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Industrial Revolution. In their view, no clear-cut European departure from the pre-modern economic mould elsewhere in the world can be identified any time before 1800. Whilst a few tentative studies of monetary systems across Eurasia in antiquity have been attempted,<sup>1</sup> it is worth noting here that, to date, the “Great Divergence” debate has largely revolved around comparative wage and consumption data, maritime trade volumes, life-span estimates, land ownership inequalities, and agricultural productivity on the eve of Britain’s Industrial Revolution. The debate has scarcely touched on monetary aggregates or financial indices in the intervening period, namely, the late Middle Ages.<sup>2</sup> Yet, in determining whether or not the early modern Chinese littoral economy was on par with north-western Europe’s, one might do well to recall that in Britain, for example, paper money and exchange drafts made up as much as half of the currency stock as early as 1688 whereas these are not likely to have exceeded 10 per cent of the money stock in China even as late as 1900.<sup>3</sup> This stark contrast between the two continental extremes warrants a more detailed examination of monetary evolution across Eurasia over the antecedent millennium.

<sup>1</sup> David M. Schaps, “The Invention of Coinage in Lydia, in India, and in China,” in *Proceedings of the XIV International Economic History Congress* (Helsinki, 2006); Walter Scheidel, “The Divergent Evolution of Coinage in Eastern and Western Eurasia,” in W. V. Harris, ed., *The Monetary Systems of the Greeks and Romans* (Oxford: Oxford University Press, 2008), pp. 267–88.

<sup>2</sup> For recent studies of the “Great Divergence” in this vein, see e.g. Jeffrey G. Williamson, “Globalization and the Great Divergence: Terms of Trade Booms, Volatility and the Poor Periphery, 1782–1913,” *European Review of Economic History* 12, no. 3 (December 2008), pp. 355–91; Oded Galor, Omer Moav, and Dietrich Vollrath, “Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence,” *Review of Economic Studies* 76, no. 1 (January 2009), pp. 143–79; Jan de Vries, “The Limits of Globalization in the Early Modern World,” *Economic History Review* 63, no. 3 (August 2010), pp. 710–33. Notable studies in monetary history that do consider to a greater extent a “Great Divergence” in monetary history include Peng Xinwei 彭信威, *Zhongguo huobishi 中國貨幣史* (Shanghai: Shanghai renmin chubanshe 上海人民出版社, 1958); Frank Perlin, *The Invisible City: Monetary, Administrative, and Popular Infrastructures in Asia and Europe, 1500–1900* (Aldershot: Variorum, 1993); Richard von Glahn, *Fountain of Fortune: Money and Monetary Policy in China, 1000–1700* (Berkeley and Los Angeles: University of California Press, 1996); Akinobu Kuroda, “The Eurasian Silver Century, 1276–1359: Commensurability and Multiplicity,” *Journal of Global History* 4, no. 2 (July 2009), pp. 245–69; and Mark Elvin, “Preface,” in Ulrich Theobald, ed., *Small Currencies Matter* (edited volume in preparation).

<sup>3</sup> Rondo Cameron, “England, 1750–1844,” in Rondo Cameron, Olga Crisp, Hugh T. Patrick, and Richard Tilly, eds., *Banking in the Early Stages of Industrialization: A Study in Comparative Economic History* (New York: Oxford University Press, 1967), pp. 15–59; Glyn Davies, *A History of Money: From Ancient Times to the Present Day* (Cardiff: University of Wales Press, 2002).

Here, we shall draw on the many stimulating insights and rich data that scholars associated to one degree or other with “California School” thought have contributed to our understanding of world monetary history, while insisting that the contours of that very history—when comparatively studied—do support in fact the notion that north-western Europe’s departure from the pre-modern mould had long predated 1800. Though our focus will be on global bullion flows, we will point to early modern advancements in coin production and metallurgic technology by way of demonstrating how Europeans were able to sustain and further benefit from the flow of specie into Asia.

The “Great Divergence” debate has of course a very contemporary dimension too. Outside the realm of academic historiography, many popular commentators point to a renewed thrust of globalization that is said to have “flattened” the world economy ever since the fall of the Berlin Wall in 1989. This present thrust of globalization is compared on occasion with the previous and much longer thrust of globalization, which had arguably started with the discovery of New World silver deposits, and ended perhaps with the parcelling up of the global economy into three separate economic blocs following World War II.<sup>4</sup> Whilst the discovery of rich silver deposits in Mexico and Peru has been persuasively shown to have effected sweeping overhaul of the monetary order across Eurasia as from the sixteenth century, and to sustain in no small measure Sino-European trade until the mid-nineteenth century—much less interdisciplinary attention is paid to the transmission of currency across Eurasia *before* the discovery of the New World.<sup>5</sup>

The additional purpose of this article is, therefore, to reprise the seemingly early modern foundation of monetary globalization as far as the conceptualization and standardization of currency are concerned. The following passages survey the transmission of currency design and production technology across Eurasia from the Middle Ages to the

<sup>4</sup> See e.g. Dennis O. Flynn and Arturo Giráldez, “Born with a ‘Silver Spoon’: The Origin of World Trade in 1571,” *Journal of World History* 6, no. 2 (Fall 1995), pp. 201–21; idem, “Cycles of Silver: Global Economic Unity through the Mid-Eighteenth Century,” *Journal of World History* 13, no. 2 (Fall 2002), pp. 391–427; Raghuram G. Rajan and Luigi Zingales, “The Great Reversals: The Politics of Financial Development in the Twentieth Century,” *Journal of Financial Economics* 69, no. 1 (July 2003), pp. 5–50; Thomas L. Friedman, *The World Is Flat: A Brief History of the Twenty-first Century* (New York: Farrar, Straus and Giroux, 2005).

<sup>5</sup> Dennis O. Flynn and Arturo Giráldez, “Arbitrage, China, and World Trade in the Early Modern Period,” *Journal of the Economic and Social History of the Orient* 38, no. 4 (1995), pp. 429–48; idem, “Path Dependence, Time Lags and the Birth of Globalisation: A Critique of O’Rourke and Williamson,” *European Review of Economic History* 8, no. 1 (April 2004), pp. 81–108. Cf. Richard von Glahn, “Comment on ‘Arbitrage, China, and World Trade in the Early Modern Period,’” *Journal of the Economic and Social History of the Orient* 39, no. 3 (November 1996), pp. 365–67; Kevin H. O’Rourke and Jeffrey G. Williamson, “Once More: When Did Globalisation Begin?” *European Review of Economic History* 8, no. 1 (April 2004), pp. 109–17.

invention of steam-powered mints. In addition, they cast a sidelight on the present (“post-modern”) and previous (“early modern”) thrusts of globalization through a discussion of previous currency standards, currency substitution and of metal transportation as determinants of hegemony. Eric Helleiner has persuasively shown in this context that “territorial currency,” namely the notion that foreign coinage cannot be used at will within another sovereign polity, crystallized across western Europe long after the concept of national sovereignty had first been envisioned in the Treaty of Westphalia (1648).<sup>6</sup>

By addressing endogenous mining output and divergent production modes of coinage, this article is intended to underscore Professor Helleiner’s important insights from an East Asian perspective. It is also intended to complement Professor Akinobu Kuroda’s important work. For despite his resolute rejection of conventional Eurocentric monetary wisdom—Kuroda does otherwise seem to suggest that the unseemly roots of Europe’s eventual uptake of “debt-based *single* [read: national] unit of account” in the early twentieth century can in fact be partly traced as far back as the sweeping mercantile restructuring of late medieval England.<sup>7</sup>

“Post-modern” interpretations of globalization often ascribe a minor role to the mastery of mineral wealth or the production of means of payment. In their influential books Hobson and Frank suggested, for example, that the mass flow of silver from Latin America to China in the early modern era was not a marker of Chinese economic passivity but rather a testament to the “magnet” qualities and the inherently more advanced nature of the Chinese economy.<sup>8</sup> It is perhaps to be expected that historians’ view of globalization would sometimes be coloured by contemporary events, e.g. the “Rise of China” as of the latter part of the twentieth century. A hundred years ago, European views of the Chinese early modern economy were of course much dimmer if not bluntly “Orientalist.” Thus, if Hobson’s aforementioned book is titled the “Eastern Origins of Western Civilization” (2004), Terrien Lacouperie’s is evocatively titled the “Western Origin of the Early Chinese Civilization” (1894).<sup>9</sup>

Lacouperie’s distinctly nineteenth-century bias should not detain us here. Of more relevance was his suggestion, based on apocryphal sources, that the pre-modern Chinese currency system had in fact been directly modelled on earlier Greek coinage. Furthermore, he claimed that the Western Han (206 B.C.–A.D. 6) monopoly of coinage production was in fact derived from the Greco-Roman practice, even though the control of coinage turned

<sup>6</sup> Eric Helleiner, *The Making of National Money: Territorial Currencies in Historical Perspective* (Ithaca, NY: Cornell University Press, 2003).

<sup>7</sup> Akinobu Kuroda, “The Eurasian Silver Century, 1276–1359,” pp. 268–69.

<sup>8</sup> John M. Hobson, *The Eastern Origins of Western Civilization* (New York: Cambridge University Press, 2004); Andre Gunder Frank, *ReOrient: Global Economy in the Asian Age* (Berkeley and Los Angeles: University of California Press, 1998), pp. 53, 115, 354.

<sup>9</sup> Terrien de Lacouperie, *Western Origin of the Early Chinese Civilisation from 2,300 B.C. to 200 A.D.* (London: Asher & Co., 1894).

out on balance much less centralized in medieval Europe than in, for example, Tang China (618–907).<sup>10</sup>

This article will survey in broad strokes the evolution of currency across Eurasia roughly from the Tang (in China) and Carolingian (in western Europe) eras up to the age in which Lacouperie lived, namely, the age in which steam technology had revolutionized everything from the notion of distance to the notion of labour. Steam, of course, also changed our notion of money because it ushered in the standardization of coin production around the world. Between 1787 and 1797 Birmingham innovator Matthew Boulton introduced steam-powered steel-collars to mints—a technology which greatly improved the quality, durability, roundness, and uniformity of British coinage. Boulton’s new steam-powered minting machines were sold all over Britain, and then purchased by Russian, French, American, Siamese, and Japanese mints. Across Europe and North America, steam quickly thus replaced less advanced minting technologies in the early nineteenth century, ranging from basic coin hammering practised from the very inception to manual screw-presses. Boulton’s invention rapidly decreased minting costs and reduced forgeries. Based on observation of mints in Europe, American technicians in Philadelphia had been able in 1836 to develop a steam-powered mint of their own, and later exported it to Latin America.<sup>11</sup>

Steam-powered minting had transformed China’s monetary system by the early twentieth century. For over two millennia hitherto, imperially cast copper coinage had remained the mainstay of Chinese currency. Distinctly known to Europeans as copper “cash” (*qian* 錢), these low-denomination coins typically had fairly simple raised rims to discourage clipping with minimalistic inscription, and featured a square hole in the middle so that they could be strung in big clusters of 1,000 pieces (mostly known as *diao* 吊 or *guan* 貫) often subdivided into smaller cluster of 100 (*zumoqian* 足陌錢).<sup>12</sup> Since the sixteenth century,

<sup>10</sup> Ibid., pp. 89, 118, 191, 217. Cf. Mark Elvin, *The Pattern of the Chinese Past* (London: Eyre Methuen, 1973), pp. 146–63, for a pioneering comparative study.

<sup>11</sup> Richard Doty, “The World Coin: Matthew Boulton and His Industrialisation of Coinage,” *Interdisciplinary Science Reviews* 15, no. 2 (June 1990), pp. 177–86; Thomas J. Sargent and François R. Velde, *The Big Problem of Small Change* (Princeton, NJ: Princeton University Press, 2002); Eric Helleiner, *The Making of National Money*, pp. 46–53; Goerge Selgin, *Good Money: Birmingham Button Makers, the Royal Mint, and the Beginnings of Modern Coinage, 1775–1821: Private Enterprise and Popular Coinage* (Oakland, CA: Independent Institute; Ann Arbor, MI: University of Michigan Press, 2008).

<sup>12</sup> For a survey of “cash” taxonomy in late imperial China, see e.g. Frank H.H. King, *Money and Monetary Policy in China, 1845–1895* (Cambridge, MA: Harvard University Press, 1965). The origin of the English term “cash” as distinctly denoting Asian copper coinage is the Sanskrit silver and gold weight unit “karsa.” The latter evolved into the Tamil word “kaasu” denoting low-value coinage. It entered the English language via the Portuguese variants for “kaasu,” *caixa*. This is not to be confused with the primary (and older) instruction of “cash” in the English language which derives from medieval Italian, *cassa*. Other important studies of the Chinese late imperial monetary system include Wang Yejian 王業鍵, *Zhongguo jindai* (Continued on next page)

heavy silver ingots (sycee) and imported silver dollars became indispensable in higher-denomination transactions. Yet in 1887 inveterate Chinese general and statesman Zhang Zhidong 張之洞 had ordered minting machinery from Birmingham, which within a decade would impact on both low- and high-tier currencies. By the early twentieth century, provincial mints had employed steam-powered machinery to not only issue limited amounts of imperial silver dollars but also flood the marketplace with better-quality copper coins (*tongyuan* 銅元). These looked very much like European currency at the time, namely, they were no longer holed, and carried elaborate designs.<sup>13</sup>

The following passages take issue with the distinctness of Chinese pre-modern coinage, namely its production and transmission modes long before 1887. The remaining sections are framed with a view toward understanding the wider ramifications of coin production in Chinese and European early modern societies. Section 2 analyses the evolution of currency across Eurasia following Rome's disintegration and the breakup of the China's formative Han Empire. Section 3 explores why western Europe had reverted to gold coinage in the late medieval era, just at a time when late imperial China abandoned paper money. Section 4 then questions the notion that China's monetary role in the early modern era was "magnetic" as California-School studies might suggest; Section 5 will point to technological breakthroughs, which account for the quality of Western coinage well before the age of steam. Finally, we shall integrate the whole gamut of historic evidence in a bid to sketch in broad strokes the Great Monetary Divergence between East and West, dating back to the early Middle Ages; we will identify the ways in which European coin production departed from the rest of the world, beginning as early as the thirteenth century, and the implication of that departure on European statecraft. Whereas other studies have traced out the Great Divergence in terms of the European economies' overcoming of common Malthusian brakes, here we shall emphasize the global pursuit of trade, mineral resources, and the supply of metallic money as critical determinants of European prosperity.

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(Note 12—Continued)

*huobi yu yinhang de yanjin (1644–1937)* 中國近代貨幣與銀行的演進 (1644–1937) (Taipei: Zhongyang yanjiuyuan Jingji yanjiusuo 中央研究院經濟研究所, 1981); Chau-nan Chen, "Flexible Bimetallic Exchange Rates in China, 1650–1850: A Historical Example of Optimum Currency Areas," *Journal of Money, Credit and Banking* 7, no. 3 (August 1975), pp. 359–76; Quan Hansheng 全漢昇, *Ming Qing jingjishi yanjiu* 明清經濟史研究 (Taipei: Lianjing chubanshiye gongsi 聯經出版事業公司, 1987).

<sup>13</sup> Eduard Kann, *The Currencies of China: An Investigation of Silver & Gold Transactions Affecting China with a Section on Copper* (Shanghai: Kelly & Walsh, 1927), pp. 41–44, 149–57, 443–45. The steam-powered mint equipment bought by Zhang in 1887 was not operationalized until 1890. It was first used to issue imperial silver dollars—modelled on Mexican silver dollars—in Guangdong 廣東 and Hunan 湖南. The production of Western style subsidiary copper coinage (*tongyuan*) did not start until the turn at the century, but once underway, it reached a much more extensive scale than imperial silver dollar output.

## 2. The Great Monetary Divergence in the Early Middle Ages: The Silver-Penny Era

The three centuries of political disunion following the breakup of China's Han Empire saw, particularly in the north-west, diminishing levels of copper output, the spread of "free coinage" and rampant debasement by competing polities. Certainly, land taxes were still levied at that time in grain or cloth in the north, yet contrary to previous Han practice—ordinary officials were rarely remunerated in copper "cash" even in the south. Nonetheless, on balance, the degree of demonetisation and discursive discontinuity in south and north-east China during those three centuries may well have been less extensive than what ensued from the collapse of the Roman Empire in western Europe.<sup>14</sup>

On the British Isles, for example, coinage fell into complete disuse as a medium of exchange by A.D. 450, only to re-emerge in the latter part of the seventh century. However, on the European continent no such clear-cut break occurred: the Germanic tribes which overran Rome continued to operate its mints, churning out the mainstay of gold *tremisssis* and *solidi* coinage in the fifth century A.D., and retaining much of the original Roman imagery intact. Their rulers' own portraiture gradually surfaced on coinage only as of the mid-sixth century, so that early medieval coinage designs came of age only at the onset of Carolingian power. The critical difference between the continental and English monetary trajectories became even more pronounced when minting resumed on the British Isles. Ironically, the management and production of currency became much more centrally controlled in England than across the Channel by the eighth century.<sup>15</sup>

Whilst the currencies of the Franks, Visigoth, and Lombards were based on golden *tremisssis* and *solidi*, Italian principalities resorted to a range of autochthonous silver and bronze coins under Ostrogothic and Byzantine rule. However, beginning in the late sixth century, western European gold currency became increasingly debased as a whole, possibly as a result of the decline of mining in eastern Europe or fewer trade links across the continent. Much of the Frankish coinage in the late seventh century was made of 25%–75% alloy of gold and silver. Byzantine mints in Italy produced debased gold coins between the seventh and eighth centuries, but by the end of the eighth century the coinage they produced composed copper alloy coins that had often been gilded perfunctorily. Thus, gold coinage survived the downfall of Rome only in Asia Minor and in North Africa,

<sup>14</sup> Quan Hansheng, "Zhonggu ziran jingji" 中古自然經濟, *Zhongyang yanjiuyuan Lishi yuyan yanjiusuo jikan* 中央研究院歷史語言研究所集刊 10 (1941), pp. 73–173; He Ziquan 何茲全, "Dong Jin Nanchao de qianbi shiyong yu qianbi wenti" 東晉南朝的錢幣使用與錢幣問題, *ibid.* 14 (1949), pp. 21–56. Cf. Xiao Qing 蕭清, *Zhongguo gudai huobishi* 中國古代貨幣史 (Beijing: Renmin chubanshe 人民出版社, 1984), pp. 94–120.

<sup>15</sup> Mark Blackburn, "Money and Coinage," in Paul Fouracre, ed., *The New Cambridge Medieval History c.500–c.700* (New York: Cambridge University Press, 2005), pp. 660–74.

where gold could still be readily sourced from the longstanding mines of Nubia and brought to mints on trans-Saharan camel convoys.<sup>16</sup>

Both the pseudo-Roman and avowedly medieval rulers' gold *tremisses* gave way in the eighth century to new coinage of pure silver in western Europe, which was less precious per unit. That new silver coinage had become known as *pennies* on the British Isles and *deniers* on the continent in the ninth century. During the period between the eighth and thirteenth centuries gold coinage further receded from circulation in much of the western reaches of the continent, whilst the new silver coinage took root—this was Europe's first silver-coinage epoch.<sup>17</sup>

Why did western Europe abandon gold coinage in the eighth century? It is plausible that the breakdown of central authority and feudalization weakened the ability to embark on large-scale mining operations to replenish the stock of currency. It may also be that this was exacerbated by shrinking trade volumes across the Mediterranean due to Arab conquest and monetary reform.<sup>18</sup>

Umayyad Caliph 'Abd al-Malik ibn Marwan initiated a reform of Islamic currency in the late seventh century. Hitherto the Islamic world had relied on the silver Sassanid *drachma* and Byzantine *solidi* gold coinage, but from then on aniconic gold coinage predominated. Nevertheless, the Umayyads did strike silver after they reformed gold currency. At the same time, one would do well to remember silver had not yet been fully monetized in China; hence its relative price *vis-à-vis* copper and gold was low there. In turn, greater demand for gold in the Arab world might have led to an outflow of gold from Europe in return for silver from China via Asia Minor—but global metal-price arbitrage alone surely cannot sum up the complex factors at play considering the relatively low volume of inter-continental trade at the time.<sup>19</sup>

Like early medieval European currency, which was pseudo-Roman in essence, the early Arab currency emulated almost precisely Sassanid silver coinage in territories occupied to the east, including central Asia, while in territories occupied to the west, including Egypt, Byzantine coinage—made up as it was of mostly gold and subsidiary

<sup>16</sup> Alex del Mar, *A History of the Precious Metals from the Earliest Times to the Present* (London: Kessinger, 2004), p. 34. Diodorus of Sicily who lived in the first century BC was the first to discuss in detail the importance of slave labour in the gold mines of Nubia.

<sup>17</sup> Mark Blackburn, "Money and Coinage," p. 579; Henri Pirenne, *An Economic and Social History of Medieval Europe*, trans. Ivy E. Clegg (London: Taylor & Francis, 2006), p. 100; Akinobu Kuroda, "The Eurasian Silver Century, 1276–1359."

<sup>18</sup> Henri Pirenne, *An Economic and Social History of Medieval Europe*, pp. 115–20.

<sup>19</sup> Philip Grierson, "The Monetary Reforms of 'Abd al-Malik: Their Metrological Basis and Their Financial Repercussions," *Journal of the Economic and Social History of the Orient* 3, no. 3 (October 1960), pp. 241–64; *The Umayyads: The Rise of Islamic Art* (Amman, Jordan: Arab Institute for Research and Publishing, 2000), pp. 173–80. On Byzantine coinage, see Michael F. Hendy, *Studies in the Byzantine Monetary Economy c. 300–1450* (Cambridge, England: Cambridge University Press, 2008).

copper—served as a model. By the time of ‘Abd al-Malik’s monetary reforms, however, the design of Arab coinage of all metals was de-anthropomorphized, featuring Kufic script exclusively. Notably, the transition from Sassanid-Byzantine coin design to purely Kufic verses due to Islamic prohibitions of imagery was faster than the transition from pseudo-Roman to avowedly medieval coinage in Europe.<sup>20</sup>

The Arab silver coinage of Central Asia carried over later into the medieval period by the Ilkhanid and Golden Horde authorities alongside copper subsidiary coinage. The original coinage of the Ottomans also consisted of silver coins (*akçe* or *asper* as it was known to Europeans). It was not until the late fifteenth century that Ottoman gold coins were finally struck; in the interim, foreign gold coins (mainly the Venetian ducat) facilitated trade between Europe and the Mediterranean basin, circulating uninterruptedly in Muslim Asia Minor.<sup>21</sup>

Of equal importance, ‘Abd Al-Malik prioritized, in areas adjacent to Europe, gold coinage over silver coinage so that, due to the Byzantine employment of the gold *nomisma* (a variant of the Roman *solidus*), the exchange rate in the Levant was between 14 and 18 silver units for one gold unit of equal weight, whereas in Europe the same rate was close to 12:1 in the early medieval period. In other words, gold was not just more widely monetized but also dearer in the east, even though Arabs and later the Ottomans could more readily tap into Nubian gold deposits. Indeed, the gold dinar served as staple currency in the east, whilst the silver dirham and copper coinage were subsidiary.<sup>22</sup>

<sup>20</sup> On early Islamic monetary reform, see e.g. Tayeb El-Hibri, “Coinage Reform under the ‘Abbāsid Caliph al-Ma’mūn,” *Journal of the Economic and Social History of the Orient* 36, no. 1 (1993), pp. 58–83. For an overview of later Arab and Ottoman monetary evolution, see e.g. Andrew S. Ehrenkreutz, “Monetary Aspects of Medieval Near Eastern Economic History,” in *Studies in the Economic History of the Middle East: From the Rise of Islam to the Present Day*, ed. M. A. Cook (London: Oxford University Press, 1970), pp. 37–50; and Halil İnalcık, “The Ottoman Economic Mind and Aspects of the Ottoman Economy,” in *ibid.*, pp. 207–18.

<sup>21</sup> Şevket Pamuk, *A Monetary History of the Ottoman Empire* (Cambridge, England: Cambridge University Press, 2000).

<sup>22</sup> Ironically, though, the Arab gold dinar was etymologically derived from the Roman silver denarius, while silver dirham arose from the Sassanid permutation of the sound of the ancient Greek silver drachmas. Trade could explain bullion traffic in that era to a considerable extent, given the almost synchronic abandonment of the post-Roman gold standard in western Europe and the upturn of gold coinage in Arabia and Byzantium. Islamic gold coinage seems to have flowed *en masse* into Europe as of ‘Abd al-Malik’s time, suggestive of a trade deficit for Arabs with a politically fractured western Europe at least initially. Muslim silver dirhams, in turn, reached eastern and northern Europe especially as a result of the extensive fur and slave trade of Arabs with the Baltic. Yet on balance it is probably the low mining and minting activity in feudal Europe that accounts for the demand for Arab coinage. For a more detailed discussion, see Peter Spufford, *Money and Its Use in Medieval Europe* (London: Cambridge University Press, 1988), chap. 2.

Demand for gold in the Muslim Mediterranean coincides almost seamlessly with the European abandonment of gold coinage, which followed decades of debasement. As indicated above, the gold tremissis standard employed by Anglo-Saxons and Franks had been wholly supplanted by pennies and deniers by the eighth century. Following 'Abd al-Malik's reforms, Byzantium, in turn, abandoned its minor silver-coin mintage for a purely gold standard with subsidiary copper coinage.<sup>23</sup> Byzantine gold coinage remained fairly stable thereafter until Constantine IX Monomachus (1042–1055) sharply reduced its gold content. That debasement was a desperate attempt to boost state revenue in the face of destructive Pecheneg invasions.

By the end of the eleventh century, the nomisma's gold content had fallen to just 10 per cent, and was replaced two centuries later by the florin as the international currency of the Mediterranean. Notably, in Byzantium coinage and bullion mining were monopolised by the state, as was the case in China at the time, whereas in much of early-medieval Europe localised mining and minting was commonplace.<sup>24</sup>

The loss of nomisma metallic-content stability, and the abandonment of gold coinage elsewhere in Europe occurred when, at the western extreme of the continent, English silver currency was quickly acquiring a reputation for quality and reliability—it was sought after in Scandinavia and the Baltic region, which did not have their own currencies at the time. This was a remarkable turnaround in monetary history, given that the use of coinage had receded in England for nearly 200 years following the retreat of Roman governors from the island. By the seventh century coin production resumed with vigour on the British Isles: mints were established by the Anglo-Saxons in London, Canterbury, and Winchester after two centuries of discontinued local production, and all remaining pseudo-Roman gold coinage gave way to local designs. In 928, a single consistent coinage system was proclaimed across England. Furthermore, in 973 King Alfred additionally reinforced the standardization and replenishment of circulating coinage by instating a system of re-minting worn-out older coins with official insignia every six year—these were brought to mints by private individuals and smelted. Those individuals would receive in return the equivalent amount in new coinage—that amount was invariably smaller in intrinsic metallic content as a result of brassage and seignorage extraction.

Under Edward the Confessor's reign (1042–1066), one of the last Anglo-Saxons to have ruled England, the re-minting of older coinage was carried out every three years.<sup>25</sup> But it was not until the fifteenth century that English coinage was firmly re-based on gold again.

<sup>23</sup> Philip Grierson, "The Monetary Reforms of 'Abd al-Malik," pp. 263–64.

<sup>24</sup> Robert Sabatino Lopez, "The Dollar of the Middle Ages," *The Journal of Economic History* 11, no. 3 (Summer 1951), pp. 209–34; Costas Kaplanis, "The Debasement of the 'Dollar of the Middle Ages,'" *ibid.* 63, no. 3 (September 2003), pp. 768–801. It is worth mentioning in this context that the crusaders issued gold dinars in the Levant imitating Egypt's Fatimid gold coinage even though western Europe was still on a silver standard at the time. Fatimid coinage was state prerogative much like in Byzantium and China.

<sup>25</sup> R. F. Tylecote, *A History of Metallurgy* (London: Metals Society, 1976), p. 77.

Crucially, rather than reverting to the continental mode of feudal free minting they had been more accustomed to, the Norman conquerors of England accepted the Anglo-Saxon system, and reinforced its centralizing tendency. The Tower of London mint was established in 1299, firmly re-enforcing the reputation of English currency for size consistency and metallic purity across the continent. That reputation was thrown into high relief because neighbouring France experienced successive waves of debasement between 1290 and 1450, which accelerated a schism there between intrinsic and imperially-decreed coin values.<sup>26</sup>

The metallic content of English silver pennies remained stable right until the mid-fourteenth century when the first of major debasements of silver coinage occurred there too. It was under Henry VIII (r. 1509–1547) and Edward VI (r. 1547–1553) that the silver content of the English pound (as a unit of account rather than a tangible coin) was imperially “cried down” more than ever before in pursuit of windfall of seignorage revenue. The era between 1542 and 1551 saw the pound losing more than five-sixths of its silver content, and therefore became known to posterity as the era of “Great Debasement.”<sup>27</sup> Yet unlike France, England had by the late seventeenth century also attempted to expensively rebase and replenish its stock of silver coinage in part so as to maintain its relatively high reputation, and in part in order to better reflect metal price movements. The latter aim proved harder to calibrate, and England did lose much of its silver coinage stock in those years because the metal price of the coins was often higher overseas than their imperially-decreed value *vis-à-vis* gold coinage domestically.<sup>28</sup>

In our view, England and France’s disparate experiences with debasement over those 250 years—though scarcely considered in comparative Eurasian terms hitherto—denote a veritable re-conceptualization of money that laid the groundwork for the eventual emergence of “national debt” and modern nation-statehood. Destabilizing as they were, these debasements helped monarchs amass resources with which to entrench central authority at the expense of feudal lords. In France, the latter could up to that time issue coinage of their own, while foreign coins could similarly be used fairly uninterruptedly. Yet, in

<sup>26</sup> Harry A. Miskimin, *Money and Power in Fifteenth-Century France* (New Haven, CT: Yale University Press, 1984); Nathan Sussman, “The Late Medieval Bullion Famine Reconsidered,” *The Journal of Economic History* 58, no. 1 (March 1998), pp. 126–54; W. M. Ormrod, “England in the Middle Ages,” in Richard Bonney, ed., *The Rise of the Fiscal State in Europe c. 1200–1815* (Oxford: Clarendon Press, 1999), pp. 19–52.

<sup>27</sup> J. D. Gould, *The Great Debasement: Currency and the Economy in Mid-Tudor England* (Oxford: Clarendon Press, 1970); Debra Glassman and Angela Redish, “Currency Depreciation in Early Modern England and France,” *Explorations in Economic History* 25, no. 1 (January 1988), pp. 75–97; Arthur J. Rolnick, François R. Velde, and Warren E. Weber, “The Debasement Puzzle: An Essay on Medieval Monetary History,” *The Journal of Economic History* 56, no. 4 (December 1996), pp. 789–808.

<sup>28</sup> Li Ming-Hsun, *The Great Recoinage of 1696 to 1699* (London: Weidenfeld and Nicolson, 1963); A. Andréadès, *History of the Bank of England, 1640 to 1903*, trans. Christabel Meredith (London: King, 1924), pp. 90–100.

England, these debasement and (less frequent) re-minting campaigns were accompanied by incipient central-authority efforts to wipe out the use of all coinage save that which was approved by the monarchy.

If early modern England and France diverged in the *degree* to which their rulers pursued debasement as a source of revenue, China's earlier adoption of paper money as well as its path-dependent formulation of Confucian statecraft meant that coinage debasement was practised by central governments there less often than in Europe before the nineteenth century. As indicated above, one way European rulers could aim to gain more seignorage revenue was by de-linking imperially-decreed coin values from their metallic price values. To a large extent, this could be achieved because both gold and silver coinage circulated in early modern Europe, whereas successive late imperial Chinese dynasties were for the most part reluctant to coin anything but traditional copper cash. Instead, as both Kuroda and Dunstan have shown, Chinese copper "cash" was conceived of in imperial statecraft as a "public good" of sorts that the central government must provide largely at its own expense and even at a net loss in order to facilitate commoners' livelihood (*bianmin* 便民). More vigorous production of "cash" was envisioned, in turn, as the ideal way of bringing down the price of grain especially over the annual *soudure* period or at times of famine. In China therefore, somewhat contrary to conventional wisdom, the price of "cash" coinage relative to silver ingots could at times rise even when more of it was produced because silver coinage was not minted, and silver ingots were too dear to be customarily used in rural areas in order to buy grain. To keep the price of "cash" at bay, the Chinese government did not just produce more of it but also aimed to release more grain for sale from its many granaries.<sup>29</sup>

Thus, whilst debasement was probably much more pervasive across early modern European polities than in China as means of raising revenue, perhaps because of the imperative to finance more frequent warfare, English policymakers and scientists, like for example Royal Mint Master Sir Isaac Newton, seem to have understood—well before the Industrial Revolution—the fiscal and monetary limits of debasement in a bimetallic setting. For these reason, they ensured monarchs debased coinage relatively infrequently between the sixteenth and eighteenth centuries; debasements, which proved too drastic were tempered with "rebasements"; at the same time, English policymakers enhanced the efficacy of debasement and shored up trust in English coinage by minimising the availability of competing foreign coinage to a greater degree than other European countries.

Eventually, England was also one of the first countries to transcend mercantilism, relax the curbs on the flow of bullion overseas, and unilaterally decree a mono-metallic gold standard in the nineteenth century, whereby its dwindling stock of silver coinage was made "token" rather than full-bodied subsidiary of gold by one fell swoop.

<sup>29</sup> Akinobu Kuroda, "Kenryū no senki" 乾隆の錢貴, *Tōyōshi kenkyū* 東洋史研究 45, no. 4 (March 1987), pp. 692–723; Helen Dunstan, *State or Merchant? Political Economy and Political Process in 1740s China* (Cambridge, MA: Harvard University Asia Center, 2006), pp. 60–61, 431–33. Cf. Hans Ulrich Vogel, "Chinese Central Monetary Policy, 1644–1800," *Late Imperial China* 8, no. 2 (December 1987), pp. 1–52.

Little studied in this context, the history of European taxation is nevertheless important because it broadly shows that early modern England was—well before the Industrial Revolution—*also* the first large polity where urban mercantile taxes supplanted rural land taxes as fiscal mainstay, whereas relatively low land taxes remained the mainstay of the Chinese polity until the twentieth century. Indeed, one might well hypothesize that by embracing a gold-exchange standard grounded in reality on territorial fiduciary coinage and later on banknotes, English political economists have intuited from historic experience—and against the backdrop of intense continental rivalries—a more stable means of bolstering state coffers than debasement; one that pre-conditioned the popular uptake of “national debt.”<sup>30</sup>

In China, by way of contrast, the path-dependent prescription of low-value copper coinage narrowed down seignorage potential emanating from the purposeful de-linking of intrinsic values from imperially-decreed ones, so that high-denomination units of account, or their conversion rates, were not effectively determined by the Chinese emperor as in England. Neither did late imperial Chinese coinage face equally intense competition in the marketplace from foreign coins as elsewhere in western Europe: on the contrary, it was usually drained by demand for coinage in the less monetized polities of Japan, Korea, and Southeast Asia at the time. Whilst China is famous to have been the birthplace of paper currency in the eleventh to fifteenth centuries, the notes centrally-issued by Chinese Emperors had to be anchored in conversion to copper coinage or silver ingots for the most part. On the other hand, a larger proportion of Chinese imperial taxes were raised in kind and *corvée* labour than in France or England up until that time.<sup>31</sup>

When coinage debasement did occur in China it was usually in the form of issuing more “big cash” (*daqian* 大錢), namely coins about four times as *heavy* as the standard units but with a nominal (read: imperially-decreed) value usually tenfold larger. Notably, *daqian* gained notoriety in part because it was usually issued at the waning days of a reigning dynasty, and was associated with fiscal crises. The only exception to this debasement pattern was perhaps partial recourse to cheaper iron-made coinage during the Han and Northern Song eras. However, careful reading of Song Yingxing’s 宋應星 famous *Tiangong kaiwu* 天工開物, an influential late Ming-era economic compendium, would seem to suggest that *daqian* coinage had by then been rarely centrally issued because it was seen as disadvantaging commoners and because it was frequently forged.<sup>32</sup>

<sup>30</sup> For seminal comparative studies of world taxation history, see Jack A. Goldstone, *Revolution and Rebellion in the Early Modern World* (Berkeley and Los Angeles: University of California Press, 1993); Carolyn Webber and Aaron Wildavsky, *A History of Taxation and Expenditure in the Western World* (New York: Simon and Schuster, 1986).

<sup>31</sup> Herbert Franke, *Geld und Wirtschaft in China unter der Mongolen-Herrschaft. Beiträge zur Wirtschaftsgeschichte der Yüan-Zeit* (Leipzig: Harrassowitz, 1949). Cf. Ray Huang, *China: A Macro History* (Armonk, NY: M.E. Sharpe, 1990); Richard von Glahn, *Fountain of Fortune*.

<sup>32</sup> Song Yingxing, *Tiangong kaiwu xinzhu yanjiu* 天工開物新注研究, annot. Yang Weizeng 楊維增 (Nanchang 南昌: Jiangxi kexue jishu chubanshe 江西科學技術出版社, 1987), pp. 184–89. Angela Redish, *Bimetallism: An Economic and Historical Analysis* (Cambridge, Eng-

(Continued on next page)

On the other hand, arguably because coin output levels dropped in China after the Song era—Chinese emperors tolerated commoner use of standard-size coins genuinely or supposedly issued by previous dynasties. Except for Emperor Qianlong’s 乾隆 (r. 1735–1796) vigorous efforts to re-mint deficient or forged “cash,” and increase coin output, Chinese late imperial pervasive re-minting efforts were relatively rare. By contrast, late medieval European debasements were often facilitated by the re-call and re-mintage of older coinage, and thus coins from previous centuries were much harder to come by there even if coeval foreign coinage was rife.<sup>33</sup> Also unlike China, late medieval and early modern continental-European debasement usually consisted of issuing *lighter, smaller* and more alloyed coins with the same nominal value as standard units. In fact, the emergence of bigger silver coinage in late medieval Europe such as the famous central European *Groschen* (also known as Groats or Grossi) was initially associated at least in part with a desire to offset the impact of long-term debasement with unadulterated more “white silver” in the monetary system.<sup>34</sup>

These differences in debasement patterns were of course underpinned by a Chinese political economy that was ordinarily more suspicious—particularly in its late imperial, neo-Confucian iteration—of coin debasement and seignorage as schemes designed to profit the state at the expense of commoners. In a practical sense, the Ming polity’s ability to debase coinage was also constrained by its reluctance to coin silver and, more implicitly, by the dynasty’s unsuccessful attempts at sustaining fiduciary paper money, as well as by the collective memory of the earlier Song and Yuan failures at preventing paper money from depreciating against copper “cash”; silver was thus strictly valued for tax purposes in the form of bullion, i.e. according to its weight and purity, whereas the value of early modern European silver was often manipulated relative to the value of gold specie.

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(Note 32—*Continued*)

land: Cambridge University Press, 2000), pp. 24–26, 109–12. Work on early modern Europe would, indeed, suggest that the higher a coin’s nominal value was the more attractive target it became for counterfeiting. Much like Song Yingxing, many early modern European economists knew that. This is why—when banknotes emerged in Europe in the late seventeenth century—those economists insisted that banknotes could potentially serve as an even easier target for forgers. Therefore, European banknotes at first were of high denominations: the idea here was that undiscerning commoners would not likely use them, and that merchants would by necessity carefully double-check their authenticity.

<sup>33</sup> For a passing observation of Qianlong-era efforts at re-minting “old” (i.e. counterfeit) coinage see, e.g., Mark Elvin’s discussion of Zhu Tingzhang 褚廷璋 in “Cash and Commerce in the Poems of Qing China” (forthcoming).

<sup>34</sup> Peter Spufford, *Money and Its Use in Medieval Europe*, pp. 320–30; Alan M. Stahl, *Zecca: The Mint of Venice in the Middle Ages* (Baltimore: Johns Hopkins University Press in association with the American Numismatic Society, New York, 2000), pp. 16–27; Man-houng Lin, *China Upside Down: Currency, Society, and Ideologies, 1808–1856* (Cambridge, MA: Harvard University Asia Center, 2006), pp. 29–30.

Consequently, even as more Spanish American silver flowed into China in the late Ming era, and despite the fact the dynasty issued comparatively low quantities of copper coinage—base copper “cash” remained exceedingly important in the popular mindset. Liang Fangzhong 梁方仲 noted, for example, that Ming fiscals were from very early on geared toward maximizing silver receipts, and that copper cash was increasingly less admissible for tax purposes; but commensurate imperial outlays were often paid out in much lower-quality silver ingots (*yinding* 銀錠) or even in copper cash, so that high officialdom could possess of the margin in good-quality monetary silver (*yinzi* 銀子). As a result, the circulation of good-quality silver ingots remained the preserve of circles close to the imperial court, high officialdom, and wealthy merchants, whereas commoners overwhelmingly relied on copper cash. Moreover, silver had not yet conjured up any special mystique in the Ming popular mindset being the “distant” metal that it was.<sup>35</sup>

Perhaps contrary to what one might expect in this context, the late imperial Chinese monetary trajectory also departed in meaningful ways from that of coeval Korea and Japan, not just from that of north-west Europe. To be sure, before 1600, Korea and Japan drew heavily on Chinese coinage to sustain their own monetary systems. However, as Lin Man-houng 林滿紅 has indicated, by the eighteenth century, about half of all Japanese coinage in circulation had been domestically produced from gold or silver—metals that remained uncoined in China proper, where coin output diminished and coin quality deteriorated fairly consistently between the fifteenth and seventeenth centuries. Moreover, much of the new Japanese coinage issued by the *bakufu* 幕府 central government in the seventeenth century carried a higher decreed value than its metallic content, whilst many local *daimyo* 大名 were allowed to issue inconvertible paper money (*hansatsu* 藩札) in a bid to overcome metal supply shortfalls. Korea had, in turn, altogether *banned* by then the monetary use of silver (and banknotes) right until 1876, whereas China became after 1600 increasingly *reliant* on imported silver.<sup>36</sup>

Notably, across East Asia one could detect difficulties in sourcing sufficient metal to meet the popular demand for coinage during the early eighteenth century. Yet banknotes had fallen out of grace by then as a credible means of payment in both Korea and China. As discussed in great detail by Professor Hans Ulrich Vogel, much of the copper needed to produce Chinese “cash” was imported from Japan between 1685 and 1715. But in 1726 the *bakufu* authorities prohibited further exports to China, in part so as to increase domestic coin output. Faced with its main source of copper supply drying up, the Chinese

<sup>35</sup> Liang Fangzhong, *Liang Fangzhong jingjishi lunwenji* 梁方仲經濟史論文集 (Beijing: Zhonghua shuju 中華書局, 1989), pp. 572–73.

<sup>36</sup> Man-houng Lin, *China Upside Down*, pp. 68–71, 294. Akinobu Kuroda, *Kahei shisutemu no sekaishi: “hitaishōsei” o yomu* 貨幣システムの世界史——「非対称性」をよむ (Tokyo: Iwanami shoten 岩波書店, 2003), pp. 137–40, cites a report by a fifteenth-century Korean envoy to Japan, who was impressed with the extent to which copper coinage was current there whereas commodity moneys like cloth and grain were still the mainstay of the Korean monetary system at the time.

Qing dynasty was forced to develop alternative copper sources in remote Yunnan 雲南, hence, by implication, the cost of coin production increased even further.<sup>37</sup>

Indeed, a subsequent spike in the relative price of “cash” persisted in China fairly consistently until the late eighteenth century. Under young Emperor Qianlong, the post-Song secular decline in Chinese *per capita* coin output levels was temporarily held back by virtue of newly-sourced Yunnanese copper and a vigorous expansionist policy. Yet Chinese coin output level started dropping again after 1770s, whilst throughout the late imperial era coins genuinely or falsely pertaining to previous dynasties widely circulated in the Chinese marketplace.<sup>38</sup>

The post-Song decline can in turn be plausibly traced back to shifts in China’s early modern mining industry, which was rigidly state-controlled in comparative terms. Record Song copper output was achieved, for example, by the replacement of slave and corvée miners with paid ones and by allowing more private mining ventures. The flat tax rate on private metal output was lowered by Song reformer Wang Anshi 王安石 (1021–1086) to 20 per cent, whereas it stood at around 30 per cent later, quite apart from the fact that later dynasties turned in effect into a monopsony of all the metal produced, so that the government-decreed price of metal was invariably weighted down. In addition, later dynasties were also conditioned by a long-established physiocratic statecraft discourse and by suspicious founding emperors to associate “excessive” mining with lawlessness in the hinterland and local bailiff speculation.<sup>39</sup>

These vastly divergent political economies of mining and coinage across Eurasia begot by the early modern era a clear technological divide. They may have also impacted the means by which forgers operated, and how counter-forgery techniques evolved: for example, we have generally *fewer* references to clipping (*jianqian* 剪錢) in late imperial Chinese sources than in early modern European sources, whilst records for the smelting of coinage (*xiaoqian* 銷錢), or its illicit re-casting into copper utensils, in late imperial

<sup>37</sup> Hans Ulrich Vogel, “Der Kupferbergbau in der chinesischen Provinz Yunnan vom 18. bis zur Mitte des 19. Jahrhunderts: Produktion, Administration, Finanzierung,” *Der Anschnitt* 41, no. 5 (1989), p. 147.

<sup>38</sup> Man-houng Lin, *China Upside Down*, pp. 29–30.

<sup>39</sup> Xia Xiangrong 夏湘蓉, Li Zhongjun 李仲均, and Wang Genyuan 王根元, *Zhongguo gudai kuangye kaifashi* 中國古代礦業開發史 (Beijing: Dizhi chubanshe 地質出版社, 1980). Zhu Yuanzhang 朱元璋, the Ming founder, was particularly well known for his anti-mining exhortations. Cf. Frank H.H. King, *Money and Monetary Policy in China, 1845–1895*, pp. 3–5; Helen Dunstan, *Conflicting Counsels to Confuse the Age: A Documentary Study of Political Economy in Qing China, 1644–1840* (Ann Arbor, MI: Center for Chinese Studies, University of Michigan, 1996), pp. 164–67. Hans Ulrich Vogel, “The Mining Industry in Traditional China: Intra- and Intercultural Comparisons,” in Helga Nowotny, ed., *Cultures of Technology and the Quest for Innovation* (New York: Berghahn Books, 2006), p. 177. Cf. Mark Elvin, *The Retreat of the Elephants: An Environmental History of China* (New Haven, CT: Yale University Press, 2004), pp. 341, 441–42.

China seem to be comparatively numerous, possibly due to a wide gap between the (“black”) market price of copper and the state-decreed price. In this context, Professor Vogel’s recent insights are invaluable for our deeper appreciation of those distinct political economies.<sup>40</sup>

While many similarities in the [early modern] mining techniques existed in Europe and China, one conspicuous difference can be observed in their varying degrees of mechanization, particularly in drainage, ore hauling and ore crushing. Although in China suitable basic technical devices were available, it seems that they were not systematically used and further developed for mining and smelting purposes. For instance, although waterpower was already being used to drive the bellows of Chinese blast furnaces in the first century AD, and although use of water-power for such purpose is also mentioned for the fourteenth century, the piston bellows at the eighteenth and early nineteenth-century Yunnan copper mines, then the leading mining region in China, appear to have been mainly man-powered.

Indeed, that before the tapping into Yunnan deposits, mid-Ming China could become so dependent on imported Japanese silver and copper—even as its absolute coin output levels fell far below the Northern Song peak—contrasts sharply with the effervescence in central European mining around the same time, namely *before* the discovery of New World deposits. Conversely, that Japan could supply so much metal to China at a time it had not yet had strong central government is a testament to how competition between various small warring polities—or in this case *daimyo*-led feudatories—as well as allowing more latitude for private prospecting can lead to a more efficient mining industry. Certainly, it would be hard to find any historic Chinese setting where private ventures could wield so much power as the Medicis and Fuggars did in the late medieval European mining.<sup>41</sup>

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Also of note is the fact that Chinese emperors relied on mining output to produce new copper coins, whilst the “Great Debasement” in England was mostly underpinned by attracting individuals to *voluntarily* hand over their foreign and older coinage to government mints for *re-minting* through legal and economic incentives. After re-minting, these

<sup>40</sup> Hans Ulrich Vogel, “The Mining Industry in Traditional China,” pp. 170–78. Cf. Peter Golas, *Science and Civilisation in China*. Vol. 5: *Chemistry and Chemical Technology*. Part 13: *Mining* (Cambridge, England: Cambridge University Press, 1999). Notably, gunpowder—though a Chinese invention—was first operationalized in mining in Venice as early as 1574. Similarly, compasses were first used in mining in sixteenth-century Europe.

<sup>41</sup> A. Kobata, “The Production and Uses of Gold and Silver in Sixteenth- and Seventeenth-Century Japan,” *Economic History Review*, n.s., 18, no. 2 (1965), pp. 245–66. Cf. Roberta Morelli, “The Medici Silver Mines (1542–1592),” *Journal of European Economic History* 5, no. 1 (Spring 1976), pp. 121–39; Danuta Molenda, “Investments in Ore Mining in Poland from the 13th to the 17th Centuries,” *ibid.*, pp. 151–69.

individuals received less in the way of pure silver, of course, but this was offset by the fact that newly-minted coins carried a higher “legal-tender” value when paying tax. Remarkably, commodity prices only partly caught up with the ratio of the debasement. Such debasements ceased by the early eighteenth century, as English monarchs found better means of raising revenue in the form of floating national debt—first through Bank of England (est. 1694) banknotes, then bonds. In retrospect, therefore, the “Great Debasement” can be viewed as a one-off transformative event that set in train far-reaching monetary and socio-economic developments in England, but was nonetheless *not* sufficiently disruptive to shaken popular trust in sovereign-backed media of payment. It may well explain the Bank of England’s ability to successfully “sell” the concept of national debt through banknote issuance in the early eighteenth century and the evolution of these banknotes into “legal tender” in the following century.<sup>42</sup>

As indicated above, English silver pennies were frequently re-called by kings and re-minted. Yet despite varying metallic weight standards they mostly preserved their market value because of the consistency of re-minting. Elsewhere in western Europe—and in China too—the value of the denier, copper “cash” and all other low-denomination currency depended more on their metallic content, and in the case of *denier* specifically on silver content.

Although there were more mints in continental Europe than in England (re-minting was common in fourteenth century France), coinage became a visible feature of everyday commoner life to a greater degree in England than in the Iberian peninsula or areas under Frankish rule. In central Europe, Coins were used intensively in Rhineland and Bavaria, but they did not circulate widely elsewhere. In Scandinavia and Russia, silver dirhams from the Arab world were commonly used as autochthonous coinage appeared much later. In sum, this might suggest that the key to understanding the monetary divergence across Eurasia in the early middle ages is the concurrent multiplicity of silver coinage of varying quality and intrinsic values, as well as repeated debasement by dissimilar polities, which spawned what Luigi Einaudi famously called “Imaginary Money” or notional unit-of-account systems. This very divergence is what afforded late-medieval French and English monarchs the latitude for re-mintage within their respective territories at higher seignorage rates, and for the gradual exclusion of competing overseas currencies as of the early-modern era.<sup>43</sup>

That *after* the Song downfall there were no imperial polities issuing competing moneys around China, coupled with the pervasiveness of low-value copper coinage and in-kind taxation, meant that Chinese emperors’ ability to extract seignorage in the form of “legal tender” blandishments was limited.

<sup>42</sup> Peter Spufford, *Money and Its Use in Medieval Europe*, chap. 3. On the historic circumstances surrounding the establishment of the Bank of England as a bank of issue, see A. Andréadès, *History of the Bank of England, 1640 to 1903*, pp. 14–67.

<sup>43</sup> Luigi Einaudi, “The Theory of Imaginary Money from Charlemagne to the French Revolution,” in Frederic C. Lane and Jelle C. Riemersma, eds., *Enterprise and Secular Change: Readings in Economic History* (London: George Allen and Unwin, 1953), pp. 229–61.

### 3. The Western European Return to Gold

Probably the most important yet relatively little-studied upturn in pre-modern global monetary history is north-western Europe's reversion to gold-based currency after about four centuries of silver-penny domination. Granted, this upturn might have been of less consequence in southern Europe, and Spain in particular, where the minting of gold coins and the usage of Islamic dinars continued alongside silver pennies after the eighth century. In Andalucía, The Umayyad governors replaced the Visigothic system of coinage in Spain with an Arabic one, consisting initially of gold dinars and their fractions similar to those of North Africa but of inferior and very variable fineness. Thus, Spain and Byzantium-affiliated Italy were the only regions of Europe where a gold standard remained intact around the twelfth century.<sup>44</sup>

The Italian emporia of Genoa and Florence, which handled much of Europe's trade with West Asia and North Africa, also used Islamic gold dinars. But the dinar became heavily debased as of the twelfth century, and was thus falling from grace as the preferred international currency of trade. In 1252, Genoa had begun minting its own gold coinage (genovino), to be immediately followed by the famous florins of Florence and the ducats of Venice, with all containing more gold than the contemporaneous Almoahed dinar. What afforded Genoa, Florence and Venice the gold with which to trade on even keel with the Islamic world, whilst the dinar was losing ground as a reliable currency? Booty brought back by the crusaders immediately springs to mind, yet surprisingly the economic effects of the crusades on the balance of trade between Europe and the Levant have remained far from clear-cut. In turn, what much more clearly emerges from pertinent studies is that the Italians' ability to tap into the gold deposits of North Africa in return for European copper was an important factor in Europe's monetary transition.<sup>45</sup>

Gold reached Italy via Hafsid Tunisia on trade routes pioneered by the Fatimids. In West Africa gold was considered a luxury royal item—it was rarely monetized or commoditized. As a mark of its success in replacing the Byzantine gold nomisma, the Venetian gold ducat had begun, by the fourteenth century, to circulate widely in Egypt and later reached other parts of the Muslim world. Later, the florin also began to be used more widely around the Mediterranean. In 1472, the Venetians too moved from a bimetallic standard to a gold standard domestically.<sup>46</sup>

<sup>44</sup> Carlo M. Cipolla, *Money, Prices, and Civilization in the Mediterranean World, Fifth to Seventeenth Century* (New York: Gordian Press, 1967), pp. 14–16.

<sup>45</sup> See e.g. Michael Postan, "The Trade of Medieval Europe: The North," in M. M. Postan and Edward Miller, eds., *The Cambridge Economic History of Europe. Vol. 2: Trade and Industry in the Middle Ages* (Cambridge, England: Cambridge University Press, 1987), pp. 168–305, ff. 212–14.

<sup>46</sup> Thomas Walker, "The Italian Gold Revolution of 1252: Shifting Currents in the Pan-Mediterranean Flow of Gold," in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds* (Durham, NC: Carolina Academic Press, 1983), pp. 29–52.

Here, perhaps for the first time in the history, we have an example of trading (read: mercantilist) polities that strategically leveraged their advanced understanding of the *global* marketplace and of bullion flows to acquire economic superiority. Indeed, information-based comparative advantages presaged by the Italian city-states, help explain how later the Portuguese, Spanish, Dutch, and English, would manipulate global bullion stocks to gradually get an upper hand over the economically preponderant East. There has traditionally been emphasis in the pertinent literature on how dreams of El Dorado propelled the exploration of the New World. But, as Vilar famously argued, the thirst for African gold had in fact much earlier fuelled competition between Genoese and Portuguese navigators, indirectly leading to re-discovery of the Canary Islands in the thirteenth century.

Whilst the literature emphasizes the effects of Latin American silver on the rest of the world, one would equally do well to recall that Columbus's diary is replete with allusions to gold, thus reflecting the impact of earlier expeditions across the Mediterranean and West Africa. Indeed, the latter was the *first* precious metal to be brought back from Latin America (mainly through looting and indigenous Caribbean forced labour in alluvial deposits) in large quantities, but it depleted by 1525.<sup>47</sup>

Yet Portuguese precious-metal transport qualitatively augmented the scale of Italian city-state trade in one very important sense: it directly reached out to India and East Asia by sea. Here, it is worth recalling Om Prakash's important observation that the mainstay of Portuguese maritime business in the sixteenth century—well ahead of the importation of indigo or silk—was the procurement of pepper from India initially in return for West African gold and later with Latin American gold and silver. In terms of cargo values, and excluding pepper and precious metals, base metals like copper were preponderant on Portuguese ships: often that copper would be of Japanese rather than European provenance, and would be offloaded by the Portuguese in China where it was used to produce “cash.”<sup>48</sup>

For these reasons, it would be a mistake to overstate the significance of silver *per se*. Rather, at play in early modern Eurasian and Euro-African trade was a reallocation of metal from places where it had no monetary value to places where it had, and thus was more precious. This transformation was evident in the European metropole as it gradually went on gold while buying off pepper, textiles, and tea with silver and copper. Yet within Europe one could also observe a secondary divergence between Britain where debasement and base metal petty cash were rare to countries like France and Spain which, as of the seventeenth century, introduced evermore small coinage alloyed from silver and copper (“black money,” “billon,” or “vellon” variants) in an attempt to reserve silver coinage for trade overseas.<sup>49</sup>

<sup>47</sup> Pierre Vilar, *A History of Gold and Money, 1450–1920*, trans. Judith White (London: NLB; Atlantic Highlands, NJ: Humanities Press, 1976), pp. 30–36, 66–69, 93–94, 108–9.

<sup>48</sup> Om Prakash, *European Commercial Enterprise in Pre-Colonial India* (Cambridge, England: Cambridge University Press, 1998), pp. 30–31, 83–84.

<sup>49</sup> Earl J. Hamilton, “Money and Economic Recovery in Spain under the First Bourbon, 1701–”  
(Continued on next page)

Gold currencies were important to the Italians because most of the Muslim world with which it traded was on a gold currency standard. As a result, gold could be converted in the Muslim world to more silver, whereas in Europe silver had been the standard and in high demand, and so it was worth a little less in terms of gold around the eleventh century. It is thus reasonable to assume the Italians, who were acutely aware of exchange-rate differentials, tapped whatever gold could still be found in Europe more cheaply, thus acquiring greater purchasing power in the East.<sup>50</sup>

In addition to debasements and the availability of African gold to the Italian city-states, the *third* factor at play in explaining Europe's monetary departure from the rest of Eurasia during the late Middle Ages concerns mining output. As famously argued by Peter Spufford, throughout the eleventh to fourteenth centuries—or well before the discovery of silver and gold in the New World—Europe had experienced sustained mining output spurts, which added to the continent's mineral riches relative to other parts of the world; these spurts arguably transformed western Europe into a more monetized area than either India or China in *per capita* terms; Output spiked up with the significant discovery of silver deposits in Goslar, followed by the discovery of the famous silver mines of Melle, Sardinia, and Kutna Hura; it quenched the domestic demand for silver quite apart from the excess silver also possibly drawn into Europe as a result of Song and Yuan recourse to paper money at the same time.<sup>51</sup>

As a consequence of increased mining activity, by the mid-fifteenth century, German mining engineers achieved two technological breakthroughs that spread to the rest of the continent: mechanical drainage pumps to eliminate flooding, and a chemical process designed to separate the copper and silver commonly found combined in European ore. These developments long pre-date steam-powered pumps and furnaces, but are seldom considered in accounts of the “Great Divergence.”<sup>52</sup>

Similarly, revolutionary improvements in mechanized minting techniques occurred in early modern Europe long before steam technology. The most notable progress was embodied in the screw press invented not long after the Guttenberg's printing press

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(Note 49—Continued)

1746,” *Journal of Modern History* 15, no. 3 (September 1943), pp. 192–206; Neil Carothers, *Fractional Money: A History of the Small Coins and Fractional Paper Currency of the United States* (New York: A.M. Kelley, 1967), p. 11; Bernd Sprenger, *Das Geld der Deutschen. Geldgeschichte Deutschlands von den Anfängen bis zur Gegenwart* (Paderborn: F. Schöningh, 1991), pp. 111–16; Akira Motomura, “The Best and Worst Currencies: Seigniorage and Currency Policy in Spain, 1597–1650,” *The Journal of Economic History* 54, no. 1 (March 1994), pp. 104–97.

<sup>50</sup> Thomas Walker, “The Italian Gold Revolution of 1252.”

<sup>51</sup> Peter Spufford, *Money and Its Use in Medieval Europe*.

<sup>52</sup> John U. Nef, “Silver Production in Central Europe, 1450–1618,” *Journal of Political Economy* 49, no. 4 (August 1941), pp. 575–91; John H. Munro, “Bullion Flows and Monetary Contraction in Late-Medieval England and the Low Countries,” in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds*, p. 99.

towards the end of the fifteenth century. At first it made little inroads into traditional ways of hammering flans, as little had changed in method from Greek times to the medieval era. Later in the sixteenth century, however, the screw press spread from Italy to Britain, thus greatly improving European coin consistency, and arguably placing the quality of European coinage ahead of Chinese coinage. The invention of the screw press is accredited to Italian architect Bramante, with the technique further systemized in Britain and France. In Spanish-ruled territories, however, the roller-press was the more common technology until the early eighteenth century.<sup>53</sup>

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As already mentioned, as from the eleventh century, sub-Saharan trade routes afforded Europe increasing quantities of gold from Nubia, Mali, Ethiopia, and later the Sofala (Mozambique). Equally noteworthy, however, are the commodities that those sub-Saharan convoys brought back from Europe to Africans, not least of which were copper alloys and copperware. These were often more prized than gold by Africans, not just as money but also as decoration. The fourteenth-century traveller Ibn Battuta noted this trade, and commented on Malian prosperity as a result of gold exports.<sup>54</sup>

Whilst Mali flourished as a result of exporting gold, its own gold bar currency was devoid of the extensive international function which Spanish-American dollars would later play, for example, in the global economy beyond their intrinsic value. In fact, Ethiopia was the only major area of pre-colonial sub-Saharan Africa to have minted its own coinage (as opposed to bar currency), but this was before Ibn Battuta's time.<sup>55</sup> Between the second and ninth centuries, the Aksumite kings minted gold coinage, as well as smaller quantities of bronze and silver coinage; initially these coins carried Greek inscriptions to be replaced later by Amharic. However, the production of indigenous Ethiopian coinage lapsed in the tenth century, so that by the eighteenth century the kingdom became dependent on imported currencies, principally the silver Maria Theresa Thalers (MMT) of Austria. Ethiopian indigenous coinage was only resumed by Emperor Menelik II (r. 1889–1913), with silver coins called *talari* (modelled on the MMT) and copper fractions, showing the Lion of Judah an allusion to the traditional belief that Menelik I had been the son of King Solomon and the Queen of Sheba.<sup>56</sup>

<sup>53</sup> Denis R. Cooper, *The Art and Craft of Coinmaking: A History of Minting Technology* (London: Spink & Son, 1988), pp. 39–51; Mary Ellen Snodgrass, *Coins and Currency: An Historical Encyclopedia* (New York: McFrand, 2007), p. 53; C. E. Challis, *The Tudor Coinage* (Manchester: Manchester University Press, 1978), p. 37.

<sup>54</sup> Mary Ellen Snodgrass, *Coins and Currency*, p. 12.

<sup>55</sup> The Kilwa sultanate was the only other part of Sub-Saharan Africa that issued its own distinctive coinage at the time. See e.g. G.S.P. Freeman-Grenville, "East African Coin Finds and Their Historical Significance," *The Journal of African History* 1, no. 1 (1960), pp. 31–43.

<sup>56</sup> Roger deWardt Lane, *Encyclopaedia of Small Silver Coins* (2008), pp. 204–6. On the subsequent history of the MMT, see Akinobu Kuroda, "The Maria Theresa Dollar in the Early Twentieth-Century Red Sea Region: A Complementary Interface between Multiple Markets," *Financial History Review* 14, no. 1 (April 2007), pp. 89–110.

Europe's ability to tap into African gold was compounded by an increase in its silver output. To begin with, the Venetians had their own mines at home and in their colonies. Thus, by 1400 Venice had become a major supplier of coins to the Levant. The generally-accepted gold to silver ratio for Italy in 1284 was 1:11. Then an abundance of silver from Bohemian mines began to cheapen silver so that the gold and silver ratio in Venice reached 1:14 between 1305 and 1310. But between 1326 and 1328 silver became less plentiful so that the ratio of gold to silver in Venice rebounded to 1:10.<sup>57</sup>

Following Venice, in the fourteenth to sixteenth centuries, other regions in Europe moved to minting gold coinage. As early as 1290, Philip IV of France established new national gold coinage to circulate alongside silver currencies (the *chaise* and *agnel*). In England domestic gold coinage re-appeared around 1344 after centuries of exclusively silver-penny circulation. Thereafter, the total value and even weight of the gold coinage produced annually could exceed at times that of silver coinage. Thus, by the end of the fourteenth century gold may have been used to supplement the silver that was being remitted eastward to fund commodity purchases.<sup>58</sup>

It is important to note that while the Italian city-states appear to have catalysed Europe's reversion to gold coinage, the leading Mediterranean currency in the thirteenth century—the gold Florin—was modelled technically on English coinage; like English coinage, it featured corrugated rims to combat sweating and clipping. Furthermore, medieval English coinage maintained a high standard because the authorities there confiscated foreign coins in ports, and re-struck them into more uniform English coinage; in fourteenth-century England there were strict regulations against debasement by private-order “moneymen” even if in Europe, more generally, “moneyer” guilds had until the nineteenth century much more power and independence from the state than their counterparts in China.<sup>59</sup>

In the 1360s all English mints produced gold coins weighing a total of about two tonnes of gold. This output can be nominally compared with the peak of coin production in pre-modern China, particularly the “Song Industrial Revolution” of the tenth to twelfth centuries. Based on a standard factoring of 1:10 European gold-silver ratio prevalent at the time, British gold coin output in the 1360s would have been roughly commensurate with 540 million Chinese copper coins (silver had not yet been fully monetized in China in Song times).

During the Wang Anshi era (in office 1070–1086), at the height of Chinese coin production, 5 million “cash” strings were produced annually, or an impressive 50 billion copper coins for the entire decade. From these data, one can vaguely fathom perhaps the sheer extent of Song effervescence in comparative terms, notwithstanding that China

<sup>57</sup> Louise Robbert, “Monetary Flows—Venice 1150–1400,” in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds*, pp. 60–62.

<sup>58</sup> Harry A. Miskimin, “Money and Money Movements in France and England at the End of the Middle Ages,” in *ibid.*, p. 82.

<sup>59</sup> Robert Sabatino Lopez, “An Aristocracy of Money in the Middle Ages,” *Speculum: A Journal of Mediaeval Studies* 28, no. 1 (January 1953), pp. 1–43.

was much more populous than England, and that Chinese coin production fell precipitously thereafter to never attain the same level in *per capita* terms before the import of steam technology. As Professor Vogel has shown, the only significant post-Song-rebound resulted in its 1750s–1760s peak in an annual absolute output of 4 million strings, yet at that point China's population had been at least threefold bigger than during the Song era.<sup>60</sup>

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As late as the fourteenth century, Chinese steelmaking processes had been more advanced than in Europe. Air was blown for example from piston-blowing fans into Chinese furnaces so as to increase the temperatures; these fans were often water-driven. They were more efficient than the concertina bellows used in metallurgy in Europe at the time. The sixteenth-century European adoption of blast furnaces may have been indirectly influenced by knowledge of Chinese designs of bellow-powered blast furnaces originating in the eleventh century. At the Song peak in the eleventh century no fewer than 125 tonnes of iron were produced in China annually, whereas in Europe as late as the eighteenth century about 150 tonnes were produced annually.<sup>61</sup>

So how did European mining and metallurgic technology overtake China's? Modern European metallurgy is associated with the publication of theses by Vannoccio Biringuccio (1480–1537) and then Georgius Agricola (1494–1555). The latter, of greater importance, recounted in Latin the advancement made by German metallurgy at the time insofar as furnaces were concerned. After Agricola's work was published in England, Elizabeth I invited German metallurgical experts to help develop mining on the British Isles. In the early sixteenth century, concomitantly, blast furnaces were set up in Sussex Weald, Newbridge, and Steel Forge alongside older Roman-style bloomery furnaces. Thus, although the Chinese pioneered the use of cast iron and had more advanced furnaces in the early Ming era the Ming *haijin* 海禁 isolationist policy seems to have translated into technological stagnation, and European advantage in metallurgic technology by the early-Qing period.<sup>62</sup>

<sup>60</sup> Calculation based on data provided in passim in Richard von Glahn, *Fountain of Fortune*; Ian Blanchard, *Mining, Metallurgy and Minting in the Middle Ages*. Vol. 3: *Continuing Afro-European Supremacy, 1250–1450* (Stuttgart: Franz Steiner Verlag, 2005); and Hans Ulrich Vogel, "Chinese Central Monetary Policy, 1644–1800." Cf. Jan Lucassen, "Coin Production, Coin Circulation, and the Payment of Wages in Europe and China 1200–1900," in Christine Moll-Murata, Song Jianze, and Hans Ulrich Vogel, eds., *Chinese Handicraft Regulations of the Qing Dynasty: Theory and Application* (München: Iudicium, 2005), pp. 423–46.

<sup>61</sup> R. F. Tylecote, *A History of Metallurgy*, pp. 48, 65–69; Hua Jueming, "Metallurgy in China," in Helaine Selin, ed., *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures* (Berlin: Springer, 2008), pp. 1624–26.

<sup>62</sup> R. F. Tylecote, *A History of Metallurgy*, pp. 81–83. On Ming-era metallurgy, monetary cycles, and urbanisation, see also Zhou Weirong 周衛榮, *Zhongguo gudai qianbi hejin chengfen yanjiu* 中國古代錢幣合金成分研究 (Beijing: Zhonghua shuju, 2004); Tanaka Issei 田仲一成, (Continued on next page)

If limited to one single event, then the turnaround by which Europe overtook Chinese metallurgy was probably embodied in the transition to the use of coke and coal in European iron-making in the early seventeenth century. These crucial technological breakthroughs in the production of iron by means of coal had been patented in England by Sturtevant (1611), Rovenson (1613), and Dudley (1665).<sup>63</sup> Later, in the eighteenth century, European water-driven cylinder blower furnaces operated on a large scale predating steam technology *per se* by a century. These applications were far ahead of Chinese metallurgic practices at the time

European flans were typically cast in individual pellets or roundels worked out from clay or sand moulds, or shear-cut off bars in medieval times when coins became thinner. The Romans pioneered the serrated-edge indentation, which evolved into an incuse or beaded rim in the medieval era to combat clipping, whereas Chinese base-metal coinage resorted to raised rims for the same purpose. As of the mid-seventeenth century English and French coins featured a more elaborate “milled edge” effected with a file before striking—a technique little used in China except for a moderately incuse rim. Re-striking coins twice or even thrice was common in Europe, but never experimented with in China as a means of re-asserting imperial authority. Chinese round coinage remained remarkably similar to its antecedents in the early-Imperial era: it was made in self-contained multiple chapalet moulds known as “coin tree” (*qianshu* 錢樹).<sup>64</sup>

The growing divergence in how coins were manufactured across Eurasia foregrounds a topic that is relatively little discussed in the pertinent literature: from the middle of the eighteenth century better-quality European coinage could enhance trade benefits already accruing to Europe as a result of the relocation of metal to places where it had monetary utility. Perhaps the clearest evidence for that was the first global coin, the Carolus silver dollar, which was made of Latin American silver and exported by Spain to the rest of the world, whilst its own domestic monetary system increasingly resorted to token “vellon” coinage.

In China, Carolus dollars were valued “on their own reputation for consistency” well above the silver content. Their reputation was sustained even after their production was discontinued as a result of Latin American emancipation.<sup>65</sup> To be sure, by the 1860s, older Carolus dollar coins had started giving way in China to Mexican Republican dollar coins, which were generally of better minting quality. Yet because many new Latin American Republican dollars were inconsistent in weight and size some two decades after

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(Note 62—*Continued*)

Kominami Ichirō 小南一郎, and Shiba Yoshinobu 斯波義信, *Chūgoku kinsei bungeiron: nōson saishi kara toshi geinō e* 中国近世文芸論——農村祭祀から都市芸能へ (Tokyo: Tōyō Bunko 東洋文庫, 2009).

<sup>63</sup> R. F. Tylecote, *A History of Metallurgy*, pp. 105–43.

<sup>64</sup> Ling Yeqin 凌業勤 et al., *Zhongguo gudai chuantong zhuzao jishu* 中國古代傳統鑄造技術 (Beijing: Kexue jishu wenxian chubanshe 科學技術文獻出版社, 1987), pp. 318–43. Cf. George F. Hill, “Ancient Methods of Coining,” *Numismatic Chronicle* (1922), pp. 1–42.

<sup>65</sup> Frank H.H. King, *Money and Monetary Policy in China, 1845–1895*, pp. 37, 46, 174–75.

independence, and because it was harder to offload in the marketplace forgeries of the more widely recognized Carolus dollars—the latter remained sought after in East Asia right until the twentieth century.<sup>66</sup>

A similar premium (i.e. *agio*) of European coinage over its metallic content when traded overseas is observed by Şevket Pamuk's (1997) study of the seventeenth century monetary system in the Ottoman Empire. Unlike China, the Ottomans at the time did coin silver, yet Pamuk shows that their long-standing, manually-produced *akçe* had lost much of its esteem in the 1580s as a result of debasement. Similarly, Ottoman mining output declined sharply after 1600. Contrary to the European pattern at the time, Ottoman debasement was, however, not a long-term strategy of raising revenue but more of an emergency measure designed to meet unexpected military outlay as a result of rebellion. Neither did the Ottomans resort in the seventeenth century to imperially-decreed token copper currency on the same scale as France or Spain. Against this backdrop, Carolus dollars amongst many other European (but *not* English) gold and silver currencies circulated widely and were highly prized in the Levant, too, in the seventeenth century.<sup>67</sup>

<sup>66</sup> Man-houng Lin, *China Upside Down*, pp. 46–47; Richard von Glahn, “Foreign Silver Coins in the Market Culture of Nineteenth Century China,” *International Journal of Asian Studies* 4, no. 1 (January 2007), pp. 51–78; Werner Burger, “Coin Production during the Qianlong and Jiaqing Reigns (1736–1820): Issues in Cash and Silver Supply,” in Thomas Hirzel and Nanny Kim, eds., *Metals, Monies, and Markets in Early Modern Societies: East Asian and Global Perspectives* (Berlin: LIT, 2008), pp. 171–89; Arturo Giraldez, “China and Counterfeiting in 1650 Potosí,” in *ibid.*, pp. 15–43. For a contemporaneous observation of the Carolus-dollar premium and local attempts to forge it in China, see e.g. John Robert Morrison, *A Chinese Commercial Guide: Consisting of a Collection of Details and Regulations Respecting Foreign Trade in China* (China: s.n., 1848), pp. 234–27.

<sup>67</sup> Şevket Pamuk, “In the Absence of Domestic Currency: Debased European Coinage in the Seventeenth-Century Ottoman Empire,” *The Journal of Economic History* 57, no. 2 (June 1997), pp. 345–66. On European coinage across the sixteenth- to seventeenth-century Ottoman Empire, see also Bruce Masters, *The Origins of Western Economic Dominance in the Middle East: Mercantilism and the Islamic Economy in Aleppo, 1600–1750* (New York: New York University Press, 1988), pp. 148–49. Within Europe, too, better-quality mass-produced coinage carried a premium over lesser known manually-produced coinage. See e.g. David Chilosi and Oliver Volckart, “Money, States, and Empire: Financial Integration and Institutional Change in Central Europe, 1400–1520,” *The Journal of Economic History* 71, no. 3 (September 2011), pp. 762–91. Notably, English coins were much less common across Asia at the time because London burghers and politicians often blamed the East India Company of draining the country of coinage. As a result, until the eighteenth century, it was forbidden to take English specie overseas. See e.g. K. N. Chaudhuri, *The Trading World of Asia and the English East India Company, 1660–1760* (Cambridge, England: Cambridge University Press, 1978), pp. 160–74.

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In sum, north-western Europe, the Muslim world and China followed diverging monetary trajectories in the Middle Ages. Europe came off a post-Roman gold standard to rely on silver pennies between the eighth and fourteenth centuries after two centuries of waning monetization, probably because of a decline in mining operations and shrinking trade volumes. European gold coinage remnants may have been smelted, in turn, and flowed to the Muslim world where gold was the mainstay along the southern Mediterranean. Initially bi-metallic, the Islamic currency system was effectively re-based on gold by the tenth century, perhaps in part because silver had been continually drained: first by India and, and as of the fourteenth century, China's newfound voracious appetite for silver.<sup>68</sup> That being the case, there may exist another possibly important factor behind Europe's reversion to gold, quite apart from the mining booms in Goslar, Sardinia, and Kutná Hora, and apart from the inflow of African gold deposits.

Following earlier studies, Professor Akinobu Kuroda has in that context recently hypothesized that China's perspicacious adoption of paper money during the Song and Yuan eras may have freed up immense silver assets in East Asia for movement westward. It could well be that the immense inflow of silver along open roads of the vast Mongol empire—long before the European acquisition of Latin American silver—catalysed the transition to a higher-value gold standard in late medieval Europe. For silver abundance was widely recorded in the late thirteenth century not just in Europe, but *across* the length and breadth of Eurasia, only to become scarce again in the 1360s. By and large, globally cheaper silver may have meant greater ability to re-base European currencies on imported gold.<sup>69</sup>

Yet, on the other hand, one must not forget that silver and gold ingots remained very important monetary components within China, too, after the establishment of the Mongol Yuan dynasty even if their circulation was more limited than during the Song era. In fact, Yuan paper money—which Marco Polo was so impressed with—had been practically based on silver reserves, whilst notionally denominated at times in “cash,” or silk units. In that sense, the scale of silver outflow from China under Mongol auspices should perhaps be qualified.<sup>70</sup> Epistemologically, Kuroda's approach departs from other studies, which tend to foreground improvements in European mining technology in the

<sup>68</sup> K. N. Chaudhuri, *Trade and Civilisation in the Indian Ocean: An Economic History from the Rise of Islam to 1750* (Cambridge, England: Cambridge University Press, 1985). The Gupta currency was largely gold-based but between 600–1300 A.D. hardly any gold coinage was minted in North India, silver coinage being the mainstay. South Indian currency was, on the other hand, gold and copper-based during that era. The Mughals did mint gold but largely relied on silver coinage.

<sup>69</sup> Akinobu Kuroda, “The Eurasian Silver Century, 1276–1359.” Cf. Robert P. Blake, “The Circulation of Silver in the Moslem East Down to the Mongol Epoch,” *Harvard Journal of Asiatic Studies* 2, no. 3/4 (1937), pp. 291–328; Andrew M. Watson, “Back to Gold—and Silver,” 20, no. 1 (April 1967), pp. 1–34.

<sup>70</sup> See e.g. Herbert Franke, *Geld und Wirtschaft in China unter der Mongolen-Herrschaft*.

fourteenth and fifteenth centuries as underpinning that continent's greater supply of silver above any exogenous source.<sup>71</sup>

#### 4. Early Modern Patterns of Monetary Hegemony

As indicated above, when the Ming abandoned paper-note issuance in China to rely on imported silver, silver may have become scarcer again in the rest of Asia. However, by then western Europe had already been firmly anchored on a gold standard with access to African gold supplies and nascent control of global bullion and currency flows through early modern maritime traffic of, for example, cowrie shells.

Cowries were widely used in Yunnan, even as late as the early Ming period, as evidenced in contracts and stone tablets from the era. It was still in limited use toward the end of the dynasty. At the same time, Yunnan itself was actually supplying up to three quarters of China's silver output. Yet, as Professor Hans Ulrich Vogel has shown in his path-breaking study, the price of cowries in Yunnan was in secular decline after the thirteenth century (when it was accepted in tax by local authorities), and suffered a more pronounced decline in the seventeenth century, when authorities decided—after several previous failed attempts—to introduce Chinese copper coinage in the province more forcefully despite the exorbitant outlay of such measures. The introduction of “cash” into Yunnan at a high cost to the imperial treasury is another reminder of the differences between Chinese late imperial statecraft and coeval European political thought, for in the Chinese case the spread of coinage served primarily a political purpose and was a net drain on central government resources. And once “cash” replaced cowrie as Yunnan's principal media of exchange, it may well be that some surplus cowries found their way from Yunnan to Africa, where cowries served as currency in some parts of the continent right until the early twentieth century.<sup>72</sup>

<sup>71</sup> See e.g. Ian Blanchard, *Mining, Metallurgy and Minting in the Middle Ages. Vol. 3: Continuing Afro-European Supremacy, 1250–1450*; John H. Munro, “South German Silver, European Textiles, and Venetian Trade with the Levant and Ottoman Empire, c. 1370 to c. 1720: A Non-Mercantilist Approach to the Balance of Payments Problem,” in Simonetta Cavaciocchi, ed., *Relazione economiche tra Europa e mondo islamico, secoli XIII–XVIII* (Tuscany: Fondazione Cassa Risparmio di Prato, 2007), pp. 905–1055.

<sup>72</sup> Hans Ulrich Vogel, “Cowry Trade and Its Role in the Economy of Yünnan: From the Ninth to the Mid-Seventh Century,” Parts I, II, *Journal of the Economic and Social History of the Orient* 36, no. 3–4 (1993), pp. 211–52, 309–53. See also John Deyell, “The China Connection: Problems of Silver Supply in Medieval Bengal,” in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds*, pp. 207–24; Bin Yang, “Horses, Silver, and Cowries: Yunnan in Global Perspective,” *Journal of World History* 15, no. 3 (September 2004), pp. 301–4. For a comprehensive survey of Yunnan's integration into the Chinese imperial system, see, e.g., Fang Guoyu 方國瑜, ed., *Yunnan shiliao congan* 雲南史料叢刊 (Kunming 昆明: Yunnan daxue chubanshe 雲南大學出版社, 2001).

The Ming abandonment of nominally silver-backed paper notes—magisterially portrayed by Richard von Glahn’s study—paralleled the famous “Single Whip” tax reform. After initial discouragement of silver transaction in the early Ming dynasty, the reform entrenched the demand for silver by the populace because silver ingots were now needed to pay land tax. Short of actually coining silver, the Ming did nonetheless see a spike in silver mining in the periphery during the early fifteenth century under the Yongle 永樂 Emperor.<sup>73</sup>

Ironically enough, from then on, as silver became more common in both tax payment and commercial transaction, and as China’s population and commercial activity grew apace—less silver was mined relative to imperial expenditure, and consequently less and less domestic silver reached Ming coffers. As noted in Flynn and Giraldez’s influential work, that deficit was more than made up by a vast inflow of silver from Japan and later from Latin America. In the face of a domestic mining decline, the amount of silver entering Ming coffers had doubled by 1570s compared with previous decades as a result of the commencement of the galleon trade between Acapulco, Manila, and China. Receipts of overseas silver numbered around 100 ton per year in the waning years of the Ming dynasty.<sup>74</sup>

The longer so-called “second silver century,” namely that which signifies the flow of Latin American silver *into* China—postdating the putative flow of silver *from* China westward under Mongol auspices—coincided as of about 1738 with shifts in the procurement of copper as raw material for traditional coinage. That year the Qing authorities reduced the amount of copper purchased from Japan for casting coinage in the imperial capital, and allowed a greater degree of freedom for private copper mining in Yunnan.<sup>75</sup> However, some Japanese copper continued to be coined in provincial mints even after 1738, whilst Yunnan copper veins had in turn already depleted by the beginning of the nineteenth century.<sup>76</sup>

Until then, there were reports of a dearth of coins, but no acute shortage of copper as raw material can be detected. On the other hand, there is little evidence of progress in mining technology for copper during that era; Yunnan copper mining seems not to have incorporated the use of water-power devices, horse-power, or other mechanized or draft-animal intervention. In fact, it was only in 1867 that the officials memorialized about the need to employ modern mints like the one then operating in British-ruled Hong Kong in order to economize on raw material, improve coin consistency, and discourage forgeries.

<sup>73</sup> Richard von Glahn, “Comment on ‘Arbitrage, China, and World Trade in the Early Modern Period,’ ” chap. 2–3.

<sup>74</sup> See e.g. Dennis O. Flynn and Arturo Giráldez, *China and the Birth of Globalization in the 16th Century* (Farnham: Ashgate Variorum, 2010). Cf. William S. Atwell, “International Bullion Flows and the Chinese Economy *circa* 1530–1650,” *Past & Present* 95 (May 1982), p. 81.

<sup>75</sup> Ryuto Shimada, *The Intra-Asian Trade in Japanese Copper by the Dutch East India Company during the Eighteenth Century* (Leiden: Brill, 2006).

<sup>76</sup> Hans Ulrich Vogel, “Der Kupferbergbau in der chinesischen Provinz Yunnan,” pp. 146–58.

However, as indicated at the outset of this article, modern minting machinery was purchased from Birmingham only in 1887, and was first used only in Guangdong 廣東. By the 1900s modern copper coin minting under imperial and provincial auspices saw extensive debasement so that the value of *tongyuan* dropped precipitously, heightening uncertainty and inflation in the marketplace.<sup>77</sup>

The long-term implications of the galleon trade which underpinned the “second silver century” and, to a lesser extent perhaps, Europe’s earlier reversion to gold coinage, were such that the exchange rate between copper and silver in China declined from 320:1 in 1368 to the late imperial enduring notional standard of 100:1 by 1621.<sup>78</sup> These 1621 figures are very instructive data that can be concretely compared with the other end of the continent around the same time. For example, by 1640 there similarly were much fewer mints and mines operating within the Ottoman Empire compared with previous centuries as a result of the flow of bullion from the New World. In the early seventeenth century, records show eight Ottoman copper dirhams (3.072 gm x 8 = 24.576 gm of alloyed copper) were valued on par with one silver *akçe* (*aksum*, 0.7 gm of alloyed silver). This in turn might roughly suggest an Ottoman silver to copper ratio of 1:35. Saddled with a tri-metallic standard, the Ottoman Empire’s gold to silver exchange rate was similar to Europe at the time at 1:10; however, this has less comparative value concerning China because in the latter gold was not monetized. In fact, the lack of demand for monetary gold as a moderating factor might have heightened the demand for silver in China. At any rate, the data might suggest that, a mere few decades before Qianlong’s vigorous re-mintage, silver was almost three times dearer relative to copper in Beijing than in Constantinople—even though copper “cash” was the only coined currency of China.<sup>79</sup>

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By the early seventeenth century, European financial innovation had shifted from the Italian city-states to the Low Countries, though it was still driven by the exigencies of

<sup>77</sup> Yang Duanliu 楊端六, *Qingdai huobi jinrong shigao* 清代貨幣金融史稿 (Beijing: Sanlian shudian 三聯書店, 1962), pp. 22–23, 44–45; James Lee, “State-Regulated Industry in Qing China, the Yunnan Mining Industry: A Regional Economic Cycle, 1700–1850,” unpublished paper presented at the 1984 Conference on Spatial and Temporal Trends and Cycles in Chinese Economic History, 980–1980, sponsored by the ACLS and SSRC at Bellagio, Italy, p. 3; Ho Hon-wai [He Hanwei] 何漢威, “Cong yinjian qianhuang dao tongyuan fanlan: Qingmo xin huobi de faxing ji qi yingxiang” 從銀賤錢荒到銅元泛濫——清末新貨幣的發行及其影響, *Zhongyang yanjiuyuan Lishi yuyan yanjiusuo jikan* 62, no. 3 (April 1993), pp. 389–494.

<sup>78</sup> Ray Huang, *Taxation and Government Finance in Sixteenth-Century Ming China* (Cambridge, England: Cambridge, 1974), pp. 60–70.

<sup>79</sup> Halil Sahillioğlu, “The Role of International Monetary and Metal Movements in Ottoman Monetary History, 1330–1750,” in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds*, pp. 287–88; Thomas Walker, “The Italian Gold Revolution of 1252,” p. 18. See also Şevket Pamuk, “The Evolution of Financial Institutions in the Ottoman Empire, 1600–1914,” *Financial History Review* 11, no. 1 (April 2004), pp. 7–32.

costly and recurrent warfare between equal-size polities and ambitions of monopolizing trade with the East. This spurt of European financial innovation had actually long preceded the English “Industrial Revolution,” a complex but much better-studied spate of events. The financial and industrial revolutions then converged with the spread of joint-stock companies and proto-types of central banks in the latter half of the nineteenth century.<sup>80</sup>

Whether or not the premium which silver fetched in China over other metals, or for that matter China’s trade surplus with Europe before the 1830s, can in any way be viewed as evidence for the “magnetic” qualities of the Chinese economy should be examined in view of European monetary penetration patterns elsewhere. In order to understand China’s monetary function in the early modern world, we must look beyond silver to the dynamics of monetization following contact with Europe. On this count, the flow of silver from Latin America as of the sixteenth and seventeenth centuries should be considered in tandem with Europe’s take-over of the global cowrie trade. For the cowrie trade can help us gain an important insight on how the transport of one form of money (not even a precious metal in this case) from one part of the world to another, where it was more coveted, could help Europeans plug trade deficits, as well as “subsidize” slave labour.<sup>81</sup>

What “subsidy” could the cowrie trade provide after the discovery of profuse New World gold and silver deposits? To be sure, gold exports from Africa to Europe did drop by the eighteenth century as a result of the ready availability of Latin American bullion. Cowrie imports, therefore, came to bankroll the purchase of slaves and African commodities like coffee instead of gold *per se*. It was the one factor equalising European trade deficits with Africa, in the same way perhaps that silver and later opium equalized the European trade deficit with China. However, that cowrie shells were drawn to Africa in such large quantities should not obfuscate the causality at play: while cowrie shells from the Maldives had been used in the gold-rich Sudan as early as the fourteenth century, it was Europeans who after 1500 enlarged this trade much beyond Arab reaches to West Africa; the Portuguese are thought to have shipped up to 150 tonnes of cowrie out of Bengal annually as a rough indicator for the amount reaching Africa. Even as late as the eighteenth century cowrie was four times dearer in Africa relative to silver as compared with India. Europeans thus sourced cowrie from outside both Europe and Africa precisely because they identified cowrie as potentially an external trade “equalizer,” and *not* because the African economy evinced any global “magnetic” qualities at the time.<sup>82</sup>

<sup>80</sup> Niall Ferguson, *The Ascent of Money: A Financial History of the World* (New York: Penguin, 2008), pp. 48–52.

<sup>81</sup> Jan Hogendorn and Marion Johnson, *The Shell Money of the Slave Trade* (Cambridge, England: Cambridge University Press, 2003); Bin Yang, *Between Winds and Clouds: The Making of Yunnan (Second Century BCE to Twentieth Century CE)* (New York: Columbia University Press, 2009), p. 207.

<sup>82</sup> Philip D. Curtin, “Africa and the Wider Monetary World, 1250–1850,” in J. F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds*, pp. 260–63.

In most cases, Europeans did not establish these trade patterns but joined them alongside veteran local merchants or established foreign hegemony, thereby enhancing their order of magnitude manifold. For example, the Dutch East India Company initially positioned itself as an important supplier of Japanese silver and copper to Ming China, *alongside* Chinese seafarers. Similarly, it was Arab traders who first brought cowrie to Africa with which to buy slaves. However, only when the Portuguese gained maritime supremacy in the Indian Ocean did the importation of Southeast Asian cowrie into Africa as means of funding the purchase of slaves truly reach global dimensions; indeed, many of these slaves ended up tilling Brazilian plantations.<sup>83</sup>

Arguably less known is the fact that Yunnan, the source of Ming-Qing copper, had in fact relied on cowrie—*not* copper cash—as its own principal currency until the mid-Ming. Cowrie and metallic cowrie-shaped casts were, of course, one of the principal currencies of the Chu 楚 kingdom as far back as the Spring and Autumn period, but Yunnan was the only part of China where cowrie re-emerged as an important medium of payment *after* the seventh century A.D.

In India, too, cowrie shells served as common subsidiary money at least since the Mauryan dynasty: they were imported from the Maldives into Bengal, and circulated in the Indus Valley, as early as 1400 B.C. By the Middle Ages, 80 cowries were worth in Bengal 144 gm of copper which were in turn tantamount to 14 gm of silver. In other words, the late medieval putative Bengali shell-copper-silver exchange rate of roughly 60:10:1 suggests that silver was considerably more abundant there at that time than in China. Either way, as coined copper became the norm in sixteenth-century Bengal, cowrie shells had lost much of their value there, and were subsequently exported to Africa, where they could fetch a higher return in the slave trade. In that sense, contact with Europe expedited the monetisation of both Bengal (coined copper) and sub-Saharan Africa (cowrie). Notably, in the Maldives, where cowrie was sourced to begin with, one gold dinar could fetch 10,000 shells in the sixteenth century, whereas in West Africa the same amount of gold could initially be bought off in return for just a few shells.<sup>84</sup>

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Cowrie aside, what else could the Portuguese trade in Africa in return for gold (and slaves)? In return for gold, the most precious store of value in Europe and the Levant at the time, Africans contented with base-metal objects. The famous *Manilha* brassware

<sup>83</sup> Jan Hogendorn and Marion Johnson, *The Shell Money of the Slave Trade*. See also Hans Ulrich Vogel, "Cowry Trade and Its Role in the Economy of Yunnan: From the Ninth to the Mid-Seventh Century. Part II," pp. 225–26. Cf. Helen Dunstan, "Safely Supping with the Devil: The Qing State and Its Merchant Suppliers of Copper," *Late Imperial China* 13, no. 2 (December 1992), pp. 42–81.

<sup>84</sup> John Deyell, "The China Connection: Problems of Silver Supply in Medieval Bengal," p. 128. There is a debate among Chinese scholars over the extent to which cowrie served as everyday "money" before the second century B.C. See Bin Yang, "The Rise and Fall of Cowrie Shells: The Asian Story," *Journal of World History* 22, no. 1 (March 2011), pp. 1–25.

ornaments were produced by the Portuguese—sometimes even from African-sourced brass—precisely in order to serve as a media of exchange with which to buy gold and slaves. However, imported copper rather than that locally mined one was the mainstay: copper was the most important monetary metal imported into sub-Saharan Africa between the sixteenth and seventeenth centuries, as gold itself was of little monetary use there, and since hardly any silver was mined locally. In fact, silver was relatively more expensive in Africa than in Europe: around the sixteenth century the African gold-silver ratio was around 1:8.<sup>85</sup>

It would be implausible to suggest that African economies possessed exceptionally “magnetic” qualities only because a mineral resource was the principal item Europeans could trade off there when purchasing local produce or “manpower.” Although late medieval China’s case is vastly different, the analogy drawn here would caution against depicting China’s economy as possessing “magnetic” qualities or as being more advanced than Europe’s on the eve of the Industrial Revolution because Europeans could only equalize trade there using silver bullion. On the contrary, the acquisition of asymmetric information on global bullion flows and dissimilar currency zones allowed Europeans to co-opt Africa and China into a wider trading system on preferential terms. In that sense, the mastery of global bullion and specie flows could perhaps be cast as an enduring early modern stratagem that allowed Europeans to buy in far-flung corners of the world those commodities they could not grow or produce themselves. In due course, the wealth generated as a result could bankroll direct European colonisation of those parts of the world where coveted commodities like pepper could be sourced; what could not be sourced in colonies outright was over time substituted at least in part by nascent European industry—even the fabled Chinese porcelain, or Indian calicos would find European-produced imitations.

## 5. Conclusions

Relatively little studied in that context hitherto, the mastery of late medieval bullion flows through extensive mining and the possession of asymmetric information on global supply and demand for precious metal seems, nevertheless, indispensable to our understanding of the “Great Divergence.” When analysed in conjunction, pertinent studies of the last three decades might suggest that the scramble for New World gold and silver may have been long preceded by an upturn in European domestic silver output. Once European domestic sources had been exhausted in the face of constant technological improvement—more readily available external sources were sought elsewhere. Thus, it would be a mistake to focus exclusively on the massive haulage of New World silver to China (or to India for that matter) as a marker of European dependence. On the contrary, the Portuguese,

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<sup>85</sup> Lars Sundström, *The Exchange Economy of Pre-Colonial Tropical Africa* (London: C. Hurst, 1974); Philip D. Curtin, *Economic Change in Precolonial Africa: Senegambia in the Era of the Slave Trade* (Madison, WI: University of Wisconsin Press, 1975), p. 313; idem, “Africa and the Wider Monetary World, 1250–1850,” pp. 255–59.

Dutch, and British—having based their domestic currencies on gold—all excelled in systematically marrying up lower-value “money” supplies outside Europe with particular demand for that “money”—which was not necessarily metallic, e.g. cowrie—in other locales outside Europe. Other than silver bullion, Spanish-American silver dollars were often the media of exchange outside Europe, whilst Spain’s own domestic currency was increasingly alloyed with copper.

Yet the picture will still not be complete without a recognition of the significance of coin output and quality (read: minting consistency) as underpinning the “Divergence” in the early modern era, i.e. long before the universalisation of steam-powered minting. For to do so would mean ignoring one of the fundamental functions of money as a medium of exchange. It is here that the technological dimension converges on the institutional one: the ability to produce better-quality (i.e. less easily falsifiable) domestic coinage at lower cost, and to enforce it *intra vires*, underpinned England (and Spain’s) transition from full-bodied to fiduciary coinage in the first instance. It was only then that England (and Spain) could divert Latin American specie to sustain imports from Asia at lower alternative cost. However, by the mid-eighteenth century at the latest, it was not just European-conveyed silver that was coveted in China: in fact European-produced silver coinage was more coveted and usually at a premium over silver bullion across much of Asia. In that sense, Latin American silver dollars attained what the Portuguese had not earlier in their foray into the region; due to the fact that silver was not (re-)coined in the commercial heartland of late imperial China, Europeans could get “more for their buck” there, whereas Mughal India remained more monetarily autonomous.

Notwithstanding the rich literature on New World silver, this aspect of the “Great Divergence” received even less attention than the mastery of global bullion flows. Yet, the comparative historic analysis offered here presents the patterns of coin production leading up to, and following, the “Great Debasement” as crucial to our understanding of the English monetary departure from the European continental (and Chinese) monetary trajectory, going as far back as the tenth century.

By the early twentieth century, steam-powered mints ultimately proved victorious in uprooting the multiplicity and concurrency of foreign and domestic coinage in favour of standardized national (“territorial”) units of payment. That wave of standardization put paid to the “ghost” or “imaginary” units of account that individuals and polities had devised right across Eurasia in order to tackle the uncertainty inherent in the multiplicity and concurrency of money. Yet it would be a grave mistake to consider the fledgling European nation-state’s take-over of minting as gratuitous provision of public good in return for prestige.

Pointing to late medieval and early modern European debasements as critical junctures in European monetary history, this article argued in fact that European sovereigns’ ultimate take-over of minting, including that of subsidiary coinage later in the process, had ensued from novel fiscal thinking that sowed the seeds for the onset of the English “national debt” economy. Baldly put, the European monetary path was borne out of the late medieval recourse to higher-value gold currencies that allowed at first for greater seignorage revenue, albeit in a destabilising, manner. But when the limits of coinage-derived seignorage as a source for sovereign revenue became apparent, English sovereign debt—indeed, money itself, was beginning to grow out of its metallic anchorage.

# 中西錢幣歷來大分流： 蒸汽時代前東亞與歐洲不同的通貨體系來源與後果

(中文提要)

荷尼夫

本文掌握對歐洲與東亞鑄幣史的最新研究，以便重視討論為蒸汽時代前歐洲及中國鑄幣的大分流；綜觀描述中國及西歐貨幣的發展存在不同的傳統。在金屬部門方面，與西方遍重於貴金屬不同，在中國歷史舞台流通的金屬貨幣主要為銀錠及銅錢；十九世紀九十年代中國開始鑄造銀圓以前，銀在市場是以按重量計算的條銀形式作為交易，故無法像歐洲等國家，採用調控金屬成色牟取鑄幣餘利或穩定貨幣數量或幣值。即便在明中葉以後，白銀鴻源從海外流入，賤金屬銅錢在人民日常生活中的重要性仍遠甚於白銀。另一方面，在非金屬部門，中國的貨幣發展似乎要比西方先進，如北宋真宗時期四川便已有交子發行，這是中國最早發行的紙幣。紙幣在中國發行前後達四個多世紀，歐洲國家才開始發行紙幣。

**關鍵詞：**世界通貨歷史 貨幣貼水 大分流

**Keywords:** world monetary history, coin premium and debasement, Great Divergence