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Esteves, Rui Pedro; Nogues-Marco, Pilar

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STEPHEN BROADBERRY

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KYOJI FUKAO

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Monetary Systems and the Global Balance of Payments Adjustment in the Pre-Gold Standard Period, 1700–1870

RUI PEDRO ESTEVES AND PILAR NOGUES-MARCO

Introduction

In 1878 Yale professor Francis A. Walker famously coined the definition 'money is that money does'. In this chapter we describe the types of money and the functions that money fulfilled, both domestically and internationally, from the eighteenth to the nineteenth centuries. In the early modern world, monetary systems were based on commodity moneys. Two commodities dominated as currencies in this period: gold and silver. The overriding characteristic of commodity moneys is that they have a market value as a commodity and a legal value as money.

In the first section, we explain how commodity monetary systems worked and how they conditioned government policy, particularly in episodes of debasement for monetary reasons or fiscal reasons. In the eighteenth century, European bullion markets were already integrated and integration limited the range of policies that policymakers could apply. Countries could be bimetallic only if they coordinated their legal ratios. We pay special attention to the cases of England, the Dutch Republic, and France, the most relevant money markets at that time.

Commodity-money was crucial for the expansion of intercontinental trade. A steady flow of silver travelled from West to East, most of it taking the Atlantic routes and going through Europe before reaching East Asia. The second section describes the main international monetary flows in the early modern period and relates them to East-West trade balance adjustments and monetary systems in Asia.

Commodity-money was replaced by bills of exchange to transfer funds for long-distance trade and finance. In the third section, we describe the most relevant features of bills and the geography of monetary relations. We document the existence by the mid-eighteenth century of a multilateral

payments system and the progressive enlargement of the bills-of-exchange network from a European scope to a worldwide scope by the time of the mid-nineteenth century.

The collapse of mercantilism and the intercontinental expansion of the bills of exchange influenced the global adjustment of the balance of payments. In the fourth section, we test empirically the specie-flow mechanism of balance-of-payments adjustment for the period between the end of mercantilism and the early liberalization of trade (1820s–1870s). To that effect, we calculate world effective exchange rates to distinguish between adjustments driven by changes in relative prices and by changes in nominal exchange rates.

Monetary Systems in Europe in the Pre-Gold Standard Period

Before the adoption of the gold standard as the international monetary system in the 1870s, monetary standards consisted of a variety of precious metals that served as money. Gold and silver were the commodities that performed the money functions in Europe throughout medieval times and into the modern era: store of wealth, means of payments and unit of account.[1] As a store of wealth, gold and silver were not perishable commodities and had minor wear-and-tear, so they could be easily stored.

As a means of payment, gold and silver had a high value-to-weight ratio so they were easily carried for transactions, and they were recognizable enough to be used among strangers. They were cast into coins of a value convenient for transactions. Because silver had a smaller value for a given weight, the joint circulation of gold and silver coins was advantageous because it provided means of payment for both large and small transactions.

1 One exception is the case of Sweden, which possessed the largest copper mine in Europe and established a copper standard in 1625. From that moment to 1776, full-bodied copper coins circulated together with gold and silver coins, forming a trimetallic monetary system. In 1777, the experiment ceased and a silver standard was reintroduced (Heckscher 1954; Edvinsson 2012). Outside Europe, we also find regions that developed monetary systems beyond gold and silver. In Asia, Indian and Chinese monetary systems included full-bodied copper coins circulating together with silver and gold. The second section explains the specificities of the Indian and Chinese monetary systems. In West Africa, cowrie shells circulated in local marketplace transactions. Cowries were mostly imported to Africa by European traders who paid for slaves with them. Cowries also served as a store of wealth and a unit of account until the second half of the nineteenth century, when the great cowrie inflation paved the way for their replacement by colonial currencies (Johnson 1970; Hogendorn and Johnson 1986).

On the one hand, merchants mostly used higher denominations for international payments. Gold coins such as the Florentine florin and the Venetian ducat were the most important means of payment inside Europe and between western Europe and the Levant in the Late Middle Ages (Spufford 1988: 177, 320–321). From the mid-sixteenth century, the steady expansion in the volume of international transactions encouraged the use of heavy silver coins for large payments (Cipolla 1989: 19–20). The best example is the Spanish-American piece of eight, which became the most common means of payment used in international transactions in America, Europe, and Asia (Cipolla 1996).

On the other hand, low silver denominations were used mainly for small daily transactions. European monetary authorities considered that exchange rates of coins in all denominations should reflect their relative metal contents. However, coins were minted freely. So keeping the coining of the different denominations appropriately aligned with the market conditions was difficult because coining money was more costly in small rather than in large denominations. As a consequence, from the thirteenth to the nineteenth century, intermittent shortages and recurrent debasements of the smaller coins occurred. To solve this 'big problem of small change', monetary authorities issued token coins for small transactions, that is, copper coins whose face value was higher than the metallic content. They were the precursor of modern fiat money (Cipolla 1956; Redish 2000; Sargent and Velde 2002).

Finally, as a unit of account, money was the standard of measurement (the *numéraire*). Transactions were expressed in units of account, although payments were naturally made subsequently in coins (means of payment). In Western Europe, the system of account established by Charlemagne survived during the Middle Ages and the early modern period until the introduction of the decimal system by Napoleon (and in the United Kingdom down to 1971). The standard of measure (unit of account) was the penny (*denarius*), together with its multiples, the shilling (*solidus*) of twelve pennies and the pound (*libra*) of twenty shillings (Shaw 1895; McCusker 1978; Fantacci 2008). The unit of account differed from the means of payment because it permitted the reconciliation of coins of different species into a sole monetary system. The monetary authority established the legal value of both gold and silver coins in terms of the money of account. For instance, the Royal Mint of England produced no coin equivalent to the 'sterling pound' until the Great Recoinage of 1816 when the accounting value of the coin sovereign was set at one pound sterling (McCusker 1978: 6). Before the nineteenth century, gold

coins were struck in guineas and valued in pounds sterling, shillings, and pence. The value of the guinea was reduced from 22 shillings to 21 shillings and 6 pence in 1699, and again to 21 shillings in 1717 (Nogues-Marco 2013: 461–462).

As we have seen in the previous example, the accounting value of coins underwent alterations in the form of debasements and reinforcements.[2] Changes of the legal relationship between the unit of account and the means of payment responded to monetary or fiscal problems. Because precious metals were commodity-money, they had two values: the legal value defined by law and the market value defined by the market when gold and silver were traded as commodities. Alterations of value for monetary reasons occurred when the monetary authority had to adjust the legal value of coins to their market value. When the market price of gold to silver equalled the legal ratio, the standard was bimetallic; but if the market price was lower or higher than the legal ratio, the standard was monometallic de facto.[3] At the end of the seventeenth century, the most important European money markets, such as London or Amsterdam, had already liberalized the export of precious metals, so one 'international' (i.e. European) money market emerged and forced countries to coordinate legal ratios to preserve bimetallism.

The exception was England. It is commonly believed that Sir Isaac Newton, Master of the Mint, mistakenly overvalued gold at the Mint in 1717.[4] However, Nogues-Marco (2013) demonstrated that the London bimetallic ratio remained too high not because of Newton's 'mistake', but because Parliament did not alter the monetary standard of England, as Newton proposed, to adjust the legal ratio to the European market ratio. Parliament decided 'that no Alteration be made in the Standard of the Gold and Silver Coins of this Kingdom, in Fineness, Weight or Denomination'.[5] Therefore, England switched to a de facto gold standard in the eighteenth

2 Experiences of European debasements are analyzed in Miskimin (1964; 1984); Bordo (1986); Sussman (1993); Rolnick et al. (1996); Pamuk (2000); Redish (2000); Chilosi and Volckart (2010); Elgin et al. (2015).

3 The stability of bimetallism has generated an extensive body of literature. See Locke (2010 [1696]); Walras (1881); Laughlin (1885); Giffen (1892); Fisher (1894); Shaw (1895); Walker (1896); Darwin (1898); Willis (1901); Chen (1972); Garber (1986); Rolnick and Weber (1986); Friedman (1990); Redish (1990; 1995; 2000); Garber and Weisbrod (1992: chapter 8); Flandreau (1996; 1997; 2002; 2004); Oppers (1996, 2000); and Velde and Weber (2000).

4 Feavearyear (1931: 142–143); Jastram (1977: 12–13); Cooper (1987: 44–45); Redish (1990: 789–790); Kindleberger (1993: 60); Eichengreen (1996: 12).

5 *The History and Proceedings of the House of Lords*, 75–76, Parliamentary Papers.

century. No change was made in the legal value of money after 1717 and finally England adopted the gold standard de jure in 1816.

The accounting value of coins suffered alterations also for fiscal reasons. In this case, the monetary authority reduced the metal content of the coins by decreasing their weight or fineness, while maintaining their nominal value in terms of the unit of account. The reduction of the quantity of precious metal in each coin was collected as a minting tax denominated seigniorage. When the rulers found that their fiscal resources were constrained, they often exploited their mints to produce greater seigniorage revenues. This was especially true in times of war (Munro 2012: 6). Debasement for fiscal reasons provided a short-term source of revenue, but considerable debasement could lead to a loss of public confidence in the currency or result in a chaotic circulation.

This was the case in the Dutch Republic. The Dutch monetary system was decentralized, the Republic had multiple provincial mints rather than a national one. Ordinances made each province's mint output legal tender in the whole republic. If a province debased its coins to increase seigniorage, those debased coins would migrate to the other provinces. Decentralization caused monetary conditions to deteriorate. Large coins traded at a premium; old, clipped, and worn-out ones remained in circulation for a long time; foreign coins were introduced into circulation; and in the end the mints themselves were tempted to strike 'inferior' coins (Dehing and 'T Hart 1997: 39–41; de Vries and van der Woude 1997: 81–82; Polak 1998: 16–17, 63–68; Quinn and Roberds 2009; 2014).

Because of the monetary chaos, the Bank of Amsterdam (*Amsterdamsche Wisselbank*) was established in 1609 upon the request of several merchants who complained about confusion regarding currency. The bank acted as guarantor for the legal standard, eliminating uncertainty about the intrinsic value of coins and protecting creditors against debasement (Gillard 2004; Quinn and Roberds 2009; 2014). The bank received money on deposit, provided settlement through a giro system, and traded in coined money and bullion (Vilar 1974: 252; van der Wee 1977: 342, 346–347; Dehing and 'T Hart 1997: 46–47).

The bank's main policy objective was to stabilize the market price of its money relative to large-denomination 'trade coins' circulating among merchants in Amsterdam. The bank created bank money, denominated bank *guilder*, which was backed predominantly by trade coins, current *guilder*. Bank money almost always circulated at a premium (called the *agio*) to the current money (Quinn and Roberds 2016: 64). The Bank of Amsterdam stabilized

bank money at a level compatible with market prices, preserving Amsterdam on an effective bimetallic standard (Nogues-Marco 2013). Bimetallism could collapse in one place, such as London, and succeed in another, such as Amsterdam. Indeed, Amsterdam bank currency, the bank *guilder*, became the European reserve currency until the bank became insolvent at the end of the eighteenth century and was liquidated after the Napoleonic period (Jonker 1996).

The French monetary system also suffered alterations of the accounting value of coins for fiscal reasons. An experiment undertaken between 1716 and 1720, known as John Law's 'system', is especially noteworthy. The system was a combination of a fiscal component (involving an operation in public finance) and a monetary component (involving fiat money). The state of French finances had been dismal due to the War of the Spanish Succession. Law's system was intended to be a radical restructuring of French public finances based on the development of two institutions. First, in 1716, he established a privately owned bank that issued banknotes. Originally, they were convertible into a specific number of coins of a given weight and fineness. But from the end of 1718, banknotes were denominated in units of account. Second, in 1717, Law created a trading company, whose shares were publicly traded and whose purpose shifted from colonial development and overseas trading to management of public funds. In order to refinance the national debt, the company doubled its equity and the new shares were sold in exchange for government bonds. From 1719 to 1720, the bank and the company merged and the company reimbursed the whole national debt. Gold and silver coins stopped being legal tender and banknotes became the sole currency. Finally, Law pegged the price of shares at a fixed price above their market level in banknotes, leading to a massive issue of banknotes in exchange for shares. The exchange rate on the *livre* began to fall and Law reduced the account value of banknotes instead of withdrawing them. Once the price of shares collapsed, in 1720, there was a bank run, and the inconvertible notes depreciated. From 1721 to 1723, a massive clean-up operation dismantled Law's system. Gold and silver were restored as currency and in 1724 an abrupt deflationary policy revalued the debt, returning France's debt burden to roughly the level at which it stood before Law. The first full-scale attempt to move from a commodity-money system to a permanent fiat currency in Europe had failed (Velde and Weber 2008).

During the eighteenth century, France consolidated as an outstanding money market in continental Europe and eventually replaced Amsterdam as the centre of bimetallism in the nineteenth century. Like Amsterdam in the

eighteenth century, France successfully preserved an effective bimetallic standard. The French monetary system's attempt to fix the market ratio during the nineteenth century was successful because shocks to gold or silver supplies led to smooth arbitrage. For instance, during the Gold Rush after 1848, France imported gold and exported silver, but French circulation was large enough to buffer the shock (Flandreau 2004). French bimetallism in the mid-nineteenth century was, thus, another example of the stability of bimetallism. However, European monetary systems shifted from the bimetallic standard to the gold standard in the third quarter of the nineteenth century. Once the main countries pegged their currencies to gold, small countries had an incentive to adopt the gold standard to prevent their exchange rates from fluctuating against the gold world because the wider the exchange rate fluctuations, the greater the disruption to international trade and finance (Meissner 2005).

Overseas Silver Flows, West-East Balance-of-Trade Adjustments and Monetary Systems in Asia (1700–1800)

During the early modern period, intercontinental trade had a counterpart in a steady flow of precious metals travelling from West to East. Between 1500 and 1800, nearly 85 per cent of the world's silver and more than 70 per cent of the world's gold was produced in America and large amounts were systematically transferred from America to Asia (Barret 1990; TePaske 2010; Palma and Silva 2017; Freire Costa et al. forthcoming). There were several routes to transfer American precious metals to Asia, with Europe being the major transshipment region. First, western Europe imported grain, timber, and furs from the Baltic in exchange for wine, textiles, and precious metals. Then, the Baltic sold precious metals to the East in exchange for Persian silk and other luxury commodities from the Middle East. Second, the Levant route of European trade through the Mediterranean also resulted in an outflow of precious metals to purchase Eastern spices through the Red Sea and the Persian Gulf. Third, the Cape route, used by Europeans to purchase spices, silk, tea, and cotton textiles also generated a steady outflow of precious metals. Finally, American precious metals, mainly silver, reached Asia directly via Manila, where they were exchanged for silk and other luxury Chinese goods (Attman 1983; TePaske 1983; von Glahn 1996; De Vries 2003; Findlay and O'Rourke 2007).

Asia was the final destination of precious metal flows, but the trade imbalances paid with these flows did not correct even over the long run, despite the steady flow of bullion. How can we explain the persistence of these disequilibria? The traditional interpretation states that the inflow of bullion did not increase Asian prices even though these countries absorbed prodigious amounts of precious metals. This assumption is based on the logic of Hume's price-specie flow mechanism to adjust the balance of payments, that is, European persistent trade deficits happened because precious metal flows did not lead to a higher price level in Asia that would have reduced its exports and increased its imports. Scholars have considered that prices did not increase in Asia because precious metals were hoarded as a store of wealth or transformed into jewellery (Blitz 1967; Braudel 1979; Kindleberger 1989).

However, according to Chaudhuri (1982) the traditional explanation is speculative because it does not have empirical support since imported precious metal became money in India and was used as a means of payment in China (von Glahn 1996; Prakash 2005). An alternative explanation is that prices did not move up because the influx of precious metal into Asia was also accompanied by an expansion of the monetary sector at the expense of the barter and subsistence sector (Blitz 1967: 47; Habib 1982: 366; von Glahn 1996: 432; Prakash 2005: 15).

Flynn and Giráldez (2002; 2004) and Flynn (2012) have given a different explanation. According to these scholars, silver should not be considered as money but as a commodity. They argue that there was no imbalance of trade between Europe and Asia for which monetary resources had to flow in compensation. Silver flows were just the result of arbitrage that responded to profitability. Merchants simply purchased silver where it was cheap (Europe) and shipped it to where it was expensive (Asia). Arbitrage between Europe and Asia (China) had two phases, that is, one from the 1540s to the 1640s, by which time gold-silver bimetallic ratios had converged around the world, and a second phase, from around 1700 until the 1750s, when global silver prices had converged a second time. Similarly, Palma and Silva (2017) argue that the gold-silver price ratio was 6:1 in China and it was between 11:1 and 12:1 in Europe when the silver from America began to be available in Europe, which suggests large arbitrage gains, even under the prevailing transport technology and institutional settings.

The hypothesis of precious metal arbitrage has been recently tested by Nogues-Marco (2019), who collected data on the price of silver and gold in London and Asia (India and China) from 1664 to 1800 from the archive of the East India Company (EIC). Her results show that it was not profitable to

export silver from London to Asia because the exchange rate was defined according to the silver arbitrated par, that is, the relative market price of silver between centres. There were episodes of arbitrage by which the EIC exported silver to China in exchange for gold for profit, but the vast majority of silver was exported without profit to pay for imports. Silver moved from Europe to Asia to compensate payments resulting from large and persistent trade disequilibria (Krishna 1924; Chaudhuri 1978; Prakash 1985; 1986).

The last interpretation is that the silver influx did not increase prices, but silver depreciated relative to copper (Braudel 1979 (vol. 1): 417; Cartier 1981; Flynn 1984: 409; Habib 1987: 141–142). The monetary system in India was trimetallic, composed of gold, silver, and copper coins. Indian authorities did not standardize the legal value of coins in different metals into a common unit of account as in European monetary systems. The exchange rate between gold-silver and silver-copper was determined by market conditions in India (Habib 1987: 157). Figure 18.1 shows the exchange rate between copper and silver for Agra and East Rajasthan from 1540 to 1750. We can observe the rupee (silver coin) depreciation in dams (copper coin) in the long run. In 1540, one rupee was exchanged for 48 dams; in 1583, the exchange rate was 1:40; in 1640, it was 1:28 and, in 1750, it had been reduced to 1:14. The depreciation of the copper price of silver was more intense from the early to the mid-seventeenth century than in

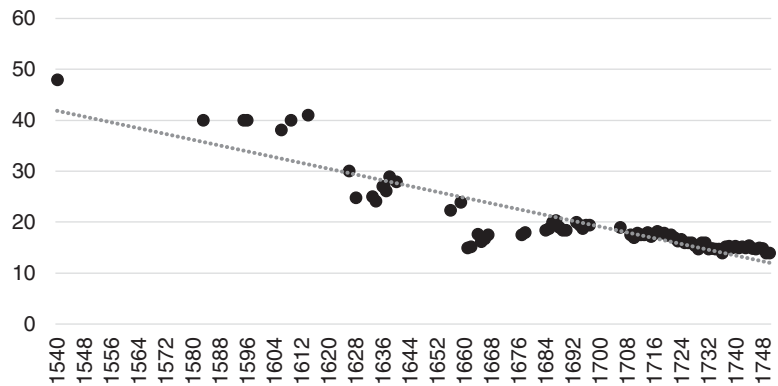

Figure 18.1 Copper value of silver, Agra and East Rajasthan, 1540–1750 (dams/rupee)
Sources and notes: Habib (1982: 370; 1987: 146–149). The dam was debased in 1663–64, when the weight of the lighter dam was reduced to two-thirds of the standard weight, according to Habib (1987: 140). In this figure, we expressed the price of silver in standard dams (copper coins of 323 grains) for the whole period (Habib 1987: 150).

the first half of the eighteenth century, when the Portuguese had lost their monopoly status as the Dutch and English penetrated the Indian Ocean.

Prices of Indian commodities could be expressed in copper or in silver as both were means of payment in India. At the end of the sixteenth century, prices were reported in copper, silver, or gold, depending on the commodity considered. For example, food grains, vegetables, *ghee* (clarified butter), milk, yoghurt, sweetmeats, spices, and Indian fruits were defined in copper. Sheep, goats, and foreign fruits were priced in silver. Cheaper textiles had prices in copper, but the more expensive in silver. The most expensive varieties of silk and cotton cloth were priced in gold (Habib 1987: 145). The influx of silver from Europe not only caused the value of silver in copper to depreciate, but also gradually displaced copper as the unit of account for some ordinary transactions. At the end of the seventeenth century, while copper continued as the most important currency medium, food grains were already priced in silver while *ghee* and *gur* (jaggery) were priced in copper (Habib 1987: 154). Figure 18.2 reports prices of wheat in silver and copper respectively. We can see that although copper prices did not rise, prices show a significant upward trend when they are measured in silver.[6]

The monetary system in China was de jure a copper monetary system, but de facto trimetallic. Gold and silver were not minted, but they circulated in the form of ingots that were used as means of payment by weight. Additionally, foreign silver coins, mainly Mexican pieces of eight, also circulated by weight (Cartier 1981: 456). Yan et al. (2018) have recently defined the Chinese monetary system as a multilayer system of currencies. On the one hand, silver currencies were influenced by the changes in international politics and the global economy. They circulated freely among major commercial centres, and their prices were synchronized with the international market. On the other hand, copper coins functioned as the primary form of currency in the landlocked rural areas, where the penetration of silver was very slow. Copper facilitated small transactions within regional boundaries. The state minted copper coins at fixed face value and strictly monopolized copper coinage in the official mints. By contrast, the state adopted a laissez-faire attitude towards the circulation and production of silver ingots, so that

6 These results are based on the price of wheat for Agra and the region of East Rajasthan. However, they might not extend to all commodities and centres. For example, Prakash (1994: 70–71) does not find a significant increase of the price of rice, wheat, *ghee*, and sugar in Bengal during the period 1657–1714, measured in silver (rupees/maund). Contrary to this result, Datta (2003: 444–445) shows a significant upward trend in the price of rice, *ghee*, and oil in Lower Bengal during the period 1700–1800, measured in silver (rupees/maund).

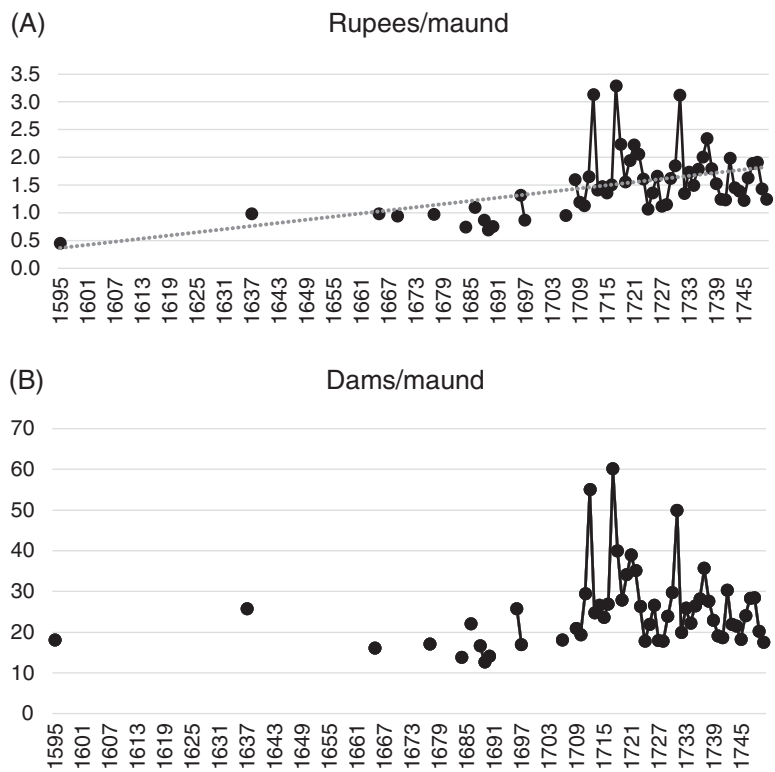

Figure 18.2 Price of wheat, Agra and East Rajasthan, 1595–1750
Sources and notes: Prices of wheat in Agra for 1595, 1673, and 1670 from Habib (1982: 373). Wheat flour has been converted to wheat taking into account the reduction of 10 per cent in weight when converting wheat to flour (Habib 1982: 373). We collected the price of wheat in East Rajasthan from 1665 to 1750 (single average of prices in Amber, Chatsu, Dausa, Lalsot, Bahatri, Malarna) from Nurul Hasan and Gupta (1967). Silver prices were transformed to copper prices using the exchange rate between rupees and dams (Figure 18.1). We use the maund of 40 seers (Gupta and Moosvi 1973: 185).

their melting and casting were mostly done by private agents. Using the changes in the exchange ratio between silver and copper as a price signal, the multilayered monetary system reduced the mutual impacts between the international market, urban areas, and rural places.

Figure 18.3 shows the exchange rate between copper currency (*cash*) and silver (*kuping taels*). The official exchange rate was fixed as one *tael* equal to 1,000 *cash*. The market exchange rate fluctuated according to the production of domestic copper mines, monetary debasements, and reinforcements in

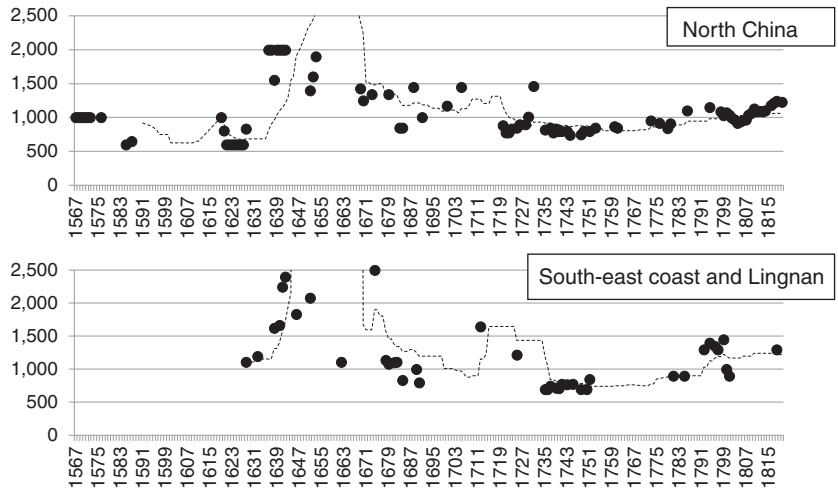

Figure 18.3 Copper value of silver, China, 1567–1820 (cash/tael silver)
Sources and notes: Vogel (1987: table 3). North China = Peking and Zhili Province and Ningjin (Zhili). The Ningjin series, which starts in 1798, is the most homogenous series, calculated from daily records of a store (Vogel 1987: 26; Allen et al. 2011: 34). Southeast Coast and Lingnan = Hubei, Hunan, and Jiangxi. The dotted line is the twenty-five-year moving average.

copper coins – as well as silver imports entering China as the result of a positive balance of trade (Vogel 1987). In the first half of the sixteenth century, the value of silver in copper depreciated more than 50 per cent (Cartier 1981: 457). The depreciation of silver continued in the second half of the sixteenth century, but this trend changed after 1600 because the Chinese state debased copper coins, so the copper value of silver rose despite the greater influx of silver (von Glahn 1996: 431; 2003: 191). Silver depreciated again in copper in the early eighteenth century. The exchange rate between both metals stabilized during the remainder of the century. Finally, at the end of the century, silver suffered an important appreciation in copper (Cartier 1981: 458; von Glahn 2003: 191).

The price of rice can be used as a proxy to measure inflation in China. Figure 18.4 shows the long run series of the price of rice measured in grams of silver. The longest series, which runs from 1500 to 1800, covers the whole of China. Because price trends probably varied across provinces, Figure 18.4 also plots two additional series for prices in the Yangtze Delta. The two sets of prices are highly correlated and there is evidence of a common upward trend in the price of rice for the whole period, from the early sixteenth to the late eighteenth centuries.

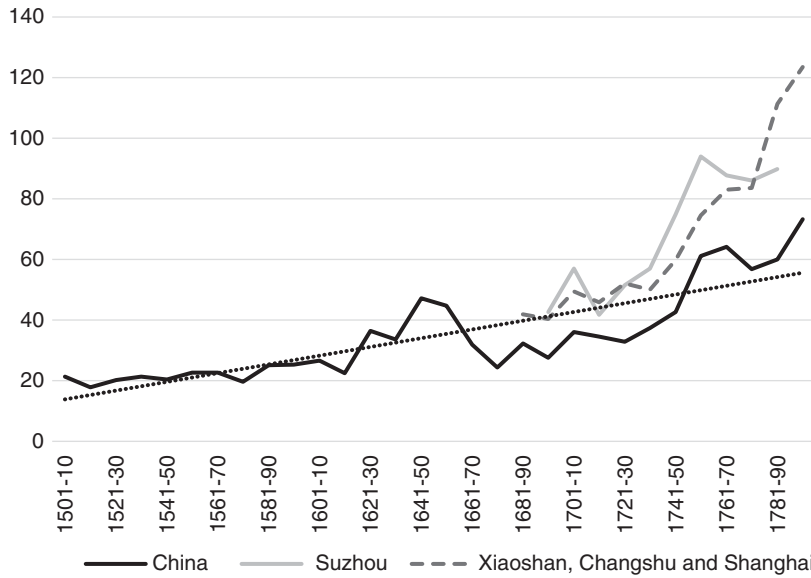

Figure 18.4 Price of rice, China, 1500–1800, decennial average (grams of silver/quintal)
Sources and notes: Data for China from Cartier (1981: 464) in *kuping taels* (37.3 grams [1.3 oz]) per quintal. This series averages rice prices in different locations across China in each year. Data for Suzhou, Xiaoshan, Changshu, and Shanghai were collected by Wang (1992) to represent rice prices in the Yangtze Delta. Because of the proximity between these locations, the two series are probably better interpreted as alternative sources for delta prices rather than independent price series. Wang (1992) reported data in *kuping taels* per *shi*. We use the equivalence 1 *shi* = 78.623 kg (173 lb) (Lemale 1875: 113).

To sum up, available evidence on prices in India and China shows that there is a positive relationship between silver influx and inflation when we express prices in grams of silver. However, European trade deficits with Asia persisted through the seventeenth and eighteenth centuries. Our explanation for this apparent violation of normal current account adjustment is based on market structure. In the mercantilist period, trade between Europe and Asia was conducted by European chartered companies (the English, Dutch, and French East India Companies) that controlled the volume of trade and prices of Asian imports in Europe to sustain high mark-ups for a very small number of commodities with low demand elasticities (Hauser 1936; Blitz 1967; Chaudhuri 1978; Bulbeck et al. 1998). In this way, chartered trade companies prevented price convergence and, as a consequence, sustained the Euro-Asian current account deficits that were cleared with silver flows.

The Development of the Global Foreign Exchange Market

Europe developed a foreign exchange market based on bills of exchange in the Middle Ages. A bill of exchange was a letter by which funds were transferred between distant cities. Four persons participated in the transaction: two at the city where the bill was drawn and two at the city where it was payable. They were, first, the drawee (deliverer, giver, remitter, or negotiator), the person who delivered the money; second, the drawer (taker) who received the money by exchange; third, the party who paid the money by virtue of the bill drawn on him, commonly termed the payer (accepter); and fourth, the person to whom the bill was made payable, called the payee (possessor or holder). Typically, the payer and the drawer would keep accounts with each other and could offset the payment of the bill with claims from other transactions so that only small net amounts would have to be occasionally settled (de Roover 1953; Einzig 1962; Neal 1990).

A bill was a safe and cheap financial instrument and thus became the most widely used instrument for international payments. The operation of exchange permitted not only the transfer of funds, but also the lending of money from the moment of the purchase of the bill to its payment. As a consequence, bills provided a useful tool to escape the regulation on interest rates. This regulation prevented interest rates from rising above a certain ceiling, which would constitute 'usury'. Unlike other financial instruments, which had a local circulation and were thus subject to the regulation of interest rates, bills of exchange escaped usury ceilings because the transaction took place between two distant cities. The price charged on bills of exchange was motivated, according to contemporary bankers, by the risks and efforts associated with overcoming the obstacles of foreign settlement. In practice, the price of bills was determined by the geographical distance as well as by time, so the interest rate was hidden by the exchange rate (Flandreau et al. 2009a; Nogues-Marco 2018).

International trade supported the emergence of a liquid market for bills of exchange in Europe, organized along lines defined by trading relations and provided the infrastructure for financial development. The adoption of the Joint Liability Rule (JLR) facilitated the expansion of bills beyond personal networks from the early seventeenth century because it provided high financial protection against non-payment as all parties involved in a bill transaction (the payer, all the endorsers, and the drawer) had a joint liability for the payment. As a consequence, the JLR played a major role in

ameliorating fundamental information problems in long-distance trade and turned the bill of exchange into the most important transfer instrument in a period of imperfect international enforcement (de Roover 1953; Santarosa 2015).

The market for bills-of-exchange was restricted to Europe until the late eighteenth century. Flandreau et al. (2009b) mapped the bills-of-exchange connections between nearly eighty cities in the mid-eighteenth century. A high proportion of the cities (close to one half) were ports. There were typically several markets per country, except for the case of England, which stands out as the one large political entity with only one exchange centre in London. Locations were evenly scattered all over Europe with outreaches on the fringes of the Orient. There were no American, Asian, or African cities and only two cities in the Ottoman Empire – Constantinople and Smyrna. This European bias is the result of a structural characteristic of the foreign exchange network: European sources did not direct to non-European centres while non-European sources directed back to Europe. The global financial system of that period had a distinct European focus.[7]

Amsterdam, London, and Paris were the core of the system in the mid-eighteenth century. They were quoted in the vast majority of the cities (more than 60 per cent of the cities quoted London and Paris while 84 per cent quoted Amsterdam), implying that multilateral settlement using these centres as clearing centres was feasible by the mid-eighteenth century. Amsterdam, London, and Paris were already tightly integrated with one another by the mid-eighteenth century and enjoyed a high degree of liquidity (Neal 1990; Flandreau et al. 2009a).

The agglomeration of monetary links is shown in Figure 18.5, which plots the number of links that a particular market received by the mid-eighteenth century. About 20 per cent of links between cities were direct, 75 per cent had to pass through an intermediary centre, while only 7–8 per cent had two intermediaries. This reinforces the notion of an encompassing multilateral settlement system, with Amsterdam, London, Paris, and also Hamburg and Genoa as the main

7 Exchange contacts from London to North America and the British West Indies had already existed during the colonial era, in particular Boston from 1630 and Philadelphia probably from the 1730s to American independence in 1776, but bills drawn in London on the colonies were negotiated only occasionally, mostly during wartime. The exchange transactions of London on North America or the West Indian colonies were insignificant for the London merchants to be mentioned in the exchange rate quotations (Denzel 2010: 12–13, 406). The use of bills was limited because there seems to have been difficulty locating anyone in London with sufficient credit in the colonies to draw against. Instead, London merchants preferred to bring such credit home and ship specie (McCusker 1978: 122, 131–150).

Figure 18.5 Monetary agglomeration in the mid-eighteenth century
Source: Map redrawn from Flandreau et al. (2009b: 161).

connecting hubs. Therefore, the European system was a dense web with an area of intense financial linkages that stretched from an Amsterdam-London-Paris-Hamburg core and thinned out as it headed towards Italy.

The European network of bills of exchange expanded worldwide at the end of the eighteenth century and in the early nineteenth century. London started to quote Rio de Janeiro from the early nineteenth century, after the Brazilian ports had been opened to non-Portuguese trade. Quotations in London on New York and Philadelphia as well as on Buenos Aires and Mexico City existed by the 1840s (Denzel 2010: 9, 12).

Philadelphia was the first centre in North America that quoted Europe after American independence in 1776. Philadelphia quoted on London from 1783 and quoted regularly on Paris, Amsterdam, and Hamburg from 1794. New York superseded Philadelphia not only as the financial but also the general economic centre of the Atlantic coast in the USA, and started quoting London in 1794, as well as Amsterdam, Hamburg, and Paris from the early nineteenth century (Denzel 2010: 408, 117).

The slave trade expanded the use of bills of exchange in North America in the second half of the eighteenth century. Colonial planters bought and sold slaves through local factors and met their bills through crop sales. Agents transferred bills to ship captains, who handed them to British slave merchants, who then redeemed them, via other merchants, businessmen, and brokers, to secure their funds. The interconnections of merchants, factors, planters, and guarantors in the eighteenth-century British slave trade helped to foster greater financial integration in the transatlantic trading world (Morgan 2005).

Trade integrated Asian centres into the European bills-of-exchange network. To be sure, before this integration, domestic systems of bills of exchange already operated in both India and China. In India, *hundi* was the financial instrument developed to transfer money in the early modern period. However, even if the *hundi* was a transferable instrument, it did not include a JLR, which limited the expansion of the financial instrument beyond personal networks. This meant that in case of non-payment, the payee had to demand payment from the last person from whom he had bought the *hundi*; and so on, up the chain of endorsements until the original drawer (Habib 1971; Chaudhuri 2017). Similarly, *fu-tie* (also called *dui-tie*) was a commercial-finance instrument developed in North China in the eighteenth century to facilitate business transactions. Analogous to European bills of exchange, the receiver of a *fu-tie* was required to pay the bearer the designated amount of cash on behalf of the issuer. But this instrument was not personally registered and was thus payable to whoever possessed it, which also limited its expansion to personal networks (Qiao 2017). By the end of the eighteenth century, Asia had become integrated into the European network of bills of exchange. The East India Company had started issuing company's bills on the court of directors payable in London for trade with India and China, and company's bills payable on the government of Bengal (and, rarely, Bombay) for trade with China (Canton) (Greenberg 1951; Dermigny 1964; Marshall 1976; Nogues-Marco 2021).

The openness of trade to private merchants at the end of the mercantilist period facilitated the expansion of bills of exchange as transfer instruments between Asia and Europe during the first half of the nineteenth century. Contemporary merchant manuals listed quotations in London on Calcutta, Bombay, and Madras by the early nineteenth century and on Canton by the mid-nineteenth century. By the mid-nineteenth century, *The Economist* listed rates on Indian, South and East Asian as well as Australian centres. Regular quotations in Canton on Bombay started in 1827/31. Quotations in Shanghai on London started in 1848, on Canton in 1849/52, on Hong Kong in 1856, on Calcutta in 1850, and on Bombay in 1855 (Denzel 2010: 13, 511–512).

By the end of the nineteenth century, the bills-of-exchange market had achieved a worldwide scope. The core of the system was composed of three senior centres: London, Paris, and Berlin/Germany in descending order. The periphery – that is, countries quoted almost nowhere – comprised Latin American and Pacific Asian nations but also Canada and parts of Europe. Finally, there was a large group of centres between the two extremes. This group was formed by the United States, the north-western European centres (Netherlands, Belgium, and Switzerland), Austria-Hungary, Italy, Spain, and, to an extent, Russia (Flandreau and Jobst 2005: 989).

The Specie-Flow Mechanism and International Trade Adjustment (1820–70)

The Scottish philosopher David Hume articulated the first model of balance of payments adjustment in a letter to Montesquieu in 1749:

> If half the money in England were suddenly destroyed, labour and goods would suddenly become so cheap that there would suddenly follow a great quantity of exports which would attract to us the money of all our neighbours. If half the money which is in England were suddenly doubled, goods would suddenly become more expensive, imports would rise to the disadvantage of exports and our money would be spread among all our neighbours. (Hume 1955: 188–189).

The model came to be known as the price-specie flow mechanism and predicts that external adjustment will happen mostly through expenditure switching rather than expenditure reduction or increase: a country facing a current account deficit would adjust by losing gold, leading to a fall in relative prices that would reestablish its competitiveness with respect to its trade partners. The mechanism rests on two assumptions: an open capital

account and flexible prices. While Hume repeatedly stated his belief in the flexibility of the prices of 'all labour and commodities', he conceded that barriers to trade in precious metals could prevent the adjustment of external imbalances:[8]

> in money, if the communication be cut off, by any material or physical impediment (for all laws alone are ineffectual), there may, in such a case, be a very great inequality of money (Hume 1955: 64).

Despite Hume's dismissal of the effectiveness of capital controls (legal barriers to trade in specie), practically all nations retained laws preventing the free export of monetary metals until the mid-nineteenth century, a policy consistent with the mercantilist doctrine of retaining precious metals at home that lived on in many countries until the dismemberment of mercantilism. Whether these were effective is an empirical question and we should be able to test it by decomposing the sources of real exchange rate variations. Real exchange rates (q) measure the ratio of domestic and foreign prices (p and $p^{\star}$), adjusted by the nominal exchange rates (e), i.e. $q = (p^{*}e)/p$. They are a measure of competitiveness. But since no country trades with just one partner, the relevant measure of competitiveness should take into account the actual trade networks of each nation. This is referred to as the *effective* exchange rate. For a given country i, we can define its nominal effective exchange rate (NEER) as the average of bilateral exchange rates (e_{ij}) weighted by the share of each of its j trade partner's in its exports (x_{ij}) and imports (m_{ij}):

$$NEER_i = \sum_j e_{ij}x_{ij} + \sum_j e_{ij}m_{ij}$$

Similarly, we can define a concept of real effective competitiveness as:

$$REER_i = \frac{1}{p_i}\sum_j e_{ij}p_j x_{ij} + \frac{1}{p_i}\sum_j e_{ij}p_j m_{ij}$$

where p_i and p_j are the domestic and foreign price levels, respectively. Computing the effective exchange rates offers several insights about the adjustment of international trade. First, it reveals which countries gained and lost competitiveness over time and whether those deviations were

8 In fact, Hume was aware that price adjustments might take a while to take effect, and acknowledged that changes in real income could occur in the short run as a consequence of external disequilibria (Murphy 2009).

related to external disequilibria. Second, it allows a distinction to be drawn between adjustment through relative prices (p_j/p_i), as envisaged by Hume, and adjustment through changes in nominal exchange rates. In a world in which all countries pegged their currencies to a commodity (gold or silver), nominal exchange rates should have been largely constant, at least so long as the market prices of gold and silver were successfully anchored, as previously mentioned. However, countries had frequently to abandon their pegs and adopt inconvertible currencies with floating exchange rates. As shown by Catão and Solomou (2005), even in the heyday of the classical gold standard (1870–1913), nominal exchange rate flexibility was instrumental in facilitating current account adjustment. Especially in the case of peripheral nations, external imbalances were corrected more through exchange rate fluctuations (e_{ij}) than price changes. This runs contrary to the predictions of Hume's model in that the flexibility of peripheral currencies also diminished the need for specie flows and price adjustment in the core European countries (Bloomfield 1959).

In this section we extend Catão and Solomou's (2005) analysis to the first seven decades of the nineteenth century to confirm how well Hume's price-specie flow applied in that earlier period. In so doing we draw on large new data sets of bilateral trade (Fouquin and Hugot 2016; Dedinger and Girard 2017), exchange rates (Denzel 2010) and prices (de Zwart 2015). The data covers a maximum of 54 countries and territories.

Figures 18.6 to 18.8 represent the evolution of nominal exchange rates after the Napoleonic Wars, separating between core and periphery nations, as well as between monetary regimes. To measure nominal exchange rates we use the pound sterling (GBP) as the *numéraire*. In all cases, there are substantial deviations between the nominal and the effective exchange rates, suggesting that competitiveness was very much a bilateral phenomenon: individual countries' effective exchange rates were influenced at least as much, if not more, by their trade partners' exchanges as by their own.[9] In general, nominal and effective exchange rates are closer for emerging or peripheral nations than for the core European nations (Figure 18.8), which accords with what we know about the stability of their monetary regimes in this period, namely, the greater prevalence of inconvertible currencies among peripheral countries. Core nations, on the other hand, witnessed moderate effective nominal appreciation as a counterpart.

9 Brazil and the USA are exceptions as most of their NEER variation is driven by their own nominal exchange rates (see Figure 18.6).

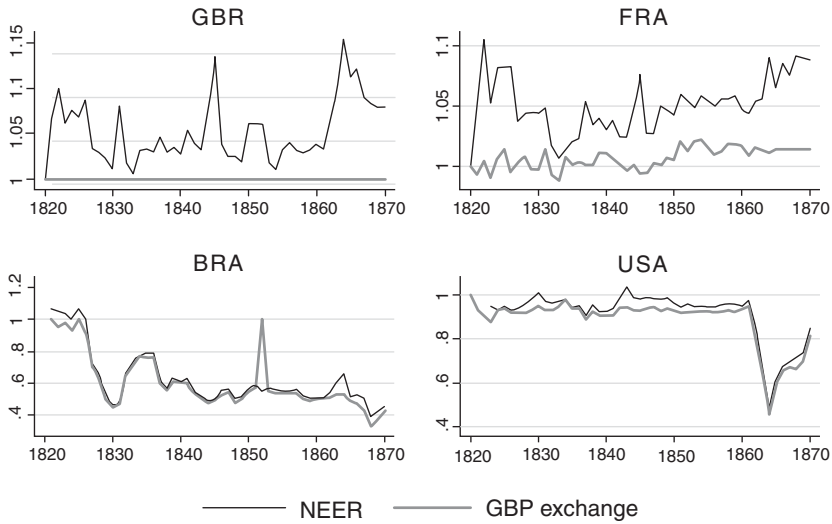

Figure 18.6 Nominal and effective exchange rates, 1820–70
Sources: see text. Values in deviation from parity with 1820=1.

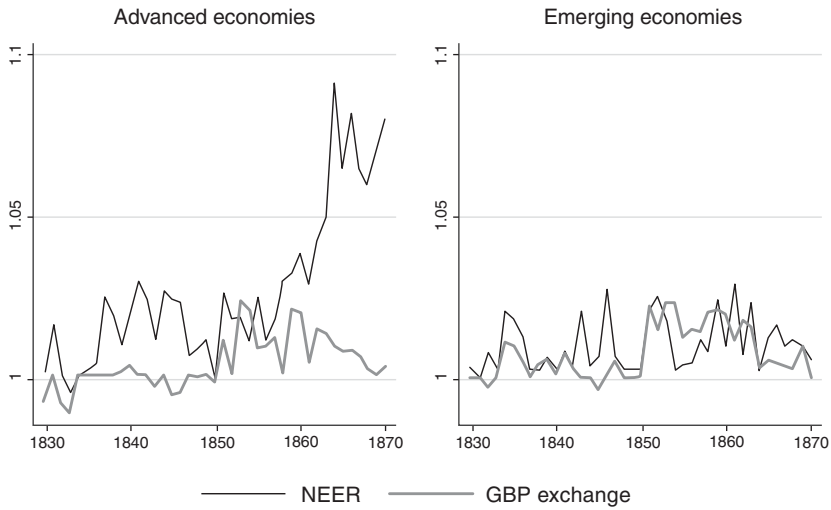

Figure 18.7 Nominal and effective exchange rates, 1820–70
Sources: see text. Values in deviation from parity with 1820=1.
Advanced economies = Britain, France, Germany (Zollverein), Belgium, and the Netherlands.

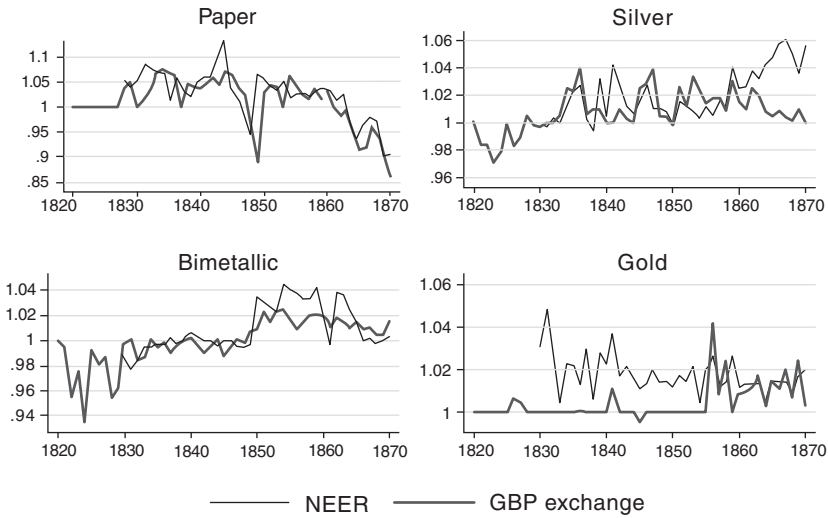

Figure 18.8 Nominal and effective exchange rates, by monetary regimes 1820–70
Sources: see text. Values in deviation from parity with 1820=1.

All in all, this evidence coincides with the findings of Catão and Solomou (2005) for the subsequent period. Table 18.1 summarizes the evidence by comparing the coefficients of variation of the two nominal measures of the exchange rate, divided by group of countries and monetary regime.[10] The majority of nominal exchange rate variations of advanced nations and nations on metallic pegs were driven by their trade partners. For these nations, the volatility of their effective exchange rates is always larger than their exchange against the *numéraire* (sterling). The opposite applied to peripheral nations and countries on inconvertible paper standards, where the ratio between the two was lower than one.

As a way of testing directly for David Hume's price-specie flow mechanism, we compute the real effective exchange rates and compare the fraction of their variance explained by nominal exchange rate (NEER) fluctuations with that due to relative price movements (PREL).[11] Table 18.1 summarizes this as a ratio between the variances of the two variables. In line with Catão and Solomou's (2005) work, we find that nations on

10 The table covers the period from 1830 only because of sparse price data to compute REERs before that date.

11 Formally, we do this by decomposing the variance of the log of REER: $\ln(\text{REER}) = \ln(\text{NEER}) + \ln(\text{PREL})$.

Table 18.1 Volatility of exchange rates, 1830–70

	Nations		Regimes			
	Advanced	Emerging	Paper	Silver	Bimetallic	Gold
GBP exchange	0.007	0.008	0.056	0.012	0.010	0.007
NEER	0.019	0.007	0.046	0.018	0.017	0.007
Ratio (NEER/GBP)	2.677	0.909	0.819	1.523	1.656	1.023
REER	0.072	0.037	0.072	0.053	0.041	0.208
PREL	0.066	0.030	0.081	0.040	0.036	0.214
Ratio (NEER/PREL)	0.265	0.197	0.633	0.337	0.422	0.036

Sources and notes: See text. Values in coefficient of variation = standard deviation/mean of each variable. PREL is the trade-adjusted relative price index (1830=1).

metallic pegs did not have much margin for nominal exchange rate adjustments. The most extreme case was nations on gold where the variance of their NEER was only 4 per cent of the variance of their relative prices. Contrary to the evidence post-1870, this was true even for nations on inconvertible monetary regimes, where the contribution of nominal exchange rate adjustments was still only 63 per cent as large as that of relative price adjustments.

In conclusion, notwithstanding the pervasiveness of barriers to exporting specie until the mid-nineteenth century, in practically all nations nominal rigidity did not stand in the way of real exchange rate adjustments, consistent with Hume's dismissal of the effectiveness of capital controls and his model of balance of payments adjustment.

Conclusion

From early on, precious metals were adopted as currency because their properties made them ideal to solve the triple functions of money – unit of account, means of payment, and store of value. However, these same properties made money a tempting target for bankrupted sovereigns, who resorted to debasements as a straightforward way of raising funds – straightforward but not painless, as the loss of metallic content of coins led inevitably to higher prices of goods and services in terms of the debased unit of account, in other words, inflation.

The fact that precious metals had value both as money and as commodities also limited what sovereigns could get away with because of arbitrage. An integrated European market for bullion from the eighteenth century

onwards further constrained policy choices, so long as bullion flows were allowed.

In our story, commodity moneys eventually went global and helped convey intercontinental trade, particularly silver, that became the linchpin between America, Europe, and Asia. Since not all regions of the world used the same monetary commodities, this led to the rise of the foreign exchange market, initially for bullion and later for bills of exchange, a more efficient form of international currency. But money did not only fulfil a passive role of facilitating international trade: it also conditioned how trade imbalances were corrected. Consistent with David Hume's mid-eighteenth century model, we conclude that the widespread use of commodity moneys prevented an adjustment via exchange rates. The rebalancing act came mostly through domestic price corrections.

Many of the strands of early modern monetary history – monetization (debasement), inflation, FX market, monetary flows compensating for trade imbalances, and current account adjustment – sound remarkably relevant to today's world and that is not by chance. The history of money in the eighteenth and nineteenth centuries followed the rising trends of international trade and financial integration – what came to be known as 'globalization'.

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